Faculty of Education
The dissertation is submitted for the degree of

Doctor of Philosophy

Dialogic teaching for students with conditions within the autism spectrum

Ana Laura Trigo Clapés

Homerton College

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Declaration

This dissertation is the result of my own work and includes nothing which is the outcome of work done in collaboration except as declared in the Preface and specified in the text. I further state that no substantial part of my thesis has already been submitted, or is being concurrently submitted for any such degree, diploma or other qualification at the University of Cambridge or any other University or similar institution except as declared in the Preface and specified in the text. It does not exceed the prescribed word limit for the Education Degree Committee.
Dialogic teaching for students with conditions within the autism spectrum
Ana Laura Trigo Clapés

Abstract

This investigation contributed pragmatically and theoretically to the current knowledge of practices that support autistic students in mainstream schools. It focused on the support of the participation of verbal autistic students in formal class activities in mainstream classrooms. This is a relevant topic for investigation due to the growing number of autistic students attending mainstream classrooms in England and reports suggesting they often experience sensory, social and understanding difficulties in this context. Autistic students' social difficulties are frequently salient, hindering their engagement with class activities.

As part of this investigation, a set of teaching strategies that could facilitate the participation of autistic students in formal class activities was created to address this issue. These strategies were based on empirically tested ones commonly used as part of dialogic teaching. Dialogic teaching represents a pedagogical approach and stance towards learning that recognises the crucial role of language and social interactions in development and learning. It was deemed as a beneficial pedagogical approach because it promotes a safe class environment in which all voices are valued and makes the class goals and participation expectations explicit for all. Accordingly, this approach can promote openness to different views and forms of participation and provide guidelines for the students’ participation. However, dialogic teaching mainly considers non-autistic cognition and communication, representing a theoretical gap in the literature. Therefore, consistent with the neurodiversity perspective that framed this investigation, these dialogic strategies were adjusted to the communicative characteristics of autistic students drawing on evidence-based practices for supporting autistic individuals.

A design-based approach was adopted because it enabled me to create and iteratively test and refine the strategies based on current literature and my collaborations with teachers in mainstream classrooms in England. This approach also permitted the simultaneous development of an underpinning practical theory for
the created strategies in the form of design principles. The principles and strategies comprised a design framework that I designed, tested and refined throughout four design cycles. These cycles involved: 1) the development of a prototype of the framework based on literature (Cycle 1), 2) the trial and refinement of the framework in a multiple-case intervention study in which three teachers from different schools put the framework’s strategies into practice in their mainstream primary school classrooms that included one autistic student each (Cycles 2 and 3); and 3) the creation and implementation of a self-paced online professional development course in which 11 teachers took part (Cycle 4).

The in-depth analysis of class interactions, teachers’ interviews and feedback obtained in the online course led to the creation of a design framework comprised of 11 design principles and 39 associated strategies. These support teachers’ planning of accessible class discussions for autistic students and guide their contingent support to these students’ participation. The findings of this investigation highlight that class discussions can be accessible if discussions are explicit and teachers conduct them in response to the students’ capabilities and promote accessible ways of participation.

**Keywords:** autism spectrum conditions, autistic students, mainstream classrooms, primary school, dialogic teaching, design-based approach, classroom discourse analysis, interpretative phenomenological analysis
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I am immensely grateful to the participants of this study, including the primary schools’ head teachers, teachers, students and their parents, for participating in the different stages of this investigation. I understand how confronting being observed may be. Thanks for allowing me to learn in collaboration with you. This research would have been impossible without you.

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<td>ADSA</td>
<td>Adjusted Dialogic Strategies for Autistic students</td>
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<tr>
<td>ALI</td>
<td>Autism Language Impaired</td>
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<tr>
<td>ALN</td>
<td>Autism Language Normal</td>
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<tr>
<td>APA</td>
<td>American Psychiatric Association</td>
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<td>ASC</td>
<td>Autism Spectrum Conditions</td>
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<td>ASD</td>
<td>Autism Spectrum Disorders</td>
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<td>BERA</td>
<td>British Educational Research Association</td>
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<td>CA</td>
<td>Communicative Act</td>
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<td>Communicative Event</td>
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<td>DBR</td>
<td>Design-Based Research</td>
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<td>DFE</td>
<td>Department for Education</td>
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<td>DSM</td>
<td>Diagnostic and Statistical Manual of mental disorders</td>
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<td>EBP</td>
<td>Evidence-Based Practices</td>
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<td>EHCP</td>
<td>Education Health and Care Plan</td>
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<td>EoC</td>
<td>Ethnography of Communication</td>
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<td>GDPR</td>
<td>General Data Protection Regulation</td>
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<tr>
<td>ICD</td>
<td>International Classification of Diseases</td>
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<td>IPA</td>
<td>Interpretative Phenomenological Analysis</td>
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<tr>
<td>NPDC</td>
<td>US National Professional Development Center on ASDs</td>
</tr>
<tr>
<td>PD</td>
<td>Professional Development</td>
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<tr>
<td>QES</td>
<td>Quasi-Experimental Study</td>
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<td>RCT</td>
<td>Randomised Controlled Trial</td>
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<td>Single-Case Experiment</td>
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<td>SENDCo</td>
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1 Introduction

There is an ongoing increase in the rate of placement of students diagnosed with autism in mainstream schools in the UK (Department for Education [DFE], 2019). Autism, according to diagnostic manuals, is a spectrum of neurodevelopmental disorders\(^1\) that are associated with deficits in social communication and interactions and repetitive and restrictive behaviours and interests, including hypo or hyperreactivity to sensory inputs (American Psychiatric Association [APA], 2013). In many cases, autism is also associated with intellectual disability and limited verbal communication or language impairment (Fletcher-Watson & Happé, 2019; Tager-Flusberg et al., 2005). Most autistic students in mainstream classes do not have ‘significant’ cognitive or language delays. Therefore, they are considered ideal candidates for mainstream education (Waddington & Reed, 2017). However, many of these students struggle to cope in mainstream classrooms (Saggers et al., 2011). They frequently face negative social experiences, such as isolation and rejection by their peers, misunderstandings due to implicit rules or complicated directions and sensory overload (Betts et al., 2007; Choi & Nieminen, 2008; DFE, 2010). The difficulties experienced by autistic students can limit their engagement in class activities. Accordingly, there is a need for teaching strategies that support their engagement in those activities.

I suggest it is particularly relevant to facilitate their participation in activities that require interaction with others. Teachers of mainstream classrooms mainly teach through the spoken word and often ask students to contribute verbally to the class or to collaborate with others. If students have difficulties understanding these exchanges and feel left out or overwhelmed, they may miss out on relevant information (including subject matter content, indications, or classmates’ contributions). They may also lose the opportunity to engage in enriching discussions. I highlight the latter in the light of research on classroom talk, which indicates that students’ participation in a dialogue that involves exchanges of ideas, scaffolding among peers, teacher feedback and co-construction of meaning is

\(^1\)Hence the widely used term autism spectrum disorders and the acronym ASD (APA, 2013).
associated with effective learning for students and improvements in critical thinking (Howe & Abedin, 2013; Wells & Mejia-Arauz, 2006).

In many educational contexts, interventions are prioritised that foster positive social interactions and communication due to the difficulties commonly associated with autism (Prizant et al., 2003). Due to the definition of autism as a disorder, some of these interventions encourage changes to autistic individuals' behaviours or increased frequency of behaviours conventionally interpreted as indicating social motivation (Mottron, 2017). Nevertheless, research that has been developed with the autistic community challenges the vision of these behaviours as deficits. In one case, by conceptualising autism as a normal human difference (adopting a neurodiversity perspective), this research acknowledges that autistic individuals have ways of socialising and communicating different from those of non-autistic people (Silberman, 2016). In another case, some researchers criticise evaluating autistic individuals’ communication solely through consideration of their cognitive or linguistic competence without pondering the contingencies of the interactions in which they participate (Sterponi & de Kirby, 2016). I suggest that interventions should explore how autistic students communicate and create accessible opportunities to engage with others accordingly.

My investigation was inspired by my experience of supporting young autistic individuals and researching dialogic interactions and classroom talk. As part of my undergraduate studies in Mexico City, I collaborated as a therapist in a psycho-pedagogical programme for children and young people diagnosed with Asperger Syndrome\(^2\). In my interactions with a group of young, verbal, autistic individuals (11 to 18 years old), I noticed that they could engage in dialogic interactions when I facilitated them. As part of my undergraduate dissertation, I described how they interacted in sessions in which I promoted dialogic interactions, providing special guidance and establishing rules for talking (Trigo-Clapés, 2016). These findings motivated my MPhil investigation, which involved exploring how students with high autistic-like traits participated in class activities in a mainstream primary-level

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\(^2\) Diagnostic category previously included in APA’s (2000) DSM-IV (now rescinded from APA’s current manual), characterised by qualitative disturbances in social interactions, repetitive behaviour and interests.
classroom in the UK. I discovered that certain factors promoted their participation but that there were limited opportunities for them to engage in discussions (Trigo-Clapés, 2017). Based on these experiences, I sought to investigate how teachers could create accessible opportunities for autistic students in mainstream classrooms to participate in class activities.

Specifically, I proposed developing teaching strategies based on those used in dialogic teaching and adjusting them to the students' communicative characteristics. Dialogic teaching encourages dialogue among teachers and students through which they can collectively construct common knowledge (Alexander, 2008). I suggest that dialogic teaching can benefit autistic students for two reasons: one, it promotes productive educational dialogue; and two, for students who prefer direct instruction, it provides explicit goals, communication guidelines and opportunities to discuss concepts and instructions openly. However, current dialogic pedagogies and their underlying theories of learning do not consider autistic cognition and communication and are focused on spoken interactions.

I identified a theoretical and practical gap in the field related to promoting accessible dialogue for all students, particularly autistic students. Accordingly, I set out to investigate the following: how can dialogic teaching strategies adjusted to autistic students' communication characteristics support their participation in activities that involve interaction with others? I focused on the participation of verbal autistic students in mainstream primary schools. Therefore, I invited three classrooms from different primary schools in England to take part in an intervention study.

I adopted a design-based approach to develop a design framework that comprised theoretically based principles and adjusted dialogic teaching strategies that can guide teachers' support of autistic students in class discussions. The iterative nature of this approach enabled me to develop, test, evaluate, and refine this framework, drawing on previous research (on evidence-based practices (EBPs) for the support of autistic students and dialogic pedagogies) and direct engagement with the research setting (Cobb et al., 2003). Through four design cycles, I created four versions of the framework. The first cycle involved the creation of Design
Framework 1 based on literature, baseline data from three primary school classrooms and the teachers' opinions. The second and third cycles formed part of an intervention study in these classrooms. During the intervention, the participating teachers tested the frameworks' strategies in their classrooms over two trial periods, during which I videotaped some of their lessons. The analysis of the class interactions and the participating teachers' input led to the creation of Design Framework 2. The fourth cycle involved the rearrangement of the principles of Design Framework 2 to clarify them. This process led to the creation of Design Framework 3. I evaluated this third version of the framework via the development and delivery of an online, self-paced, professional development course, and I created Design Framework 4 based on the feedback shared in the course.

This dissertation details the underpinnings, design, implementation and findings of this investigation and consists of 10 chapters. In Chapter 2 I present the literature review I conducted for this investigation, highlighting its theoretical underpinning and the gaps I identified in the literature. I divided it into three sections: autism and autistic students' school experiences, the conceptualisation of inclusion, and dialogic teaching as a means for inclusion. In Chapter 3, the rationale for carrying out this investigation, the aims and research questions that guided the study's design, and the underpinning methodological framework are explained. In Chapter 4, the method is outlined. The study's design is described, with ethical considerations, data collection and analysis procedures, and instruments I used in the four design cycles.

Chapters 5, 6, 7, and 8 contain the intervention study and online course results. In Chapter 5 I delineate the development of Design Framework 1 based on literature, the baseline data I gathered and how these and the teachers' opinions helped to enrich the framework. Chapter 6 carries the findings from the class observations during the intervention study (these comprised design cycles 2 and 3) and how they led to the creation of Design Framework 2. First, I describe the strategies implemented by the three teachers to facilitate their autistic students' participation. Second, I outline the common behaviours I observed in the three autistic students. Third, I characterise the findings for each classroom. Chapter 7 contains the results of the comparisons between the baseline and post-intervention
observations for each classroom. In Chapter 8, Design Framework 3 is introduced, its evaluation through the implementation of an online course is explained and I describe the creation of Design Framework 4.

In Chapter 9, I discuss how the findings answered the research questions and the limitations of this investigation. I offer suggestions for future research. Finally, Chapter 10 includes concluding thoughts.

As a result of this investigation, I developed a design framework that comprised 11 design principles and 39 strategies to support teachers' planning of accessible discussions and to guide their contingent support of autistic students' participation during those discussions. I also developed an online, self-paced course for practitioners that introduces the design framework. The findings of this investigation highlight that class discussions can be accessible when discussions are explicit and when teachers conduct them in response to each student's capabilities and promote accessible ways of participation.
2 Literature review

2.1 Introduction

This chapter presents the literature I reviewed and the findings which underpinned this investigation. It covers three central topics: autism, inclusion, and dialogic teaching. I address these topics in three sections, in which I define key concepts and theoretical proposals, findings from empirical research and my position concerning the literature reviewed.

First, I define and describe the condition of autism and provide information regarding the placement of autistic students in mainstream educational contexts. I refer to the disability models that have shaped the conceptualisation of autism, the communication characteristics associated with it and common school experiences that autistic students report. Second, I introduce the concept of inclusion and describe the conceptualisation and approach to inclusive pedagogy that I adopted in this study. Third, I characterise dialogic teaching. I present some of its theoretical underpinnings, key concepts and empirical findings. I delineate how this pedagogical approach can benefit autistic individuals and the need for its adjustment to address autistic students' neurodiversity. Finally, I describe how the literature discussed in this chapter inspired this investigation.
2.2 Autism and autistic students’ school experiences

2.2.1 Introduction

In this subsection, I describe autism and the characteristics that are commonly associated with it. I also refer to the placement of autistic children and young people in mainstream educational contexts in England (according to the DFE, 2019). I aim to highlight how the conceptualisation of the condition impacts how practitioners help autistic individuals. I also stress why teachers' practices should consider the students' communicative characteristics and preferences. I focus on teaching in mainstream contexts because this study aimed to develop forms of support for students placed in regular primary school classrooms.

I discuss the influence of different disability models on the conceptualisation of autism. I indicate the conceptualisation that I consider beneficial for planning educational support for autistic students. Next, I characterise the communication profiles that are associated with autism and how they can be related to autistic students' difficulties in educational contexts. Then, I refer to the current placement of autistic students (five- to 10-year-olds) in mainstream classrooms in England and the usual experiences and challenges that these students face in these contexts. Finally, I discuss the concept of EBPs, which is a term used to refer to empirically tested strategies that are considered to support autistic individuals effectively and on which I drew for this investigation.

2.2.2 Descriptions of autism associated with different disability models

Traditionally, the literature attributed the first descriptions of Autism to the work of psychiatrists Leo Kanner (1943) and Hans Asperger (1943). Kanner described the behaviour of children with 'autisticaloneness', who were characterised as having problems with social communication, understanding words in a literal and inflexible manner, obsessive interests, repetitive behaviours, and learning difficulties. In the same year, Asperger described children who found social interactions a challenge, exhibited unique sets of interests and were resistant to change but showed no significant delays in language development or cognition. However, recent literature
recognises that 20 years earlier, Grunya Sukhareva (1925) was the first academic psychiatrist to delineate clinical portraits of six autistic boys (see Sher & Gibson, 2021). As part of her description, she emphasised the talents of her case studies and pointed out the boys' tendency towards automatism (e.g., sticking to tasks) and sensitivity to noise. She also delineated sex differences in autistic symptoms that current literature is only now starting to recognise (see Section 2.2.2.1). Lorna Wing, also a psychiatrist, contributed later to the characterisation of autism by identifying a triad of associated impairments: patterns of social interaction (that showed a social typology of aloof, passive and active-but-odd), communication and imagination. She suggested the existence of an autistic spectrum and proposed diagnostic criteria for the conditions described by Kanner and Asperger (Watts, 2014; Wing, 1981). Following Wing’s characterisation, other researchers published different explanatory models to describe autism, including cognitive (e.g., details-focused attention) and genetic explanations of its characteristics (e.g., Bailey et al., 1995; Baron-Cohen et al., 1985) and later, accounts from autistic people started to shape its conceptualisation.

These descriptions are tightly associated with the disability models to which their advocates are or were aligned. A medical framework influenced the first accounts because autism was considered a disorder. However, now, autism is more widely recognised as a neurodevelopmental condition that is associated with various manifestations (Happé & Frith, 2020). It is mainly diagnosed based on behavioural features. Nevertheless, it appears to be rooted in genetic factors (many common genetic variants contribute to it) and is related to different cognitive mechanisms that underlie similar behaviours in autistic and non-autistic individuals (Fletcher-Watson & Happé, 2019). Due to the influence of disability models in autism’s definition, I describe briefly below the models that have impacted its conceptualisation since its conception (and the associated assumptions). I also delineate the approach I adopted for this study.

2.2.2.1 The medical model

The medical model is focused on individual pathology. It aims to prevent or cure disability (Marks, 1997). It takes for granted certain assumptions about normality in
behaviour and level of ability and pathologises any deviation from those. It locates deficits and functional impairment within the people who show differences in behaviour and suggests that these cause disability directly (Kapp, 2019).

Autism was initially described under this paradigm. The influential descriptions made by Kanner and Asperger conceived autism as a disorder, and this led other authors to work on refining the symptoms of the condition through the adoption of a deficit model of behaviour interpretation. The growing interest in characterising and identifying the disorder encouraged the World Health Organization (WHO) in 1979 and the American Psychiatric Association (APA) in 1980 to include autism as an independent disorder in their diagnostic manuals (i.e., the ninth edition of the International Classification of Diseases (ICD-9) and the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III)).

The current edition of the APA’s (2013) diagnostic manual (DSM-5) defines autism with the following symptoms:

- difficulties in social communication and interaction, including problems in non-verbal communication, socio-emotional reciprocity and developing relationships; and
- restrictive and repetitive behaviours, activities and interests.

Difficulties with imagination, empathy and the ability to represent mental states, and understanding others' thoughts and feelings as different from their own, are also associated with autism (Symes & Humphrey, 2010; Walker & Berthelsen, 2008). Based on the identified difficulties, most of the scientific community regarded autism as a neurodevelopmental disorder or an aberrant development of the brain and its functions that are due to multiple non-genetic and genetic causes (Moy & Nadler, 2008).

Language disorder was central to the early definitions of autism, as illustrated in APA's DSM-III (e.g., “gross deficits in language development”, 1987, p.89). Nevertheless, researchers and clinicians recognised this aberrant neurodevelopment
in conditions that did not display a significant delay in cognitive and language
development (Happé & Frith, 2020). Asperger Syndrome\(^3\) was an example of the
latter. These conditions remain associated with clinically significant impairment of the
individual’s social and occupational activities. The heterogeneity of the autistic
conditions that shared their main characteristics supported the idea that there was a
spectrum of autistic disorders. Accordingly, APA’s DSM-V adopted the official
terminology of autism spectrum disorders (ASD) to prevent a lack of consistency in
the diagnosis of these conditions. ASD characterises autistic conditions with a wide
range of abilities, disabilities and needs (Walker & Berthelsen, 2008). Currently,
there is growing interest in the under-diagnosis of women, which is underpinned by
research that suggests that they may be better than men at masking their difficulties
(Hull & Mandy, 2017). This latest research contributes to the diversity that is
associated with autism, which was initially considered by some to be present mainly
in males and to involve a higher drive to systematise than to empathise (e.g., Baron-

Overall, the medical model endorses the assumption that autism is a brain
development disorder characterised by biologically derived functional deficits. It
suggests that practitioners should research, categorise and change or cure these
deficits to help autistic individuals to live ‘normally’ or to prevent autism (Jaarsma &
Welin, 2012). Although this model has significantly advanced our understanding of
autism, it perpetuates the idea that disabled people must give up autonomy and
depend on others when making life decisions (Kenny et al., 2016).

In response to these assumptions, autistic and non-autistic scholars and
advocates have challenged the medical model in the 21\(^{st}\) century (e.g., Dawson et
al., 2007; Milton, 2012). The main criticisms include its overfocus on deficits, the
pathologisation of neutral or positive differences and its fleeting (or null)
consideration of autistic individuals’ voices and the societal and interpersonal factors
that contribute to the challenges they experience (Kapp, 2019; Pellicano & den
Houting, 2022). Additionally, there has been no confirmation that there is a universal,

\(^3\) Asperger Syndrome was a diagnostic category that was included in APA’s (2000) DSM-IV. It was
also characterised as involving qualitative disturbances in social interactions, repetitive and
stereotyped behaviour, interests and activities. It has been rescinded from the current APA manual.
biological explanation for autism’s core ‘anomalies’, and it is difficult to demarcate the boundaries of this diagnosis (Verhoeff, 2015). The latter and other reasons, such as the rise in the number of autism diagnoses, have led researchers to challenge even the autism label itself (e.g., Timimi, 2011). I discuss this briefly in Section 2.2.2.4.

The social oppression and exclusion that are perceived by autistic individuals to be related to a deficit perspective of the diagnosis promoted increased self-advocacy (e.g., Sinclair, 1993). Advocates particularly drew on the disability rights movement and the social model of disability (Oliver, 1990) to approach autism without a sole focus on individual characteristics and to emphasise the impact of societal and environmental factors. This movement led to the creation of a model now known as the neurodiversity paradigm. The social model had a strong impact on this paradigm's development, so I describe below the social model of disability and its claims before I explain the paradigm.

2.2.2.2 The social model of disability

According to this model, impairment and disability can be distinguished (Hughes & Paterson, 1997). The original social creationist approach (or materialist approach; Oliver, 1990) of this paradigm in the UK envisioned impairment as biological (individual characteristics) and disability as socio-cultural (social oppression). It emphasised the disadvantages that people with impairments experience as they face social, economic and environmental barriers to their participation in society (Burchardt, 2004). The model envisages disability as a product of social arrangements and suggests that it can be reduced or eliminated (i.e., the deficit lies within the environment). Accordingly, how autistic people are 'disabled' depends on their condition and how society fails to respond to their needs (Oliver, 1990). Under this paradigm, any intervention is targeted to change social or political factors to lower environmental barriers and to raise levels of understanding (Haegele & Hodge, 2016).

The introduction of this model promoted a radical shift in thinking as it discarded an individualist understanding of disability and emphasised the impact of
the broader context on disabled people’s lives. For example, the approach of critical disabilities studies to this model highlighted how the perception and level of disability were related to the loading of a medical condition with social meaning and symbolism (Goodley, 2011). Therefore, striving for social justice also involves psychological, cultural and discursive factors (Meekosha & Shuttleworth, 2009). Accordingly, this model’s advocates have encouraged the use of language that promotes autonomy and creates positive identities for disabled people (Kenny et al., 2016). One proposal has been the use of person-first language, in which the individual is referred to first, and then the disability. However, members of the disability community consider that this language maintains a negative view of disability. It prevents individuals from taking pride in something that represents a part of their identity and undermines any positive characteristics (Dunn & Andrews, 2015). In autism research, the influence of the social model of disability encouraged academics to problematise the use of medical labels. An example of this is the term autism spectrum conditions (ASC), which Baron-Cohen (2010) has adopted for most of his research. He argues that the word condition (instead of disorder) acknowledges that the cognitive differences associated with autism may sometimes result in talents and that other aspects of autism contribute to the challenges that autistic people experience.

The social model can be liberating for disabled people because it avoids a deficit perspective and pushes for positive social change. However, scholars have suggested that it provides only a half-truth. Shakespeare (2013), an influential academic in the field of disability, has criticised three specific aspects of this model. He argues that it is difficult to separate social and biological factors in everyday life; that the model downplays the impact of impairment in people’s lives; and that the removal of every obstacle and the creation of a barrier-free environment for all is impossible. Shakespeare argues that these issues have significant consequences for the provision of support for disabled people. By claiming that only social barriers cause disability, the model rejects the adoption of impairment-specific approaches or rehabilitation, and such rejection may leave individuals’ needs unaddressed. Many people experience impairment as difficulty or limitation (although it can sometimes lead to opportunity), and it cannot be attributed solely to social factors (e.g., learning difficulties).
To address these issues, Shakespeare (2013) proposes an interactional or critical realist approach to the social model of disability that emphasises different causal levels. According to this approach, disability emerges from the interplay between intrinsic (impairment, personality, qualities, and attitudes) and contextual factors (attitudes of others, the extent to which an environment is enabling, and socio-cultural and economic issues). Through this approach, Shakespeare highlights that interest in the removal of social barriers does not imply neglect of intervention. I suggest that this position can best inform the neurodiversity paradigm, because it promotes the support of individuals to address their needs while recognising the potentially disabling impact of the environment and others’ behaviours on people’s lives (see Section 2.2.2.3). I refer to this approach again in Section 2.3.2 to describe how it may inform the support of autistic students in educational contexts.

2.2.2.3 The neurodiversity paradigm

The central claims of the neurodiversity paradigm are that neurodivergent conditions are not disorders; rather, they are valuable and natural human neurocognitive variations (Hughes, 2021). The model rejects the notion that divergence from the norm (in the development of brain structure or function) is a flaw and it states that typical development is neither superior nor inferior to the atypical. Steve Silberman (2016) describes this paradigm in his book NeuroTribes as “the notion that conditions like autism… …should be regarded as naturally occurring cognitive variations with distinctive strengths that have contributed to the evolution of technology and culture rather than mere checklists of deficits and dysfunctions” (p.17). In autism research, the paradigm seeks to demedicalise the condition. Although its advocates underpin the arguments of difference with biologically or neurologically grounded models (which they co-opt from a medical framework), they aim to replace the view of autism as a disorder with that of a difference, to avoid medicalised terms and to highlight the need for social responses.

This paradigm emerged due to efforts to challenge the deficit model by the neurodiversity movement, led by the autism community in the 1990s. They drew on the term ‘neurodiversity’ that had been coined by Judy Singer in 1998 to explain
autism as a normal human difference that is associated with atypical neurological development (Jaarsma & Welin, 2012). Singer used this term in a bid to add the concept of neurological difference to the disability categories that were recognised by governments and to contribute to disability rights theory. The foundation essay by the autistic advocate Jim Sinclair (1993), entitled ‘Don’t mourn us’, also helped to set the basis for the movement. Sinclair sought to promote autistic people’s self-acceptance, and to that end, he invited the parents of autistic children to embrace their children’s differences and attempt to meet their needs. The neurodiversity movement demands that society recognises, values and accepts autism and other neurodivergent conditions (e.g., dyslexia), and that it confers rights on autistic people. It aims to develop a culture in which autistic people are proud to identify themselves as part of a minority group that socialises, communicates and senses in ways that are different from others and that are not necessarily disadvantageous (Ortega, 2009). This conceptualisation celebrates autism, recognises support needs and highlights various skills across the spectrum (Bottema-Beutel et al., 2021). It challenges the simplistic conception of a spectrum that ranges from low- to high-functioning.

The supporters of this movement explain that autism is inseparable from the person; the person-first phrase ‘person with autism’ appears to imply that it can be separated. Therefore, people in the neurodiversity movement prefer to speak of ‘autistic people’. Consistent with this view, a study by Kenny et al. (2016), in which the authors surveyed 3,470 members of the UK’s autism community, showed that more autistic adults and their parents used the word ‘autistic’ than did professionals (who reported using person-first terms). People close to the condition were more comfortable describing themselves or family members in ways that placed autism as a characteristic part of the person than were those who worked with autistic people.

Advocates of the neurodiversity paradigm adopt the social model of disability and suggest that the inaccessibility of social and political infrastructures is strongly

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4As Kenny et al. (2016) point out, the terms ‘low-functioning’ and ‘high-functioning’ autism have not appeared in a diagnostic manual. They are colloquial conventions that refer to intellectual or verbal ability and level of apparent social and everyday capabilities.

5The UK’s autism community includes autistic people, their family members and friends, and professionals.
related to the disability that autistic people experience (Kapp et al., 2013). Thus, while this paradigm recognises the biological nature of this condition (without considering it a deficit), it highlights the disabling effects that can be caused by the interaction between the context and individual factors (Pellicano & den Houting, 2022). However, as I described in Section 2.2.2.2, how practitioners and activists approach the social model of disability impacts the goals of the support that is provided under the neurodiversity paradigm. For example, if the materialistic approach (Oliver, 1990) is adopted, it is assumed that physical and social environments cause disability in cases in which they do not accommodate autistic individuals’ characteristics. This view removes the stigma of having a deficit (especially for autistic people without cognitive delay). Nevertheless, it can also seem problematic for people within the spectrum who have intellectual disabilities or who experience more challenges in their everyday lives because some assume that this stance is incompatible with the provision of specialised support (McGeer, 2004).

The concern expressed above shows the challenges that occur due to the heterogeneous difficulties and strengths that people within the spectrum experience. First, some autistic people and their parents criticise the unrepresentativeness of the autistic voices that inform the neurodiversity movement (Russell, 2020). They claim that the movement mainly comprises ‘less impaired’ individuals who do not represent and, therefore, should not speak for individuals with more severe problems. Second, there is a lack of consensus regarding what is disabling or the impairment, if any, that is associated with autism (Hughes, 2021). For example, one view suggests that disability emerges due to social barriers (as described above), and another perspective proposes that co-occurring conditions that are separate from autism are the cause of disability (e.g., epilepsy or anxiety, see Walker, 2014).

Shakespeare’s more nuanced account of the social model, his relational approach (see Section 2.2.2.2), can be used to address the different concerns that are associated with the challenges experienced by autistic individuals. In this model, disability is said to result from the interaction of internal and contextual factors. Therefore, it permits recognising advantages and disadvantages within the spectrum and the idea that the magnitude of the latter depends on both kinds of factors. I suggest that, under this perspective, the neurodiversity paradigm may achieve its
goal of recognising and respecting differences while ensuring the development of adequate support (Fletcher-Watson, 2018). The latter may involve the treatment of co-occurring conditions (which are not necessarily representative of the condition) or mitigation of the weaknesses associated with autism (e.g., improving access to reliable communication on essential services) (Happé & Frith, 2020; Russell, 2020).

The neurodiversity paradigm also sets the goal of promoting of the participatory co-design and co-production of research with the autistic community, and a focus on their priorities (Pellicano & den Houting, 2022).

2.2.2.4 The conceptualisation for this study

This study aligned with the neurodiversity paradigm and took a relational approach to the understanding of disability. Consistent with this perspective, I adopted the definition of autism as a lifelong neurodevelopmental condition that has a spectrum of manifestations and co-occurring mental-health difficulties (Happé & Frith, 2020). I consider it essential that the conceptualisation of autism includes its unique characteristics and the sometimes debilitating difficulties that are related to intrinsic and contextual factors. I chose to use the term 'autism spectrum conditions' (ASC) and the label 'autistic students'. Removal of the label 'disorder' avoided the stigmatisation of the identified differences as disorders and instead characterised them as individuals' fundamental ways in which they related to the world and as possibly desirable and enabling features that were associated with autism. Reference to the vulnerability related to different forms of thinking helped to recognise the need for support.

This perspective permitted me to consider the cognitive and behavioural characterisation of autism that emerged from a medical framework under a lens that avoids a deficit perspective. It represents a multifactorial account that encourages the understanding of behaviour as the result of the interaction between individual characteristics and social and physical environments. It also recognises the vast diversity of ways in which people may engage with the world. With this view, I aimed to observe behaviours that sometimes are perceived as deficits; to identify their function (e.g., they may help students to understand an activity); and to understand
how they may reflect alternative forms of engagement with the environment. It also enabled me to understand whether specific contextual factors promoted these behaviours, how others perceived them, and the environment’s impact on the challenges experienced by autistic students. If teachers learn to recognise how students engage with the environment, they can identify students’ strengths and capitalise on them (consistent with a strengths-based educational approach, e.g., Lopez & Louis, 2009). Then, they can address students’ specific needs or challenges by personalising their teaching and adjusting the environment correspondingly.

I propose that this conceptualisation can guide the creation of innovative, inclusive practices tailored to autistic students’ characteristics. It rejects the view of autism as a curable condition and the expectation that autistic students’ behaviour will become wholly normalised after interventions in school. I suggest that teachers’ adoption of this conceptualisation could impact their attitudes toward teaching autistic students. If teachers are aware of potential differences and identify their students’ specific characteristics and strengths, they may interpret their students’ behaviour accordingly. Characterisation of different traits that may be associated with ASC can guide the adjustment of the curriculum, a school’s physical and social environment (including forms of communication) and instructional practices. I describe in Section 2.3.3 how the approach I adopted in this study informed my perspective on inclusion and specialised pedagogies.

As part of this study, I drew on the diagnostic criteria of autism and the characterisation of communication and thinking in autism to delimit the potential characteristics and behaviours I could observe among autistic students. I considered criteria that the ICD-10 and DSM-5 had in common: difficulties in reciprocal social communication and interaction (e.g., initiating and sustaining conversation or integrating spoken language and non-verbal cues) and restrictive and repetitive patterns of behaviour, interests or activities (APA, 2013; WHO, 2016). As Hughes (2021) suggests, the criteria represent the closest we have to a standard working definition of autism, and they reflect current scientific and clinical thinking. I considered them to be hypotheses (rather than evidence of a disorder). However, some researchers have criticised the diagnosis. For example, Timimi (2011) challenges its validity, highlighting three reasons. These are the significant rise in the
numbers of people being diagnosed with autism; the lack of a single, clear genetic or biological brain-based evidence that underpins it; and the absence of methodologically sound and replicated research that confirms that specific interventions differentially help autistic individuals.

Consistent with the first reason, a population-based study by Russell et al. (2022) that was based on information kept on the clinical practice research datalink primary-care database showed that the number of autism cases diagnosed between 1998 and 2018 rose by 787% in the UK. It suggests that the increased reporting and application of diagnosis and the rise in the numbers of women, adults and less-impaired individuals who had been diagnosed have influenced the figures. Nevertheless, the study also found that it was difficult to determine whether cases increase and in which age groups, gender, or with which characteristics, because different studies measure autism inconsistently. These results reflect the issues that arise due to the broadness of autism’s diagnosis criteria and the lack of clarity regarding the underlying conditions of individuals diagnosed with autism. In response to this study, Frith (in Gibbons, 2021) suggest that the broadness of the diagnosis limits the predictions of individual needs and our understanding of how autism occurs. Timimi and McCabe (2016) have put forward a more radical view; they propose that the diagnosis has become a catch-all metaphor that aims to include a disparate range of behaviours that are assumed to indicate a lack of social and emotional competencies believed to be necessary for our current neoliberal societies. For example, boys may be caught in cycles of progressive alienation if they struggle to uphold society’s valued traits of masculinity – lower levels of empathy compared with girls or high physical prowess.

Happé and Frith (2021) argue that, although current techniques do not offer reliable evidence of qualitative differences in brain structure or replicable evidence of differences in brain function, there are differences at a cognitive level between autistic and non-autistic people. They refer to the following qualitative and quantitative differences, which are supported by 30 years of research on cognitive theories of autism (e.g., Frith, 2012; Frith & Frith, 2021).
• Autistic individuals show non-automatic or explicit mentalising; they make inferences about their own and others’ states of mind through compensatory processes (see Theory of Mind in Section 2.2.3.3).
• Autistic people appear to pay attention preferentially to parts rather than wholes in all sensory modalities (detail-focused strategy; see weak central coherence theory in Section 2.2.3.3).

The diagnosis of autism is based mainly on behavioural traits. Even when others display similar behaviour, this different cognitive style and forms of experiencing and processing the social and physical environment underlie the behaviour associated with autism (Chown & Leatherland, 2021). I suggest that these underlying differences support the use of specialised support and should inform teachers’ perceptions of autistic students' behaviours and the difficulties they experienced in school.

I argue that a unitary diagnosis is valuable to explain experiences of difference; it acts as a rallying point for political action and has a positive role as it enables allocation of services and resources (e.g., a diagnosis in an educational context confirms that a real difference exists and that the student needs classroom assistance) (Milton, 2016; Russell, 2020; Shakespeare, 2013). Nevertheless, I acknowledge the wide variety of preferences, needs and experiences of autistic individuals. Therefore, I aimed to complement the usual description of autism with the characteristics I observed from specific individuals and the impact of different contextual factors on their behaviour and the challenges they experienced. This was my way of addressing the heterogeneity within the spectrum. I also focused on the characteristics of verbal individuals who attended mainstream schools. Ideally, as pointed out by Frith (in Gibbons, 2021), further research will enable the creation of more specific categories within the spectrum and the corresponding supports that each category requires. Additionally, in my adoption of a neurodiversity perspective with a relational and strengths-based approach, I challenge the idea that an autism label reduces the chances that individuals will be accepted or noted for their strengths.
Consistent with my interest in students' participation in discussions, I focus in the following section on describing the communication characteristics usually associated with autism. I suggest that it is relevant to characterise associated communication styles because formal schooling typically involves verbal encounters orchestrated by teachers (Edwards & Westgate, 1994). (Due to the medical model's influence on the development of autism research, I refer to some of the difficulties identified by previous research as part of the characterisation of communication in autism.)

2.2.3 Communication characteristics associated with autism

Many autistic people experience difficulties communicating with others (e.g., Moore, 2016). For this reason, in educational and clinical contexts, the most critical priorities are regarded to be obtaining information and developing treatments that are focused on increasing communication and socio-emotional abilities (Prizant et al., 2003). However, individuals with ASC have a noticeable heterogeneity in language development and ability, which practitioners should consider when they develop educational approaches for these students. I describe in the following subsections the general characteristics related to language development, pragmatic language and communication in school interactions associated with autism.

2.2.3.1 Language development

Acquisition of language takes longer for most autistic children than it does for their non-autistic peers. Difficulties in comprehension, processing of meaning, expressive phonology and grammar are frequent in early childhood (Boucher, 2012). The early articulatory and syntactic problems tend to resolve throughout development, but some morphological errors (omission or substitutions of prepositions, articles or conjunctions) and anomalies in comprehension, semantics and processing of meaning may persist (Mottron, 2004). In other cases, children do not acquire language and present low, non-verbal intellectual coefficients (Tager-Flusberg et al., 2005).

Tager-Flusberg and Joseph (2003) delineated two language phenotypes that they associated with autism, autism language normal (ALN) and autism language
impaired (ALI). They identified ALN in autistic children who displayed normal-range linguistic abilities, including phonological skills, vocabulary, syntax, and morphology. These children score within the normal range in structural language tests and present standard articulation and average receptive and expressive language. The researchers associated ALI with autistic children who presented impaired language such as that observed in specific language impairments (SLI). These children obtain scores of 1.5 standard deviations below the normative mean on standardised structural language tests, and their development of phonology and syntax is delayed and limited. However, these phenotypes are based on group studies and standardised scores that mask the heterogeneity among individual profiles, with structural language that ranges from minimal verbal expression to near-normal verbal fluency (Boucher, 2012; Norbury, 2013).

Despite these differences, difficulties in higher-order language processing, pragmatic language and social communication occur in the two phenotypes, and these represent the main language characteristics of ASC (Tager-Flusberg et al., 2005).

2.2.3.2 Pragmatic language

Pragmatic language involves using social contextual cues to understand the meaning of others’ expressions (to go beyond what they explicitly state) and to achieve social goals by communicating effectively with others (Norbury, 2013). It is an essential contributor to the development of children’s communicative competence and socio-emotional adjustment. Coplan and Weeks (2009) emphasise its protective role for shy children: they explain that when children recognise that they can interact with others, they feel confident to engage in more social interactions. Similarly, researchers have suggested that if autistic individuals have sufficient social skills, these skills facilitate their language learning or can help them to rely on other developmental skills to compensate for social vulnerabilities (Norbury, 2013).

Most autistic children use language to communicate their needs and to help them to regulate their behaviour (e.g., request objects) through speech, non-specific vocalisations, or using others’ bodies. However, the frequency and quality of
communications to share experiences and interests seem more readily impaired (Clifford et al., 2010). For example, speech acts related to social uses of language occur infrequently among verbal autistic individuals, who also have difficulty listening and following politeness rules (Tager-Flusberg et al., 2005).

Certain general aspects of pragmatic language are commonly associated with the diverse conditions that fall within the autism spectrum, which can limit their social interactions and vary depending on the individual's chronological age, non-verbal IQ and primary mode of communication (Norbury, 2013; Stone & Caro-Martinez, 1990). Some of these aspects are listed below.

- Poor understanding of figurative and metaphorical language.
- Limited inference skills and ability to resolve ambiguities (e.g., homographs).
- Difficulties understanding prosodic information.
- Problems maintaining a topic of conversation.
- The expression of fewer contingent conversational responses than non-autistic peers.

However, the characteristics of social communication depend on the context. For example, Nadig et al. (2010) showed that talking about a topic of particular interest (compared with generic topics) negatively affected the reciprocal verbal exchanges between verbal autistic children and an adult. The topics of interest seemed to elicit automatic, highly practised speech from the autistic children. This demonstrated that certain contextual factors can facilitate autistic children’s engagement in social interactions. This finding also highlights the importance of considering the context and individuals' characteristics when promoting their participation in conversations.

Other language features have been identified to occur more often in autistic people than in those whose development is typical or who show other

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6 Fewer contingent utterances about the topic of conversation and more self-contingent elaborations related to the topic they have introduced.
neurodevelopmental disorders (Austin, 2013; Prizant & Duchan, 1981; Tager-Flusberg et al., 2005; Volden & Lord, 1991). These include the following.

- Repetition of someone else's words or phrases (echolalia). These repetitions appear to have communicative functions for individuals with ASC: they seem to help autistic people to take turns, self-regulate and make requests (Prizant & Duchan, 1981).
- Misuse of deictic terms (self-reference terms such as 'I' and 'you') due to difficulties in conceptualising notions of self and other.
- Neologisms (or idiosyncratic words).
- Underuse of words related to mental states ('know' or 'think').
- Monotony in intonation, poor control of volume and unexplained fluctuations (which can hamper the ability of others to comprehend them).

Classic autism research considers these features to be symptoms of deficits in areas such as social relatedness, perspective-taking, and abstract thought (Sterponi & de Kirby, 2016). However, although these behaviours may seem odd, some research has advocated for their communicative functions. For example, echoed language seems to help autistic individuals to take turns, self-regulate, make requests or provide affirmative answers (Prizant & Duchan, 1981). I briefly describe in the following subsection some explanations of characteristic autistic pragmatic language.

2.2.3.3 Considerations regarding pragmatic language in ASC

Classic explanations of autistic individuals' delayed language development and unusual characteristics refer to socio-emotional-communicative difficulties and other cognitive "deficits" (Boucher, 2012). These difficulties include the following (see Baron-Cohen, 1999; Bishop, 2010; Boucher, 2012; Happé & Frith, 2006; Norbury, 2013; Warren et al., 2010).

- Individuals' preference for non-social stimuli causes them to receive less linguistic input.
• Limited Theory of Mind: autistic people find it difficult to consider others’ knowledge, thoughts and feelings when they interpret the others’ speech.
• Executive dysfunction: limited cognitive flexibility.
• Weak central coherence: reduced generalisation related to sensory-perceptual differences, which leads to enhanced discriminability (attention to detail).
• An idiosyncratic semantic meaning base.
• Comorbidities with other language impairments (e.g., specific language impairment).

Wetherby (1986) proposes that communication development is delayed and follows a different trajectory from that of typical synchronous development. She suggests that autistic children display an uneven pattern that starts with the regulation of behaviour (e.g., requesting), is followed by dyadic social interaction (attracting and maintaining attention to oneself), and finally, involves the direction of another’s attention to an object or event (joint attention).

However, as Happé and Frith (2020) highlight, the descriptions of language deficits (e.g., “abnormal social approach” or “failure of back-and-forth conversation” in APA (2013)) focus on autistic individuals’ language rather than their communication. Like the autism diagnosis, which construes autism as a within-person phenomenon even when diagnosed based on social interactions, the descriptions of impaired communication relate to subjective interpretations of behaviour (Bottema-Beutel et al., 2021). The descriptions of language deficits often locate the impairment in autistic people’s ability to understand non-autistic social behaviour. However, these views do not question the non-autistic interlocutors’ difficulty in understanding or responding to the autistic individuals. De Jaegher (2020) suggests that understanding autistic individuals’ social interactions requires beginning from their capacities (it is hard to see how individuals interact when starting from a deficit idea). Similarly, the assumption that autistic individuals are not interested in others because certain expected behaviours are not displayed misconstrues social motivation as residing only within the individual (Jaswal & Akhtar, 2019). Social motivation also arises from the dynamic interaction between the individual and how others perceive and react to the individual. So, researchers
and practitioners should factor in the impact of their behaviour when they address and support autistic individuals.

Considering the characteristics mentioned above, I suggest that class discussions can be challenging for autistic students because discussions involve joint reference, establishing and maintaining reciprocity, following rules of politeness, and providing contingent responses. Additionally, teachers may use abstract language, or complex instructions and classrooms may be noisy, which limits autistic students’ understanding of the lessons (Wing, 2007). In the next section, I describe the current placement of autistic students in mainstream schools and the potentially enabling or disabling factors that affect their participation in these contexts.

2.2.4 Placement and experiences of autistic students in mainstream classrooms

Estimates of the prevalence of ASC seem to show that it has been steadily increasing since the descriptions of the conditions have been refined. In the UK, Fannin and Watson (2015) report an autism prevalence of 94 per 10,000 individuals. The number of autistic students who attend mainstream classrooms is also rising (Pisula & Łukowska, 2012). The percentage of students with special educational needs in England has increased (from 14.4% of pupils in 2017 to 14.9% in 2019 and 15.5% in 2020), and the needs associated with ASC are the most common among all needs of students with an education, health and care plan (EHCP) (DFE, 2017, 2018). About 70% of autistic students attend mainstream classrooms (DFE, 2019b). Many of these students do not show significant cognitive delay and have a normal-range linguistic ability and, consequently, they are considered ideal candidates for mainstream education (Waddington & Reed, 2017).

However, as Goodall (2018) states, being academically able does not imply being mainstream ready. Autistic students often struggle to cope with mainstream educational contexts. A study by Saggers et al. (2011) identified six categories that autistic students highlighted as sometimes having positive or negative effects on

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7 These students would score within the normal range in structural language tests (see ALN language phenotype in Section 2.2.3).
8 He followed the lived experiences of 12 autistic young people in a study.
their participation and learning. These included teacher characteristics (teachers’ relatedness and active listening positive factors), curriculum issues (usually associated with tight work schedules), support mechanisms (students appreciated subtle, specialised help), environmental considerations (mostly physical factors such as noise) and teasing and bullying. A similar study by Humphrey and Lewis (2008) pointed out that positive relationships with peers were a significant enabling factor and that the environment could especially promote anxiety and stress (which impaired students’ ability to ‘function’). Both studies highlighted the impact of social interactions on students’ school experiences. Several studies have reported that autistic students experience negative social outcomes, which include frequent exclusions, low perceptions of support, having fewer friends than non-autistic peers, teasing and verbal aggression (Choi & Nieminen, 2008; Locke et al., 2017; Pisula & Łukowska, 2012; Symes & Humphrey, 2011).

Autistic students may find mainstream settings difficult to understand or overwhelming (often due to sensory overload). Students sometimes do not know what teachers expect from them due to implicit language, instructions or rules. Additionally, teachers and classmates may have a limited understanding of autistic individuals’ forms of communication, so they misunderstand autistic students’ behaviour. Autistic students recognise these difficulties in communication and social interactions. As Moore (2016) states in a report from the National Autistic Society in the UK, which surveyed 85 young autistic people, autistic students identify a need and a lack of help in schools to understand social situations and to know how to get on with people.

Autistic students’ cognitive styles challenge teachers’ assumptions regarding teaching and learning (Symes & Humphrey, 2010). Teachers often need to find alternative ways to present information to accommodate these students’ piecemeal way of processing information, preference for precision and routines, and sensory hypersensitivity and they have to discover what motivates them to carry out tasks (Moore, 2007). These students can also express themselves in unusual ways, which hinders teachers’ comprehension of their utterances. Additionally, mainstream classrooms may have unpredictable and poorly structured activities that usually
involve participation in large social groups with excessive noise, sustained attention for long periods, and distractors (Baron-Cohen, 2010).

The growth in the number of autistic students in mainstream classrooms has led to more awareness in schools regarding students’ potential communicative difficulties and increased interest in developing strategies that support their communication. However, sometimes teachers’ or teaching assistants’ (TAs) forms of support do not take into account the students’ communication attempts or limit the children’s experiences of interaction with peers. I describe two studies that have addressed this issue in the following subsection.

2.2.4.1 Communication in school interactions

A study by Wood (2018) showed that teachers sometimes overlook autistic students’ communication attempts because they consider that these students' behaviours are devoid of meaning. Wood observed five primary schools in the UK that had autistic students on roll for five months. She noticed that some of the students' attempts involved verbal and non-verbal communication (such as short phrases, noises, or silence) to express their unwillingness to perform tasks, to share how they felt, or to denote their engagement with activities. The teachers sometimes problematised students’ silences, did not notice their noises or insisted on eliciting specific responses.

A study by Waddington and Reed (2017), in which they reviewed the archive data regarding the support provision for 108 autistic students in schools in Southeast England, revealed that the provision of increased hours of individual support to the students seemed to create barriers between them and their peers. It also seemed to decrease the challenges of the class activities.

These studies highlight the importance of being open and observant toward autistic students’ forms of communication and orienting part of the teachers’ support to promote the students’ interactional participation. If teachers identify students’ preferred communication and contextual factors that enable their participation, they can create accessible and motivating opportunities for students to interact with their
teachers and peers. For example, Davidson (2008) found that online conversations encouraged autistic individuals to communicate with others. The computers provided interactive consistency, removed the need to consider non-verbal communication and slowed the pace of social exchanges. Teachers can consider these characteristics when they plan class discussions.

A systematic literature review by Mamas et al. (2021) suggests that pedagogical practices and social climate, rather than just individual characteristics, heavily influence autistic students’ social participation in inclusive primary and secondary schools. They defined social participation based on four areas suggested by Koster et al. (2010): friendships, contacts, social self-perception and acceptance by classmates. If teachers adjust their practice and social climate to the students’ characteristics, they can help autistic students to improve their social skills and acceptance by peers.

Various approaches are used to enhance communication and social interaction skills in response to the communication difficulties experienced by autistic students. In the educational context in the UK, a strong emphasis has been placed on language and communication interventions for autistic students (Wood, 2018). Five categories encompass most of these interventions. The categories are: ecological variations (of physical spaces, schedules or work teams); collateral skills interventions; child-specific interventions (usually related to reinforcement); peer-mediated interventions; and comprehensive interventions that combine proposals (McConnell, 2002). However, there is controversy regarding the appropriateness and effectiveness of specific strategies due to questionable interventions without validated methods or scientific support (Simpson, 2005). Therefore, teachers have been increasingly encouraged to implement research-based strategies and interventions. I describe what EBPs are in the following subsection and comment on the affordances and limitations of their adoption as the gold standard of support for autistic students.

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Examples of these dubious interventions include the array of practices named ‘complementary and alternative medicine’ which are not considered to be part of conventional medicine and involve mind-body techniques, biologically based therapies, manipulative methods, energy therapies and body-based methods (O’Reilly et al., 2012).
2.2.5 Evidence-based practices: definition and considerations for their use

Scientifically based practices, also called EBP, involve the use of materials or products validated by rigorous and systematic research designs. The APA (2006), considering psychological practice, defined EBPs as “the integration of the best available research with clinical expertise in the context of patients’ characteristics, culture and preferences” (p. 284).

The practices are identified as the best because they have been proven to be reliable and valid (Mesibov & Shea, 2011). Their evaluation usually involves the use of random samples and control and experimental groups (randomised controlled trials, RCT) that meet peer review and other standards (No Child Left Behind, 2002). However, researchers have identified limitations related to using RCTs and quasi-experiments (Smith, 2013). First, not all the characteristics of autistic individuals are represented in a study’s samples. Second, not all studies consider all changes in individuals that are associated with specific interventions. For these reasons, researchers also recur to high-quality, single-case, experimental designs (SCD) that involve repeated observation of an individual’s behaviour. The replication of SCD results by different research groups can be used to ascertain the reliability of the practices.

However, finding EBPs represents a challenge as far as ASC are concerned, due to their associated irregular skills and idiosyncratic characteristics. RCTs are infrequent because there are limited samples of autistic people who show similar characteristics. Also, they are not practical to determine which aspects of comprehensive practices are relevant to specific difficulties (Mesibov & Shea, 2011). Another issue relates to the testing of the interventions in ‘ideal’ conditions, which makes it difficult for teachers to adopt the interventions (Guldberg, 2017). Considering these issues, research can only tell us what worked in a particular context and facilitate professional problem-solving (Biesta, 2007).

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10 Each intervention may follow different protocols, outcome measures and enrolment criteria.
Two broad groups of interventions support autistic individuals (Odom et al., 2010). One group comprises focused intervention practices that address a specific skill or behavioural or developmental goal. The other comprises comprehensive programme models that involve a set of practices created to achieve a broad impact on core difficulties associated with autism. The scientifically based practices I found in the literature included skill-based, environmental, cognitive and interpersonal relationship interventions (according to Simpson et al.’s (2005) categorisation)11. These EBPs involved the use of fundamental applied behaviour analysis techniques (e.g., prompting or reinforcement), assessment and analytical techniques that are the basis for intervention (e.g., task analysis) and combinations of behavioural practices used in a systematic way (Wong et al., 2015). They produce outcomes across multiple developmental and skill areas12 (e.g., social, academic, cognitive, communication), that represent discrete behaviours, ratings of students’ performance, and standardised or informal assessments of academic performance (Steinbrenner et al., 2020; Wong et al., 2014).

Identification and verification of the EBP is the first step. Next, its selection and application depend on the practitioners’ skills and knowledge about the autistic individuals they support (Hume et al., 2021). Researchers often adopt technically eclectic programmes that combine EBPs to address specific intervention goals. Combinations seem to be particularly favourable for the development, learning and life outcomes of autistic children when practitioners plan the interventions around individual needs and implement them “well” (Odom et al., 2012; Wong et al., 2015). Additionally, considering that the practices evolve based on advances in the knowledge about demographics, ability features and intervention science, the interventions selected to support autistic individuals should be updated accordingly (Hume et al., 2021).

11 As part of this investigation, I looked for common EBPs that support autistic individuals. I include a list of these interventions in Appendix F. Section 5.1.2 explains how I retrieved them and the selection criteria I delineated.

12 Outcomes areas of EBPs: social, academic, self-help, interfering behaviours, cognitive, communication, joint attention, mental health, motor, play, school readiness, self-determination and vocational (Steinbrenner et al., 2020).
Adoption of a balanced range of methodologies to select an EBP can positively impact autistic individuals’ lives and the support they receive from practitioners. Guldberg (2017) suggests that practitioners’ and researchers’ knowledge base should be situated on a par and should draw on evidence from classrooms and consult the views of autistic individuals and other members of the autism community. The selection of EBPs can be informed by these findings to make decisions based on the individuals' goals. I suggest it is essential to consider the assumptions about autism and the expected outcomes of these practices and to evaluate whether these are in harmony with the identified goals (see Gibson et al., 2021). In the same way that different disability models influence the definition of autism, these also impact the development of interventions with different aims. These aims include behaviour change, societal accommodation, or the incorporation of individual preferences (Vivanti & Messinger, 2021). To support autistic students in mainstream classrooms, the selected practices and beliefs shape how practitioners include them in this context.

I suggest that autistic students’ difficulties reflect the mismatches between schools’ expectations and how content is delivered, and students' characteristics (and vulnerabilities). Therefore, I propose that interventions should address both potentially disabling contextual factors (to promote barrier-free exchanges that recognise and guide autistic students’ participation) and individual needs. Given that mainstream education inherently involves social interactions, which play a central role in students’ learning, interventions could strive to include students through the facilitation of their participation in class activities.
2.3 Inclusion as accessible opportunities to participate

2.3.1 Introduction

Howlin (2005) explains that, even though schooling for autistic children has improved because they remain longer in school (at least 10 years), full inclusion in schools still seems to be an exception. Consequently, many of these students leave school without academic or vocational qualifications. Their inclusion sometimes involves educating them in the same setting as their mainstream peers (Waddington & Reed, 2017). However, as de Valenzuela (2014) argues, the incorporation of autistic students in these contexts does not always provide them with equal learning opportunities. This section briefly describes the concept of inclusion according to current literature. I also delineate how I conceptualised inclusion for this study, based on the descriptions in the literature.

2.3.2 Definition of inclusion in education

The definition of inclusion has not been consistent. Consequently, there is a noticeable disparity between what people understand it to mean is understood and its implementation. Broadly, it implies an ongoing process of educational provision that ranges from providing access for students with special educational needs and disabilities (SEND) to mainstream classrooms to develop education for all (Booth & Ainscow, 2002; Florian et al., 2017; Haug, 2017). Recent conceptualisations emphasise the students' rights to be present and accepted in a school and to have opportunities to achieve goals and develop socially and emotionally through positive interactions with peers and teachers (Falkmer et al., 2015; United Nations Educational, Scientific and Cultural Organization [UNESCO], 2017). It requires a transformation of a classroom to consider these students' needs and strengths, including the physical environment and others' behaviour (Goodall, 2015; Verdugo, 2003). The changes should help to structure an environment that does not represent a barrier to the participation of students with SEND in classroom interactions.

The term inclusion (and inclusive education) came into use in the UK after the release of the ‘Salamanca statement and framework for action on special needs
education’ (UNESCO, 1994). This influential international document in special education¹³ aimed to develop inclusive education systems. It suggested this could only happen if mainstream schools educated all children in their communities (Ainscow et al., 2019). The justifications associated with the statement were: 1) developing teaching that could address individual differences and benefit all children, 2) creating welcoming communities to change attitudes towards difference (to combat discrimination), and 3) improving the cost-effectiveness of the education system. As these justifications reflect, the definitions of inclusion depend on pedagogical, societal, and policy aims (Terzi, 2014).

Consistent with a social model of disability, inclusive education aims to remove barriers to learning and participation. Norwich (2013) highlights the stretch relationship between models of disability and those of learning and ability and points out that this conceptualisation of inclusive education is related to a social model of learning. The latter envisions learning as the process of becoming a member of a community through active participation in socially valued activities (see Section 2.4.2.1; Lave, 1991; Rogoff, 1995). Accordingly, researchers generally emphasise social participation as an integral element of inclusion (Mamas, 2021). This participation involves learning and collaborating with others, being recognised and accepted, and having a say in how education is experienced (Booth & Ainscow, 2002). Kershner (2009) suggests it is essential to identify the values, beliefs and activities that maximise children’s engagement in learning while minimising the marginalisation of certain groups in the school system to achieve it.

In schools, inclusion may be addressed via an inclusive curriculum (in which a common curriculum is taught by different means), pedagogy and schooling (Norwich, 2013). Inclusive pedagogy represents an approach to teaching and learning that supports teachers in responding to individual differences among learners without stigmatising students who are treated differently (Florian, 2014). Florian and Black-Hawkins (2011) propose three main principles for successfully implementing inclusive pedagogy:

¹³ The Salamanca statement originated at the 1994 World Conference on Special Needs Education, which was organised by the Ministry of Education and Science in Madrid (Spain) and UNESCO (Paris, France), and in which 92 governments and 25 international organisations participated.
• Shift the focus from one concerned only with students identified as having additional needs to one that involves learning for all, hence extending what is available in general classrooms (rather than providing additional or different teaching).
• Reject deterministic beliefs about students’ abilities that involve assumptions regarding types of learners and fixed abilities to a belief that all can learn and their capacity can change.
• Respect the dignity of learners as full members of the class community and do not attribute all difficulties to deficits in learners.

Florian’s and Black-Hawkins’s principles are focused on adjusting practice to address exclusionary and restrictive contextual barriers. Nevertheless, Norwich (2013) argues that these principles pose false dichotomies. He suggests that additional teaching is not necessarily disconnected from the general, that students’ abilities are alterable to a certain extent, and that it is possible to respectfully identify students’ strengths and difficulties in a social context. Norwich also highlights that differences in ability among people cannot necessarily be removed and that sometimes adaptations to practice that support specific needs may not be required or beneficial for all. Norwich’s nuanced vision denotes how the principles suggest a dichotomy between specialised and inclusive education; in other words, an assumption that practice adjusted to specific conditions is not inclusive (tension recognised by Florian, 2008). The suggested dichotomy originates from the contrasting perspectives on disability that are associated with the medical and social paradigms. The principles align with a materialist approach to the social model that envisions difficulties as socially constructed. As I described in Section 2.2.2.2, this view can leave students’ particular needs unattended, which would merit treatment under a medical framework.

Particularly in the field of inclusion and the education of autistic individuals, Ravet (2011) refers to these contrasting perspectives as rights-based (associated with the social model) and needs-based (associated with the medical model). The former rejects labelling and advocates a single pedagogy for all, while the latter promotes educational provision that meets distinct needs that are associated with
specific labels. This binary thinking and moral positioning pose the dilemma of whether to recognise and respond to differences or not, which complicates the implementation of inclusion. Ravet argues that both perspectives may be exclusionary. On the one hand, a rights-based perspective precludes teacher training that informs and enables practitioners to address the broad set of preferences and difficulties experienced by autistic students, which they might not intuit. This perspective suggests that many non-autistic peers share the needs and surface behaviours of autistic students and that, therefore, the same pedagogic strategies are relevant or effective for all (Ravet refers to this as the ‘many kids argument’, p. 674). Nevertheless, as described in Section 2.2.2.4, even if the non-autistic members of a class display behaviours or difficulties similar to those of their autistic peers, these are underpinned by a different way of experiencing and processing the environment. If teachers do not consider these characteristics, they may make normative assumptions about the reason for and meaning of autistic students’ behaviours. On the other hand, a needs-based perspective can limit autistic students’ opportunities to interact with peers in mainstream educational contexts.

Instead of totalising one over the other, Ravet proposes an integrative perspective that minimises negative labelling, values neurodiversity, and prioritises teacher training in autism in mainstream schools. She argues that this perspective promotes a distinctive pedagogy that is different (founded on knowledge about autism) and can benefit non-autistic students. This perspective is consistent with the neurodiversity framework and relational approach that I adopted as part of this study; it offers a middle point between the medical and social perspectives. Nevertheless, as Norwich (2013) emphasises, autism-specific adjustments are not always relevant for all (e.g., it may be time-consuming for teachers to implement strategies with all learners). Lewis and Norwich (2004) recognise another view of specialised pedagogy that is related to the notion of a continuum of teaching approaches in general teaching. They suggest that general teaching strategies can be specialised by intensifying and personalising them according to students’ needs. In this case, a label permits teachers to understand associated generalised strengths and difficulties, and to consider these hypotheses of how the strategies will be personalised for specific students.
Development of an inclusive practice also involves social learning processes in a community, to influence individuals' actions and the thinking that informs those actions (Ainscow & Sandill, 2010). Research related to inclusive practices for autistic students highlights that inclusion of these students requires the participation of the whole school community (e.g., Goodall, 2015). The latter may include providing training, support and awareness education on autism to all students, teachers and staff to create an appropriate ethos. In the same vein, Kluth (2003) included among her six characteristics of successful inclusive schools for autistic students are committed leadership, democratic classrooms and a supportive school culture. (The other three were reflective educators, engaging curricula and responsive instructions).

2.3.3 Conceptualisation in this study

I adopted a position that was consistent with this investigation's alignment with a neurodiversity paradigm and relational approach to the social model of disability. I envisioned inclusive pedagogy as pedagogy that includes specialised strategies (which would consider group-specific strengths and difficulties), makes them available to all, and adopts a social model of learning. I argue that a specialised pedagogy inspired by Ravet's (2011) integrative perspective and Lewis's and Norwich's (2004) suggestion of a continuum of teaching approaches represents a practical way through which to promote inclusion, value students' neurodiversity and recognise the interplay among intrinsic and contextual factors.

Regarding the contextual factors, I considered it essential to acknowledge the social aspect of education in classrooms and to view learning as a social process. This view highlights that autistic students' learning in these contexts depends not only on their abilities but also on their capabilities and the social environment. Under a neurodiversity paradigm, this view promotes openness to the different forms of communication that autistic students may display and points out potential barriers to their participation that exist in the classroom. In my opinion, being included in a classroom involves being able to engage in class activities. This engagement should not be limited to being encouraged to contribute verbally. It also includes being able to access the contents of the lessons, understanding expectations, having
opportunities to participate using one's preferred forms of communication and feeling part of class activities. To ensure that these participation opportunities, environment, and curriculum are accessible, teachers should consider autistic students’ intrinsic factors. These factors include students’ different ways of thinking and of experiencing the environment and potential challenges (e.g., sensory sensitivity and preference for literal language). Teachers who consider these factors may prepare their lessons in an accessible way for the whole class while also planning how they can intensify and personalise their strategies to support their autistic students. In this study, I consulted how EBPs promote accessible communication and guide students in the development of an activity (according to the characteristics associated with autism) to adjust strategies used in general teaching (see more in Section 5.1.2).

This investigation did not advocate a specific type of placement for all autistic students (either mainstream or special schools). Nevertheless, I consider that the development of specialised teaching for mainstream contexts can help to address the current rise in the number of autistic students attending mainstream classrooms in England. I focused primarily on the participation of verbal autistic students, a group that does not represent all autistic individuals but constitutes most students in these contexts. Some autistic students’ experiences in mainstream classrooms are highly stressful, and their placement should be decided case by case. Sadly, special schools do not provide all the necessary support. As Hansen (2012) points out, the development of inclusive pedagogical practices also responds to a political and economic need that is associated with the high number of students with SEND in mainstream contexts and special education offerings that do not have the desired effect. The development of a specialised, inclusive practice is required to address this reality and to guide teachers as they attempt to promote learning for all in their classrooms.
2.4 Dialogic teaching as a means to include autistic students

2.4.1 Introduction

As mentioned above, some of the difficulties experienced by autistic students in mainstream classrooms include misunderstandings related to implicit or complicated instructions and unwritten rules, and problems to understand social interactions (e.g., Betts et al., 2007; Moore, 2016). Consistent with the framing of this research, which recognises the central role of social participation in students’ learning, I suggest that the adoption of a dialogic pedagogy can guide the process by which autistic students become part of the classroom community. This pedagogy focuses on furthering students’ learning and encouraging their participation through the promotion of dialogue that invites and values different voices, establishes rules for talking and makes learning objectives explicit (Alexander, 2008).

This section describes dialogue and its promotion through dialogic teaching. It includes some theoretical underpinnings and empirical findings related to this pedagogical approach. I delineate the beneficial goals that I identify that could be offered to autistic students through this pedagogy. I also highlight the challenges of using this form of teaching to support autistic students. Related to these challenges, I describe why I suggest its implementation should be adjusted to the students’ characteristics.

2.4.2 Dialogic forms of teaching

Dialogic education represents a pedagogical approach and a stance towards learning that recognises its social nature and the central role that dialogue has in it. This approach envisions language as a tool that permits a social mode of thinking or ‘interthinking’ (Mercer, 2000). In classrooms, language enables teachers and students to be involved in a joint intellectual activity, co-constructing knowledge and developing intersubjectivity (the latter is defined as sharing a common understanding: Rogoff, 1990). In other words, language becomes the vehicle that connects teaching, learning and cognitive development (Kim & Wilkinson, 2019).
Researchers have developed different pedagogical approaches and theoretical frameworks related to this form of education. Many of them focus on the quality, dynamics and content of talk, and they structure it to encourage student participation in learning activities (Hennessy et al., 2017). Accordingly, many of them delineate discursive practices that promote student learning, as they recognise that not all class talk represents dialogue that permits interthinking. ‘Dialogue’ (also called ‘productive classroom dialogue’) involves talk that has an educational value. Researchers use different terminologies and conceptualisations to define this term. However, the different descriptions generally indicate that it involves continuous co-construction of knowledge, critical and respectful engagement with others’ perspectives and linkage of knowledge to past or future events and broader contexts (Hennessy et al., 2016). Some specific characteristics associated with ‘productive dialogue’ include open questions, the promotion of extended contributions (which elaborate on previous ones), acknowledgement and critique of different opinions and the link among contributions (Howe et al., 2019).

I focused on this pedagogical approach because it strives to promote student participation and acknowledges the influence on students’ participation of the interplay between interlocutors. I argue that this view can help with the recognition of the forms of interaction that facilitate autistic students’ engagement in activities. Therefore, I built upon existing dialogic practices to investigate how these could guide the creation of accessible participation opportunities that consider autistic students’ preferences and characteristics.

Dialogic teaching adopts a sociocultural theoretical framework for the understanding of learning; it is influenced by the work of Vygotsky (1978). This framework proposes that language and social interactions play essential roles in students’ learning processes and lead to cognitive development through knowledge sharing (de Valenzuela, 2014). Some accounts of educational dialogue are based on Bakhtin’s (1981) theory of dialogism, which focuses on the emergence of meaning in dialogue with different voices. Some of the concepts that underlie these theoretical proposals are outlined below.
2.4.2.1 Theoretical underpinnings of dialogic teaching

**Vygotsky’s sociocultural theory**

Vygotsky adopted a sociohistorical approach to explain how culture becomes part of individuals’ nature. He focused on the development of ‘higher order’ psychological functions, which he suggested originated in social processes (Vygotsky & Cole, 1978). Vygotsky’s theory suggests that language acquisition shapes intellectual development because it acts as the mediator that enables different members of a community to share knowledge (Mercer & Littleton, 2007). Individuals ‘internalise’ these tools by internally reconstructing an external action. Following this logic, Vygotsky proposed that every psychological function appears twice, first at a social or inter-psychological level and then at an individual or intra-psychological level (Vygotsky & Cole, 1978). Language represents the cultural and psychological tool that permits the sharing of knowledge with others, and it structures individual thought processes and content (Mercer et al., 2019).

Vygotsky argued that learning and development are interrelated. He identified two levels of development: actual and potential. Actual development represents the matured psychological functions that are reflected by the activities individuals can carry out themselves. Potential development relates to the activities an individual can do with the guidance of more knowledgeable individuals. It reflects developing functions. The support provided by knowledgeable individuals facilitates the maturation of those functions, moving from potential to actual development. Vygotsky referred to the distance between the two levels with the concept of the ‘zone of proximal development’ (ZPD) (Vygotsky & Cole, 1978).

**Bakhtin’s theory of dialogism**

The theory of dialogism, which was developed by the Russian language philosopher Bakhtin (1981), refers to the shifting among different mental perspectives that creates a space in which diverse voices interact and negotiate meanings. Bakhtin suggested that every word or utterance is the outcome of different voices that are united in the structure of socially constituted language (Cohen, 2009). According to this theory, language represents a historically evolved worldview or an ideologically
saturated concrete opinion that ensures mutual understanding in a community (Bakhtin, 1981). Its meaning depends on the speakers’ communicational needs and intentions. He suggested that the meaning of any utterance emerges during the interaction between the speaker and others and is impacted by its position and role within dialogue (Trausan-Matu et al., 2021). During dialogue, listeners appropriate the voice of the other. They merge it with their voices and respond or act. Through this process of assimilation of the other's voice, we provide it with a new meaning. In this way, we negotiate, construct and learn meanings via engagement in dialogue with others in a particular context.

Bakhtin delineated some aspects that are key in this 'dialogic' process. These include sequentiality, directionality, positioning, plurality and historicity (Fernández-Cárdenas, 2014). In dialogue, we recognise the existence of interlocutors before whom we position ourselves, and vice versa. This process creates a sequence of contributions through which we negotiate meaning. We provide an intention and direct our utterances towards an interlocutor as we adopt a historically constructed, discursive genre. Thus, the utterances should be understood considering the situation in which they occur, and a longer term dialogue that has been culturally and historically defined (Linell, 2009).

Despite their authors' differences in worldview, these two theories complement each other, as they explain how individuals learn through their interaction with others and how context impacts social interactions and the resulting creation of meaning (Eun, 2019). Based on Bakhtin's polyphonic perspective, I suggest his theory highlights the importance of creating a classroom culture that recognises that different positionings are always possible. I argue that this culture can also open a space for the various forms of participation that autistic students may display. Bakhtin's reference to sequentiality and its role in meaning-making highlights the importance of achieving intersubjectivity. I propose that making this sequentiality visible for autistic students may clarify the lines of thought that are developed during class interactions. Vygotsky's view shows that the support of autistic students' participation should be planned according to their strengths and ZPD. This view is enriched by other proposals that emphasise how this learning
process occurs within a community (in this case, the classroom) and how experts can tailor their support. I describe these in the following section.

Other sociocultural theoretical proposals

The model of situated learning that is called 'communities of practice' (CoP) envisions learning as the process through which a person becomes a member of a community of practice (e.g., at work or school) (Lave, 1991). The process involves participation in a culturally valued activity, through which individuals gradually develop knowledgeable skill and identity. Newcomers participate peripherally at first, as they obtain information about the activity from their interactions with others (legitimate peripheral participation). The mutual commitment of the community members shapes individuals' identities through sharing historical and social resources (Wenger, 2001). This model of learning underpins the definition of inclusion that I quoted in Section 2.3.2. I argue that this view promotes a classroom culture that recognises that all students are valued members who can contribute and whose participation should be encouraged.

Rogoff's (1995) three planes of analysis of learning and development enriches the view that students are active members who initially receive guidance from others. These include the personal plane, which involves a participatory appropriation; the interpersonal plane, which is related to processes of guided participation; and the plane of involvement in a community, which Rogoff envisioned as an apprenticeship. These planes highlight the active role of learners and that social activities have the purpose of advancing novices' participation. In the case of the participation of autistic students in class activities, I suggest that the latter requires creating accessible opportunities for participation.

Related to the guidance from knowledgeable members, Wood et al. (1976) introduced the concept of scaffolding. Through this metaphor, they explained how experts provide tailored guidance to novices by controlling the elements of a task that are, initially, beyond their capacity. This temporary expert tutoring enables novices to complete aspects of a task that are within their range of competence. van de Pol et al. (2010) delineated three main characteristics of scaffolding: contingency, fading and transfer of responsibility. These facets indicate that experts constantly
tailor their support to the novice’s competence, gradually withdraw it as the latter develops, and transfer the responsibility of the task to the novice. The concept of scaffolding provides a clear, practical framework for how teachers can support the participation of autistic students. It builds on Vygotsky’s concept of ZPD; scaffolding highlights the constant evolution of individuals’ competence and development, which the ZPD construct does not. For this reason, Mercer (2000) proposed the idea of the ‘intermental development zone’, which represents a communicative space that constantly evolves as dialogue advances.

2.4.2.2 Description of dialogic teaching

Consistent with the abovementioned views regarding learning, a dialogic pedagogy suggests that education is enacted through the interactions between teachers and learners. Teachers structure the classroom dialogue to open a space for developing thinking, in which different views can interact. Teachers become mediators who promote social interactions and encourage students to discover knowledge (Mercer & Littleton, 2007). From this perspective, classroom dialogue becomes a scaffold for students’ learning as it supports their construction of meaning and understanding (Myhill, 2006). This vision of learning challenges the traditional teacher and student roles, because it enables students to influence the course of action in the classroom (Davies et al., 2017). However, for teachers to provide these participation opportunities, they have to conceptualise education as a process that is enriched by both students and teachers (Sedova et al., 2014).

Researchers have developed and tested several dialogic pedagogical approaches to promote class dialogue. However, these approaches interpret the construct of dialogic teaching in various ways and ascribe different meanings to commonly used labels such as dialogue, talk, learning and pedagogy (Asterhan et al., 2020). As Kim and Wilkinson (2019) highlight, researchers have used the term ‘dialogic teaching’ to refer to (a) the use of talk in discussions to help to advance students’ learning, (b) a type of talk for instruction or (c) a stance toward knowledge and learning. The first two views regard dialogue as a pedagogical method that is reflected by their interest in the characterisation of quality talk and the offer of discourse tools to students and practitioners (e.g., Resnick et al., 2018; Reznitskaya,
The perspective of dialogic teaching as a stance is focused on the social activity that facilitates dialogue. It envisions dialogue as the means and goal; it is focused on the relationship among participants instead of on specific forms of language (e.g., Boyd & Markarian, 2011). Wegerif's (2011) concept of ‘dialogic space’ reflects the perspective of the adoption of a stance. He describes it as a space of reflection and exploration that encourages students to question ideas collectively and to refer to the voices of others, with a relational orientation.

From my perspective, dialogic teaching involves adopting a stance towards learning and it serves as a method that permits the development of productive dialogue. I suggest that the adoption of a dialogic stance is essential to create a culture in the classroom that is open to diversity and provides opportunities for students to influence the advancement of class activities and to engage respectfully and critically with other ideas. This culture or ethos provides a safe space in which all voices are acknowledged and valued. Once this is set as a goal, diverse discursive practices can be implemented and adjusted to achieve the dialogic goals. Freire’s (2003) proposal of dialogic teaching as a liberatory pedagogy reflects this promotion of a culture by focusing on the empowerment of students as they “find their own words to name the world” (Wegerif, 2020, p. 22).

This ethos is often promoted and maintained in approaches to dialogic teaching through the establishment of ground rules for talking and through open discussion and reflection on the purpose and forms of engagement in dialogue (or metatalk) (Edwards-Groves & Davidson, 2017; Mercer & Dawson, 2008). The rules and students’ participation in metatalk support their understanding of language and its interpersonal dimensions and fosters self-conscious participation (Newman, 2016). I consider that this aspect is particularly relevant for promoting autistic students’ participation, because it clarifies the behaviour that is expected and why; hence it provides them with guidelines (see Section 2.4.4). This aspect was central to several of the design principles that I developed as part of this investigation (see Section 8.4).

In this investigation, I conceptualised dialogic teaching by drawing on Alexander’s (2008) five principles of ‘dialogic teaching’. I introduce these dimensions
in Table 2.1. I suggest that this conceptualisation of dialogic teaching provides a general description that refers to the broad aims of the promotion of dialogue and the classroom culture that it entails.

Table 2.1. Alexander's (2008) five principles of dialogic teaching

<table>
<thead>
<tr>
<th>Principles</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Collective</td>
<td>Teachers and students are involved in the development of the classroom tasks as a group.</td>
</tr>
<tr>
<td>Reciprocal</td>
<td>Teachers and students share their ideas and are open to different points of view.</td>
</tr>
<tr>
<td>Supportive</td>
<td>A safe place is provided in which all the participants can express their ideas freely and support among peers is encouraged.</td>
</tr>
<tr>
<td>Cumulative</td>
<td>There is a joint construction of knowledge; teachers and students build on the ideas of others and their own and link them to lines of thinking or inquiry.</td>
</tr>
<tr>
<td>Purposeful</td>
<td>Teachers explicitly delimit specific goals that are shared by the whole group and guide the class’s joint endeavour to achieve them.</td>
</tr>
</tbody>
</table>

These principles are part of Alexander's (2008, 2018) framework. It includes repertoires and conditions that promote dialogue. Alexander indicates that the collective, reciprocal and supportive principles characterise the classroom culture and pattern of relationships that enable the development of dialogue. The purposeful principle highlights that classroom discussion is both valuable and represents the means to an educational end. Finally, the cumulative principle ensures that conversations build on what has gone before and advance understanding. Taken together, these principles provide a summarised overview of dialogic teaching and what it entails. However, the dimensions overlap and are not particularly clear regarding how dialogic teaching can be enacted in classrooms. For these reasons, to conduct my investigation, I used as a base two existing coding frameworks that characterise dialogic interactions comprehensively (see Section 4.4.3). In Chapters 4 and 5, I indicate the types of contributions and discursive strategies that I used to operationalise dialogic teaching.
2.4.3 Evidence from empirical studies

Several studies have examined the relationship between theoretically productive dialogue and student learning and outcomes. Some have used interventionist methodologies to promote target features, while others have employed naturalistic approaches to observe naturally occurring aspects. Evidence from empirical research on classroom talk and dialogic teaching has highlighted the following (see Billings & Fitzgerald, 2002; Daniel et al., 2005; Davies & Meissel, 2016; Howe & Abedin, 2013; Kutnick & Colwell, 2010; Mercer & Littleton, 2007; Wells & Mejia-Arauz, 2006).

- Dialogic teaching can be implemented in classrooms because teachers can adopt some of the suggested strategies, and students can adopt the forms of talk that are promoted by their teachers.
- Participation in class dialogue can support students' development of critical thinking and argumentation, and their reasoning skills. This dialogue involves exchanges of ideas, scaffolding among peers, favourable teacher feedback and dialogic co-construction of meaning.
- Dialogue enables students to get their points across and promotes a sense of trust and respect that motivates them to engage in dialogic interactions.

Three recent, large-scale studies obtained similar findings to those listed above, and in particular, they identified a positive impact of students' participation in a productive dialogue on their academic attainment. One was a large-scale, naturalistic study by Howe et al. (2019). It was undertaken in 72 Year 6 classrooms in the UK to investigate the relationship between classroom dialogue and student learning. It indicated that certain aspects of teacher-student dialogue, which are widely promoted through the implementation of dialogic teaching, predict students' positive performance in standardised achievement tests (SATs). These aspects included elaboration on others’ contributions, querying when contributions were challenged, and students’ engagement with others’ ideas. A large-scale, randomised controlled trial of dialogic teaching that was reported by Alexander (2018) obtained similar results from 76 Year 5 classrooms in the UK. In this study, the students in ‘dialogic teaching schools’ made additional progress of two and one month in
English, Science and Math lessons compared with students in the control group. Another large-scale project that was funded by the European Commission's framework programme, which involved 26 longitudinal case studies in seven European countries, also highlighted the positive impact of students' engagement in egalitarian dialogue in interactive groups (Flecha, 2015). The students' participation in dialogue that was conducted in small heterogeneous groups boosted their learning of mathematics (reflected by improvements in mathematics performance) and fostered their self-confidence and positive attitude toward mathematics (García-Carrión et al., 2020).

Despite these positive findings, this form of teaching is not used widely in classrooms (Lefstein, 2010). Also, not all teachers who attend professional development programmes that are focused on supporting dialogic approaches to teaching and learning change their practice (Reznitskaya & Gregory, 2013). Hennessy and Davies (2020) highlight that the implementation of dialogic teaching is highly demanding cognitively and sometimes requires teachers to shift their beliefs radically regarding the value of talk and the teacher-student relationship. Based on previous research, these authors suggest that fundamental to success are the adoption by teachers of a dialogic stance, their metacognitive reflection on their promotion of dialogue, and their creation of a conducive classroom climate that includes practised routines, clear ground rules and respect. (These aspects are reflected in some of the design principles that I developed as part of this research, which are related to how discussions could be conducted to respond to students’ capabilities; see Section 8.4).

2.4.4 Beneficial educational goals for autistic students

With Alexander’s (2008) conceptualisation in mind, I suggest that operationalising dialogic teaching’s purposeful principle can help teachers to provide clear guidance and instruction to their autistic students. If teachers make class goals explicit to the whole class, they make it clear to students what they can expect from class activities, what they will do and why. Similarly, when ground rules for talking are established, social exchanges in discussions may become easier to predict and, to some extent, procedural. The latter can benefit autistic students due to their
strengths in procedural skills (Kurth & Mastergeorge, 2010). Furthermore, teachers can help to avoid semantic noise\textsuperscript{14} through open discussion of the communication rules, specific concepts and procedures for classroom activities, making any misunderstandings clear.

This guidance by teachers, which is represented by the use of straightforward instructions, expectations, and rules for talking, can help to structure classroom interactions. They may help autistic students to understand what teachers expect from them. Additionally, they offer models that students can learn regarding how they could interact with others in class activities. Learning new forms of interaction may support the students’ compensation for social difficulties. Despite the students’ interest in interacting with others, these difficulties sometimes hinder their engagement, promote their isolation and result in negative experiences (e.g., bullying and anxious behaviours) (Choi & Nieminen, 2008). Dialogic teaching can provide these students with opportunities to practise positive interactions with others and to express their views in a safe environment (referring to its supportive principle), representing a protective factor in their future development.

Dialogic pedagogy also promotes a change in teachers’ mindsets as it encourages them to envision students as active agents in classroom dialogue (given that learning requires their active participation in the community; (Lave, 1991). This vision can facilitate teachers’ acceptance of autistic students’ differences (in communication and thinking) and their recognition that these students’ voices can contribute to classroom discussions and should not be eliminated or camouflaged. This view contrasts with the normalisation paradigm that seams to permeate educational research regarding the inclusion of autistic students (Waltz, 2007). This point of view is reflected in Freire’s (2003) view of dialogue as an act of creation among individuals, which, among other characteristics, requires: commitment to others, recognition that all have the power to create (even if thwarted in certain situations) and a disposition to learn together.

\textsuperscript{14} Problems in communication due to different understandings (DeVito, 2009).
Additionally, when peers are made aware of the structure of the classroom dialogue and that active roles are expected from all students, they can also engage in dialogic interactions by encouraging the participation of students with social difficulties. The opportunities to interact with others that are created by dialogic teaching offer autistic students the space to learn ways in which they can interact with their peers and to practise it. For example, García-Carrión et al. (2016) observed that grouping together students who had and did not have disabilities in interactive groups in which dialogue was promoted contributed to the inclusion of all the students in the group and had positive effects on instrumental learning and group cohesion.

2.4.5 The need for adjusted dialogic teaching

It is crucial to highlight that researchers have developed diverse dialogic pedagogical approaches that are based on theories and empirical studies that do not consider autistic cognition, development and communication. Therefore, expectations of typical engagement from autistic students in dialogue may create barriers to their participation.

Regarding its sociocultural background, Walker and Berthelsen (2008) and Goodall (2015) have suggested that adopting a social constructivist perspective can provide an effective framework that explains how to promote social participation of students with disabilities because teachers can provide scaffolding within their ZPD. Through this approach, teachers can avoid a deficit perspective by focusing on students’ cognitive and communicative competence. These suggestions are consistent with my views, which are presented in Section 2.4.4. However, they also reflect that there is no specific, practical framework that offers strategies to guide teachers’ adjustments to their practice and their scaffolding while they promote dialogue for the whole class.

The frameworks and pedagogical approaches related to dialogic education envision language as the medium for teaching and learning and as a psychological tool that assists students in constructing a way of thinking (Edwards & Mercer, 1987). However, these approaches mainly, but not exclusively, study dialogic
pedagogy discursively (Matusov et al., 2019). Accordingly, many of them delineate specific forms of talk or interaction that are conducive to productive dialogue and the advancement of students' learning. I suggest that these may limit the identification of the communication attempts of students that communicate and interact differently.

Autistic individuals often experience social communication and interaction difficulties. Nevertheless, research has also identified that autistic individuals' behavioural differences, which may be considered aberrant from a deficit perspective, can serve communicative functions. For example, reduced eye contact, infrequent pointing to communicate, motor stereotypies\(^\text{15}\) and echolalia\(^\text{16}\) that are displayed by autistic students, have been associated with a lack of social motivation. However, as Jaswal and Akhtar (2019) point out, these behaviours can represent communication attempts (echolalia and stereotypies), different communication preferences (no tendency to communicate by pointing) and sensory difficulties (eye contact can overstimulate the student or induce stress). In the case of echolalia, attributing meaning to individuals' repetitions can help listeners to understand their function. For example, Suskind (2014) identified that his son repeated phrases from cartoon characters to communicate his feelings. Also related to differences in communication, Heasman and Gillespie (2018) found that autistic individuals might have a 'neurodivergent intersubjectivity'\(^\text{17}\) that leads them to overestimate common ground and to display a low demand for coordination. Considering these findings, I suggest that autistic students may display dialogic forms of engagement in discussions in different ways from those that are expected.

I acknowledge that there is value in addressing students' difficulties to help them to achieve expected behaviours. However, I also consider it relevant to identify how neurodivergent communication can inform our understanding of dialogic exchanges. Accordingly, I propose that supporting autistic students' participation in dialogue also involves adjusting the dialogue in which the whole class participates. This way, teachers may open opportunities for all students to contribute to dialogue.

\(^{15}\) Repetitive patterned, rhythmic, continuous, and ritualistic movements, postures, or utterances that occur during a minimum period of time and on a minimum number of episodes (Melo et al., 2020).

\(^{16}\) Repetition of someone else's words or phrases (Prizant & Duchan, 1981)

\(^{17}\) The authors define intersubjectivity as the process through which individuals create understanding (Heasman & Gillespie, 2018)
using diverse forms of participation. The latter would permit promoting collectively while also providing a supportive environment.

In sum, I argue that there is a theoretical and pragmatic gap in the conceptualisation of dialogic teaching and its promotion in classrooms. Namely, I suggest that a theoretical and practical framework is required to explain how the joint construction of knowledge can be accessible for individuals with diverse forms of communication and relating with others.
2.5 Rationale

The rise in the number of autistic students who are placed in mainstream education in the UK (DFE, 2019) and the sensory, social and understanding difficulties that they often face in this context highlight the need for strategies that support their participation in class activities (e.g., Moore, 2016; Saggers et al., 2011). I suggest that this is particularly the case in formal classroom activities that require interaction with others. One reason is their salient social difficulties (e.g., Goodall, 2018); another is that students in mainstream classrooms are taught mainly through the spoken word and are usually required to collaborate with others or to contribute verbally to the class. Education in mainstream classrooms is inherently social and students may miss out on relevant content if they struggle to understand what is discussed and the expectations of participation that are put upon them.

I suggest that in part, the problems they experience are due to mismatches between the schools' environment, the forms in which content is delivered, expectations and the students' characteristics and difficulties. In the case of their communication, teachers’ expectations that children will participate in particular ways or their association of behaviour differences with deficits may lead them to dismiss communication attempts (e.g., Wood, 2018). Different factors influence students’ social participation, including cognitive differences (e.g., tendencies toward attention to detail) and contextual factors. Published studies have shown that pedagogical practices and the social climate greatly influence autistic students' participation (Mamas et al., 2021). Therefore, I suggest that it is essential for schools to identify how teachers’ expectations of students’ behaviour and the participation requirements in class activities may become barriers to autistic students’ participation.

As reflected by the characterisations of autism that I introduced in Section 2.2.2.1, the perspective that researchers and practitioners assume concerning the abilities of autistic students impacts their support goals and what they expect from these students' participation. I argue that teachers and researchers who adopt a neurodiversity perspective (Silberman, 2016), in contrast to that of a deficit, become open to identify these students' communication characteristics, preferences and difficulties. Based on these characteristics, teachers can acknowledge the students’
communication attempts, adjust the social and physical environment of the classroom to harness their strengths, remove barriers and facilitate their participation in formal class activities. These adjustments and considerations would create equitable participation opportunities that are made available to all, which I suggest are vital for the students’ inclusion.

I propose that students’ participation involves them not only contributing verbally to activities but also them having the opportunity to:

- feel that they are part of the activities;
- understand the expectations placed on them;
- have access to relevant information; and
- contribute to accessible activities if students wish to in a way that is accessible to them.

This vision is congruent with a specialised pedagogy that enables teachers to address students’ individual differences without stigmatising students who are treated differently and recognises the interplay among intrinsic and contextual factors. Social participation is an integral element of this pedagogy (de Valenzuela, 2014). However, it requires a shift in mentality to aim toward learning for all, being open to specialised teaching and rejecting determinist beliefs about ability (Florian & Black-Hawkins, 2011; Ravet, 2011).

I suggest that teachers’ adoption of a dialogic pedagogy can help to create equitable opportunities and a classroom ethos that is conducive to autistic students’ participation. In dialogic classrooms, teachers open space in which all can take part and value all views, thereby recognising that everyone’s contribution aids the collective construction of knowledge (e.g., Wegerif, 2011). Therefore, I propose that teachers create environments in which there is openness to difference and to diverse communication styles and perspectives. For autistic students who benefit from direct instruction, a dialogic pedagogy can also provide an environment in which class goals are made explicit, and communication rules, concepts and instructions are
discussed openly (Newman, 2016). In this way, interactions within the classroom can be structured and become, to some extent, predictable.

However, most current dialogic pedagogies and their underlying theories regarding learning consider non-autistic forms of cognition and communication. These theories suggest that learning occurs through social and communicative processes in which dialogue is a crucial tool in both teaching and learning (Bakhtin, 1981; Mercer, 2000; Vygotsky & Cole, 1978). Consequently, most proposals of dialogic pedagogies delineate and encourage the promotion of ‘productive classroom dialogue’, which comprises verbal forms of interaction and contribution to discussions. It is also often associated with critical thinking. I suggest that many autistic students find participation in this form of dialogue a challenge, because such dialogue involves a social component and high cognitive demand (e.g., a student must sustain attention and sequence, and retain a considerable amount of information). Additionally, engagement in dialogue sometimes involves an acknowledgement of multiple ‘simultaneously valid’ perspectives and continuously evolving meanings (Bakhtin, 1981). Autistic students may struggle to follow and adjust to these changes.

To capitalise on the potentially beneficial aspects of dialogic pedagogy, the ‘dialogic space’ should be accessible to students who show different characteristics and preferences. Opportunities must be created for diverse forms of participation; content delivery should be adjusted; and potential barriers to understanding and engagement in discussions should be removed. The requirement for and design of these adaptations depends on each student’s needs.

In summary, I recognise that there is a theoretical and pragmatic gap in the field of educational dialogue, which is related to teaching strategies that promote accessible class interactions that are adjusted to take into consideration autistic students’ neurodiversity. These strategies should also foster openness that enables

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18 The term ‘non-autistic’ is used instead of the terms ‘neurotypical’ and ‘typically developing’, which are widely used in autism research to refer to the forms of cognition that are described as ‘normal’ in a statistical sense. This is because the two terms do not acknowledge any other clinical conditions that may present in individuals.
the noticing of and respect for each autistic student’s preferred forms of interaction (given the vast diversity of manifestations that is associated with the diagnosis). I suggest that this is relevant due to the beneficial impact that an adapted productive dialogue could have on students’ learning and school experiences. Therefore, as part of my research, I have focused on describing strategies that promote class dialogue that is accessible to various autistic students with different characteristics and that removes potential barriers. I have attempted this while also seeking a balance between the consideration of common characteristics associated with autism and the avoidance of imposing inflexible assumptions about the diagnosis.

I describe my aims in more detail in the following chapter.
3 Aims, research questions and framework

I include in this chapter the aims, research questions and methodological framework of this research. I first delineate the aims and provisional questions that guided the fieldwork and analyses. Second, I introduce the methodological approaches that I adopted because they aligned with my position on autism research and dialogic education.

3.1 Aims

I aimed to contribute pragmatically and theoretically to current knowledge regarding support for autistic students' participation in activities in mainstream classrooms. Pragmatically, I designed a set of dialogic teaching strategies that can adjust to the communication characteristics and preferences of autistic students. These strategies were designed to encourage autistic students' participation in formal class activities that required interaction with others. I developed an underpinning, practical theory for the newly created strategies. This theory delineates the guiding principles of those strategies and describes the purpose of these forms of support.

I adopted a design-based approach to research to achieve these aims because such an approach enabled the development of theory and pedagogical innovation. It enabled me to create strategies based on current literature and my collaborations with teachers in mainstream classrooms in England. I describe this approach in Section 3.3.

To attain the two main goals, I delineated the following specific aims:

1. To develop a preliminary set of dialogic teaching strategies that were based on published literature on dialogic pedagogy and best practice for students with autism, and that were adjusted to encompass communicative characteristics that are identified in many autistic students.
2. To introduce the preliminary strategies to schoolteachers in England and to collaborate with them to develop and iteratively refine the strategies.

3. To observe how teachers and autistic students engaged in class discussions while teachers used the created teaching strategies. I identified the autistic students’ forms of participation in discussions and the ways in which the teachers supported and promoted their engagement. Based on these observations, I updated the strategies further.

I posed preliminary research questions that were based on these aims and which took into consideration the functions associated with a design-based approach. I present these in the following subsection.
3.2 Research questions

I specified one main research question and some sub-questions to guide the study’s design and the data-collection scheme. I elaborated the questions according to one of the two types of questions that are common in design research; in line with Bakker (2018), I came up with a "how" question,\(^{19}\) which was focused on ways to achieve particular learning goals (i.e., to provide proof of principle). I list the questions below.

1. How can dialogic teaching strategies that are adjusted to the communication characteristics associated with autism support the participation of autistic students in formal classroom activities that involve interaction with others?

   1.1. How do autistic students engage in formal classroom activities that require interactions with others? What are the barriers, if any?

   1.2. How can dialogic teaching strategies be adjusted to take into account the communication characteristics of autistic students and to open opportunities for the students’ participation in these activities?

   1.3. How do teachers implement the strategies in their classrooms? How and to what extent do they facilitate opportunities for students to participate?

   1.4. What effects do the teachers' trials of the strategies have on teachers' and students' participation in these activities?

   1.5. What does an improved set of strategies look like?

I developed these initial questions according to the design and advisory functions of design-based research. My investigation involved the design of adjusted dialogic teaching strategies and the description of ways in which they could support

\(^{19}\) See Section 3.3.1 on design-based research. Bakker (2018) delineates ‘how’ and ‘what’ questions (focused on the characteristics of some kind of intervention that has the intended effects).
autistic students’ participation in discussions. I formulated sub-questions to answer the main question. They reflected my interest in the consideration of the teachers’ and students’ responses to the strategies and the students’ forms of communication during the process of designing the strategies.

It is essential to mention the suggestions in the literature that it is difficult to predict at the start of a design-based study the research questions that will prove to be worth being asked. Bakker and van Eerde (2015) explain that researchers may uncover new phenomena and problems to investigate after they have collected the data, because this approach involves the gradual development and trialling of innovations. Therefore, in this study, the drafted questions mainly guided the design of an ‘innovative learning ecology’ and its theoretical underpinnings. In the discussion chapter, I refer to these questions and delineate how I adjusted them based on my data analysis.

In the following subsection, I describe the design-based approach to provide context regarding the framework that guided this investigation.

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20 I follow Cobb et al.’s (2003) metaphor of a design context (the designed intervention) as an ecology. They describe this ecology as a complex, interacting system that involves multiple elements of an educational setting (e.g., tasks, types of discourse, norms and materials). See Section 3.3.
3.3 Methodological framework

I adopted a design-based approach as the overarching framework of my research. This choice was consistent with my alignment with the neurodiversity framework, because it permitted the development of practice and theory in close contact with the context of interest. The latter included identification of the communication characteristics of autistic students, their teachers’ priorities, and appropriate adjustment of the pedagogical strategies.

Autism research that has been developed with the autistic community highlights the need for research approaches that do not stigmatise autistic people and that acknowledge differences among individuals and the multiple factors that influence social behaviour (Bottema-Beutel et al., 2021; De Jaegher, 2020). Therefore, I set out to conduct research that would:

- acknowledge the students’ neurological diversity;
- avoid the observation of differences from a deficit perspective;
- recognise the influence of context and the interplay between interlocutors on autistic students’ participation in discussions; and,
- consider the participants’ experiences and perspectives, leading to collaboration with teachers in the development of helpful strategies for their respective contexts.

To achieve this, in addition to the design-based approach, I adopted a multiple-case design, methods from interpretative phenomenological analysis (IPA) and ethnography of communication (EoC). This subsection introduces the design-based approach, briefly describes the other approaches I adopted and explains how I implemented them. The specific methods I used are outlined in Chapter 4.
3.3.1 Design-based research

A design-based approach to research (DBR) is an iterative approach to the development of innovations to solve practical problems. It is focused on the creation of practical theories and tools that support those innovations (Penuel et al., 2011). In education, pedagogical design has provided critical input for the development of theories of instruction, as its use has engineered specific forms of learning and tested them systematically in the defined contexts that support them. It facilitates a context of discovery in which researchers develop theoretical and practical proposals while they are in contact with the context of interest. The relevance of the design intentions is tested. The tests include whether the design is practical and consistent with the findings of existing literature and its purpose (Bakker, 2018).

DBR represents a meta-methodology. It is used to solve educational problems through the creation and study of use-inspired products\textsuperscript{21} through the application of other methodologies as nested design processes (Easterday et al., 2018). Cobb et al. (2003) classified five main features of the use of DBR.

- It develops theories about learning and the means that support that learning.
- It develops theories concerned with domain-specific learning processes that also inform prospective design.
- It has an interventionist methodology.
- It involves prospective and reflective aspects (tests of hypothesised learning that lead to the generation of alternative conjectures).
- It is of an iterative design.

The design process involves iterative cycles of invention and revision. Researchers nest other research processes recursively to search iteratively for empirical solutions. Use of the process requires researchers to draw on previous research and to maintain direct engagement with the research setting and trialling of the interventions. Ideally, the use of DBR results in researchers gaining an increased

\textsuperscript{21} Its products include practical interventions and theoretical design models.
understanding of a learning ecology as they design the elements that comprise it and anticipate how the elements will work together to support learning (Cobb et al., 2003). This approach enables educational researchers to propose theoretical models of learning and instruction that are grounded in an empirical base and to design interventions based on theoretical descriptions that justify why they work (Brown, 1992).

Bakker (2018) suggests that three phases are typical within each design ‘macro-cycle’. The first phase is the preparation and design, the second phase implementation, and the third, analysis and redesign. However, sometimes, design researchers do not repeat macro-cycles of design. For example, researchers may conduct micro-cycles to revise an aspect of the learning ecology (e.g., learning activities) and test an adjusted version in another lesson. These phases may also involve sub-goals such as the bounding of the scope of the research, investigation of the general problem, delineation of learning goals, assessments and research questions, the planning of the design, and the creation and subsequent testing of a usable prototype (Easterday et al., 2018).

Researchers may define the theoretical aims of a project through the creation of research questions. DBR usually involves the use of questions that ask about the characteristics of interventions that show the intended effects ('what' questions) or ways to achieve specific learning goals or solve particular problems ('how' questions) (Bakker, 2018). However, as I mentioned in Section 3.2, researchers sometimes define their research questions after they have collected their data. Usually, the primary theoretical contribution of DBR is the creation of 'design models' that make explicit the rationale behind the design. The models may consist of design principles or a design argument. These represent heuristic statements regarding an intervention’s 'what' and 'how' (e.g., its characteristics or design process) and the theoretical and empirical underpinnings that justify the claims (van den Akker, 1999). These statements enable the re-enactment of the design, which provides insights into how interventions can work via mediating processes (Bakker, 2018). Throughout a design study, design principles evolve as researchers implement them in subsequent design iterations (during which researchers add, adjust or drop principles).
In this investigation, I created and refined a design framework throughout four design cycles. This framework comprised design principles and associated dialogic teaching strategies that would support autistic students' participation in discussions. In the first cycle, I developed an initial set of strategies and design principles that were based on the findings of current literature regarding dialogic teaching and evidence-based practice to support autistic individuals. In Cycles 2-4, I updated the strategies in collaboration with practitioners in England. Performance of these updates first involved a 'classroom experiment'\(^{22}\) form of DBR (according to Cobb et al.'s 2003 nomenclature) throughout cycles 2 and 3. In these cycles, three primary-school teachers trialled the adjusted form of dialogic instruction in their classrooms. I invited them to become involved in the design of the strategies and the creation of specific foci for the interventions in their contexts during the interventions. I assessed the strategies by observing and analysing class interactions in some lessons throughout the school year. This collaboration enabled me to consider the teachers' crafted knowledge of their students' characteristics, their priorities, and the potential limitations of their contexts in the development of the strategies and intervention. Finally, as part of cycle 4, I updated the design principles and strategies according to the intervention findings. To assess this update, I gathered feedback from other practitioners in England on the design framework via an online course. The design principles that I created and updated represented the 'proof of principle' that dialogic teaching can support autistic students' participation in class activities that required interaction with others.

3.3.2 Multiple-case design

I adopted a multiple-case design to conduct in-depth observations of interactions that occurred in different mainstream classrooms that included autistic students. The case studies helped me describe the complexity of the real-life situations in each classroom, including issues and the effects of changing specific factors (Denscombe, 2010b). I observed more than one case to identify the forms of teaching that

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\(^{22}\) A classroom experiment involves collaboration between a research group and a teacher. During the collaboration, the teacher assumes responsibility for the instruction (Cobb et al., 2003).
supported autistic students who showed different characteristics, given the vast diversity of features that are associated with autism.

By observing how different autistic students engaged in class discussions, I identified strategies that seemed more helpful in supporting the participation of each of them. This observation also enabled me to register how each teacher usually assisted the students and specific affordances and limitations that affected each context. The case-study design allowed me to continuously observe and analyse in-depth the interactions that occurred in each classroom before, during, and after the teachers trialled the strategies. This method was ideal for the iterative assessment and update of the strategies and design principles, which I adjusted to each teacher’s objectives and student's needs.

To follow my research aim and given the diversity among autistic individuals, I did not compare the class interactions among the participating classrooms. Instead, I compared findings between cycles to optimise the design framework (Bakker, 2018). Additionally, it would have been impossible to match classrooms to make them comparable due to the heterogeneous difficulties and strengths of autistic students and the different characteristics of schools (Mottron, 2004).

3.3.3 Ethnography of communication

It was essential to analyse classroom talk due to my interest in observing autistic students' participation in discussions, the hindering and enabling aspects of these discussions and the teachers' support via dialogic strategies. Consistent with my interest in developing dialogic teaching strategies, I used empirically tested coding schemes to identify systematically dialogic features of class interactions. These schemes involved coding at the level of discourse moves or turns that reflected an interactional function (I describe the coding frameworks and how I used them in Chapter 4). However, before using these schemes, it was essential to consider how the context impacted the teachers’ and students’ contributions to the discussions (shaping their meaning). I decided this taking into consideration that the meaning and functions of talk moves depend on their position within a sequence of moves.
and the cultural setting in which they occur (Gee & Green, 1998; Lefstein et al., 2015).

To address this issue, I adopted methods from the EoC to enrich my analysis of class interactions. The EoC represents an approach to language research that recognises language as a system of cultural behaviours (Farah, 1997). It originated in Hymes’ (1968) work as a discipline that was focused on the analysis of the patterning of communicative behaviour as it functioned within the holistic context of culture and related to patterns in other component systems (Saville-Troike, 2003). Maine & Čermáková (2021) emphasise that an ethnographic approach to analysing classroom dialogue enables the consideration of the situational contexts, participation structures and relationships among turns of speech.

I adopted the three units of analysis that were suggested by Hymes (1972) to study communication. These three units delineate communicative activities that show recognisable boundaries (Saville-Troike, 2003). These units are the communicative situation (CS), communicative event (CE), and communicative act (CA). Together they represent a hierarchical system of nested categories. At a macro-level, a CS serves as the context for the manifestation of one particular communication activity. It maintains a consistent configuration of activities and the same overall ecology. At a meso-level, a CE represents an activity or an aspect of activities within CSs that are governed by rules or norms for the use of speech. Saville-Troike (2003) suggested that a unified set of components defined a CE, including a particular purpose and topic of communication and a determined group of participants and setting. Therefore, a CE terminates when there is a change in participants or the focus of attention. At a micro-level, CAs represent particular functions in social interactions (e.g., a request), which are embedded in a CE.

Figure 3.1 shows a visual representation of these units of analysis. Chapters 5 and 7 include diagrams of the units of analysis that I delimited for specific observations I conducted in each classroom (e.g., Figure 5.2), which can serve as examples of how I carried out the analysis.
I identified dialogic features in the class interactions at the level of CAs through the use of empirically tested coding schemes for educational dialogue (see Section 4.4.3). However, following the methodology suggested by Hennessy et al. (2016), I interpreted the features I identified with consideration of the CE and the situation in which the coded acts occurred.23

By establishing these three units of analysis, I extracted segments of class interactions that were related to specific goals or topics within a lesson (and even, in more detail, within a particular activity). This segmentation gave me an overall view of the structure and context of the communication during activities. It made it possible for me to register the influence of previous interactions and activities on students’ participation. Additionally, it enabled me to select relevant segments in which students on whom I was focused contributed to a discussion. I describe in Section 4.4.3 how I delimited these three units of analysis for each of my observations. I also explain how I characterised each level and my addition of another meso-level unit.

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23 One coding scheme I used was that developed by Hennessy et al. (2016), who suggest that CA-level coding should be accompanied by the establishment and analysis of the three units of analysis from EoC (see Section 4.4.3).
3.3.4 Interpretative phenomenological analysis

I adopted methods of IPA to analyse baseline teacher interviews and parent questionnaires. IPA is a qualitative research approach that enables a detailed examination of how people make sense of their life experiences, through exploration of the meanings that specific experiences and events hold for them (Smith et al., 2013; Smith & Osborn, 2003). It involves examining the subjects’ accounts intensively and iteratively by interpreting them in terms of possible meanings (always with consideration of the individual’s context) and comparing them with the accounts from other subjects and the researcher’s evolving understanding (Eatough & Smith, 2017; Smith et al., 2013).

I used these methods due to my interest in understanding the participants’ beliefs and meanings related to dialogue, inclusion and the participation of autistic students in activities. My aim was also to identify their priorities related to the support that was provided to the students. Through IPA methods, I developed an interpretative account of the teachers’ experiences of teaching autistic students and their support of the students’ participation, incorporating the parents’ perceptions of their children’s experiences in school and the schools’ support. This information was relevant to my research in two ways. It enabled me to consider the participants’ voices during the development of this research’s design products; and it gave me insight into the teachers’ experiences, goals and difficulties related to their promotion of dialogue with and their support for the focus students before they tested the adjusted strategies in their classrooms. The latter insight informed my analysis of their reactions to, perceptions of, and commitment to the intervention. I explain how I implemented these methods in Section 4.4.4.

24 The approach commits to equality of voice and researcher reflexivity, which, Howard et al. (2019) suggest, can help to illustrate more closely the experiences of autistic individuals and avoid researcher-autistic individual misunderstandings. I suggest that these beneficial outcomes could apply to interviews with other members of the autism community.
4 Method

In this chapter, I describe the characteristics of the design that was used in this investigation, the ethical considerations, the procedures and the instruments I used in each design cycle.

4.1 Design of the study

4.1.1 Type of study

Consistent with a DBR approach, this research had an advisory function (Bakker, 2018); it had characteristics of an exploratory and, to some extent, explanatory study. Through four design cycles, I developed, tested iteratively and refined an innovative design framework that provided a theoretical and practical insight into how teachers could promote autistic students' participation in discussions within mainstream classrooms. The design framework comprised teaching strategies that had been adjusted to take into account autistic students' common communication characteristics, and design principles that explain the theoretical underpinning of and logic behind those strategies. These principles may help others to develop and implement strategies relevant to their contexts, dialogue goals, and students' characteristics and preferences.

As advised by the DBR approach, I used diverse data collection and analysis methods throughout the four design cycles (Easterday et al., 2018). My investigation, which involved a design-based and mixed-method approach, included the following elements.

- During Cycle 1, I created a prototype of the design framework that was based on current literature on EBP regarding autistic individuals and dialogic teaching. At the end of the cycle, I introduced three mainstream schoolteachers in England to the prototype and asked for their input to develop it further.
- During Cycles 2 and 3, I conducted an intervention study that was of a multiple-case design and which involved participant observation (over
four to six months in a school year). The three teachers I introduced to the prototype at the end of Cycle 1 tested the design-framework strategies in their classrooms during two trial periods as part of the intervention. During the observation, I maintained a naturalistic approach to permit teachers to focus on their topics of interest and facilitate and encourage their engagement with the study. (I address the ethical and practical reasons why I adopted this approach in sections 4.2.1 and 4.3.2.1). I updated the design framework based on class observations and the teachers’ input.

- I developed and implemented an online professional development (PD) course for practitioners who worked in mainstream classrooms, through which I gathered feedback on the adjusted strategies.

The multiple-case design permitted continuous observations and fine-grained analyses of the social interactions that occurred in each classroom. These data informed an individualised refinement of the strategies. I adopted the mixed-methods approach in a complementary fashion. This enabled me to gain an in-depth understanding of the autistic students' participation, the teachers' use of the strategies (and other forms of support) and the strategies that seemed to offer the most support. Specifically, I was able to do the following:

- Qualify the teachers' and students' participation in class discussions, identifying dialogic features and interpreting them based on the context.
- Quantify the dialogic features, initiations and responses that I identified; and
- Register teachers' and parents' opinions through the use of questionnaires, interviews, and an online survey and forum in the PD course. I identified themes in the interviews, questionnaires and teachers' feedback and quantified responses that were related to the usefulness or applicability of the strategies.

Figure 4.1 illustrates the four design cycles of this research (Section 4.3 describes the methods I followed in each of them). The first cycle involved the creation of the design framework, its trial and evaluation; each subsequent cycle involved its refinement, trial and evaluation. In total, the design framework had four versions.
Figure 4.1. Overview of the design cycles that were created for this investigation

Notes:
A. Delimitation of 8 elements of evidence based practices for supporting autistic children.
B. Consultation with the participants (interviews and initial workshops with teachers and questionnaires sent to parents).
C. Baseline classroom observations.
D. Classroom observations and trialling of the strategies.
E. Collaboration with teachers (communication and meetings with teachers, including joint analysis sessions when possible).
F. In-depth analysis of selected examples of class interactions.
G. Re-arrangement of the design principles in Design Framework 2.
H. Consultation with teachers in various schools in England via an online course.
This investigation adopted a 'pragmatic worldview' that was concerned with applications, solving problems and drawing from quantitative and qualitative methods (Creswell, 2014). Pragmatism was coherent with its design approach because DBR does not require the researcher to commit to a particular stance or procedure. Instead, it advises the researcher to deploy different methods in ways appropriate to the iterative development of the design products, and it supports the solution of practical problems (Easterday et al., 2018).

4.1.2 Participants and context

I collaborated with two groups of participants during this investigation. The first group participated in the first three design cycles as part of the intervention study, and the second took part in the online PD course during the fourth cycle. I describe these groups below (Section 4.3 describes the sampling procedures that were used to enrol each group).

4.1.2.1 Participants in the intervention study

Three primary-school classrooms, each of which included one student with an autism diagnosis, participated in the intervention study. This group comprised one Year 1 and two Year 5 classrooms, each of which represented a case study. The classrooms were in three different mainstream schools that catered for some students’ EHCPs\textsuperscript{25} or special educational needs (SEN\textsuperscript{26}) statements. Two were in the East of England and the other in London. None of the schools was officially involved in any other professional development programme on productive dialogue during the intervention.

The three autistic students, their teachers and their parents were the focus participants in these classrooms. The three autistic students were boys. Each had an

\textsuperscript{25} An EHCP is a plan of care for children and young people aged up to 25 who need more support than is available through special educational needs support in their schools. It identifies educational, health and social needs and sets out the additional support required to meet those needs. It is created by a local authority (GOV.UK).

\textsuperscript{26} An SEN support statement describes the support that should be provided in school to a child in response to any learning difficulties or special needs that are related to a disability (GOV.UK)
official diagnosis of autism from a psychiatrist and did not present with significant language delay. I established as selection criteria the students' ability to speak in sentences, pay attention to activities that had been initiated by others and participate in a group with support. Table 4.1 shows information regarding each participating classroom and the autistic students.

Table 4.1. Characteristics of the three participating classrooms

<table>
<thead>
<tr>
<th></th>
<th>Classroom A</th>
<th>Classroom B</th>
<th>Classroom C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year group</td>
<td>Year 1</td>
<td>Year 5</td>
<td>Year 5</td>
</tr>
<tr>
<td>Focus students</td>
<td>1 boy</td>
<td>1 boy</td>
<td>1 boy</td>
</tr>
<tr>
<td></td>
<td>6 years old</td>
<td>9 years old</td>
<td>10 years old</td>
</tr>
<tr>
<td></td>
<td>Had an EHCP</td>
<td>Had an EHCP</td>
<td>Had an EHCP</td>
</tr>
<tr>
<td>No. of students</td>
<td>30 students</td>
<td>30 students</td>
<td>21 students</td>
</tr>
<tr>
<td></td>
<td>Aged 5 to 6 years old</td>
<td>Aged 9 to 10 years old</td>
<td>Aged 9 to 10 years old</td>
</tr>
<tr>
<td>Usual no. of teachers and teaching assistants (TAs)</td>
<td>1 teacher 1 TA</td>
<td>1 teacher 1 TA</td>
<td>1 teacher 1 TA</td>
</tr>
<tr>
<td>Location</td>
<td>East of England</td>
<td>East of England</td>
<td>London</td>
</tr>
</tbody>
</table>

I observed the participation of autistic students in primary-school classrooms because, at this educational level, the environment is stable; usually one teacher was in charge of the teaching, and students remained in the same classroom for most of their lessons. These characteristics were ideal because one teacher oversaw the implementation of the adjusted dialogic strategies in each classroom. One teaching assistant (TA) was present in each of the classrooms and supported the autistic students when necessary. Additionally, the schools would have identified most students who might be autistic because children are usually diagnosed between the ages of three and eight years (Ghaziuddin, 2010). Two other autistic students were part of Classrooms A and C. I did not include them as focus students because one was undiagnosed and experienced additional difficulties, and the other displayed high-level communication difficulties and left the school. Additionally, other

27 It is important to mention that some autistic individuals, who may experience less perceptible difficulties, can go undiagnosed until they attend secondary school or higher education. This is because their difficulties are not noticed until they face greater demands in these educational settings (Baron-Cohen et al., 2009).
students experienced different challenges in Classrooms A and C, whom the teaching assistants supported. In Chapter 6 (Section 6.7), I briefly describe how the teachers assisted these students' participation with the study's strategies.

During my observations of the autistic students' participation and the teachers' implementation of the strategies, I coded the contributions of all the students in the selected discussions. The use of a 'sample' of three classrooms enabled me to analyse the interactions in each classroom in detail throughout the intervention. Hence, I could improve the intervention according to the students' characteristics and needs. I did not recruit control groups because autistic students have heterogeneous difficulties and strengths (Mottron, 2004), and I aimed to promote an individualised intervention for each classroom (see Section 3.3.2).

4.1.2.2 Participants in the PD course for practitioners

In the fourth cycle, 16 teachers in England took part in the online PD course that presented the strategies that had been created during the intervention study. Most of these teachers worked in mainstream educational settings (81%, n=13); these were primary schools (75%, n=12) and higher education (college, 6%, n=1). One participant indicated that they were involved in an inclusive school (6%), and the other two (12%) worked in a school that was centred on initial teacher education for primary, middle, and special schools. Some of the teachers had roles related to their school's support provision for SEN (38%, n=6). These six participants were either coordinators of the SEN and disability provision in their schools (SENDCos) or class teachers with roles related to SEN provision. Another six (38%) of the teachers were trainee teachers working in their placement schools.

I invited only teachers who were working in schools in England because this was the context in which I had developed the design framework. I sought the feedback of teachers who worked in mainstream classrooms and had experience teaching autistic students. The participation of the teachers with roles related to SEN provision

28 The teachers who were involved in teacher education were developing a programme for trainee teachers on 'inclusion and communication'.

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was also beneficial because they had information about the usual interventions and support that were provided for autistic students in their schools.

4.1.3 Overview of the design of this investigation

Table 4.2 presents a summary of the main features of the design of this investigation, following Denscombe’s (2010a) characterisation.

Table 4.2. Key features of the research design

<table>
<thead>
<tr>
<th>Intervention study</th>
<th>PD course</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participants</strong></td>
<td>16 teachers, some of whom were SENDCos, from mainstream schools in England at which autistic students were taught.</td>
</tr>
<tr>
<td><strong>Variables</strong></td>
<td></td>
</tr>
<tr>
<td>• Autistic students’ participation in class discussions (frequency and characteristics).</td>
<td></td>
</tr>
<tr>
<td>• Teachers’ promotion of dialogue and support of focus students’ participation (including their use of dialogic strategies).</td>
<td>Teachers’ feedback on the adjusted strategies that had been created as part of the intervention study.</td>
</tr>
<tr>
<td>• Teachers’ and parents’ opinions regarding the students’ experiences and participation in school.</td>
<td></td>
</tr>
<tr>
<td><strong>Intervention</strong></td>
<td></td>
</tr>
<tr>
<td>A multiple-case intervention with no random allocation of participants.</td>
<td>Feedback surveys and open boxes.</td>
</tr>
<tr>
<td><strong>Timeframe</strong></td>
<td></td>
</tr>
<tr>
<td>Longitudinal, over four to six months.</td>
<td>Cross-sectional.</td>
</tr>
<tr>
<td><strong>Number</strong></td>
<td></td>
</tr>
<tr>
<td>Study oriented towards obtaining in-depth information on the use of adjusted teaching strategies to support the participation of autistic students in mainstream classrooms.</td>
<td>Obtain information on how the teaching strategies can be improved and the strategies that teachers find helpful.</td>
</tr>
<tr>
<td><strong>Type of data</strong></td>
<td></td>
</tr>
<tr>
<td>Qualitative and quantitative.</td>
<td>Qualitative and quantitative.</td>
</tr>
<tr>
<td><strong>Theory</strong></td>
<td></td>
</tr>
<tr>
<td>Explanation and exploration.</td>
<td>Exploration.</td>
</tr>
</tbody>
</table>
4.2 Ethical considerations

This investigation adhered to the ethical guidelines of the British Educational Research Association (BERA, 2018). I had undergone a Disclosure and Barring Service check, and all the participants received information regarding the stage of the investigation in which they were taking part (the intervention study or the online PD course). I obtained ethical approval from the Faculty of Education at the University of Cambridge before I started my collaboration with the participants.

I introduce below the specific ethical considerations for the intervention study and the online course, as well as comments related to the consideration of the participants' voices in research.

4.2.1 Ethical considerations during the intervention study

Before I started the intervention, I provided the teachers and the parents of all the students in the participating classrooms each with an information sheet, a consent form and a privacy policy. These documents disclosed information regarding the aims and procedures of the study, each participant’s right to withdraw, and details regarding the data processing (see Appendix A). All the students were informed by their teachers of the study’s procedures before the research started. I introduced myself to the students of each school, described what I would do in their classrooms and offered to answer questions.

To retain the participants' confidentiality, I assigned them pseudonyms. I informed all participants that I would video and audio-record some lessons throughout the school year. I kept confidential all the data I gathered (video and audio-recordings, written responses and personal information) and stored it in an encrypted and password-protected hard drive.

One sensitive aspect of this study was the identification of the autistic students in the participating classrooms. I asked the schools that were interested in participating to contact the parents of the students first and explain the study to them so that they could decide whether they consented to the school disclosing their
children's diagnoses to me and to their children's participation in the study. I provided these parents with more detailed information sheets, which included information about the study's aim to develop strategies to that adjusted to the communication characteristics of autistic children.

I kept the students' diagnoses confidential because autistic students often feel singled out due to the special support they receive in school (e.g., Pisula & Łukowska, 2012; Saggers et al., 2011). I carried out the following procedures to avoid attracting extra attention to the students or promoting stressful situations.

- I positioned cameras and recorders in two corners of the classroom and observed the interactions from there, to remain distant from the autistic students.
- I adjusted the information sheet I provided to the classmates' parents in the three classrooms, so that it did not mention the students' diagnoses. The document contained information about the study's procedures and the general aim of studying class interactions among students with different communication forms in mainstream classrooms. The schools gave the parents the information sheets, consent forms and privacy policies in envelopes, along with new envelopes. I asked the parents to fill in the consent form and return it to the school inside the new envelope.

Other important aspects that influenced how the activities developed throughout the study were teachers' time availability, workload and interests. I adjusted the number of activities in each classroom and the teachers' level of engagement accordingly (often reducing them) to facilitate their participation. This decision was particularly relevant due to the time-consuming and high-commitment nature of the study. In the case of teachers B and C, with whom I had limited contact and who preferred less involvement in the study's activities, the adjustments were necessary due to the demands they experienced related to additional roles they had, school-wide events and their school's curriculum. I also maintained a naturalistic approach while teachers trialled the strategies in their classrooms to allow them to focus on topics of interest and have flexibility in how and when they participated. Through these adjustments and a naturalistic approach, I aimed to reduce the
pressures related to taking part in the intervention study while addressing their teaching goals and the school’s expectations.

4.2.2 Ethical considerations as part of the online course

I advertised the online PD course to a network of teachers in the UK by sharing a flyer via email. I used the blind carbon copy feature to avoid disclosure of the teachers’ email addresses to others. I asked those teachers who were interested in participating to contact me or to complete an online form. I sent them an information sheet and a consent form to be completed before they could access the course. I indicated the following information:

- the contents of the course;
- the personal information I would register and how I would use it;
- information regarding the intervention study that would help in the development of the teaching strategies; and
- details regarding the participants' right to withdraw their participation.

Once each teacher had returned a signed consent form, I emailed them an individualised username and password to access the course. The Moodle platform of the University of Cambridge hosted the course, and the Moodle administration team in the university information services section for the Faculty of Education administered it. The faculty adheres to the General Data Protection Regulation (GDPR, 2016) and does not disclose personal data29 (as required by law). The contents of the course and the contributions from the participants were available only to the participants and the course administrators (i.e., the Moodle team and me). I kept confidential all personal information that the teachers shared with me, including their full names and the names of their schools. I also asked the participating teachers not to share identifiable information about their students. A privacy policy was available for them in the online course.

29 More information about the guidelines and policies to which the Moodle team adhered can be found in the following links. Moodle policy and legal statements: https://www.student-systems.admin.cam.ac.uk/moodle/legal; Moodle list of active policies: https://www.vle.cam.ac.uk/admin/tool/policy/viewall.php; university information services’ storage and sharing of personal data: https://help.uis.cam.ac.uk/service/security/personal-data
4.2.3 Consulting the voices of the participants

Inspired by the code of practice drawn up by Hampton and Fletcher-Watson (2016) for researchers investigating autism, I aimed to develop the design framework with consideration of the participants' opinions. This code of practice originated from discussions between researchers, practitioners, autistic people and their families in a UK seminar series entitled ‘Shaping autism research’. The code aims to promote participatory research, and it suggests that researchers should collaborate with the autistic community by involving its members in all aspects of research (Fletcher-Watson et al., 2019). Involvement may include sharing lay abstracts of research with and defining research questions and procedures with the autism community.

There is interest currently in the development of autism research with members of the autistic community, from its conception to its implementation, and on issues that matter to them instead of it happening to or for them (Chown et al., 2017; Fletcher-Watson et al., 2021; Happé & Frith, 2020). With this in mind, I aimed to include the participants' voices in the development of the intervention and design framework. I consulted the teachers and the autistic students' parents to discover factors that were likely to enhance or hinder the students' participation. I considered this an ethical and pragmatic aspect of my research that would enable me to understand and focus on the students’ goals and characteristics to update the design framework accordingly.

I asked for the opportunity to interview the three participating autistic students with their teachers. However, the opportunities I had to interact with the students were limited and inconsistent between the three classrooms. They were limited due to the adjustments I made to the study's activities to match the teachers' preferences and availability. Therefore, I do not report an analysis of my interactions with these autistic students. In a future design iteration, it would be desirable to consult the opinions of autistic individuals who attend (or have attended) mainstream education regarding the design framework's strategies and their preferred forms of support.

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30 More information about the ‘Shaping autism research’ UK seminars can be found at: https://www.shapingautismresearch.co.uk
4.3 Procedures

In the following sub-sections, I describe the methods I followed to recruit the participants and to collect and analyse data in each of the four design cycles. Each subsection outlines how I created, updated, and tested the design framework in each cycle. I describe the four versions of the design framework in Chapters 5, 6 and 8. Appendix B illustrates how the design framework evolved throughout this investigation.

4.3.1 Cycle 1: creation of Design Framework 1

I created the prototype of the design principles and strategies of the design framework during the first cycle. I first elaborated a set of principles and strategies that were based on theories and current research on dialogic pedagogies and best practice in the support of autistic individuals. I consulted the latter to develop them with consideration of the common forms of communication, thought and perception that are associated with autism. This set of principles and strategies represented Design Framework 1. Second, I introduced Design Framework 1 to the three participating teachers from the intervention study during a series of initial workshops. I also conducted baseline classroom observations, interviewed the participating teachers and sent questionnaires to the autistic students' parents to gather baseline data. The teachers' feedback and baseline data helped to refine the design framework, taking into account the students' characteristics and teachers' objectives. This process led to a revised version of Design Framework 1. I describe the development and refinement of Design Framework 1 in more detail below.

4.3.1.1 Elaboration of the initial design framework

I used empirically tested, dialogic teaching strategies as the basis for the elaboration of the preliminary strategies of the design framework. These strategies were those included in the coding framework of the Teacher Scheme for Educational Dialogue Analysis (T-SEDA; Vrikki et al., 2019). It is a 'teacher-friendly' coding scheme that comprises ten 'dialogue categories', which represent fundamental dialogic forms
through which people contribute to dialogue and strategies to promote it. I selected this scheme due to the following reasons:

- Researchers developed it for practitioners.
- Teachers have tested it worldwide.
- It stems from another extensive coding scheme that comprehensively characterises dialogic interactions (i.e., the Cambridge-National Autonomous University of Mexico (Cam-UNAM) scheme for educational dialogue analysis (SEDA) (Hennessy et al., 2016). I describe the T-SEDA and SEDA in Section 4.4.3.

I enriched the dialogic strategies of the T-SEDA with features of some of the EBPs that are most used to support autistic children. I first identified these EBPs through a literature search in these digital databases: the British education index; PsychInfo; and Scopus, through the use of the keywords 'autism', 'evidence-based practices', and 'autism spectrum disorder' (November 2018). Most of the articles I gathered were review papers that followed the methods of systematic literature reviews and delineated the criteria used to determine whether a practice had enough evidence for its use to be recommended. I also adopted a snowball approach to retrieve other relevant papers. Second, I created a list of the practices I identified in the selected articles. Based on their shared characteristics, I extracted eight main features that characterised them. These features represented the first set of design principles for Design Framework 1. Third, I developed dialogic strategies for each design principle based on the EBPs I had identified (particularly those applicable in classrooms and that were congruent with a dialogic pedagogy) and some of T-SEDA's strategies. I describe this process in detail in Section 5.1.

I decided to consult different practices that were considered to be effective and to identify the characteristics that they had in common instead of adhering to one only. I considered that practitioners and researchers usually adopted technically eclectic programmes that combined practices so that they could address specific, individualised, intervention goals. I explain why I did not adhere to one piece of EBP in Section 5.1.2.
4.3.1.2 Sampling for the intervention study

To trial and evaluate the design framework, I recruited three primary school classrooms from three different mainstream schools in England for an intervention study. The small sample enabled me to gather extensive information from each classroom, to carry out fine-grained analyses and to develop individualised adjustments in the teaching strategies. I recruited them through non-statistical, purposive sampling to obtain an exploratory sample. This sampling method enabled me to develop and test the adjusted dialogic strategies in classrooms that showed specific characteristics relevant to the study (Denscombe, 2010b). These characteristics were:

- The class was in a mainstream primary school and it offered SEN support.
- It contained at least one student who had been diagnosed officially with autism.
- The autistic students could speak in sentences, pay attention to activities initiated by others and participate in a group with support.
- The class was not part of a school year in which students underwent standardised assessment tests (SATs) during the school year (i.e., Years 2 or 6). These years dedicate part of the curriculum to preparation for the SATs and often place teachers and students under pressure (Bradbury et al., 2021).

The study required the investment of time and effort by the participants. So, it was desirable for the participating teachers to be interested in partaking in a longitudinal intervention that aimed to support the participation of autistic students. For these reasons, I did not conduct probabilistic sampling and obtain a representative sample. A random selection would not guarantee the inclusion of participating classrooms that showed the required characteristics and contained students and teachers who were interested in participating in the study. Additionally, it was unlikely that I would find a fully representative sample of autistic students in mainstream classrooms due to the wide variety of manifestations of autism.

I contacted various mainstream primary schools in the East of England via email and phone calls. I addressed the schools' SENDCos and head teachers, with whom I shared information about the study's aim. Interested schools contacted me to
arrange meetings in their schools with their SENDCo to discuss the procedures of the intervention study. Next, each school's head teacher and SENDCo shared the information with the teachers in their schools who taught autistic children. Classroom A's teacher volunteered to take part because she was interested in improving the support she gave to an autistic student in the class. The head teachers of the schools in which Classrooms B and C were based indicated teachers who met the inclusion criteria and these teachers agreed to participate. The time that was needed to recruit each teacher and to obtain written consent to participate from the teachers and the students' parents varied among the three classrooms. In consequence, the study started on different dates in each school. Classrooms B and C began later than Classroom A.

4.3.1.3 Baseline data collection in the participating classrooms

Before the teachers trialled the strategies, I gathered baseline information from each class to refine the design framework. This information included the characteristics of each autistic student, the teachers' dialogue goals and the typical activities of each classroom. I describe below how I collected this information.

- **Classroom observations.** I visited each classroom on two separate occasions to observe and to video and audio-record typical interactions that occurred in each class. The first observation was treated as a habituation day for the students and teachers. I videoed only one lesson and trialled the positioning of the cameras and audio recorders. On the second day, I recorded three lessons to observe the class interactions during activities that were associated with different subject matters and class arrangements (whole-class and small-group activities). I focused on the class discussions and the level of support that the autistic students received from their teachers and TAs.

- **Semi-structured interviews with the teachers.** I interviewed the teachers to learn more about their experiences of teaching autistic students, their opinions on inclusion and how they promoted classroom discussions. I conducted these interviews at the teachers' schools; the average duration of an interview
was one hour; and I audio-recorded them. The TAs of Classrooms A and B also participated.

- **Questionnaires for the autistic students' parents.** I sent questionnaires to the parents of the autistic students that measured the parents' perceptions of their children's school experiences and the school's support (via a five-point Likert scale) and invited them to share details of their children's strengths and difficulties (through the use of open questions).

Section 4.4.2 provides more information on the elaboration and contents of the interviews and questionnaires. I include the interview schedule and questionnaire in Appendix C.

**4.3.1.4 Preliminary analysis of the baseline data**

In this first cycle, I performed preliminary analyses of the baseline video recordings of class interactions through the use of EoC tools (Hymes, 1972). I extracted segments of class interactions, that were related to different activities within each lesson. From these, I extracted specific exchanges that were related to specific goals and topics (see Section 4.4.3). I took notes on the overall classroom context, the usual class arrangements and activities and the autistic students' general forms of participation and communication during class discussions.

I also preliminarily analysed the interviews and questionnaires. I focused on the characteristics that teachers and parents shared about the autistic students, the strategies they identified as most effective for supporting the students, and the usual challenges the students faced during class activities. I added the strategies they had pointed out to Design Framework 1 and noted the aspects that could enhance or hinder the students' participation. I also checked for any potential areas of improvement that parents had indicated in the Likert-scale part of the questionnaire. I quantified their responses to the scale to obtain an overall score per questionnaire.
4.3.1.5 Refinement of Design Framework 1 with the participating teachers

After collection of the baseline observations, I introduced the three participating teachers to the initial strategies contained in Design Framework 1 and invited them to provide their input to develop them further. I asked them to participate in three, weekly, two-hour workshops in which I:

- Shared this study's conceptualisation of autism,\(^{32}\) information on autism (commonly associated strengths and difficulties), and productive classroom dialogue.
- Introduced the T-SEDA coding framework and the process of coding with it.
- Presented the design principles of Design Framework 1 and their preliminary strategies (I displayed the latter in the format of the T-SEDA scheme).
- Invited the teachers to add new strategies or enrich the preliminary versions based on their previous experiences and the characteristics of their students.

I conducted these workshops with each teacher separately and adjusted the number of sessions and the dates on which they occurred according to each teacher’s availability. The extent to which I carried out the planned activities depended on the number of sessions I was able to hold with each of them. Teachers A and C each participated in three, two-hour workshops, while Teacher B took part in only one, one-hour workshop. Despite these differences, I introduced all the teachers to the study’s conceptualisation of autism and the coding process that involved use of the T-SEDA framework with an example video.\(^{33}\) I also advised them to establish ground rules for talking to their students to prepare them for the intervention. All teachers had access to a personal online folder, to which I added the workshop materials. These included a copy of the T-SEDA coding framework, the initial design

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\(^{32}\) The first workshop session started with a discussion about the social model of disability and the neurodiversity movement, and their relationship to the support provided to autistic individuals. I aimed to raise awareness of the different forms of cognition and communication that might be used by autistic individuals, in order to justify the objective of adapting teaching to make it accessible to all students.

\(^{33}\) I retrieved the video example from the T-SEDA research project with the permission of the T-SEDA research team (Faculty of Education, University of Cambridge). The video is used in PD workshops on coding with T-SEDA.
principles of Design Framework 1 and the working version of its strategies. The latter two were modifiable, and I encouraged the teachers to edit them.

Teachers A and C had the opportunity to watch a video excerpt from the baseline observations that illustrated their students' participation. I encouraged them between sessions to observe the interactions that occurred in their classes and to try out T-SEDA strategies so that their experiences could inform our discussion on the strategies in Design Framework 1.

The aims of the workshops were to:

- Provide the teachers with a link between the theoretical concepts (related to dialogic teaching, autism, and the preliminary strategies) and their practice. Previous empirical research has found that the lack of this link can hinder teachers' implementations of a dialogic pedagogy (Reznitskaya & Gregory, 2013; Sedova et al., 2014). I aimed to present potential steps for the implementation of dialogic teaching and to contextualise the strategies that could be used in their classrooms, and prepare them for critical examination of class discussions (Mercer & Howe, 2012; Sedova et al., 2016).
- Consult the teachers regarding their opinions on the preliminary design framework to update it accordingly.
- Familiarise the teachers with the T-SEDA coding framework.

The adjustments and additions that were made to the design framework corresponded to the first assessment and refinement of Design Framework 1.

4.3.2 Cycles 2 and 3: creation of Design Framework 2

The teachers tested the revised Design Framework 1 in their classrooms during Cycles 2 and 3 (intervention study). Each cycle comprised a trial and assessment period. The teachers implemented the strategies, and I observed and videoed some lessons to assess their implementation and their impact on the focus students' participation. The latter involved analysis of examples of class interactions, per
lesson I observed, per classroom. I invited the teachers to participate in this analysis (if possible).

After each cycle, I adjusted the description of the Design Framework 1 strategies and added new ones that the teachers (or TAs) had implemented in their classrooms. At the end of Cycle 3, I invited the teachers to participate in interviews. I sought their opinions on the Design Framework 1 strategies and their experiences in the intervention study. I describe below the data collection and analysis methods that I used in Cycles 2 and 3.

4.3.2.1 Data collection: classroom observations and interviews

During the intervention study, I gathered recordings of class interactions and teachers' feedback and opinions. These data enabled me to assess and register the impact of the Design Framework 1 strategies, the teachers' support, and the autistic students' forms of communication and participation. The data fulfilled different purposes depending on when I collected it, either during or after the trial periods. I describe below the data I collected during and at the end of the trial periods and its purpose.

Data collected during the trialling of the strategies

Overall, each trial period lasted up to one month (the end of February to the start of April, and the end of May to the start of July 2018). During these periods, I encouraged the teachers to use the strategies of Design Framework 1 in activities that involved whole-class and small-group discussions. They did this during lessons on specific subject matter that they had selected based on their dialogue interests. I proposed that I would visit their classrooms on three days (once every two weeks) during each trial period to observe one lesson per day on their chosen subject matter. I also suggested that I schedule a meeting per observation to analyse jointly a video excerpt from the lesson.\(^{34}\) However, the specific duration of each trial period,

\(^{34}\) I scheduled the observation days and joint analysis sessions via email exchange and through the marking of dates in a shared timetable (included in the teachers' online folders). Due to the late start of the study in classes B and C and other compromises that teachers were required to make in their schools, there were limited viable date options for observation days.
and the number of lessons and joint analysis sessions that I attended per classroom depended on each teacher's availability.

For ethical and logistical reasons, I made every effort to accommodate changing and unforeseen circumstances in the schools and the teachers' preferences.\(^{35}\) As mentioned in Section 4.2.1, the adjustments frequently involved reducing the number of class observations and analysis sessions to match the teachers' time availability. I also adopted a naturalistic approach for two practical purposes. One goal was to encourage and ensure the teachers' continuous participation in the study, on which my access to the participating schools depended. It allowed teachers to trial the strategies in the activities and subject matters of their choosing. They also had the flexibility of changing these at their convenience and based on their students' preferences. This way, I aimed to motivate teachers to continue participating throughout the school year and help them feel comfortable with the associated workload throughout the extended intervention study. Another goal was to observe how teachers' integrated the strategies into their everyday practice, including how they implemented them and in which type of activities. These observations permitted me to refine the strategies based on how teachers used them in realistic contextual conditions. Particularly in the case of teachers B and C, with whom my communication and collaboration were limited, it gave me insight into their priorities and the strategies they considered relevant for their students based on classroom observations. This approach impacted the data I collected and how I analysed them. It particularly influenced the extent to which I could interact with the autistic students and my comparative analysis of the pre-and post-intervention class observations (see the following subsection on the data collection after the intervention).

Table 4.3 shows the number of lessons I observed, their subject matter and the number of sessions of joint analysis per cycle that were held for each classroom (I describe these in detail in Chapter 6).

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\(^{35}\) I describe the adjustments to the design of the intervention in each classroom in Chapter 6, in Sections 6.4.2, 6.5.2 and 6.6.2.
I video and audio-recorded each lesson I observed per classroom and took notes related to each focus student's participation. The lessons had an average duration of 45 minutes. These observations and discussions with teachers informed the iterative update of the Design Framework 1 strategies.

**Data collected at the end of the intervention study**

To evaluate the quality of class interactions at the end of the intervention and the potential impact of Design Framework 1 on the autistic students' participation and teachers' support, I carried out extended class observations and final teacher interviews.

Specifically, I observed, and video- and audio-recorded two to three lessons that were held during a single school day in each classroom at the end of Cycle 3. My aim in recording these lessons was to compare these observations with the baseline ones. I focused on the teachers' use of the strategies and the autistic students' participation during each observation. Consistent with the study's naturalistic approach, the teachers determined the lessons I observed, which were not the same as the ones I observed at baseline in all cases. Even though these differences limited the comparison between observations, the changes reflected the teachers' decisions regarding the activities in which they could promote their autistic students' participation (I describe my analysis in Chapter 7).

**Table 4.3. Lessons observed and joint analysis sessions performed per trial period per classroom**

<table>
<thead>
<tr>
<th></th>
<th>Classroom A</th>
<th>Classroom B</th>
<th>Classroom C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cycle 1</strong></td>
<td>3 lessons observed</td>
<td>3 lessons observed</td>
<td>1 lesson observed</td>
</tr>
<tr>
<td></td>
<td>3 joint analysis sessions</td>
<td>1 joint analysis session</td>
<td>No meetings</td>
</tr>
<tr>
<td><strong>Cycle 2</strong></td>
<td>3 lessons observed</td>
<td>2 lessons observed</td>
<td>3 lessons observed</td>
</tr>
<tr>
<td></td>
<td>2 analysis sessions</td>
<td>No meetings</td>
<td>1 analysis session</td>
</tr>
<tr>
<td><strong>Subject matter</strong></td>
<td>Religious education</td>
<td>Maths and English</td>
<td>Philosophy for children and guided reading</td>
</tr>
</tbody>
</table>

I video and audio-recorded each lesson I observed per classroom and took notes related to each focus student's participation. The lessons had an average duration of 45 minutes. These observations and discussions with teachers informed the iterative update of the Design Framework 1 strategies.
I adjusted the baseline teacher interview schedule to conduct semi-structured interviews with Teachers A and C (Teacher B did not participate\textsuperscript{36}) and to inquire about the following factors:

- Changes in students' participation and attitudes towards class discussions.
- Newly identified challenges.
- Teachers' experiences in the implementation of the Design Framework 1 strategies and suggestions for improvement.

The interviews lasted, on average, for 45 minutes, and I audio-recorded and transcribed them strictly ad verbatim.

4.3.2.2 Data analysis: analysis of classroom observations and interviews

I analysed the collected data in two stages. The first stage occurred during the intervention study; at this stage, interactions that had been observed in the classes during the trial periods were preliminarily analysed. The findings were used to adjust the implementation of some strategies during the trials. The second stage involved in-depth analysis of segments of the class interactions selected during the intervention, the pre- and post-intervention observations, and the baseline interviews and questionnaires. This second analysis led to the creation of Design Framework 2 and enabled the comparison of more extended segments of pre- and post-intervention class interactions (to evaluate any potential impact of the intervention). It also provided insights related to the teachers' participation in the study. The analysis of the final teachers' interviews complemented these findings. I clarify the specific selection criteria for the examples I analysed during and after the intervention in Chapters 6 and 7.

Preliminary analysis during the intervention

After I had made each set of observations during the intervention, I segmented the video recording into fragments of class interactions and identified those that illustrated the autistic students' participation in a discussion. I selected two of these

\textsuperscript{36} I explain the changes in my collaboration with Teacher B in Section 6.5.
fragments or communication events\textsuperscript{37} (if possible, one from a whole-class activity and another from group work). Then, I extracted from them short video excerpts that specifically displayed the students’ contributions or reactions to the discussions (three to 10 minutes each). I transcribed\textsuperscript{38} the excerpts and qualified the class exchanges in terms of dialogic contributions and strategies. I conducted these analyses through the use of EoC methods and an adjusted version of the T-SEDA teacher-friendly coding scheme for educational dialogue. The modified scheme included the strategies in Design Framework 1 and evolved in parallel with the refinement of Design Framework 1. I describe these analyses and the creation of the adjusted coding framework in Section 4.4.3.

I invited the teachers to analyse with me the excerpts that had been taken from their classrooms (one analysis session per lesson) through the use of the adjusted coding scheme. The joint analyses served as feedback meetings in which we assessed the implementation of the strategies and characterised the autistic students' participation. The sessions enabled us to discuss any required adjustments and encouraged teachers to reflect critically on the interactions among the students that they had been shown. I planned these sessions based on previous research, which had shown that PD programmes that included video recordings of lessons and specific feedback could lead to changes in practice (Sedova et al., 2016). However, only Teacher A participated in more than one joint-analysis meeting (at the Faculty of Education of the University of Cambridge). Teachers B and C participated in only one session in their schools due to time constraints, unforeseen changes in their circumstances and personal preference\textsuperscript{39}.

Between Cycles 2 and 3, during the assessment period, I adjusted the strategies of Design Framework 1 based on the findings from the class observations (how teachers used the strategies and students' usual participation) and comments

\textsuperscript{37} As I mentioned in Section 3.3.3, a 'communicative event' took the form of a segment of interactions that were related to specific goals or topics and that involved a particular set of participants. It is one of the units of analysis for communication that is derived from EoC (Hymes, 1972).

\textsuperscript{38} The excerpts were transcribed strictly verbatim according to the transcription procedures used by Rojas-Drummond et al. (2017).

\textsuperscript{39} I describe the changes in my collaboration with Teachers B and C in Sections 6.5.2 and 6.6.2.
from the teachers. I developed supporting resources to share the updated strategies with the teachers.

Analyses after the intervention
At the end of Cycle 3, besides analysing the post-intervention classroom observations and final teacher interviews, I conducted a second round of analysis of data I had gathered at baseline and during the intervention (baseline observations, interviews and questionnaires, and video excerpts from the intervention). I describe these analyses briefly in the next sections.

- In-depth analysis of video excerpts from the intervention
  After the strategies had been trialled, I enriched my analysis of the excerpts from the intervention, which was performed with the adjusted version of the T-SEDA scheme. This enrichment involved characterisation of the specific manifestations of the dialogue categories I had identified in the autistic students' contributions and the teachers' speech when they were supporting the focus students. I drew on the codes that are included in the coding scheme SEDA to do this (Hennessy et al., 2016). The analysis covered taking note of whether speakers engaged with others' contributions. I also counted how frequently I identified dialogic features and distinguished the most common of these that I noted in the students' and teachers' speech. These analyses helped me to refine the strategies of Design Framework 1 in more detail. I specified different forms of implementation and added new strategies that I had not considered previously. As part of this process, I updated the adjusted coding scheme by adding elements from SEDA codes and creating new items that were related to the autistic students' usual forms of participation (see Section 4.4.3).

- In-depth analysis of the baseline teacher interviews and parent questionnaires
  I examined the initial interviews and questionnaires through using IPA methods (Smith et al., 2013) to understand the participants' baseline beliefs and priorities. I noted how these might have influenced the teachers' experiences and commitment to the intervention. The analysis also helped
confirm whether the design framework addressed the parents' and teachers’ priorities regarding the support provided to the autistic students. I transcribed the teachers' interviews strictly verbatim and used the parents' responses to the open questions in the questionnaire. I looked for emergent themes for each participant and then I drew up a set of themes across all the teachers and another set across all the parents. The themes helped me to identify hindering and enabling factors that required consideration to promote the students' participation, and the teachers' goals and opinions related to the students' participation in class activities. I describe the steps of the analysis in Section 4.4.4.

- **In-depth analysis of the baseline and post-intervention observations and comparison of these findings**

As in the case of the procedures I followed during the intervention, I first extracted the three EoC units of analysis per observation (baseline and final) per classroom. Second, I identified the CEs that involved class discussions. I selected two of these per observation per classroom (i.e., two baseline and two final events per classroom). I chose the ones in which the focus students contributed or notably reacted to the discussions (if possible, one from a whole-class activity and another from a group activity). If more than two events displayed the focus on students' participation, I selected those in which they participated the most. Unlike the intervention excerpts, the duration of the chosen examples ranged from 10 to 18 minutes. Third, I transcribed and analysed them using the version of the coding scheme that included the updated Design Framework 1 strategies and the codes from SEDA and students' usual participation. I quantified the number of dialogic features I had identified and the frequency of their occurrence in the teachers', students' and classmates' speech.

Additionally, I registered how many autistic students' contributions (that corresponded to their turns in the transcriptions) represented initiations or responses, whether they were verbal or non-verbal, and whether they seemed related to the activity. I left any ambiguous turn uncoded.
Once I had carried out these analyses, I compared the findings from the baseline and the final recordings per classroom on two levels. I first contrasted the number and type of activities I had identified in each observation per classroom. Second, I calculated the percentage of incidence of each dialogic feature and new code for the baseline and final observation per classroom. I also computed the codes' percentages at each school separately for the teachers’, focus students’, and classmates' turns. I compared these baseline and final percentages per classroom. These comparisons helped me to identify changes and consistencies in each focus student's participation and how and to what extent the teachers had integrated the strategies into their practice. I did not use a statistical test due to the small sample size and the low frequencies at which some of the codes occurred.

- **Thematic analysis of the teachers’ final interviews**
  I analysed the teachers' post-intervention interviews thematically to identify and analyse patterns within their responses (Braun & Clarke, 2006). I identified themes that were related to their experiences as they implemented the strategies in their classrooms and supported the autistic students' participation in discussions. This analysis complemented my analysis of the post-intervention interactions and their comparison with those at baseline.

**4.3.2.3 Coding reliability**

To ensure the reliability of the qualification of the class interactions, I invited a colleague to analyse a subset of the examples I had selected from the baseline, intervention and post-intervention observations. Using Cohen's kappa, I calculated an inter-rater reliability index for each dialogic code from my coding scheme (Cohen, 1960). This coefficient is widely used in behavioural science to summarise agreement on a scale that involves two or more nominal categories and considers (dis)agreements due to chance (Warrens, 2014). I calculated an index per code to discern the patterns of agreement and disagreement in more detail. I analysed these coefficients in terms of presence (1) or absence (0) as mutually exclusive levels. I did
not consider the coefficients of codes with minimal (<5) or null frequencies of occurrence.\textsuperscript{40}

Before my colleague coded independently, I introduced her to the adjusted coding scheme. She was familiar with the frameworks that I had used to create the adjusted version for this research (Cam-UNAM SEDA and T-SEDA, see Section 4.4.3). I explained the features that were related to the Design Framework 1 strategies and the codes I had created for the students’ usual behaviours. Some of them represented non-speech forms of contributions and support. We discussed examples of coded interactions and established coding guidelines.

I measured the reliability coefficients in two stages. In the first, my colleague coded 20% of the examples I had analysed from the intervention (i.e., six of 30, which comprised 315 turns in total). I calculated the first set of reliability coefficients for each dialogic code. We reconciled any disagreements in the coding through discussion and consensus. Based on these agreements, I corrected the codification of the other examples. I did not calculate the indexes for the new codes that were not familiar to my colleague (i.e., related to the Design Framework 1 strategies and the students’ usual behaviour). In our meeting, we discussed and agreed on the way to code them. In the second stage, my colleague coded 20% of the events I had coded from the baseline and post-study observations (i.e., two of 12, which comprised 119 turns). I first calculated the reliability coefficients per dialogic category in the coding scheme. Then, we discussed the disagreements and reached a consensus. After this, I adjusted the coding of the rest of the examples.

Table 4.4 shows the Cohen’s kappa coefficients for each dialogue code in the first and second stages.

\textsuperscript{40} I decided not to consider the coefficients of categories that showed low frequencies of occurrence because the use of kappa with variables that show marginal distribution can lead to misrepresentation of the inter-reliability measures. Two effects can be occasioned (Hallgren, 2012), either a prevalence problem (in which these fall under one category of ratings at a much higher rate over another) or a bias problem (in which they are substantially different between coders).
Table 4.4. Cohen's kappa indexes for the dialogic codes

<table>
<thead>
<tr>
<th>Code</th>
<th>First calculation</th>
<th>Second calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>IB</td>
<td>0.647</td>
<td>0.693</td>
</tr>
<tr>
<td>B</td>
<td>0.53</td>
<td>0.747</td>
</tr>
<tr>
<td>CH</td>
<td>0.577 (n=7)</td>
<td>N/A (n=4)</td>
</tr>
<tr>
<td>IR</td>
<td>N/A (n=5)</td>
<td>N/A (n=0)</td>
</tr>
<tr>
<td>R</td>
<td>0.552</td>
<td>0.715</td>
</tr>
<tr>
<td>CA</td>
<td>N/A (n=2)</td>
<td>N/A (n=3)</td>
</tr>
<tr>
<td>C</td>
<td>0.455</td>
<td>0.652</td>
</tr>
<tr>
<td>RD</td>
<td>N/A (n=1)</td>
<td>N/A (n=2)</td>
</tr>
<tr>
<td>G</td>
<td>0.503</td>
<td>0.781</td>
</tr>
<tr>
<td>E</td>
<td>0.763</td>
<td>0.689</td>
</tr>
<tr>
<td>U</td>
<td>0.711</td>
<td>0.932</td>
</tr>
</tbody>
</table>

Cohen’s kappa (1960):  
- No agreement (<0)  
- Slight (0.2 – 0.4)  
- Moderate (0.41 – 0.6)  
- Substantial (0.61 – 0.8)  
- Excellent (0.81 – 1.0)

In this study, I considered any value over 0.6 to represent moderate agreement. 

4.3.2.4 Creation of Design Framework 2

After I had completed the in-depth analysis of the intervention examples, I enriched the description of the strategies for each design principle from Design Framework 1. As part of this update, I specified different ways in which teachers could implement the strategies in mainstream classrooms and the enabling and hindering factors of class discussions. I also added new forms of support that Teachers A, B and C used in their classrooms that I had not considered previously but that were congruent with the eight principles of the design framework.

The updated version of the design framework represented Design Framework 2, which had the same design principles as the first version but included more associated strategies. Once updated, I noticed that the design principles were not sufficiently specific to reflect the new forms of support that I had added to them. This observation led me to work on another update of the design framework. This part of the work represented the beginning of Cycle 4.

41 The colours in Table 4.4 represent Cohen’s suggested interpretation of kappa (Cohen, 1960). I adopted McHugh’s (2012) interpretation that “any kappa below 0.60 indicates inadequate agreement” because a kappa of less than 0.60 is associated with confidence intervals that are sufficiently wide that about half the data may be incorrect.
4.3.3 Cycle 4: creation of Design Frameworks 3 and 4

During Cycle 4, I refined the design principles of Design Framework 2 to better reflect the strategies I had related to each of them. This update led to the creation of Design Framework 3. To evaluate the new iteration of the design framework, I consulted the opinions of another group of teachers in England via an online course I created on the updated principles and strategies. After analysing their feedback, I adjusted the design principles and created Design Framework 4.

4.3.3.1 Regrouping the design principles to create Design Framework 3

Design Framework 2, which resulted from the analyses from Cycles 2 and 3, comprised more strategies associated with the initial design principles than had Design Framework 1. After I had created it, I noticed that these principles were no longer wholly illustrative of the revised versions of their strategies and that there were similarities between those I had assigned to different principles. Consequently, I regrouped the strategies based on their similar characteristics and reworded the design principles to create Design Framework 3. As part of the update, I separated the strategies that were required to enable accessible discussions and those that were related to teachers' contingent support during activities. Through this process, I enriched the principles I had created based on theory (or on EBP for autistic individuals) with details from empirical findings. I introduce the new principles and associated strategies in Chapter 8 and Appendix B (Table B.5).

4.3.3.2 Creation of an online course

To evaluate Design Framework 3, I created an online PD course to introduce its principles and strategies to another group of teachers in England and to gather their feedback. The course allowed me to refine Design Framework 3 based on these teachers' feedback. It enabled me to provide teachers with a more detailed, exemplified and flexible way of engaging with the strategies during the uncertain time of the COVID-19 pandemic. It also helped me address the difficulty of not being able to visit schools during that time. I provide more details regarding the reasons why I created this course in Chapter 8 (Section 8.3.1).
I designed it to be self-paced and made it available for two months (February and March 2021) to enable teachers to engage with it at their preferred time.\textsuperscript{42} The course comprised the following six main sections:

1. Common school experiences of autistic students.
2. Introduction to classroom dialogue and dialogic teaching.
3. Strategies for planning discussions that would be accessible to autistic students.
4. Strategies to support autistic students' participation in discussions.
5. An interactive example of how teachers could use the strategies.
6. Feedback activities (an open box and a survey) and an asynchronous forum.

In these sections, I included descriptions of the strategies and background information to help the participants understand the principles and strategies. I provided a video example and invited the course participants to share their feedback. I also elaborated downloadable examples of supporting materials and included interactive activities. Section 8.3.1 describes the course and its activities. Teachers could choose and complete the sections they found interesting over the two-month period. However, I encouraged them to consult those that were related to the strategies and provide their feedback. Teachers who completed these sections (3, 4 and 6) obtained participation certificates.

4.3.3.3 Data collection: consulting opinions of teachers in England

**Sampling**
I conducted non-statistical sampling to recruit a 'convenience sample' (Denscombe, 2010b). This choice of process enabled me to recruit quickly teachers with specific characteristics who were interested in committing to participation in an online course that required their feedback. Specifically, I invited teachers who taught in mainstream primary schools in England and had experience teaching autistic students. However,

\textsuperscript{42} I explain in Section 8.3.1 why I chose the format of a self-paced online course to introduce other teachers to the design framework.
I allowed other practitioners with experience in teaching and supporting autistic students in England to join the course.

I created a flyer that carried information about the online course and shared it with a network of teachers and schools in England. The teachers in this network had participated previously in studies related to classroom dialogue, which I considered an ideal background to engage with the course.

**Gathering practitioners’ opinions**

As part of the teachers’ participation, I asked them to share general recommendations on ways to support autistic students in mainstream classrooms and an example of a dialogic activity in their classrooms.

I included three methods through the use of which they could share their feedback. Below, I list them and what they registered.

- Share suggestions on ways to improve the strategies and point out any implementation challenges (via an open box).
- Contribute to an ‘asynchronous forum’ by commenting (or asking questions) about their experiences of supporting autistic students’ participation.
- Fill in a survey to rank each principle’s strategies and rate both their utility and the likelihood that the teachers would implement them in their classrooms.

**4.3.3.4 Data analysis: thematic analysis**

I analysed the teachers’ contributions to the feedback activities in two ways. One way involved conducting a thematic analysis of their responses in the open box and the asynchronous forum. The other way implied the calculation of a total score for the usefulness of the strategies and the likelihood that the teachers would implement them. I also tried to find a pattern in their rankings of the strategies. Through these analyses, I aimed to collate the PD course participants’ suggestions for improvement of the strategies and to identify those that the participants considered the most helpful.
4.4 Instruments

This subsection describes the materials and analytical tools I used in the four design cycles and how I developed some of them.

4.4.1 Design argument for this design investigation

As mentioned in Section 3.3.1, the usual theoretical contributions that are used in DBR are design models. These models may take the form of design principles or a design argument. The design framework that was created in this research included principles that served as heuristics for the implementation of dialogic strategies to support autistic students’ participation in discussions. However, I also created a ‘design argument’ to provide a summarised account of how others could develop such an intervention. It includes statements on the characteristics, goals, context, procedures and theoretical and empirical underpinnings (Easterday et al., 2018). I present this argument in Chapter 8, following van den Akker's (1999) format.43

4.4.2 Intervention questionnaires and interview schedules

I created the interview schedules for the teachers and the questionnaire for parents based on questionnaires and interview schedules that had been used in previous empirical research.44 I retrieved the latter through a literature search and a snowball strategy. First, I searched the British education research index and PsychTests online databases for the terms ‘questionnaire’, ‘students’, ‘autism spectrum disorders’, ‘autism’, and ‘inclusive education’. I gathered research papers from academic journals that had included, in empirical research, questionnaires or interview schedules for teachers and parents of autistic students. Second, I retrieved other relevant articles that were cited in those that were selected. As a result, I consulted 18 papers. The topics they covered were:

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43 van den Akker's (1999) format: “If you want to design intervention x for the purpose y in context z, then you are best advised to give that intervention the characteristics a, b and c (substantive emphasis), and to do that via procedures K, L and M (procedural emphasis), because of arguments P, Q and R.”

44 I also created an interview schedule for the autistic students. The analysis of these interviews is not presented in this dissertation.
• the support that teachers provided for autistic students;
• the importance of dialogue in the classroom; and
• the opinions of members of the autistic community on research conducted on autism.

I selected key items from each of these and adapted them to the interview schedule for teachers and the questionnaire for parents. Appendix C shows the questions that were included in these instruments and list the papers from which I retrieved them. I piloted the instruments before the study. I interviewed two primary school teachers and two TAs from different mainstream schools. I also discussed the questionnaire with a parent of an autistic child who attended a mainstream primary school. I refined the instruments based on this piloting; I changed some terms to familiar ones for the participants (e.g., I replaced dialogue with discussion) and discarded repetitive items to reduce the implementation period.

Before the intervention took place, I implemented the instruments to gather the teachers' and parents' baseline opinions regarding the focus on students' school experiences and their participation in class activities. At the end of the intervention, I modified the teachers' interview schedule to enquire about changes in students' experiences in discussions and teachers' experiences of implementation of the strategies.

4.4.3 Tools to analyse educational dialogue

As I indicated in Section 3.3.3, I analysed the class interactions with tools from the EoC method and empirically tested coding schemes for educational dialogue. I describe these below.

4.4.3.1 Methods from EoC

The first step in the analysis of the interactions that occurred within the class was the segmentation of each observation into the three EoC units of analysis (suggested by Hymes, 1972; see Section 3.3.3). I defined each of them as listed below.
• The CSs were the general context of the student interactions and mainly corresponded to the subject of each lesson I observed (e.g., a mathematics lesson).
• The CEs constituted the different activities of a particular lesson (e.g., writing a text or whole-class brainstorming).
• The CAs were represented as the function of a speaker’s utterance(s) in a discussion (e.g., ask for an opinion, expand one’s idea). They did not necessarily correspond directly to one turn.

I first delineated CSs and CEs for each observation in each classroom. Next, I identified the events during which the focus students contributed to the discussions or interacted with peers or teachers. I selected two segments per classroom observation for in-depth analysis through the coding schemes. In the case of the observations that were made during the intervention, I established another level of analysis that I named communicative sub-events (CSEs) due to my interest in analysing short exchanges. The sub-events were specific exchanges within an event, such as interactions related to the solution of a particular problem. I describe the criteria I used to select the pre-, during- and post-intervention examples of class interactions in Chapters 6 and 7.

4.4.3.2 Coding schemes for educational dialogue

I transcribed verbatim the selected segments using the transcription notation adapted by Rojas-Drummond et al. (2017) from procedures proposed by Mercer (2000) (see Appendix D ). Each speaker’s utterance usually represented one turn and often constituted a CA. However, I defined the latter by their interactional function (see section 3.3.3). I analysed the CAs (units for the fine-grained analysis) through the use of an adjusted version of a coding scheme for educational dialogue to identify dialogic features. I created this adjusted scheme based on the following already existent and trialled frameworks.
• **Cam-UNAM SEDA**\(^{45}\) (Hennessy et al., 2016): this scheme comprises 33 codes that represent CAs defined as dynamic interactional processes,\(^{46}\) which are essential in the development of dialogic interactions in educational contexts. It enables the performance of fine-grained analysis and describes what participants do and say during dialogic interactions. The SEDA puts together key theoretical proposals and findings from empirical studies on productive classroom dialogue (e.g., Alexander, 2008; Mercer & Littleton, 2007; Nystrand et al., 2003; Rojas-Drummond et al., 2013; Wells & Mejia-Arauz, 2006).

• **T-SEDA coding framework**\(^{47}\) (Vrikki et al., 2019): this framework is a ‘teacher-friendly’ coding scheme that has been adapted from the SEDA. It takes key CAs from the SEDA and introduces them as ten ‘dialogue categories’ that represent dialogic contributions and strategies that teachers can identify, encourage and implement in their classrooms. The framework forms part of a 70-page resource for practitioners that supports evaluation and further development of their practice (focusing on productive dialogue).

Appendix E presents a condensed version of SEDA and T-SEDA. I am familiar with the use of these coding schemes because I was involved in the development of the SEDA, its trials with empirical data, and the calculation of its coding inter-rater reliability. Similarly, I have collaborated with the research team that developed the T-SEDA framework.

I used an adjusted version of the T-SEDA framework during the intervention to open opportunities for teachers to engage in the analysis of class interactions and to become familiar with dialogic CAs. The T-SEDA framework included characteristics of the strategies that had been created in this investigation to enable the coding of the teachers’ support for their autistic students. After the intervention, I

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\(^{45}\) The full version of the SEDA can be found at the following link [http://tinyurl.com/BAdialogue](http://tinyurl.com/BAdialogue)

\(^{46}\) (Hennessy et al., 2016) suggest that the temporal sequencing of speakers’ interventions must be considered throughout lessons. Accordingly, they propose inclusion of the identification of CSs, CEs and CAs as part of the analysis, focusing recursively on the dynamic interactions among these different levels.

\(^{47}\) The resources of the T-SEDA, including its coding framework, can be found at: [https://www.educ.cam.ac.uk/research/projects/tseda/Teacher_SEDA_packv5_290518%20.pdf](https://www.educ.cam.ac.uk/research/projects/tseda/Teacher_SEDA_packv5_290518%20.pdf) (or at [http://tinyurl.com/BAdialogue](http://tinyurl.com/BAdialogue))
conducted an in-depth analysis by drawing on the SEDA's codes. I established a correspondence between the T-SEDA and SEDA codes, which enabled me to describe specific manifestations of each T-SEDA dialogue category. I also added a new set of codes that were related to the autistic students' usual ways of engaging in class discussions to enrich my characterisation of their participation.

I iteratively updated the coding scheme throughout the intervention study. The scheme represents one of the design products of this investigation. I created it with sufficient flexibility so that new strategies and diverse forms of contribution that the students might adopt could be registered. These diverse forms of contribution included non-spoken forms of support and communication during class discussions, which the SEDA and T-SEDA did not register (because they are designed to focus on the quality of spoken interactions). I introduce the different sections of this adjusted coding scheme in Chapters 5 and 6 (and Appendix F, which includes a condensed version of the complete coding scheme).

4.4.4 Interpretative phenomenological analysis

I used IPA methods to analyse the baseline teacher interviews and parent questionnaires. Section 3.3.4 describes this approach. As mentioned in Section 4.3.2.2, I examined the strict verbatim transcripts of the interviews and the parents’ responses to open questions. I followed the steps listed below:

1. I first read them line by line. In the case of the interviews, I also listened to the audio-recordings.
2. I made notes related to the content of the participants’ responses (e.g., the explanations and phrases they shared) and the ways in which they used language to talk about specific topics (e.g., changes in intonation, repetitions, or the subject of conversation). I sought emergent themes for each participant based on my notes.
3. I organised the participants’ emergent themes through the creation of superordinate themes that connected the questionnaires and interviews separately.
4. I established a set of broad subordinate themes to group those that the teachers and parents each had in common ('master' and sub-themes).

I summarise the findings of the analysis of the interviews and questionnaires in Sections 5.2.2 and 5.2.3.2, illustrating some of the themes I identified with quotes from the interviews and questionnaires.
5 Cycle 1: Design Framework 1 and findings from baseline data

This chapter presents details of Design Framework 1 (including its first theoretical prototype) and how I refined it based on the teachers’ input and my analysis of the baseline data. Figure 5.1. Design Cycle 1 that produced the revised Design Framework 1 from the original illustrates the activities that led to the first and first revised versions of Design Framework 1.

First, I introduce the empirically tested dialogic strategies and elements that are regarded as EBP for the support of autistic individuals. I retrieved these strategies from published literature and used them as the base on which to create the design framework. I also describe the first version of the design framework. Second, I present the findings that I obtained from the analysis of the baseline data, which included the classroom observations, teachers’ interviews and parents’ questionnaires. Third, I explain how I refined Design Framework 1 based on the baseline data and my collaboration with the participating teachers. At the end of the chapter, I present the revised version of Design Framework 1.

Notes:
A. Extraction of 8 elements of evidence based practices for supporting autistic children.
B. Consultation with the participants (interviews and initial workshops with teachers and questionnaires sent to parents).
C. Baseline classroom observations.

Figure 5.1. Design Cycle 1 that produced the revised Design Framework 1 from the original.
5.1 Preliminary proposals that led to adjusted dialogic strategies

I elaborated the initial prototype of Design Framework 1 based on theory and findings from empirical studies. I drew on practices and resources that had been developed for practitioners and that they can use in mainstream classrooms. I introduce in the sections below the strategies I selected from the literature on dialogic pedagogy and from EBP for the support of autistic children. After this, I describe how I merged these practices to create Design Framework 1.

5.1.1 Selected empirically tested dialogic strategies

I chose the strategies that were included in the coding framework of the T-SEDA (Vrikki et al., 2019) to serve as the basis for the design framework's first set of strategies. This coding framework comprises ten codes (introduced as ‘dialogue categories’) that illustrate crucial dialogic forms of contribution to and promotion of educational dialogue. Therefore, these codes can represent teachers' and students' dialogic CAs (see Table 5.1). The T-SEDA framework is designed to help practitioners to identify these features in classroom discussions and to assess their quality. It serves as a guideline for the promotion of dialogue as it defines the forms of participation of teachers and students. Specifically, its codes illustrate how speakers can engage respectfully and critically with the contributions from others, provide relevant contributions, and invite others to participate in the same ways.

I selected this framework because it provided a teacher-friendly, summarised version of a comprehensive characterisation of educational dialogue. The T-SEDA stems from previous research that combined key theorists' work and empirical findings on productive educational dialogue48 (see Hennessy et al., 2016; Rojas-Drummond et al., 2013). Additionally, practitioners from different countries have used it as part of the trial of the T-SEDA resource pack49 (Hennessy et al., 2021). Findings

48 Some key theorists and those who made empirical findings include: Alexander, 2008; Mercer & Littleton, 2007; Rojas-Drummond et al., 2013; Sedova et al., 2014; van de Pol et al., 2010; Vygotsky, 1978; Wells, 1999; Wood et al., 1976.
49 The T-SEDA pack is an open resource that supports practitioners at all educational levels in their development of dialogic teaching and learning in their contexts. It suggests a reflective inquiry approach and provides materials that guide teachers in the conduct of their own inquiries into classroom dialogue.
from this trial highlighted that teachers who monitored the dialogue that occurred in their classrooms through the application of these categories became more aware and critical of how they talked (Calcagni et al., 2023). Their analyses included the identification of ways to promote students' participation so that the students could take part in ways that were expected of them, and the teachers adjusted their practices accordingly.

Table 5.1. Synthesised version of the T-SEDA coding framework (T-SEDA Collective, 2021)

<table>
<thead>
<tr>
<th>Dialogue categories</th>
<th>Contributions and strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invite to build on ideas</td>
<td>Invite elaboration, build on, clarify or improve own or others’ ideas.</td>
</tr>
<tr>
<td>Build on ideas</td>
<td>Build on, elaborate or clarify one’s own or others’ ideas.</td>
</tr>
<tr>
<td>Challenge</td>
<td>Question, disagree with or challenge an idea.</td>
</tr>
<tr>
<td>Invite reasoning</td>
<td>Invite others to explain, justify, and/or use possibility thinking that relates to their own or another’s ideas.</td>
</tr>
<tr>
<td>Make reasoning explicit</td>
<td>Explain, justify and/or use possibility thinking that relates to own or another’s ideas.</td>
</tr>
<tr>
<td>Coordination of ideas and agreement</td>
<td>Contrast and synthesise ideas, express agreement and consensus; invite coordination/synthesis.</td>
</tr>
<tr>
<td>Connect</td>
<td>Make pathway of learning explicit by linking to contributions/ knowledge beyond the immediate dialogue.</td>
</tr>
<tr>
<td>Reflect on dialogue or activity</td>
<td>Evaluate and reflect ‘metacognitively’ on a learning activity; invite reflection.</td>
</tr>
<tr>
<td>Guide direction of dialogue or activity</td>
<td>Take responsibility for shaping activity or focusing the dialogue in a desired direction; use scaffolding strategies to support dialogue.</td>
</tr>
<tr>
<td>Express or invite ideas</td>
<td>Offer or invite relevant contributions to initiate or further a dialogue.</td>
</tr>
</tbody>
</table>

I recognise that the coding framework is ideal and may omit some potential forms of dialogic CAs. For instance, in one case, it focuses on the identification of spoken forms of contribution to a dialogue. The theory of educational dialogue acknowledges the role of non-verbal communication in furthering the dialogue (Alexander, 2018). In another case, research indicates that it is rare to observe
educational dialogue in classrooms in just the way that theory describes it (Lefstein, 2010). The framework codes draw partly on theoretical principles that characterise dialogic pedagogies. These principles, as Reznitskaya suggests, can be 'activated' in different ways, which leads to diverse classroom practices (Asterhan et al., 2020). For these reasons, I suggest that the CAs reflected in the T-SEDA framework may take different forms. Accordingly, I aimed to broaden the descriptions of the dialogic CAs that were reflected in the codes of the T-SEDA framework. To achieve this, I focused on the interactional function of the dialogue categories and their role in the development and furtherance of the dialogue.

Specifically, I aimed to identify accessible dialogic ways in which autistic students could contribute to dialogue, and dialogic strategies that could guide the participation of these students effectively. I explored how dialogic strategies could achieve two goals. One was to open opportunities for students to contribute in different (and preferred) forms and to help teachers to acknowledge and capitalise on those forms. I suggest that this acknowledgement by teachers of students’ different forms of participation benefits the whole class. Reznitskaya suggested that teachers who capitalised on students' discourse differences broadened the repertoire that was available to all students (Asterhan et al., 2020). The other goal was to encourage clear dialogue and the explicit joint construction of knowledge. I focused on dialogic teaching’s supportive, cumulative, and purposeful principles to achieve this (according to Alexander’s 2018 definition).

Thus, I looked for a balance between opening a space to diversity and providing boundaries and guidelines. Segal et al. (2017) point out that seeking such a balance represents one of the challenges of the promotion of a dialogic pedagogy because it requires both the cultivation of communication rules and the inclusion of marginalised students' voices that may deviate from those norms. I argue that a first step in addressing this is the identification of the characteristics of and barriers that block students' participation and to adjust expectations and communication norms accordingly. For this reason, I first adapted the dialogic strategies by enriching them
with elements of EBP\textsuperscript{50} that support autistic children, because these consider communication and learning characteristics that are commonly associated with autism. I introduce in the following subsection the elements of EBP I selected.

5.1.2 Elements selected from EBPs for the support of autistic children

Rather than adhere to one EBP, I reviewed different practices that had been considered in the literature to be effective in the support of autistic individuals. I chose this method because even when one intervention is based on an empirically sound foundation, it is not universally suitable (Simpson et al., 2005). Therefore, many practitioners draw upon different practices to address individualised goals that are based on autistic individuals’ diverse skills, interests, and patterns (Odom et al., 2012). Additionally, particularly in the case of practices taken from comprehensive programme models,\textsuperscript{51} it was neither feasible nor desirable to adhere to the intensive and highly structured programmes that were associated with them or to undergo specialised training (Odom, Boyd, et al., 2010).

Instead, I consulted some of the most used EBPs to identify the characteristics that they had in common. I focused on classifying how, through the use of these practices, practitioners conveyed information to autistic individuals and supported the engagement of those individuals in activities (while they respected the communication preferences of those autistic people). I selected methods from them while being aware that methods and desired outcomes that were associated with some EBPs were incompatible with a dialogic pedagogy and the aims of this study. This incompatibility is due to the different conceptualisations of autism that EBPs may adopt. For example, interventions that are based on applied behavioural analysis rely on operant conditioning that is aimed to modify and normalise the subject’s behaviour (e.g., the early and intensive behavioural intervention model; Lovaas, 1981). Such interventions illustrate a non-acceptance of difference.

\textsuperscript{50} As Chapter 2 mentions, the term EBP can be applied to practices that may not address all the goals of practitioners (sometimes to the detriment of individuals). Evaluation of the evidence that backs up the practices is necessary before such practices are adopted.

\textsuperscript{51} Comprehensive programmes consist of a set of practices that are designed to achieve a broad learning or developmental impact. Many are identifiable through the use of a consistent name, occur over an extended period of time and are intense in their application (Odom, Boyd, et al., 2010).
To identify the relevant EBPs, I conducted a word search in three online databases (the British education index, PsycInfo, and Scopus). I entered the terms “evidence-based practices”, “autism”, and “autism spectrum disorder” and searched for review papers. I retrieved two review papers that provided comprehensive reviews of EBPs that practitioners could implement in educational or home settings. The paper authors reported on the quality of the studies that had led to the EBPs (Bond, Symes, Hebron, Humphrey, Morewood, et al., 2016; Wong et al., 2015). Table 5.2 presents more details regarding the papers.

The reviews considered both comprehensive programmes and focused intervention practices, which can support individuals with diverse manifestations of autism from birth to young adulthood. The authors described the procedures they had used to produce the systematic literature reviews and the criteria they had used to assess the level of evidence for the practices. Following a snowball approach, I also retrieved the complete reports of these papers’ literature reviews and a book to gather more details about the EBPs (Bond, Symes, Hebron, Humphrey, & Morewood, 2016; Simpson et al., 2005; Wong et al., 2014).

\[52\] The outcomes of the EBP were related to individuals’ communication, social skills, ‘interfering behaviours’, play, school readiness, ‘cognitive performance’, motor skills, joint attention, adaptive/self-help skills, vocational skills, and mental health.

\[53\] I also retrieved two other papers that discussed the benefits, issues and limitations that were related to identification and use of EBP to support autistic individuals (Mesibov & Shea, 2011; Simpson, 2005b).
Table 5.2. Information about the EBP review papers that were retrieved

<table>
<thead>
<tr>
<th>Citation</th>
<th>Review coverage</th>
<th>Databases consulted and inclusion criteria</th>
<th>Ways that levels of evidence were established</th>
<th>No. of papers and practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bond et al., 2016</td>
<td>2008-2013</td>
<td>20 databases, and web and hand searches.</td>
<td>Purpose-built, four-level, trialled framework to assess the weight of evidence. Results ranged from most evidence (four+ RCT/QES or six+ SCEs) to a small amount of evidence (one RCT/QES or two SCEs)</td>
<td>176 papers 27 practices</td>
</tr>
<tr>
<td>Wong et al., 2015</td>
<td>1990-2011</td>
<td>10 databases; the participants, interventions, comparison, outcomes, and study design search tool were used.</td>
<td>Criteria of the NPDC(^{54}), which requires practices be supported by any of the following:</td>
<td>456 papers 27 practices</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- high-quality QES by two research groups</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- five high-quality SCD by three research groups, or</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- combination of high-quality designs by more than one research group (at least one QES, three SCD)</td>
<td></td>
</tr>
</tbody>
</table>

RCT: randomised controlled study; QES: quasi-experimental study; SCD/E: single-case experiment/designs; NPDC: the US National Professional Development Centre on autism spectrum disorders.

After the search, I created a list of the EBPs that had been presented in the review papers. I identified 40 EBPs, of which I selected 28 that fulfilled the following criteria:

- they could be used in classrooms;
- their use did not involve replacement of a child’s way of communicating;
- their implementation did not require special technological equipment;
- their application did not require one-to-one teaching outside the classroom;

\(^{54}\)Details of the National Professional Development Centre on autism spectrum disorders (NPDC) in the United States of America can be found at https://autismpdc.fpg.unc.edu/national-professional-development-center-autism-spectrum-disorder
they did not involve a parent-implemented intervention; and
their implementation did not involve physical exercise.

Application of these criteria enabled me to select practices that teachers could implement during their lessons, using their usual materials, without training, and without taking the students out of the classroom for ‘training’. I aimed to disrupt teachers' usual practices and autistic students' regular activities as little as possible (and to avoid singling them out). I did not select techniques that required the replacement of students' usual behaviours due to my interest in identifying their forms of contribution to discussions. Similarly, I did not choose practices that involved adherence to strict and limited models of ‘appropriate behaviour’ (which would ‘extinguish’ some of the students' behaviours). Despite my focus on dialogic participation (associated with specific verbal CAs), I aimed to broaden its characterisation through acknowledgement of students' ways of communicating and engaging.

I grouped the selected 28 EBPs into six categories according to similarities in their foci or procedures (Table G.1 in Appendix G shows the complete list of the selected EBPs). These categories were based on Simpson et al.'s (2005) categorisation. The categories covered:

• practices that involved reinforcement or dealing with ‘challenging behaviour’;
• cognitive interventions (which taught individuals to monitor their behaviour);
• environmental and schedule arrangements;
• skill-based interventions (which targeted and taught specific skills);
• use of specific pedagogical resources; and
• practices that created opportunities to use positive social interactions.

I distinguished 23 characteristics that illustrated the main procedures (such as use of multimodal supporting materials) and goals (such as learning a specific skill) of the practices in each category (see Table G.2 in Appendix G). For ease of use, I combined these characteristics into eight encompassing elements. These elements became the initial design principles of Design Framework 1, which guided the development of strategies that took into account EBP procedures and goals. As a
precursor to development of the strategies of Design Framework 1, I elaborated suggestions on how dialogic teaching could integrate these principles.

Table 5.3 displays the eight principles and their associated suggestions. Their use would encourage consideration of students’ interests, preferences, and sensory sensitivities and would highlight the structure of dialogue to promote accessible conversation.

Table 5.3. Principles that originated from EBPs and suggestions for application of them in dialogic teaching

<table>
<thead>
<tr>
<th>Design principles</th>
<th>Suggestions for dialogic teaching</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add intrinsically motivating features to the dialogue</td>
<td>1. Incorporate students’ interests in the dialogue.</td>
</tr>
<tr>
<td></td>
<td>2. Encourage use of dialogue in activities that are motivating for the student or have desirable outcomes.</td>
</tr>
<tr>
<td>Use prompts or cues</td>
<td>3. Use verbal, gestural or physical prompts to elicit a form of participation.</td>
</tr>
<tr>
<td></td>
<td>4. Fade the use of prompts.</td>
</tr>
<tr>
<td>Model behaviour</td>
<td>5. Show/act how a dialogic interaction looks.</td>
</tr>
<tr>
<td>Provide guidelines</td>
<td>6. Provide scripts (e.g., sentence stems) and descriptions of social situations during discussions (e.g., social stories).</td>
</tr>
<tr>
<td></td>
<td>7. Delineate steps or rules.</td>
</tr>
<tr>
<td></td>
<td>8. Break down skills into smaller components (e.g., steps for listening).</td>
</tr>
<tr>
<td>Examine thoughts and emotions</td>
<td>9. Recognise when negative thoughts and emotions escalate during class discussions.</td>
</tr>
<tr>
<td>Modify/adjust the environment</td>
<td>10. Delimit a space for class discussions.</td>
</tr>
<tr>
<td></td>
<td>11. Block irrelevant or overwhelming stimuli.</td>
</tr>
<tr>
<td></td>
<td>12. Visually communicate the structure of discussions with materials.</td>
</tr>
<tr>
<td>Use/encourage the use of different communication modalities</td>
<td>13. Make use of visual supports and schedules.</td>
</tr>
<tr>
<td></td>
<td>14. Use forms of communication other than speech.</td>
</tr>
<tr>
<td>Give students opportunities to interact with others</td>
<td>15. Peer mediation.</td>
</tr>
<tr>
<td></td>
<td>17. Collaborative projects with peers.</td>
</tr>
</tbody>
</table>

Their use would imply the inclusion of motivational characteristics (principle 1), provision of brief and concise guidelines or models (3,4), the monitoring of students’ understanding and state (5), use and promotion of multimodal
communication (2,6,7), and preparation of an environment that was free of distractions or overwhelming stimuli and promotion of collaboration between peers (8).

I adjusted the T-SEDA strategies based on these principles and suggestions. In the following subsection, I explain how I created Design Framework 1 by merging my eight principles with the T-SEDA categories and developing new strategies. I named the design framework provisionally to differentiate its strategies from those that existed in the literature. I called it adjusted dialogic strategies for autistic students (ADSA). To clarify the evolution of ADSA during this research, I refer to the specific iterations of the design framework in the following chapters instead of to its acronym (i.e., Design Frameworks 1 to 4).

5.1.3 Design Framework 1: ADSA’s initial prototype

I used the T-SEDA format to organise the design framework's initial strategies. I adjusted some of its categories and added a new set of non-speech strategies.

In the former case, I identified ways in which the principles could help to develop alternative ways to implement some T-SEDA strategies. I selected mainly five categories that had similar functions to those of the eight principles (e.g., to prompt a particular behaviour) or that enabled the introduction of supporting EBP resources to the dialogue. The five categories were: 'build on ideas', 'challenge', 'connect', 'reflect on dialogue' and 'guide direction of dialogue'. I enriched their descriptions in the coding framework through a classification of the various ways in which they could be implemented. Table 5.4 shows my additions to those strategies (Table F.1 in Appendix F presents more detail about these adjustments).

In sum, the suggestions involved the following steps:

- Reiterate information by accompanying it with a visual representation.
- Guide participation through modelling, use cues and refer often to guidelines, expectations and schedules.
• Monitor students’ understanding and mental states to adjust dialogue accordingly.
• Indicate different ways to participate.

Table 5.4. My additions to the five categories from the T-SEDA scheme.

<table>
<thead>
<tr>
<th>Selected T-SEDA categories</th>
<th>Adjustments made</th>
</tr>
</thead>
</table>
| Build on ideas             | • Physically show how the class builds ideas.  
|                            | • Build on ideas after the conversation is over. |
| Challenge                  | • Probe the students’ understanding of class activities. |
| Connect                    | • Refer to the agreed expected behaviours or steps of class discussions.  
|                            | • Refer to the timetable of the day. |
| Reflect on dialogue or activity | • Reflect on/monitor negative thoughts or feelings during discussions.  
|                            | • Talk about the components or steps of class discussions. |
| Guide direction of dialogue or activity | • Suggest alternative ways of communication.  
|                            | • Model different ways to contribute.  
|                            | • Use cues to prompt forms of participation.  
|                            | • Indicate student roles in group activities. |

The additions were designed to help to clarify the dialogue and what teachers might expect from students’ participation, to reduce the number of degrees of freedom\(^{55}\) and adjust the conversation to take account of students’ understanding and experiences.

I created eight new strategies, which I added as an attachment to the T-SEDA scheme. These strategies did not rely on speech and did not involve contingent guidance of students’ participation. They comprised suggestions on preparation of the classroom’s physical environment, resources and class activities, and the planning of alternative forms of participation (different from speech) to develop accessible dialogue. Table 5.5 displays the new strategies (Table F.2 in Appendix F contains more detail).

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\(^{55}\) Reduction of the number of degrees of freedom is one scaffolding strategy, which is based on sociocultural theory of learning and its proposal of the proximal developmental zone (Vygotsky & Cole, 1978), as described by van de Pol et al. (2010).
<table>
<thead>
<tr>
<th>New strategies</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan layout for discussions</td>
<td>Delimit a special place or seating arrangement for discussions and block irrelevant stimuli.</td>
</tr>
<tr>
<td>Create temporal physical prompts for dialogic participation</td>
<td>Display physical/visual prompts during discussions that show other forms of contribution.</td>
</tr>
<tr>
<td>Indicate the start/end of discussions with different communication modalities</td>
<td>Indicate that a discussion starts or ends with a hand signal, visual prompt, or auditory stimuli.</td>
</tr>
<tr>
<td>Continuously guide physically the direction of dialogue</td>
<td>Have available visible materials that show different ways to contribute to discussions, the structure of the dialogue, descriptions of social situations and phrases that model ways to take part in discussions.</td>
</tr>
<tr>
<td>Use alternative communication modalities during discussions</td>
<td>Use previously agreed forms of communication that are different to speech to contribute to discussions.</td>
</tr>
<tr>
<td>Promote dialogue in intrinsically motivational activities for students</td>
<td>Design activities that involve students' topics of interest, desirable outcomes that are related to participation according to the rules for talking, and opportunities to share out-of-the-box ideas.</td>
</tr>
<tr>
<td>Promote dialogue in peer-mediated activities</td>
<td>Design collaborative activities that involve shared projects in which peers guide the students.</td>
</tr>
<tr>
<td>Plan or ask for breaks or relaxation time outside discussions</td>
<td>Plan breaks that enable one or all students to stop participating in discussions, take deep breaths and think about uncomfortable aspects of the activity. Students can also ask for a time-out.</td>
</tr>
</tbody>
</table>

Through the designs of these strategies, I aimed to address any potential barriers that autistic students might experience during discussions. As Bailey and Baker (2020) point out in their systematic review, autistic students most frequently experience barriers that are related to sensory processing difficulties, maintenance of attention, negative effects, and problems in social interactions. Specifically, the aims of the new strategies were as follows:

1) Adjustment of the physical environment can remove distracting or overwhelming stimuli that hinder students' access to discussions.
2) Supporting resources can serve as participation guidelines and inform students about what they can expect or highlight details of the discussions’
content to guide their contributions. (The resources can offer multimodal information that helps students to follow discussions.)

3) The planning of motivational activities, breaks, and peer mediation can encourage student participation, allow them to stop when they wish, and enable them to interact with peers according to clear guidelines.

4) Use of and encouragement of the use of forms of communication other than speech enables the reiteration of information in diverse modalities and provides various participation methods to students who struggle to communicate verbally.

Before I shared Design Framework 1 with the participating teachers and asked for their opinions and input, I gathered data on the characteristics of each classroom to identify any further adjustments that were required to address individualised goals. The following subsection introduces the baseline data I collected and an overview of the characteristics I identified.
5.2 Baseline information

In this subsection, I present the general findings from the analysis of the baseline data from the three classrooms. The data comprised video-recorded lessons, interviews that had been conducted with the participating teachers and questionnaires that had been filled in by the autistic students' parents. I collected these data to gather information regarding usual class discussions, the teachers' objectives, and the autistic students' characteristics. This information supported the refinement of the first design framework that I carried out in collaboration with the participating teachers.

5.2.1 Baseline class observations

5.2.1.1 Overview

Before the intervention began, I visited each classroom twice, once for an acclimatisation session and once for an observation day (to observe and video-record two to three lessons). In Cycle 1, I preliminarily analysed the class interactions I observed during the second visit. I extracted CSs and CEs and described how teachers promoted discussions, the types of activities, the autistic students' participation and the support they received. This subsection summarises the preliminary analysis of the observations in the three classrooms. I describe the characteristics I observed in each classroom (including the activities, teachers' support for the autistic students and the autistic students' participation in activities) in Appendix H.

Table 5.6 shows an overview of the lessons I observed in each classroom and the form of support each autistic student received. It shows that the three teachers primarily promoted whole-class discussions. These activities involved moments during which the teachers provided guidance and instigated class discussions (at least one per classroom). The three figures below illustrate the CS (lessons) and CE (activities) that I identified in each classroom.

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56 Establishing two of the three units of analysis from the EoC (Hymes, 1972): communicative situations (CS) and communicative events (CE).
Table 5.6. Overview of the baseline lessons observed in the three classrooms

<table>
<thead>
<tr>
<th></th>
<th>Classroom A</th>
<th>Classroom B</th>
<th>Classroom C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lessons observed</td>
<td>English, phonics and maths</td>
<td>Maths (2) and computing</td>
<td>Guided reading and maths</td>
</tr>
<tr>
<td>Type of activities (and number)</td>
<td>- Whole-class activities (5)</td>
<td>- Whole-class activities (8)</td>
<td>- Whole-class activities (5)</td>
</tr>
<tr>
<td></td>
<td>- Individual activities (1)</td>
<td>- Individual activities (2)</td>
<td>- Individual activities (1)</td>
</tr>
<tr>
<td></td>
<td>- Pair activities (1)</td>
<td>- Small-group activities (2)</td>
<td></td>
</tr>
<tr>
<td>Extra day:</td>
<td><strong>57</strong> small group/pair activities (2).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of support for autistic child during lessons</td>
<td>Constant support from the teacher or TA when contributing to a discussion, interacting with peers and carrying out individual activities.</td>
<td>Constant support from the TA to carry out individualised tasks during whole-class and individual activities.</td>
<td>Occasional support from the teacher to help the child to calm down or to move on with an activity (during individual and pair work).</td>
</tr>
<tr>
<td>Supporting resources</td>
<td>- Physical objects to fiddle with.</td>
<td>- Personal visual timetable.</td>
<td>- Emotions chart to communicate level of discomfort.</td>
</tr>
<tr>
<td></td>
<td>- Visual register.</td>
<td>- Physical materials related to the activity.</td>
<td>- Headphones and calming audio-visual materials.</td>
</tr>
</tbody>
</table>

*Transitions (e.g., retrieving notebooks) and other activities not related to the lessons were not counted.

Figure 5.2. EoC units of analysis of the first baseline observation day in Classroom A

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57 Due to audio difficulties, I could not listen to Child A’s interactions with peers during small-group activities. For this reason, I visited Classroom A another day to observe small-group activities.
Figure 5.3. EoC units of analysis of the baseline observation day in Classroom B

Figure 5.4. EoC units of analysis of the baseline observation day in Classroom C
5.2.1.2 Promotion of students’ participation

The teachers sought to promote students' active participation (which they expected to be verbal). They mostly asked students to make their reasoning explicit, elaborate on their contributions and provide answers (e.g., solutions to a maths problem). Accordingly, students participated primarily through elaborating on their ideas (often prompted by the teachers). Nevertheless, occasionally I observed students engaging with others' contributions, which was promoted by certain types of activities (brainstorming) and the teachers' invitations. Teachers also promoted talk in pairs or small groups. However, short snippets of pair talk embedded in whole-class discussions occurred more frequently than small-group conversations. These exchanges mostly acted as encouragement to verbalise their ideas to others.

These observations reflected the potential use of whole-class activities to promote dialogue in all three classrooms. Teachers frequently guided students' formulations of answers; hence, the next step that was required to promote dialogue was to encourage students to consider their classmates' ideas. Consideration of others' ideas was also a shared goal among the teachers, and they seemed to model it as they rephrased students' contributions and provided feedback. However, each teacher had a particular focus related to this goal. Teachers A and C aimed to foster listening in their classrooms, while Teacher B seemed to focus on supporting students' reasoning as he encouraged them to engage critically with others' ideas.

5.2.1.3 Participation of the autistic students and support provided by the teachers

Overall, the three autistic boys were responsive to the teachers' signals, the class activities and peers' behaviours. Visual and physical supportive resources seemed to help to make the content of the activities clearer and easier for them to manipulate than it would have been without them. However, the form and level of support given to each autistic student differed. Children A and B required more support than Child C, and TAs frequently accompanied them. Their peers were also responsive to their difficulties and guided them during small-group activities. Child C occasionally received support from Teacher C during small-group or individual activities.
The three teachers used physical materials to support the focus students' engagement with the activities. Teacher A and TA A sometimes communicated the instructions of the work to Child A through non-speech communication. Teacher C used the emotions chart when Child C was overwhelmed. These forms of support demonstrated the usefulness of multimodal information and visual representations, and that cues and prompts can be used to guide the students' participation in discussions. All the focus students received close support when they required it. This support was provided by the teachers in Classrooms A and C and by the TA in Classroom B. It included assistance with the children's regulation of emotions and focus of their attention, control of sensory stimulation and the reiteration of relevant details about the activities. Children A and B required more extensive support than did Child C.

These forms of support highlighted how diverse factors impacted the autistic students' participation in discussions. These factors included the accessibility of the activities and materials, the physical environment and the students' mental state. The activities and goals that the teachers had planned played roles in these factors. For example, because Teacher B planned maths activities for Child B differed from those of the rest of the class, he worked separately from his peers and did not engage in the whole-class discussions. In the case of Child A, having to write down responses during a small-group activity limited his engagement with his teammates because he struggled to do so. These observations showed that, to promote autistic students' participation, the activities should also consider the level of difficulty that autistic students can access and how their requirements can become barriers to students' participation. This finding is consistent with strategies in Design Framework 1 regarding the preparation of the environment and supporting resources. I suggest that provision of accessible materials and activities may help autistic students to gain confidence to contribute and may motivate them to do so.
5.2.2 Summary of the findings from the baseline teacher interviews

As described in Section 4.3.2.2, I examined the transcripts of the teachers' interviews by examining them in-depth according to IPA procedures. I identified emergent themes per teacher and patterns across the interviews. Based on these patterns, I delineated common subordinate themes and grouped them into broader superordinate themes, which I present in Table 5.7. In this subsection, I summarise the findings related to these themes. Appendix I provides a description of each superordinate theme, a list of themes related to the subordinate ones, and examples of how I identified them in the interviews and across the interviews.

Table 5.7. Superordinate and subordinate themes in the teachers' baseline interviews

<table>
<thead>
<tr>
<th>Superordinate themes</th>
<th>Subordinate themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theme 1: Conditions in each classroom</td>
<td>A. Teacher’s background and experience.</td>
</tr>
<tr>
<td></td>
<td>B. Characteristics of the class and school.</td>
</tr>
<tr>
<td></td>
<td>C. Aspects that hindered or enabled teachers’ practice</td>
</tr>
<tr>
<td></td>
<td>D. Priorities</td>
</tr>
<tr>
<td>Theme 2: Teachers’ support for the focus students</td>
<td>A. Children’s characteristics</td>
</tr>
<tr>
<td></td>
<td>B. Forms of support and priorities</td>
</tr>
<tr>
<td></td>
<td>C. Experience supporting child.</td>
</tr>
<tr>
<td></td>
<td>D. View of inclusion</td>
</tr>
<tr>
<td>Theme 3: Interest, knowledge and forms of promoting dialogue</td>
<td>A. View of dialogic teaching</td>
</tr>
<tr>
<td></td>
<td>B. Description of discussions in their class</td>
</tr>
<tr>
<td></td>
<td>C. Interest in class dialogue</td>
</tr>
<tr>
<td></td>
<td>D. Forms of promoting discussions</td>
</tr>
</tbody>
</table>

The three superordinate themes were related to the characteristics of each context (Classrooms A, B and C), the teachers' priorities regarding their support for the focus students and their perspective on class dialogue. These themes reflected the aspects that impacted the intervention implementation in each classroom.

They reflected how the characteristics of their classrooms and their previous experiences influenced the teachers' perspective about inclusion, priorities for the support of the focus students and the promotion of discussions. Teachers A and C identified having ‘high need classes’ and their previous professional experiences showed an interest in inclusive education. Therefore, they paid particular attention to
making their practice accessible to all and were interested in improving the quality of students' interactions and clarifying their own communication with the class. Their support for Children A and B aimed to facilitate the students' engagement with the activities and others.

“I want Child A to be able to communicate effectively with others…”
(Teacher A)

“…we have to modify our lessons for most of the children anyway… it is something that you do for the whole class and it just you kind of hope that it like trickles up…” (Teacher C)

Teacher B was especially interested in promoting all students' proactivity and reasoning, which he aimed to encourage through class discussions. He preferred providing differentiated activities to Child B so that the student could access challenging material and he could also advance on the curriculum with the rest of the class. This approach supported Child B's understanding of his individualised activities while setting a barrier for his engagement in certain class activities (e.g., maths). This impacted this research because Teacher B decided to test the strategies in lessons on this subject matter (see Sections 5.3.1 and 6.5.2).

“I'm trying to build that independence… I very much feel like I'm kind of spoon feeding them…” (Teacher B)

“…Child B is just not able to access [some contents], and there's no way in my mind… we can differentiate what we were doing.” (Teacher B)

All teachers were interested in eliciting more student participation during class activities and students' consideration of their classmates' contributions. This interest was reflected by the talk rules they mentioned they had in class (e.g., listen, turn taking) and the strategies they used to promote students' participation (e.g., participation pen). They all mentioned using visual prompts and supporting materials and helping the focus students when they felt overwhelmed. These accounts highlighted the possibility of incorporating alternative forms of communication (visual
or behavioural) and the importance of monitoring students' states (anxiety and understanding) to promote their participation.

5.2.3 Parent questionnaires

The parents’ questionnaire included a 5-point Likert scale with 34 items and 11 open questions on different aspects of their children's characteristics, school experiences and received support. This subsection presents an overview of the Likert-scales scores and a summary of themes in the written responses. Appendix J includes a detailed account of these findings.

5.2.3.1 Scores from the Likert scale section

I separated the Likert-scale scores into three groups: schools' support (items 1 to 23), the impact of sensory sensitivities (items 24 to 31), and negative social experiences (items 32 to 34).

- Schools’ support: parents assigned high scores to 83% of the items, illustrating their satisfaction with the schools' teaching and support (see Table J.1 in Appendix J).
- Impact of sensory sensitivities: Child B's parents only highlighted a negative impact from his sensitivity to hearing and Child A's pointed out the negative and positive effects of touch and the positive ones of vision and hearing (highlighting the benefit of incorporating different sensory stimuli for Child A, see Table J.2 in Appendix J).
- Negative social experiences: only parents B and C indicated mild and high social difficulties, respectively (see Table J.3 in Appendix J).

5.2.3.2 Parents’ written responses to the open questions

The open questions inquired about the students' characteristics and the parents’ views on the schools’ support. I analysed their written responses with IPA methods (see Section 4.4.4). This section summarises the findings related to the superordinate and subordinate themes I identified across the questionnaires. Table
5.8 displays these themes. Appendix J describes each superordinate theme, provides a list of themes related to the subordinate ones and presents an example of how I delineated the themes.

Table 5.8. Superordinate and subordinate themes in the parents’ written responses

<table>
<thead>
<tr>
<th>Superordinate themes</th>
<th>Subordinate themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theme 1: Social interactions and children’s experiences in school</td>
<td>A. Child’s characteristics and social interactions</td>
</tr>
<tr>
<td></td>
<td>B. Concerns related to social interactions</td>
</tr>
<tr>
<td>Theme 2: School characteristics and children’s learning</td>
<td>1. Focus tasks</td>
</tr>
<tr>
<td></td>
<td>2. Enabling and hindering factors</td>
</tr>
<tr>
<td></td>
<td>3. Adjusting teaching</td>
</tr>
<tr>
<td></td>
<td>4. Children’s enjoyment of school and learning</td>
</tr>
<tr>
<td>Theme 3: Parents’ attitudes towards their children’s school</td>
<td>A. Parents’ foci</td>
</tr>
<tr>
<td></td>
<td>B. Parents’ trust in school</td>
</tr>
</tbody>
</table>

Two superordinate themes were related to specific students’ or schools’ characteristics that impacted the students’ behaviour, experiences and learning in their classrooms. The other theme was related to the parents’ interests and perceptions of the schools’ support.

The themes illustrated parents’ trust and positive perception of schools' support. Consistent with the literature, they mentioned the meaningful impact of social interactions on the students’ school experience and the need for guidance on this aspect (e.g., Saggers et al., 2011).

“…due to some bullying, they (Child C) sometimes feel isolated and do not want to go to school.”

Parents highlighted teachers should constantly adjust their practice and expectations of students’ participation. This suggestion required teachers to monitor the students’ behaviour (e.g., to identify unusual communication attempts), state (e.g., distractions, emotionally overwhelmed) and understanding of the activities.
“Visual learning/directions… seem to be the most pro-active way of learning for Child B at this time. …Sometimes making a sound is Child B’s instinct response until he puts his thoughts/ideas together to then answer.”

They pointed out teachers should use an explicit language, regulate sensory stimuli, introduce multimodal information and be considerate regarding the expected forms of carrying out tasks (e.g., difficulties writing).

5.2.4 Summary of baseline findings that informed the refinement of the strategies

The baseline data that were gathered through interviews, questionnaires and observations confirmed the potential usefulness of some of the preliminary strategies in Design Framework 1. Teachers’ and parents’ comments reflected their agreement regarding the central issues that required attention and how the students could be best supported. I also confirmed their opinions with the baseline observations in each class. I include below a list of the initial strategies I created in Design Framework 1 that addressed the areas of support and preferences highlighted by the baseline data:

1) **Opening of opportunities to add information to discussions that had ended.** Children A and B required extra time to finish activities compared with other children, and Child C was distracted by recurrent thoughts that were not related to the subject at hand. These findings justified the creation of a strategy that could help them to share their ideas when they were ready to do so. It could also help them to "complete a thought" and move on.

2) **Incorporation of visual or physical components to dialogue, preparation of supporting resources and agreement on alternative forms of contributing.** I observed that the three autistic children used multimodal supporting resources. Additionally, the students showed their abilities to communicate without speaking. They pointed at resources, used hand signals or made sounds. Therefore, I inferred that teachers could incorporate the
students' forms of communication into the expected ways of contributing to class discussions. This would require that these forms of communication be made clear to the whole class and to the teacher/TA.

3) **Probing students’ levels of understanding and monitoring students’ state (emotional and thoughts).** It was noticeable that sensory or emotional discomfort and confusion related to class activities limited the level of attention that the three focus students could pay to the activities. Therefore, their participation in the class was limited. Also, both teachers and parents emphasised the importance of ensuring that the students understood what was happening, what they were being taught and what was required of them.

4) **Openly discuss behaviours that are expected during dialogue and their purpose and assign roles.** It was noted that the three students found it helpful to have established groups of teammates and to follow explicit participation guidelines.

In the case of each of the autistic students, I identified particular characteristics that guided the ideation of specific further adjustments to the Design Framework 1 strategies. The strategies were the same for the three students, but I thought of different ways in which they could be implemented to support each of the students. For Child A, the regulation of sensory stimuli seemed to be particularly important to help him to maintain his attention on the task, avoid discomfort and keep calm. Also, regulation of his social behaviour was required to help him to direct his attention to others. For Child B, it seemed helpful to break down information into small chunks, to provide him with the processing time he required, and to prevent the build-up of overwhelming sensory stimuli. In relation to his interaction with others, Child B benefited from the receipt of close support from the TA or guidance from willing peers. Finally, Child C seemed to find it helpful to receive support to move on with an activity, complete ideas, and be allowed to take breaks from class activities. In the following section, I introduce how this information about the classrooms and the students, in combination with the teachers’ input, was used to develop further the adjusted strategies.
5.3 First refinement of the strategies in collaboration with the teachers and design principles

After I had gathered the baseline information, I invited the three teachers to participate in three workshops. These workshops aimed to ask the teachers to share their input, to familiarise them with the study and the theory involved, and to plan the intervention that would take place in their classes. I introduced them to the principles of Design Framework 1, the suggestions I had created and the preliminary strategies I had developed. This collaboration with the teachers in the first cycle represented the initial evaluation of the design framework.

In this subsection, I describe the teachers' input in the further development of the design framework strategies. I also delineate the teachers' particular goals for the intervention study in their classrooms regarding dialogue. At the end of the subsection, I introduce the revised version of Design Framework 1.

5.3.1 Establishment of initial goals and foci

I invited the teachers to participate in three, weekly, two-hour workshops. Besides introducing the principles and strategies of Design Framework 1, I planned to share background information on dialogic pedagogies, autism and the T-SEDA coding scheme in the workshops. However, the number of seminars that teachers attended differed among the schools, due to differences in the start date of the study in each school and the teachers' availability. The teachers of Classrooms A and C each participated in three two-hour workshops, whereas the teacher of Classroom B attended only one workshop of one hour. I introduced all the teachers to the conceptualisation of autism that was used for the study and the coding method that followed the T-SEDA framework and was used for the dialogue. I showed an example video.^[58]

Each teacher had access to an online shared folder, to which I added materials as we progressed through the workshop sessions. I invited the teachers to

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^[58] Section 4.3.1.5 provides more information about the workshops.
use the documents, modify them and add comments if they wanted to. The materials were:

- The T-SEDA coding framework;
- The initial principles of Design Framework 1, which originated from EBPs, and the suggestions for their implementation; and
- An adjusted version of the T-SEDA scheme, in which I included the preliminary strategies of the design framework.

The teachers chose a subject of interest and a dialogic goal for the intervention in their classrooms. I list below each teacher’s choice:

- Teacher A chose to trial the strategies during her religious education lessons. For Child A, we thought of ways in which physical materials could support his participation.
- Teacher B focused on the promotion of small-group discussions during maths lessons. Given that Child B was seen to react well to guidance from peers during the baseline observation, the teacher decided to place a peer next to Child B who would guide him during the maths activities.
- Teacher C focused on the promotion of listening among students during guided reading and sessions of philosophy for children (P4C). For Child C, it was essential that he be helped to share his ideas and that his emotional state be monitored.

The noticeable differences in the teachers' time investment in the workshop sessions impacted their engagement in the further development of the adjusted strategies. Teacher A was the first to participate in a workshop and she dedicated time to observing the dialogue that occurred in her classroom between the workshop sessions. She also trialled live coding with the T-SEDA framework, with the help of a TA. Teacher A was also the first to provide her input on the Design Framework 1 strategies. Teacher C had the opportunity to see the coding scheme that had been adjusted by incorporating the suggestions from Teacher A. Teacher B, by contrast, had access only to the online documents. I based any refinements I made to the
design framework that took into account Child B’s characteristics as recorded in the baseline observations. In the following subsection, I introduce the practical additions that Teachers A and C made to the design framework strategies.

5.3.2 Refinement of the preliminary strategies of Design Framework 1

I introduced the teachers to the strategies used in the design framework through use of the adjusted coding scheme format of the T-SEDA. So, Teachers A and C provided input to the five T-SEDA categories I adjusted and to the new set of non-speech strategies I added. The teachers enriched three of the five T-SEDA categories and seven of the eight non-speech strategies. The following tables show the additions that were made by the teachers to each set of strategies.

Table 5.9. Further adjustments to T-SEDA categories as suggested by the teachers

<table>
<thead>
<tr>
<th>T-SEDA categories</th>
<th>My preliminary additions</th>
<th>Additions suggested by teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Build on ideas</td>
<td>Physically show how the class builds ideas. Build on ideas after the conversation is over.</td>
<td>Build an object (e.g., building blocks), pass an object to leave a trace (e.g., string) or wear a hat to indicate interest in sharing an idea. Have available a place in the classroom to add ideas to a conversation that has finished (e.g., a wall of sticky notes related to a lesson).</td>
</tr>
<tr>
<td>Connect</td>
<td>Probe students’ understanding of activity.</td>
<td>Refer to the sequence of contributions or tasks that have taken place during the class discussion.</td>
</tr>
<tr>
<td>Guide direction of dialogue or activity</td>
<td>Refer to the agreed expected behaviours or steps of class discussion. Refer to the timetable of the day.</td>
<td>Establish and assign individual roles for small-group discussions (e.g., writer, monitor of dialogue, presenter).</td>
</tr>
</tbody>
</table>

The three T-SEDA categories they adjusted were 'build on ideas', 'connect' and 'guide the direction of dialogue'. Their additions to these categories involved suggestions on how physical or visual components could be incorporated into dialogue and how spaces could be created in the classroom where students could share ideas after the fact. Their suggestions also encompassed specific roles for group work and recapitulation of the sequence of events in an activity.
The teachers suggested additions for most of the new strategies, mainly inspired by their practices. Namely, the teachers suggested the creation of physical support resources (e.g., printed resources), different multimodal forms of communicating information (e.g., music, familiar hand signals, images), monitoring students' emotional states and creation of calm environments.

<table>
<thead>
<tr>
<th>New strategies</th>
<th>Additions made in collaboration with teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan layout for discussions</td>
<td>Block distracting unrelated objects. Position chairs in a particular arrangement.</td>
</tr>
<tr>
<td>Create temporal physical prompts for dialogic participation</td>
<td>Show objects that illustrate the conversation topic.</td>
</tr>
<tr>
<td>Indicate the start/end of discussions with different communication modalities</td>
<td>Incorporate sign language that is familiar to the student (e.g., Makaton) Use music, sounds or a song.</td>
</tr>
<tr>
<td>Continuously guide physically the direction of dialogue</td>
<td>Represent visually the ground rules for talking (through use of icons, images and cards). Print supporting resources such as cards that can be displayed on the walls or provided to the students (using Print3 software).</td>
</tr>
<tr>
<td>Use alternative communication modalities during discussions</td>
<td>Monitor focus students’ movements and sounds (e.g., flapping hands, repeat noises) and when the student engages in them</td>
</tr>
<tr>
<td>Promote dialogue in intrinsically motivational activities for students</td>
<td>Create opportunities for students to lead a class discussion or small-group activity. Provide praise that can be shown physically (e.g., behaviour chart).</td>
</tr>
<tr>
<td>Plan or ask for breaks or relaxation time outside discussions</td>
<td>Create a calm atmosphere for breaks (e.g., play quiet music, display soothing images, maintain low noise volumes).</td>
</tr>
</tbody>
</table>

Both Teachers A and C agreed with the preliminary strategies of Design Framework 1 that I had created and did not suggest any modifications to them. Instead, they added to the strategies with suggestions of practical ways in which they could be implemented. These methods included proposals for particular class
activities and the creation of materials that could accompany the strategies. The types of adjustments that the teachers made were of interest to the teachers because they represented ideas regarding how the teachers could test them in their classes. The activities and materials that the teachers promoted and used in their classes inspired their suggestions. Appendix F displays an extended version of the adjusted coding scheme with the additions that both the teachers and I made.

5.3.3 Revised Design Framework 1

The updated version of Design Framework 1 comprised eight design principles (that originated in EBPs) and 18 associated strategies. Table 5.11 displays the revised version of the first design framework. I continued to update these principles throughout the intervention study. Chapters 6 and 8 show how the design framework evolved through three more iterations.
<table>
<thead>
<tr>
<th>Principles</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use prompts or cues</td>
<td>1. Physically show how ideas are being built.</td>
</tr>
<tr>
<td></td>
<td>2. Display (temporally or continuously) physical or visual prompts/resources associated with forms of dialogic contributions.</td>
</tr>
<tr>
<td></td>
<td>3. Show resources that illustrate the conversation topics or steps to carry out an activity.</td>
</tr>
<tr>
<td></td>
<td>4. Use different ways to communicate the start/end of a discussion.</td>
</tr>
<tr>
<td>Model behaviour</td>
<td>5. Model ways to contribute to dialogue, including use of different forms of communication.</td>
</tr>
<tr>
<td>Provide guidelines</td>
<td>6. Refer to expected behaviours and elements of class discussions.</td>
</tr>
<tr>
<td></td>
<td>7. Refer to the timetable of the day.</td>
</tr>
<tr>
<td></td>
<td>8. Indicate the roles that each student will assume in a group activity/discussion.</td>
</tr>
<tr>
<td>Examine thoughts and emotions</td>
<td>9. Monitor negative thoughts or feelings during the class discussions.</td>
</tr>
<tr>
<td></td>
<td>10. Talk about the components of class discussions.</td>
</tr>
<tr>
<td></td>
<td>11. Plan breaks or encourage student to ask for one.</td>
</tr>
<tr>
<td>Modify/adjust the environment</td>
<td>12. Plan layout for class discussions.</td>
</tr>
<tr>
<td></td>
<td>13. Block distracting objects.</td>
</tr>
<tr>
<td>Provide opportunities for student to interact with others</td>
<td>14. Promote dialogue in peer-mediated activities.</td>
</tr>
<tr>
<td>Add intrinsically motivating features for the students</td>
<td>15. Promote dialogue during intrinsically motivating activities.</td>
</tr>
<tr>
<td>Use/encourage different communication modalities</td>
<td>16. Suggest alternative forms of communication and model them.</td>
</tr>
<tr>
<td></td>
<td>17. Provide opportunities to build on ideas from discussions that have ended.</td>
</tr>
<tr>
<td></td>
<td>18. Use different forms of communication during class discussions.</td>
</tr>
</tbody>
</table>
6 Cycles 2 and 3: Design Framework 2, intervention- and case-study findings

6.1 Introduction to the chapter

This chapter presents the main findings from the intervention study that enabled me to adjust the first design framework and its dialogic strategies. Design Cycles 2 and 3 comprised the intervention study and represented two trial and assessment cycles of the dialogic strategies in the participating classrooms. Figure 6.1 shows the activities that were conducted in the intervention study.

![Diagram of Cycles 2 and 3]

Notes:
D: Classroom observations and trialling of the strategies.
E: Collaboration with teachers (communication and meetings with teachers, including joint analysis sessions when possible).
F: In-depth analysis of selected examples of class interactions.

Figure 6.1. Design Cycles 2 and 3

I have placed the results of the two design cycles together for two reasons. One is that this format enables me to show a comprehensive set of examples and observations from the complete intervention study. The other is that, during the intervention, it was difficult to pinpoint when I adjusted the strategies and principles because of differences in the schedules and numbers of observations and joint analysis sessions I organised with the teachers per cycle. Therefore, I assessed the strategies and design framework in one process at the end of the intervention study.
In the first two sections of this chapter, I introduce the general findings of the in-depth analysis of the class observations, based on which I generated the main outcomes of the intervention study. These outcomes formed Design Framework 2 (which included the revised version of the strategies) and an adjusted coding scheme that registered the autistic students’ participation and the teachers’ strategies. Firstly, I describe the teachers’ common strategies that they used to support their autistic students and the dialogic features I identified to be associated with them. I delineate how these observations helped me to update the strategies and design framework. Secondly, I characterise the forms of contribution to dialogue that the three autistic students had in common. In this section, I introduce the new codes I created to register their behaviour. In the three following sections, I provide details of the dialogic features and strategies that I identified in each classroom and the evolution of my collaboration with each teacher. Throughout the chapter, I illustrate the descriptions with quotes and excerpts of transcripts of class interactions.

I distilled these findings from the fine-grained analysis that I carried out of 31 examples of class interactions that I had extracted from the 15 lessons I had observed in the three classrooms. The examples added up to 1671 turns (which totalled one hour and 46 minutes of class time) and included whole-class, small-group or paired, and one-to-one discussions. I selected the examples based on the criteria listed below:

- The examples illustrated the autistic students’ verbal or non-speech contributions to discussions.

- Each example represented a communicative sub-event (CSE).59

- I selected two examples from each lesson, one from a whole-class activity and another from a small-group activity. If the focus students did not contribute to a discussion, I selected an example of their one-to-one interactions with the teacher or TA.

59 I defined CSE as a meso unit of analysis that represented a particular exchange within a CE and that was associated with a specific topic, solution or formulation of an answer (see Section 4.4.3).
I codified turn-by-turn the sections of the conversations that were spoken by the focus students, teachers and classmates in the selected examples. In Sections 6.4, 6.5 and 6.6, I display graphs that illustrate the overall type and frequency of dialogic features that I observed per classroom. However, due to the selection criteria, some of the identified features did not illustrate all the dialogic features that I could have identified in the teachers’ and class’s speech. In Chapter 7, the features (and their frequencies of occurrence) that I identified during extended exchanges before and after the study are presented. These features enriched the description of the usual overall participation.

I summarise the findings at the end of this chapter. Materials that support the findings that are explained in this chapter can be found in Appendix B, Appendix K and Appendix L.
6.2 Trial and update of Design Framework 1

6.2.1 Introduction to the section

In this section, I illustrate the ways in which teachers trialled the strategies, and how I updated them and created Design Framework 2. I present the overall findings from my in-depth analysis of the classroom observations. First, I present a summary of how the three teachers (and sometimes the TAs) supported participation by the autistic students in class discussions. I include segments of transcripts and quotes that exemplify the types of class exchanges that inspired the adjustments of the strategies and the eight initial design principles (Design Framework 1). I also refer to the dialogic features and non-speech strategies that I identified frequently in the teachers’ discourse when they supported the focus students. Secondly, I introduce Design Framework 2 with delineations of the updates that were made to the design principles and their strategies. At the end of the section, I summarise the findings.

6.2.2 Teachers’ use of the strategies and adjustments that were made to Design Framework 1

To systematise the descriptions of the teachers’ strategies, I have divided this section into eight subsections: one for every design principle in the first design framework. In each subsection, I describe the strategies that were related to each design principle. I delineate:

- The practical ways in which the teachers implemented the strategies; and
- How teachers usually supported the focus students’ participation in their day-to-day practice.

In Table B.2 in Appendix B, I summarise how the design principles and teaching strategies evolved, based on the observations from the intervention study.

As part of the descriptions, I indicate the dialogic features and non-speech strategies that I identified most frequently in the teachers’ implementations of the strategies. For this, I focused on the teachers’ (and TAs’) turns in the transcripts in
which they addressed the focus students directly. I registered and counted the frequency of occurrence of the specific features and strategies that I had identified in their turns during whole-class discussions and small-group (or one-to-one) talk. The following tables show the total frequencies of occurrence of these features and strategies for each teacher and TA in each classroom arrangement.

The dialogic features that were observed to occur at the greatest frequencies were somewhat similar among the three participating teachers and the TAs and between the two activity arrangements. I identified the dialogic features ‘invite to build on ideas’ (IB), ‘build on ideas’ (B) and ‘guide direction of dialogue’ (G) most frequently in the three teachers’ speeches.

<table>
<thead>
<tr>
<th>Features and strategies</th>
<th>Frequencies during whole-class discussions</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Teacher A</td>
<td>TA A</td>
</tr>
<tr>
<td>IB</td>
<td>26</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>CH</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>IR</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>R</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>CA</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>C</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>RD</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>G</td>
<td>29</td>
<td>3</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

I highlight the four most frequently identified codes per agent (columns), in increasing order from light to dark shades of orange. For explanation of the codes see Appendix F.

<table>
<thead>
<tr>
<th>Features and strategies</th>
<th>Frequencies during whole-class discussions</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjust physical environment</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Use resources</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Non-speech communication</td>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td>Activity characteristics and praise</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

60 Dialogic codes: IB (invite to build on ideas), B (build on ideas), CH (challenge), IR (invite reasoning), CA (coordination of ideas), C (connect ideas), RD (reflect on dialogue), G (guide direction of dialogue), E (expressinvite ideas).
Table 6.2. Frequencies of occurrence of dialogic features and non-speech strategies in teachers' contributions during small-group or one-to-one discussions

<table>
<thead>
<tr>
<th>Features and strategies</th>
<th>Frequencies during small-group discussions</th>
<th>Total freq.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Teacher A</td>
<td>Teacher B</td>
</tr>
<tr>
<td>Dialogic codes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IB</td>
<td>22</td>
<td>2</td>
</tr>
<tr>
<td>B</td>
<td>23</td>
<td>2</td>
</tr>
<tr>
<td>CH</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>IR</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>R</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>CA</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>C</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>RD</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>G</td>
<td>48</td>
<td>4</td>
</tr>
<tr>
<td>E</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Adjust physical environment</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Use resources</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Non-speech communication</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>Activity characteristics and praise</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

I highlight the four most frequently identified codes per agent (columns), in increasing order from light to dark shades of orange. For explanation of the codes see Appendix F.

In the three teachers' talks, I also recognised frequently the feature ‘connect ideas’ (C, in small-group discussions), and non-speech forms of communication (especially in Classrooms A and B). Three of the dialogic features that occurred frequently (B, G and C) represented three of the five T-SEDA dialogue categories that had inspired the initial strategies. This overlap might have explained their high frequencies of occurrence. However, the overlap also confirms that they are helpful during the support of autistic students.

The frequencies of occurrence also reflected the TAs' support for the focus students. They provided little to no advice during the whole-class discussions, and only Children A and B received their guidance. During small-group discussions, Child B’s TA was his major supporter (in contrast with Children A and C). I describe in more detail in Sections 6.4, 6.5 and 6.6 the specific forms of support that were offered in each classroom.
Throughout Section 6.2.2, I refer to the frequencies that are shown in these tables to indicate how often I identified the dialogic and non-speech strategies that were associated with each design principle.

\textit{6.2.2.1 Design principle: use prompts or cues}

The design principle of ‘using prompts or cues’ was originally proposed regarding the use of verbal and non-verbal (visual, auditory, or physical) prompts or cues to support students’ participation in class discussions. I describe below the verbal and non-verbal strategies that were originally suggested and what they looked like in the classroom.

\textit{Verbal prompts or cues}

I associated the verbal aspect of this principle with the dialogic strategy of ‘guiding the direction of dialogue or activity’ (G). The specific strategy involved the creation and use of verbal cues that could elicit dialogic forms of contributions to a discussion (e.g., the use of a specific phrase to elicit the provision of an argument).

I did not identify any specific cue that teachers employed to draw out a specific dialogic form of verbal contribution to a discussion. The strategy that was used by all three teachers and that seemed similar to the suggestion was saying the word ‘because’ to elicit students’ reasoning. However, I noticed other forms the three teachers (or TAs) used to prompt students to contribute in particular ways and guided their responses to relate these to the topic. The teachers implemented these strategies when the focus students had difficulty responding or continuing with activities, provided short or ambiguous responses or appeared distracted. The strategies included:

- guided questioning;
- provision of options or the highlighting of essential details that were related to the steps to develop an activity; and
- the focusing of students’ attention on key moments during class discussions.
As part of **guided questioning**, a teacher (or a TA) asked a focus student to elaborate or explain his responses while the teacher guided the direction of his answers. The teacher either supplied specific words or ideas related to the topic at hand, or asked the student to elaborate on a particular aspect of his previous contribution. Through questioning, the teacher helped the student to clarify his original contribution and to elucidate how this was (or could be) associated with the discussion. The following tables show short examples of this form of questioning.

**Table 6.3. Example of a TA’s guided questioning during a one-to-one interaction with Child B.**

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
<th>Code 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.</td>
<td>TA</td>
<td>What about the safety?</td>
<td>IB, G</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Child B</td>
<td>The safety, their safety is, ah, to be protected</td>
<td>B</td>
<td>BD</td>
</tr>
<tr>
<td>14.</td>
<td>TA</td>
<td><strong>How are they not protected?</strong></td>
<td>IB, G</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Child B</td>
<td>Because they are in the desert</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>TA</td>
<td><strong>So, what is not safe about the desert?</strong></td>
<td>IB, G</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>Child B</td>
<td>Because there is poison animals</td>
<td>B</td>
<td></td>
</tr>
</tbody>
</table>

The example in Table 6.3 shows how the TA helped Child B to elaborate on his contribution. She specifically asked him to expand on why the children in the story were not protected (IB and G, in turns 14 and 16), which redirected his attention to the topic. Her support enabled Child B to formulate a more precise argument than he had thought of previously, which he could use to advance the activity.

The example in Table 6.4 illustrates how Teacher A focused Child A’s attention on one aspect related to the definition of the word resilience (G, turn 5: people’s actions). The Teacher Added this detail to her question so that Child A could formulate an answer based on it.
Table 6.4. Example of Teacher A’s guided questioning in a whole-class discussion

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
<th>Code 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>T</td>
<td>Does anyone have anything to add to Boy 1? Is there anything more about resilience? Child A, what do you think resilience is?</td>
<td>IB, G</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Child A</td>
<td>Resilience is good and happy ((puts one of his thumbs up))</td>
<td>E</td>
<td>1RESP</td>
</tr>
<tr>
<td>5</td>
<td>T</td>
<td>It is good. When you are resilient, what do you do?</td>
<td>IB, G</td>
<td></td>
</tr>
</tbody>
</table>

Teacher A did not invalidate Child A’s first response, which seemed ambiguous. Instead, by asking a more specific question, she provided Child A with another opportunity to develop a response and to contribute to the discussion.

The examples show how, through questioning, the teachers helped the students to focus on details that would enable them to formulate responses that advanced the discussions (G). Depending on the level of support that each child required, the teachers carried on with the questioning and introduced more details to guide them (thereby removing degrees of freedom\(^\text{61}\)). Sometimes the continuous questioning required teachers to elaborate on previous contributions (B). Teachers rephrased their previous questions to make them more specific, or they formulated new questions based on the students’ responses.

Alternatively, to remove more degrees of freedom, the teachers highlighted essential information regarding the steps required to carry out the activity, provided students with options to choose from, or pointed out potential topics for development. These strategies were beneficial when students struggled to respond to an invitation or to carry on with the activity.

\(^{61}\) I refer to work by Wood et al. (1976) on the process of tutoring, which includes the reduction of degrees of freedom as a ‘scaffolding function’.
In the case of providing options, teachers suggested potential answers to questions, courses of action that the children could take to continue with activities, or forms of contribution to the discussion.  

“So, do you want to read that, that is slightly more, or that, that is slightly less?” (TA in Classroom B, small-group discussion)

“Oh, maybe you can ask your friends, Child A.” (Teacher A, small-group discussion)

Regarding the potential topics that students could develop, the teachers referred to concepts, examples of specific situations or personal experiences based on which the students could build answers (e.g., going to the beach).

“Could you relate it to autism awareness week?” (Teacher C, small-group activity)

By highlighting alternatives, the teachers created more opportunities for the students to contribute to the dialogue through the formulation of ‘relevant answers’ and focused the students’ attention. On some occasions, those opportunities implied that the students could reply by repeating one of the options. Then, teachers could invite the students to build on their chosen answers. I suggest that this method enabled students to experience contributing to discussions with confidence because they knew that their answers would help to advance the discussion. Students who were invited to choose a course of action thus gained a feeling of control over what would happen next.

The TAs in Classrooms A and B also cued when essential information was shared during whole-class activities. The TAs focused the students’ attention on the discussion when they seemed to be distracted, asked them to listen and, sometimes, shared short comments related to the discussion.

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62 Teachers A and C suggested ways in which students could contribute to a discussion as part of their guidance for the class in whole-class discussions (e.g., “maybe you could listen to somebody else’s idea and see if you can build on it”).
I qualified most of the turns in which I identified these strategies with the dialogic feature of ‘guiding the direction of dialogue’ (G). If I observed guided questioning and teachers’ reformulation of previous contributions, I identified the features of ‘inviting to build on or explain’ (IB, IR), ‘inviting ideas’ (E) and ‘build on ideas’ (B). Three of these features (G, IB and B) corresponded to the features I identified frequently when the teachers supported the autistic students. Many of the turns that I coded with these features corresponded to the strategies I describe in this section, which indicated that these were the strategies that were implemented most frequently to support the focus students.

Non-speech prompts and cues

I associated ‘non-verbal’ aspects of the principle with the dialogic feature named ‘build on ideas’ (B) and with the non-speech strategies of ‘displaying/using physical or visual supporting resources’ (TEMP, CONT) and ‘cueing the start or end of a discussion’ (ST/EN). The purpose of the non-verbal prompts and resources was to provide visual or physical representations of the discussions. Their use aimed to illustrate the topic discussed or expected forms of contribution from students (or signalling when expected) or the forms of contribution that had taken place. The specific strategies included:

- representing physically or visually how ideas were brought together during a conversation;
- providing information on (or cue) expected forms of participation in discussions, visually or physically;
- displaying prompts with information, based on which students could ‘build’ their contributions; and
- signalling the start or end of a discussion with a cue that was different to speech.

Before my study, the three teachers already displayed support resources as part of their day-to-day practice. They displayed the resources on smartboards and walls to support the development of the activities and their students’ participation in
them. The resources included images, text (e.g., questions or sentence stems), calculations to be solved, and ‘take-away points’ related to the lessons’ topics of conversation. In general, these ‘prompts’ helped to provide all the students with visual representations of what the class discussed. Particularly for the autistic students, I noticed that referral to these prompts or supporting materials during a discussion enabled the teachers to:

- **provide a concrete aspect to the discussion** (when the referral accompanied verbal contributions);
- **offer information**, which students could use to formulate responses or alternative ways to contribute to discussions; and
- **focus the students’ attention** and make sure that relevant information was available.

Having concrete representations of discussions helped Children A and B to understand the content of class discussions and what happened in them. In the case of Child A, referral to these concrete representations also seemed to motivate him to participate.

Teacher A was the only teacher who trialled the strategy of **representing physically or visually how the class ‘built ideas’**. Use of this strategy helped Child A to keep track of his and his classmates’ participation. Teacher A planned activities and used objects to illustrate the number of contributions that were provided during a discussion and who provided them. Some examples included: the creation of a structure of building blocks (the structure represented the class’s collective idea and a block was added for each contribution); passing a string between speakers (to leave a trail of those students who had participated); and asking students to sit in the centre of a circle after they had shared an idea. These strategies helped to create visual registers of the students’ participation. The register made it evident how the participation of different speakers enriched and shaped the discussions. Child A seemed to find this visible register motivational and, at times, it encouraged him to contribute to the discussion (he showed enthusiasm when he
contributed to ‘physically building’ the collective idea, under the dialogic feature B1.2).

“So, that was a really good point, Child A. You want to build on our point?” (Teacher A showed Child A the pile of blocks so that he could add a new piece)

The representation of Child A’s own contribution showed him that he could help to advance the activity and that he had a space in which to do so. In the same way, when Child A observed the physical register of other students who had participated (e.g., they were sitting inside the circle after they had contributed), he wanted to join them.

I also observed that the students’ engagement and understanding were facilitated when abstract concepts and problems were represented physically or visually during a discussion as they were explained. The teachers illustrated the logic behind those concepts and problems and their solutions, and they focused the students’ attention on concrete characteristics. In the case of Child B, who struggled with the maths activities, he benefited from having physical support materials that represented the calculations that he had to solve.

I depict in Table 6.5 how the use of physical resources and drawings supported Child B’s participation in an activity that was performed in pairs. In this example, Child B worked with a classmate who took on a tutor role. The classmate and the TA explained to Child B the process of adding two mixed numbers by representing the numbers and addition through the use of physical blocks and by drawing figures (dialogic feature R1.2).

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63 See Section 6.2.2.6 for findings related to the strategy of planning activities that provided the children with opportunities to interact with others.
Table 6.5. Example of the use of physical materials to represent an abstract problem

**Classroom B, activity in pairs with support from TA (Cycle 2)**

**Context:** In this interaction, Child B worked with a peer and the TA to solve an addition of mixed fractions (2 1/6 + 2 2/3). The peer and the TA used supporting materials to explain the calculation.

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
<th>Code 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>TA</td>
<td>So, you have got two wholes there (holds two columns of blocks) so, let’s see, and then the other two wholes on the other side and we need to put a cross in the middle, I guess, don’t we?</td>
<td>G, R1.2</td>
<td>TEMP</td>
</tr>
<tr>
<td>2.</td>
<td>Boy 1</td>
<td>And then you need to change this (shows the two columns that represent the fractions of the two mixed numbers), change this into sixths (shows the blocks that represented 2/3)</td>
<td>B1.2, C</td>
<td>TEMP</td>
</tr>
<tr>
<td>3.</td>
<td>Child B</td>
<td>Oh (looks at the blocks)</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Boy 1</td>
<td>So, Child B, how many of these make that? (displays in front of Child B individual blocks that represent sixths and then points at the column that represents 2/3)</td>
<td>G, R1.2</td>
<td>TEMP</td>
</tr>
<tr>
<td>5.</td>
<td>Child B</td>
<td>Uhm, nam (grabs the loose blocks and puts them together)</td>
<td>B1.2</td>
<td>ALT, TEMP</td>
</tr>
<tr>
<td>6.</td>
<td>TA</td>
<td>So, at the moment we have got that, haven’t we? 1/6 there, got two whole ones and 1/6 plus two whole ones (draws figures representing two mixed numbers)</td>
<td>CA, R1.2</td>
<td>ALT, TEMP</td>
</tr>
<tr>
<td>7.</td>
<td>Child B</td>
<td>((Child B puts together the individual blocks and leaves the resulting column on the table))</td>
<td>U</td>
<td>ALT, TEMP</td>
</tr>
<tr>
<td>8.</td>
<td>Boy 1</td>
<td>So, this equal this (holding the columns of 2/3 and 4/6), so then you add these together, add this together Child B (points at the column that Child B put together, 4/6, and then points at the loose block that has to be added to it)</td>
<td>R1.2, C</td>
<td>TEMP</td>
</tr>
<tr>
<td>9.</td>
<td>Child B</td>
<td>Ah (makes a high-pitched sound, grabs the loose block and attaches it to the column of 4/6)</td>
<td>B1.2</td>
<td>ALT, TEMP</td>
</tr>
</tbody>
</table>

Child B did not reply verbally to the guidance. However, he followed their instructions and, based on his peer’s explanation, he ‘built’ the answer to the sum with the blocks\(^{64}\) (B1.2). Child B’s behaviour indicated that he paid attention to his peer, understood his suggestions, and engaged in an activity in which he would not have usually participated due to its difficulty. Teacher B generally provided Child B with physical support materials during maths lessons. However, in many cases,

\(^{64}\) See Section 6.2.2.8 regarding encouraging students to participate through the use of forms of communication other than speech.
these were related to exercises that were set only for Child B and that he solved with the TA’s direct support. The example shows the potential value of planning the involvement of physical materials in group activities. The use of such materials can enable students to engage in the same activity as their classmates and can facilitate interactions between peers.

I present in Table 6.6 another example of how the addition of a concrete aspect to a discussion encouraged Child A to remain attentive and to contribute to the discussion.

Table 6.6. Example of use by a TA of objects to prove a point

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
<th>Code 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>TA</td>
<td>Do you think everybody should just wear trousers for school?</td>
<td>IB</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Girl 1</td>
<td>No, only boys. And girls should wear this ((stands up and shows her dress, Child A turns to see her))</td>
<td>B</td>
<td>TEMP</td>
</tr>
<tr>
<td>3.</td>
<td>TA</td>
<td>Look at me, what am I wearing? ((points at her trousers))</td>
<td>G</td>
<td>TEMP</td>
</tr>
<tr>
<td>4.</td>
<td>Child A</td>
<td>Black trousers. They are the same ((looking at the TA’s trousers and his trousers))</td>
<td>B</td>
<td>TEMP</td>
</tr>
<tr>
<td>5.</td>
<td>TA</td>
<td>Where is my dress? My skirt? I don’t need one.</td>
<td>CH</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Child A</td>
<td>The same</td>
<td>U</td>
<td>RPT2</td>
</tr>
</tbody>
</table>

In this example, the TA referred spontaneously to her clothing (G, turn 3 - trousers) to illustrate her counterargument (CH) to a girl’s previous contribution (turn 2, girls should wear dresses). This action attracted Child A’s attention and he seemed enthusiastic to reply to her comment. He built on the TA’s comment and provided a relevant contribution without being prompted by the TA (B, turn 4). This example shows that the addition of concrete aspects to discussions does not necessarily involve the preparation of materials.

Teachers’ displays or referrals to prompts and supporting materials also helped students to respond to invitations during discussions (particularly when
they struggled to formulate responses). For instance, a student could elaborate a response based on the information conveyed in prompts such as images, bullet points or phrases displayed on a whiteboard. Alternatively, students could point at a specific prompt or material to answer. In most cases, I observed these forms of response in Classrooms A and B. The example in Table 6.7 shows that Child A responded to a question by pointing at an image on the board and formulating an answer based on it.

Finally, I noticed that the supporting materials could focus the students’ attention and keep relevant information available. If students became distracted, they could catch up with the discussion by looking at the information displayed on the board or walls. For example, Children A and C consulted the materials independently and commented on their information. Also, if a student became disengaged from a small-group activity, the teacher could redirect the student to their team’s written outcomes (I observed an example of this type in Classroom C).

Table 6.7. Example of Child A replying by referring to a supporting resource

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
<th>Code 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>27.</td>
<td>T</td>
<td>Child A, when is life really good for Child A?</td>
<td>G</td>
<td></td>
</tr>
<tr>
<td>28.</td>
<td>Child A</td>
<td>Ah, when is life is good ((walks towards the smartboard and points at the picture of a birthday party)), birthday.</td>
<td>E</td>
<td>ALT, TEMP</td>
</tr>
<tr>
<td>29.</td>
<td>T</td>
<td>When it’s your birthday?</td>
<td>IB</td>
<td></td>
</tr>
<tr>
<td>30.</td>
<td>Child A</td>
<td>It’s this ((grabs a marker and points at the same image)). This is their birthday.</td>
<td>B</td>
<td>ALT, TEMP</td>
</tr>
<tr>
<td>31.</td>
<td>T</td>
<td>Why is that good?</td>
<td>IR, G</td>
<td></td>
</tr>
<tr>
<td>32.</td>
<td>Child A</td>
<td>Because this is birthday, is happy.</td>
<td>B</td>
<td>1RESP</td>
</tr>
</tbody>
</table>

In the case of cueing a discussion, only Teacher A created a particular stimulus (a song) to signal that a whole-class discussion was going to take place or had ended. It was observed that all the members of the class (including Child A) adjusted their behaviour; they paid attention to the teacher, waited for

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65 This example illustrates how the use of supporting materials also seemed to open opportunities for students to contribute to discussions by pointing at the materials. I describe this in Section 6.2.2.8.
guidance and sat in a circle on the carpet. All three teachers already used similar strategies to indicate the end of all activities, usually through an auditory stimulus (e.g., they rang a bell) to get the students’ attention. For this reason, I suggest that teachers could readily implement the strategy, and the students could understand it within a short time of its introduction.

I noted that the teachers used non-verbal prompts or referred to supporting materials less often than they did for the verbal strategies (‘display resources’ in Table 6.1 and Table 6.2). I identified their use of non-verbal prompts or support resources when the teachers and TAs in Classrooms A and B assisted the focus students to participate in small-group activities. These results indicate that the strategies did not represent the main form of support for the students and that teachers implemented them under close guidance of the students.

In summary, verbal and non-verbal prompts and cues helped to focus students’ attention on relevant details, to motivate and guide their participation, and to clarify information in different modalities. Through the use of these strategies, teachers shared details (on the content of dialogue or expected forms of contributions) that enabled students to continue to engage with an activity. I suggest that, through the use of these strategies, teachers supported students to formulate their responses, which meant that the students found it less daunting to contribute to discussions.

6.2.2.2 Design principle: model behaviour

The design principle ‘modelling behaviour’ suggested the exemplification for the students of productive ways in which to contribute to class discussions. I associated this principle with the dialogic strategy of ‘guiding the direction of dialogue or activity’ (G). The original specific strategies that were included in this principle were:

- acting dialogic conversations and
- modelling specific dialogic forms of contribution to a discussion.
Overall, the teachers adopted dialogic ways of interacting and engaging with all the students’ ideas to promote dialogue. For example, teachers explained explicitly that they were referring to or building on previous contributions when they did this during the facilitation of discussion. I suggest that this led teachers to model organically ways to engage in dialogue for the whole class. In a way, teachers and TAs became facilitators of and participants in the class dialogue, as they followed the same rules and expectations. I present in Table 6.8 an example of this.

Table 6.8. Example of TA modelling ways in which students were expected to contribute to discussions

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
<th>Code 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>T</td>
<td>Ok, I haven’t seen any thumbs when Girl 1 was talking. So, do we just, no one knows if they agree or disagree with her?</td>
<td>IB</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>TA</td>
<td>((The TA puts her thumb down))</td>
<td>U</td>
<td>ALT</td>
</tr>
<tr>
<td>3.</td>
<td>T</td>
<td>Oh, TA disagrees. Why do you disagree with her?</td>
<td>IR</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>TA</td>
<td>I disagree with Girl 1 because I think that the character hasn’t got a scowl. Because if I think of a scowl, I would think of this ((frowns)).</td>
<td>CH, R</td>
<td>ALT</td>
</tr>
<tr>
<td>5.</td>
<td>T</td>
<td>Everybody look at TA because she is doing something.</td>
<td>B, G</td>
<td></td>
</tr>
</tbody>
</table>

In this example, the TA in Classroom C engaged in a whole-class discussion in the form expected from the students. She indicated physically and verbally that she disagreed with a previous contribution and provided a reason.

When the teachers modelled ways to contribute in order to support the focus students, I noticed that they often exemplified the formulation of clear contributions. To do this, the teachers tended to rephrase the students’ contributions in a form that clarified their connection with the discussion at hand. The teachers and TAs used this strategy when students shared ambiguous or incomplete responses. Teachers frequently implemented this method after they had conducted guided questioning and helped the students to formulate answers. Teachers built on the students’ responses (B) by structuring them, correcting the form of speech, and
making the arguments evident. Table 6.9 illustrates how Teacher A rephrased Child A’s response to clarify his contribution to a piece of dialogue (turn 17).

Table 6.9. Example of Teacher A rephrasing Child A’s contribution in a whole-class discussion

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
<th>Code 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.</td>
<td>T</td>
<td>Child A, what can we do about it?</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Child A</td>
<td>Ahh, the plastic.</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>T</td>
<td>Yeah, the plastic, the plastic is going in. So, what could we do to stop it going in?</td>
<td>IB, G</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Child A</td>
<td>Into the dustbin ((replies with information that the TA had mentioned to him during a previous pair talk)).</td>
<td>B</td>
<td>BP</td>
</tr>
<tr>
<td>17.</td>
<td>T</td>
<td>We put it into the dustbin instead.</td>
<td>B</td>
<td></td>
</tr>
</tbody>
</table>

The example shows how Teacher A put together the different ideas mentioned by Child A (plastic and putting rubbish in the dustbin) to formulate a complete sentence that was based on his contributions (B). Teacher A illustrated for Child A the formulation of a clear contribution. I suggest that this strategy served two purposes. Firstly, this move was congruent with her interest in improving the child’s verbal communication. Secondly, it helped to clarify Child A’s contribution to both the class and the teacher herself. The use of this strategy opened the opportunity for others to build or comment on Child A’s ideas.66

Sometimes students did not notice the teachers’ attempts to model a way to formulate or contribute an answer. At times, students were distracted, or they found the teachers’ intention of modelling unclear. I suggest that a strategy I observed in class C could help the students to pay attention and to adopt the modelled forms of participation. The strategy involved explicit indications of what teachers were modelling and when. Teacher C opted sometimes to model the expected forms of communication after talking openly about them. The Teacher Accompanied her

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66 I also associate the strategy of ‘rephrasing students’ contributions’ with the design principle ‘provide opportunities to interact with others’. I discuss this in Section 6.2.2.6.
explanation with modelling, so the latter became more explicit. I present in Table 6.10 an example, in which Teacher C explained to Child C and his teammates what they could do if they did not hear a teammate’s idea. She modelled the question they could ask.

Table 6.10. Example of Teacher C’s explicit modelling

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>T</td>
<td>When you can’t hear someone, do we just carry on with our lives [or] do we say, “I can’t hear you, could you repeat that?”</td>
<td>G, RD</td>
</tr>
<tr>
<td>2.</td>
<td>Child C</td>
<td>[No]</td>
<td>U</td>
</tr>
<tr>
<td>3.</td>
<td>Girl</td>
<td>I didn’t hear him say anything</td>
<td>U</td>
</tr>
<tr>
<td>4.</td>
<td>Boy 1</td>
<td>I did</td>
<td>U</td>
</tr>
<tr>
<td>5.</td>
<td>T</td>
<td>So, someone is going to say that to Boy 1 now. Okay, can we ask him to repeat himself? ((Says this looking at Child C and points at Boy 1))</td>
<td>G</td>
</tr>
<tr>
<td>6.</td>
<td>Child C</td>
<td>Can you repeat yourself please?</td>
<td>U</td>
</tr>
</tbody>
</table>

In summary, modelling seemed to carry more impact when it was clear that it was taking place. Such modelling exemplified the ways in which students could contribute to dialogue and formulate their responses. I qualified the turns in which I identified this strategy with the dialogic features ‘guide direction of dialogue’ (G) and ‘build on ideas’ (B). These dialogic features were identified at two of the highest frequencies. However, I identified the reformulation of responses (B) the most.

6.2.2.3 Design principles: provide guidelines

The design principle ‘providing guidelines’ suggested a frequent referral to relevant information regarding the structure, expectations and schedules of the discussion or activity at hand. I associated this principle with the dialogic strategies ‘connecting ideas’ (C) and ‘guide direction of dialogue’ (G). The specific strategies that I suggested initially as part of this principle included a referral to:

67 The direct explanation of the form of communication is related to another design principle, ‘examine thoughts and emotions’. I include in Section 6.2.2.4 more details regarding the strategies that were related to that principle.
• The expected forms of contribution or behaviour;
• The sequence of key contributions that would occur during a discussion;
• The timetable of the day; and
• Guidance regarding roles for students in class discussions.

The objective of these strategies was to make clear to the students what the teachers expected of them and what they could expect from the activity and to clarify how the activity would progress. I noticed during my observations that the teachers implemented strategies that served these purposes. However, some of the teachers’ strategies were slightly adjusted versions of those that had been suggested originally. I clustered these strategies into two types that had the characteristics listed below.

• Explicit indication of roles and how students could participate at a specific moment during a discussion.
• Share information in a brief and friendly form on the contributions or steps that would help to advance the activity at hand.

In the first case, when teachers stated explicitly how students were required to participate in a discussion, they promoted students’ engagement and regulation of behaviour. One example of this form of support was the establishment of specific roles for small-group activities (G). Teacher A implemented this strategy by assigning roles to Child A and his teammates. The roles required students to consider their teammates’ ideas and to take on tasks to help to carry out the activities (e.g., writer of the team’s ideas, turn-taking monitor, question-asker). Child A willingly took on the role that the teacher had assigned to him and engaged in the activity. I suggest the assignment of a role eased participation for him and increased his motivation to take part. It guided his behaviour and showed that his participation was essential to advance the task.\(^68\)

\(^68\) More information on the type of roles that Teacher A assigned to child A and child A’s responses to them is included in Section 6.4.
Additionally, Child A’s teammates were more open to guiding him and allowing him to take responsibility for one aspect of the activity. Teachers B and C assigned roles on some occasions. However, these were less specific than the roles assigned by Teacher A or were not planned for the autistic students.

Teacher A also used another strategy of explicitly asking students to build on the idea she had just shared with the class (IB). She either introduced a new idea or referred to her previous contribution and asked them to comment on it. I include in Table 6.11 an example of this strategy. In this example, Teacher A helped to redirect the students’ attention to the topic they were discussing (Child A’s drawing of a turtle - G, turn 44). She added a new idea that was related to their conversation (B, ‘using nets to help the turtle’) and asked the students to elaborate on it (IB, how they could use the nets). Teacher A guided her students by pointing out the idea on which to elaborate. I suggest that this strategy enables students to practice engagement with someone else’s idea.

Table 6.11. Example of Teacher A’s invitation to build on her idea

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
<th>Code 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>41.</td>
<td>Teacher A</td>
<td>What could you do to save the turtle?</td>
<td>IB, G</td>
<td></td>
</tr>
<tr>
<td>42.</td>
<td>Child A</td>
<td>[We have bin…]</td>
<td>B</td>
<td>BP</td>
</tr>
<tr>
<td>43.</td>
<td>Girl 1</td>
<td>[Oh, I know, you can, recycle it] before it gets to the sea</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>44.</td>
<td>Teacher A</td>
<td>We could get nets. What could we do with the nets?</td>
<td>B, G, IB</td>
<td></td>
</tr>
<tr>
<td>45.</td>
<td>Girl 1</td>
<td>Ah, pick up the rubbish out</td>
<td>B</td>
<td></td>
</tr>
</tbody>
</table>

Concerning the strategy of referring to expected forms of contribution or behaviour, it was beneficial to remind students of specific ways in which they could participate at strategic moments. This meant that they could remind students at points when specific forms of contribution could help them to advance the dialogue or activity (C). I identified the use of this strategy on a few occasions, and it seemed to regulate students’ behaviour. In terms of dialogic contributions,
mostly I observed that teachers reminded students that they could “build on” what someone else had said. (For example, Teacher A: “Does anyone want to answer to that or build on what he has just said?”). However, this usually represented an invitation to the whole class.

I also observed instances in Classroom A in which the teacher referred to specific talking rules during the conversation. For example, Teacher A reminded the class to “take turns” (sharing the phrase “my turn, your turn”). The rule became so familiar to the students that they sometimes referred to it during discussions and adjusted their behaviour accordingly (Child A also did this). In the cases of Teachers B and C, they referred to usual participation dynamics in their classrooms. These were related to general expectations in terms of the students’ participation in the classroom (e.g., not calling out, volunteering so that the teacher did not need to select a speaker randomly) and particular activities (problem-solving). I include two quotes that illustrate the references to this strategy by Teachers B and C.

“What do you need to be showing me in problem-solving?” (Teacher B, whole-class discussion)

“… if there are not enough hands, what am I going to do?” (Teacher C, whole-class discussion)

Strategies that involved sharing information about previous contributions or steps in a concise form displayed the trajectory of the activity at hand. Through use of this strategy, teachers clarified what had happened and what was coming up next. By doing this, teachers enabled students to keep up with the activities and guided their further engagement. In some cases, teachers summarised the previously shared ideas during a discussion to promote student participation (CA code). The teachers clarified how the conversation had evolved and reminded students of what was under discussion. Sometimes, teachers recapped information that had been shared seconds before. I illustrate this with two quotes below.
“We had the idea that we should… help the short person out so we can make it easier. So, we treat the short person, because of what they look like, differently. Child A, what do you think? (Teacher A, whole-class discussion)

“So that is your safety bit, they’ve got snakes and lizards there, they are not protected, and the other bit is not enough water” (TA, one-to-one interaction with Child B)

This strategy was similar to the original suggestion that teachers refer to the sequence of key contributions in a discussion. However, in contrast to the original, the altered strategy of sharing a summary seemed to be friendlier for the students. It represented a more manageable amount of information to process, so the information remained available for them to formulate responses. I observed the use of this strategy in classes A (during whole-class discussions) and B (during one-to-one interactions between the TA and Child B).

In other cases, teachers referred continuously to the previous and following steps that were involved in carrying out an activity (C). I observed this strategy most often in Classroom B during provision by the TA of one-to-one support for Child B. As she guided him through the solution of an activity, she referred to the steps he had carried out and the ones that would follow and she discussed how these were connected.

I include in Table 6.12 a short example of this form of support in which the TA helped Child B to shade half of a shape in his notebook. In this example, the TA reminded Child B of the information they had already figured out about the shape, the pieces he had shaded (C, turn 39) and the aim of shading half of them (C, turn 41). Through use of this strategy, the TA evidenced the process he needed to follow to solve the activity by referring to the different components he had to consider (C).


Table 6.12. Example of a TA referring to the previous and next steps in a process

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
<th>Code 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>39.</td>
<td>TA</td>
<td>So, if you got eight. One, two, three, four, five, six, seven, eight ((points at the figure in Child B's notebook)), two of them you shaded so far, if I am going to eat the same amount of chocolate as you are, how many would you have to shade in?</td>
<td>C2.2, G</td>
<td>ALT, TEMP</td>
</tr>
<tr>
<td>40.</td>
<td>Child B</td>
<td>Three, [one]</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>41.</td>
<td>TA</td>
<td>[You shaded] two already, yes, how many more do you have to shade in?</td>
<td>C, G</td>
<td>ALT, TEMP</td>
</tr>
<tr>
<td>42.</td>
<td>Child B</td>
<td>Eight?</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>43.</td>
<td>TA</td>
<td>((The TA points at his notebook))</td>
<td>U</td>
<td>ALT</td>
</tr>
<tr>
<td>44.</td>
<td>Child B</td>
<td>Oh, four</td>
<td>B</td>
<td></td>
</tr>
</tbody>
</table>

The teachers also implemented a different version of the strategy, in which they broke down instructions into specific tasks or goals and repeated those for the child.

Overall, the strategies that were related to the principle ‘providing guidelines’ enabled teachers to make explicit their expectations of the students’ participation, the connections between ideas, and the processes to be followed throughout an activity. This information clarified the discussions (content and expectations) and guided students’ responses. I suggest that these strategies helped to keep key information in the students’ minds because it was presented in a manageable form, which gave the students the chance to elaborate on it.

I qualified these strategies according to the dialogic features of ‘guide direction of dialogue’, ‘connect’ and ‘coordinate’ ideas and ‘invite to build on ideas’. I identified these strategies less often than I identified others; I observed them most during small-group discussions when the teachers approached their student teams.
6.2.2.4 Design principles: examine thoughts and emotions

The design principle of ‘examining thoughts and emotions’ suggested that the teachers should enquire/talk openly about the students’ understanding and experiences of the discussions. I associated this principle with the dialogic strategies of ‘challenge ideas’ (CH) and ‘reflect on dialogue or activity’ (RD). The initially suggested specific strategies were that the teachers should:

- probe the students’ understanding of the discussion or activity;
- talk openly about talk;
- monitor any unpleasant thoughts or feelings; and
- plan relaxation time or breaks for the students from class discussions.

The main aims of these strategies were: a) to elucidate the purpose of certain forms of engagement in dialogue; and b) to check with the student to flag up any difficulties that could hinder the student’s participation.

Regarding the teachers talking about dialogue or probing students’ understanding, I noticed again that being explicit could be helpful. Based on my observations, I suggest that there is potential for students to gain more than they do currently from teachers’ guidance when teachers clarify their intentions to test understanding or to challenge ideas. A difficulty I observed in Classroom B inspired this observation. I illustrate it in Table 6.13. The example shows that Child B did not understand that the TA was challenging his idea (CH, turn 17) and instead considered the TA’s comment to be guidance (shown in turns 18 and 20, in which he responded “Ok” and confirmed that he would eat six pieces). I suggest that in a situation such as this, asking a question such as “Do you think six is half of eight?” could have clarified the TA’s intention. It could have even transformed the challenge into explicit probing of his understanding.
Table 6.13. Example of Child B’s misunderstanding of a TA’s challenge

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
<th>Code 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.</td>
<td>TA</td>
<td>So, there are eight altogether, so half is going to be how many?</td>
<td>IB, G</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Child B</td>
<td>Mm, eight</td>
<td>B</td>
<td>BD</td>
</tr>
<tr>
<td>15.</td>
<td>TA</td>
<td>That’s the whole thing. Half of that?</td>
<td>B, G</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Child B</td>
<td>Ah, six</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>TA</td>
<td>So, you are going to get six squares and I am only going to get two?</td>
<td>B, CH</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>Child B</td>
<td>Ok</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>TA</td>
<td>I am going to share these equally</td>
<td>B, G</td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>TA</td>
<td>That means that you are going to have six squares and I’ll only have two.</td>
<td>B</td>
<td></td>
</tr>
</tbody>
</table>

When the class faced a problem during a discussion, Teacher C talked openly about behaviours and ways to contribute to dialogue that enabled all to be respected and to participate (RD). I include below a quote that exemplifies this.

“That is what happens when we talk to each other while someone else is talking, we don’t get to hear what other people say and it is very important what [they] said.” (Teacher C, whole-class discussion)

Teacher C often shared comments such as this with the class or with groups of students. Therefore, it did not represent a specific strategy to support Child C. However, I noticed that the TA with Classroom B implemented this form of support in her one-to-one interactions with Child B. She talked specifically about Child B’s participation in class discussions. The quote I include below illustrates this form of support from the TA. She was explaining to Child B that listening to his team had enabled him to advance the activity.

“…you know why you have been able to write on all those things, because you listened” (TA, one-to-one interaction with Child B)
Child B also found it helpful when the teacher or TA **explained the purpose of the steps taken in a discussion or the guidance and the use of certain materials.** In one instance, Child B decided to continue with an activity after the TA explained that he would have to work on it after lunch if he did not finish it then.

Few adjustments were made regarding the **flagging of difficulties or provision of opportunities to relax.** Teachers already employed strategies as part of their day-to-day practice to create opportunities for the students to relax. In Classroom B and C, there were opportunities for the students to take breaks from activities. Teacher C had specialist materials that were designed to help Child C to calm down and to communicate his level of discomfort. In Classroom A, the teacher and TA facilitated relaxation or meditation activities before lessons that involved discussions. Teacher A used hand signals during these activities to communicate with Child A when he seemed distracted or distressed. Child A responded by repeating the signals and calmed down.69 The teachers did not often suggest that students take breaks. Children A and B showed discomfort and disengaged from activities at times70 (e.g., they separated physically from the group or expressed tiredness).

Again, the strategies that were related to the examination of thoughts and emotions emphasised the importance of explicitness and talking openly about talk. Use of these strategies helped to explain the purpose of engagement in dialogue, potentially to uncover misinterpretations or difficulties (monitoring students’ understanding) and to encourage students to reflect on their participation. I did not identify the use of these strategies often. I qualified them with the features ‘reflect on dialogue’ (RD) and ‘challenge ideas’ (CH), which I identified a few times. These were two features that I observed to occur at the lowest frequencies, which indicated infrequent use by the teachers.

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69 I include in Section 6.2.2.8 more information about these non-speech forms of communication.

70 Table 6.19 and Table 6.20 illustrate the frequency at which students ‘asked for a break’.
6.2.2.5  Design principle: modify or adjust the environment

The design principle ‘modify the environment’ involved the arrangement of the physical classroom environment to make it friendly and conducive for dialogue. The original specific strategies of this principle represented non-speech (non-dialogic) strategies for the planning of discussions, which included:

- establishing a particular layout for discussions, and
- blocking distracting or overwhelming stimuli.

The objectives of these strategies were to help students to prepare for discussions and to control any stimuli that could hinder their participation.

Teachers A and C made special classroom arrangements for discussions so that it was clear to the students when these discussions would take place. I observed that these had the potential to promote and sustain the students’ engagement in the activities. Both teachers had previously carried out whole-class discussions when their students were sitting on the carpet (at times in a circle). They additionally introduced class debates in which they split the classroom into different sections. Generally, asking students to change places to adopt these arrangements promoted their engagement in the discussions. Child A was particularly motivated to participate after seeing his classmates do so (as mentioned in Section 0). Another dynamic in Classroom C that seemed to impact Child C’s participation was “listening chairs”. This dynamic involved asking the students to turn their chairs to see the person who was speaking. It aimed to show the speakers that their classmates were listening. Child C followed this dynamic willingly, moving his chair every time someone shared an idea. I suggest that the latter was attractive to Child C because he liked to follow rules. Additionally, it enabled Child C to show that he was attentive and was participating in the activity.

The strategies that were designed to control stimuli were particularly beneficial for Child A, who was easily distracted and sensitive to sensory stimuli. The suggestion that irrelevant stimuli should be blocked seemed to facilitate his sustained attention during class activities, keeping him from becoming distracted for
a longer time than was previously the case. Based on our observations, Teacher A and I decided to add another related strategy that involved **providing the student with a soothing object**. Despite these two suggestions appearing to work against each other, both served the purpose of helping Child A to regulate his behaviour. By avoiding distractions, Child A was more likely to hear, see and understand what happened during the discussion, and this potentially enabled him to contribute to it. When he was provided with a soothing object, Child A was less likely to feel overwhelmed during conversations than he had previously, which allowed him to re-engage after becoming distracted.

I noticed that sometimes it was necessary to adjust the ‘social environment’ as well as the physical. This change involved **asking the students to regulate their behaviour to be considerate towards the sensory and communication preferences of the focus students** (e.g., to avoid speaking loudly). I observed the most examples of this in class B, when Teacher B and the TA regulated the interactions between Child B and his classmates. For example, Teacher B asked students not to look at Child B while he contributed to the dialogue (illustrated in Table 6.14, turn 3) and the TA asked his teammates to leave extra space between them and Child B.

A surprising finding was that children in Classrooms A and B took part in adjusting to the environment; they removed distracting objects and asked others to adapt their behaviour. I present below a quote from one classmate of Child B during work with him in a small-group activity. This teammate asked other students in their team to stand so that they could start to practice their speech. This enabled Child B, who had been waiting for a while, to gain his chance to read his text aloud.

“Come on guys, let’s stand up, stand up” (Child B’s teammate, small-group activity)
Table 6.14. Example of Teacher B asking the class to adjust their behaviour

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
<th>Code 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>T</td>
<td>... that equals how many wholes? Two wholes add two wholes. Child B, I am coming to you. Two add two is... Look at my fingers ((shows two fingers on each hand, students look at Child B))</td>
<td>G</td>
<td>ALT</td>
</tr>
<tr>
<td>2.</td>
<td>Child B</td>
<td>((Covers his eyes)) People keep looking at me.</td>
<td>U</td>
<td>DIF</td>
</tr>
<tr>
<td>3.</td>
<td>T</td>
<td>No one look at him, look at me ((students turn to see the teacher)) Child B, go, two and two.</td>
<td>U</td>
<td>P.ENV.</td>
</tr>
<tr>
<td>4.</td>
<td>Child B</td>
<td>Four.</td>
<td>U</td>
<td></td>
</tr>
</tbody>
</table>

The explanations of the strategies presented here highlight how the students' participation was impacted by diverse environmental factors and they emphasise the importance of considering these factors when dialogue is planned. Despite not being dialogic strategies (such as those that promote and guide student contributions and engagement with others’ ideas), these strategies can represent first steps towards the conduct of friendlier classroom discussions than occurred previously. Teachers may plan friendlier activities and discussions by tailoring them to students’ preferences and by consideration of potential difficulties. I found that these strategies were used at a lower frequency than the others in the selected examples (see ‘physical environment’ in Table 6.1 and Table 6.2). However, I registered more instances of these strategies in my broad analysis of the lessons I observed.

6.2.2.6 Design principle: provide opportunities to interact with others

The design principle ‘provide opportunities to interact with others’ suggested that activities should be planned that encourage or required interaction of the focus students with peers. Initially, it was related only to the non-speech strategy of promoting dialogue in peer-mediated activities. The aim of the strategy was that small-group activities should be planned that prompted peers to guide the focus students, with clarification of how they would collaborate.

It seemed to motivate Children A and B when they received guidance from their peers. In Classroom A, this guidance turned out to be in the form of spontaneous responses from Child A's peers when he experienced difficulties in the
activity. They supported him by adopting some strategies that Teacher A used to help him (such as spelling words, reminding him of the activity guidance, and guiding his attention). Thanks to the support that his peers and teacher offered, Child A gradually became more open to following the suggestions from his peers and to interacting with them. I suggest that Teacher A modelled ways to assist Child A and promoted openness that would invite his participation. Teacher A also facilitated peer guidance by purposefully and frequently pairing Child A with peers who were inclined to guide him.

In contrast, Teacher B planned a peer-mediated activity to promote Child B’s participation during maths. He paired Child B for two lessons with a classmate who performed well in the subject and was able to take on a tutor role. As I illustrated before (in Table 6.5 in Section 0), this peer’s guidance attracted Child B’s attention and enabled him to engage with materials with which he would not have worked on his own (i.e., to add fractions). However, Teacher B did not maintain this dynamic because the students experienced difficulties in this arrangement. Child B’s classmate seemed to find the tutor role a challenge, and he missed out on solving other exercises. Child B struggled generally with the maths curriculum (which represented his first barrier to participation), and he usually worked closely with the TA. He was not close to his peer. This observation highlighted the importance of planning collaborative activities that were friendly and accessible to facilitate student interactions with peers. As part of this planning, teachers could base discussions on familiar topics, determine specific dialogue goals (to guide the students’ interactions), and use accessible materials that are shared by the whole class.

I observed an altered form of the initially suggested strategy, in which teachers opened opportunities for the focus students to interact with others. This support involved provision of close support to mediate the students’ collaboration or communication with their classmates. Its specific strategies included:

- the rephrasing of students’ contributions to others; and
provision of advice on how to respond or interact with peers.

The three teachers often paraphrased or elaborated on the focus students’ contributions to whole-class or small-group discussions (B). In this way, the teachers clarified the students’ ideas and made evident their relevance. Through use of this strategy, the teachers enabled others to take up the students’ answers and to engage with their ideas (as mentioned in section 6.2.2.2). Sometimes teachers openly encouraged others to build on the rephrased version of the students’ contributions (IB). Teacher A implemented this strategy several times during whole-class discussions after she had helped Child A to formulate answers through the use of guided questioning. In some small-group discussions, Teacher A and the TA in Classroom B sometimes revoiced the students' contributions when their teammates did not hear these contributions or did not take up the ideas them. I include below a quote in which Teacher A rephrased Child A’s contribution and invited the class to provide reasons based on it (this quote is the continuation of the example presented in Table 6.9, Section 6.2.2.2).

“We put it into the dustbin instead. So, we throw rubbish away. Why would we throw it away, not put it straight into the water?” (Teacher A, whole-class discussion).

Teachers also mediated the students’ interactions with peers during small-group activities by providing them with advice throughout the activity (G). Teachers A and C and the TA in Classroom B joined the focus students during activities and guided them and their classmates to ensure that their contributions were responsive to one another. Teachers helped students to follow talk rules (see the quote from Teacher A below), made students' ideas explicit and suggested ways in which to respond or continue the activity. Sometimes the support involved parallel talk in which the focus student talked with the teacher or TA while the team continued with the activity. The latter enabled the focus student to formulate responses with the support of the teacher or TA before the focus student shared his ideas with the team. I show below two examples of this form of support: a quote from Teacher A and a segment from a small-group interaction in Classroom C (see Table 6.15).
“Oh, Girl 1, Child A started, you need to wait for him to finish…” (Teacher A, small-group activity)

Table 6.15. Example of Teacher C’s mediation of a discussion in Child C’s team

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
<th>Code 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>24.</td>
<td>T</td>
<td>Look at what the girls thought of (reads out loud the questions written by Child C’s teammates). So, could you think about something that has to do with respect or love? Does the question have to be about marriage?</td>
<td>G, C, IB</td>
<td>TEMP</td>
</tr>
<tr>
<td>25.</td>
<td>Girl 1</td>
<td>No. Could be about difference.</td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>27.</td>
<td>Girl 2</td>
<td>Gender</td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>28.</td>
<td>T</td>
<td>((Addressing Child C)) Gender, she’s thinking about gender. ((Addressing Girl 2)) What do you mean?</td>
<td>IB</td>
<td></td>
</tr>
<tr>
<td>29.</td>
<td>Girl 2</td>
<td>Like, if you a girl likes a girl, then that’s ok. Why do people always think that a boy needs to get married to a girl? As if it is right or wrong.</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>30.</td>
<td>T</td>
<td>So, Child C, can you think of questions that have to do with that?</td>
<td>IB, G</td>
<td></td>
</tr>
</tbody>
</table>

In the example shown in Table 6.15, the teacher mediated Child C’s participation in a small-group activity by directing his attention (G) to the work completed by his teammates (turn 24) and their ideas (turns 26 and 30) and asking him to build on those to come up with new ideas (IB).

Based on these observations, I updated the design principle by adjusting its non-speech strategy (planning accessible features for peer-mediated activities) and by adding new dialogic methods (providing close guidance). I suggest that these strategies created conditions that enabled the students to engage with their peers’ ideas and vice versa in different ways. In particular, the new strategies highlighted the importance of close scaffolding that focused the students’ attention and made contributions and intentions explicit. I identified these strategies in turns that were
coded with the dialogic features I identified most frequently: ‘guiding the direction of
dialogue’, ‘building on ideas’ and ‘inviting to build on ideas’.

6.2.2.7 Design principle: add features that intrinsically motivate the students

The design principle ‘add intrinsically motivating features’ proposed that teachers
plan to promote dialogue in activities that encouraged the focus students. Its specific
strategies involved the planning of activities that had interesting characteristics (e.g.,
talking about a topic of interest) or desirable outcomes for the students.

Teachers did not seem to plan discussions that were based on their students’
specific interests. However, based on my general observations, I noticed two
characteristics of class activities that seemed to motivate Children A and B and
promote their participation. These were:

- keeping a visual register of participation in class discussions, and
- having the opportunity to lead others.

In the case of the visual register, Teacher A rewarded students who were
attentive or who contributed to discussions by moving their names up on a
‘behaviour chart’. This chart represented visual praise that indicated to students that
they had participated as expected. Most students in Classroom A (including Child A)
were motivated to volunteer to participate or to adjust their behaviour to receive this
praise. I suggest that, for Child A, the register helped him to regulate his behaviour. It
also showed him that his participation was acknowledged and valued.

In the case of providing opportunities to lead, Teacher A and TAs in
Classrooms A and B assigned responsibility to the focus students. This responsibility
was usually for something simple, such as allotting turns or registering classmates’
ideas (in the case of Child A) or explaining to the TA what the activity was about (in
the case of Child B). Children A and B seemed to enjoy guiding others, and
placement in this position of responsibility promoted their sustained engagement in
the activity. This placement also indicated to them and their classmates that the
teacher valued the students’ participation and trusted them to guide others.
Additionally, for Child A, this position gave him a sense of control over what happened in the classroom.

I identified a few cases of the use of these strategies in the selected examples of class interactions (in five turns, from TAs A and B). Most of these examples involved a delegation of responsibility from the TA to Child B ("You are going to help TA because I missed the first lesson...") or praise from the TA of students concerning their participation. I did not adjust or add new strategies to this principle due to the small number of examples that I saw. However, based on my observations, I suggest that class discussions can become motivational if students’ participation is acknowledged and they feel part of the activity.

6.2.2.8 Design principle: use/encourage different forms of communication

The final design principle ‘use or encourage different forms of communication’ suggested that opportunities be created for diverse modalities of participation during class discussions. Its strategies were:

- the negotiation of forms of communication that were different from speech for discussions;
- the use of non-speech forms of communication and the encouragement of students to use them too; and
- the provision of opportunities to comment on ideas that had been discussed in a conversation that had ended.

Use of these strategies aimed to enable students to contribute in ways that suited their strengths and preferences. Therefore, this principle also suggested that the students’ usual movements and sounds should be monitored to identify potential communication intents.

I observed just one short example of a teacher negotiating with the class regarding ways in which they could contribute to a whole-class activity. This occurred in Classroom C (see example in Table 6.16). In this example, the teacher proposed to the students that they should indicate whether they agreed with their classmates' ideas in a discussion (G, turn 1) and asked them to suggest ways in
which they could do this. Her invitation promoted suggestions of verbal and non-verbal ways of showing agreement (E, B, G, in turns 2 and 4) and motivated Child C to suggest another method, based on his classmates’ suggestions (B, G, turn 12). After this interaction, Child C showed his thumb after each of his classmates’ contributions (and often he used the signal he had suggested). It seemed that Child C found “negotiating expected forms of contribution” attractive. He liked to abide by rules, and the rules for the activity were explicit. Additionally, he had the chance to incorporate and use his suggestion.

Table 6.16. Example of negotiation by Teacher C of forms of participation

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
<th>Code 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>T</td>
<td>We can think about what things we can say when one of the others share [an idea], in a full sentence. <strong>You can think about, if you agree or disagree.</strong> What could we do if we agree?</td>
<td>RD, G, E</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Boy 1</td>
<td>Thumbs up.</td>
<td>E, G</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>T</td>
<td>You could do thumbs up. What else could we do? Could we say, “I agree because”, and add more information? Could we build on that? What could we do if we disagree?</td>
<td>IB, B, G</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Boy 1</td>
<td>Thumbs down.</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>T</td>
<td>What could we say?</td>
<td>IB, G</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Girl 1</td>
<td>Ah, you could say that you disagree</td>
<td>B, G</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>T</td>
<td>I’m just going to say, “I disagree, sorry, I disagree, I’m not going to explain”. (<strong>Child C and boy 2 raise their hands</strong>)</td>
<td>CH</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Boy 2</td>
<td>You can say “I disagree” and why.</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>T</td>
<td>What do you mean?</td>
<td>IB</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Child C</td>
<td>Like, if you agree a little bit or disagree a little bit, we could say “a little bit” and then this movement, and you have to say why (<strong>makes hand signal</strong>)</td>
<td>B, G, ALT</td>
<td></td>
</tr>
</tbody>
</table>

This example shows the potential of using this strategy to clarify expected methods of participation and to motivate students to take part in the suggested ways.
Similar to Teacher C’s first turn in the example, Teacher A proposed various methods of contribution to whole-class discussions a few times. However, most of her suggestions were verbal forms of communication (see quote below).

“Does anyone want to answer to that or build on what [he] has just said? You can say the same thing, or you can say something different.” (Teacher A during whole-class discussion)

Teacher A suggested potential non-speech forms of participation mainly to Child A. Often, she recommended that he draw his ideas or responses when he experienced problems verbalising an idea or writing his responses.

“You want to write down your idea or draw a picture? Do you want to write your idea? (Teacher A during a small-group activity).

Teacher A also encouraged Child A to participate in small-group activities by registering his teammates’ ideas. She suggested this based on our observations of Child A’s behaviour because he often repeated the contributions of others (see section 6.4.3). By taking this role, Child A was able to continue to participate in the activity (when he struggled to formulate a response) and to practise paying attention to others’ ideas.

Concerning the teachers’ communication methods, I observed two ways in which teachers used non-speech forms of communication. One occurred in Classroom A when the teacher strategically used hand signs known to Child A to help him to regulate his behaviour and to clarify her speech. Some of these signals corresponded to Makaton signs and others to the class relaxation activity. Occasionally she accompanied her spoken guidance with Makaton, which provided visual cues of what she had said (e.g., listen, the activity is finished). Also, she used the known "relaxation signs" (repetitive tapping movements) when Child A seemed to be restless. Notably, use of the latter triggered a response from Child A, who repeated the signs himself and calmed down.

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71 The relaxation activity consisted of a sequence of tapping movements.
The other form that I observed was when teachers naturally accompanied their speech with body language that guided students' attention, wrote essential details or examples, or pointed at resources. In contrast with the sign-language form, it implied a natural body movement approach that provided a concrete aspect to the discussions and guided the students. It conveyed information and clarified what teachers said. Similarly, students responded to the teachers by pointing at objects or through the use of body language. The three teachers used this form of communication. However, I mainly identified it in Classrooms A and B.

As I illustrated in Section 6.2.2.1, Children A and B sometimes opted to contribute to discussions by pointing at or showing objects (and sometimes without being prompted to do so). Table 6.5 depicts Child B putting together blocks in response to his peer's guidance (ALT, TEMP, turns 10, 12, 14) and Table 6.7 displays how Child A pointed at the board to answer a question from the teacher (ALT, TEMP, turns 28 and 30). In these examples, the children did not express their full ideas verbally but showed a representation (blocks or images) of what they wanted to say.

The strategies that had been suggested originally for this principle were designed to promote non-speech forms of contribution that represented specific dialogic participation forms. However, the use of these strategies required teachers to create, negotiate, and agree on these "new forms of communication" with the class. There was no evidence that this happened. Instead, I observed different non-speech aspects that usually accompanied discussions and facilitated student participation and understanding. I suggest that it is relevant to register the forms of non-speech communication that seem to be helpful to the students so that the teachers can improve their understanding of ways to promote friendly discussions for the students.

No teacher invited students to share ideas that had been discussed in previous conversations. However, I observed some instances in which children referred to previously discussed ideas. I include more information regarding this form of participation in Section 6.3.2.1.
6.2.3 Adjustments to Design Framework 1 and the creation of Design Framework 2

Overall, the examples and strategies that are presented in this section highlight the importance of close guidance of students' participation during class discussions. The high frequency at which I identified the use of the dialogic strategy of 'guiding the direction of dialogue' served as evidence for the latter. Most of the teachers' guidance involved frequent clarification of information (on the content and expectations of dialogue), mediation of the interactions of the focus students with others, and preparation of accessible and motivational activities and environment. Through these actions, teachers provided scaffolding for the students to participate in activities; they offered support so that the students understood the discussions, guided the students' responses, and focused the students' attention.

Many strategies that had been suggested initially were focused on the promotion of dialogic forms of contributing; they were designed to remind students of talk rules and expected behaviours. However, throughout the study, I observed that teachers implemented strategies predominantly to convey relevant information concisely. The teachers focused the students' attention on the topic and helped them to formulate their contributions. Their most frequently used strategy involved 'verbal prompting and cueing' (which were often implemented via guided questioning in Classrooms A and B). I suggest that the application of these strategies helped students to achieve their first step in participating in a discussion, which was to understand and retain relevant information in mind (i.e., the topic under discussion, others' contributions, the teacher's expectations, and goals). Once this step was achieved, students could work on the formulation of their responses accordingly.

Based on the strategies and the interactions that occurred within the three classrooms I observed, I updated Design Framework 1. The findings did not negate the theoretical underpinnings of the eight design principles. Instead, the strategies I observed led me to adjust the strategies that were related to each principle through clarification of the forms of delivery of support. I updated the design framework to create its second version by carrying out the following procedures:
• I added new strategies that teachers frequently implemented (and that I had not included initially) to the appropriate principles; and

• I adapted some of the original strategies with the incorporation of aspects that facilitated students’ participation.

I present a simplified version of Design Framework 2 in Table 6.17. I summarise the strategies that are associated with each design principle and highlight the ones I added or adjusted after the intervention study (marked in blue). Appendix B presents the extended version of Design Framework 2 in Table B.3, with the complete list of strategies.
### Table 6.17. Simplified version of Design Framework 2

<table>
<thead>
<tr>
<th>Pragmatic principles</th>
<th>Summary of strategies in each principle</th>
<th>Objectives and frequently used strategies</th>
</tr>
</thead>
</table>
| Use prompts or cues          | • **Verbal prompting**: closely support students through guided questioning and narrowing the attention focus.  
                                 • **Non-verbal prompting**: visually/physically represent verbal exchanges and abstract concepts or problems or cue discussions (auditory cue). | **Objective**: guide students’ formulation of responses and clarify information in different modalities.  
                                 **Frequently used strategy**: guided questioning.                                                   |
| Model behaviour              | • Explicitly model forms of contributing, sometimes accompanying open talk on dialogue.                      | **Objective**: explicitly exemplify the expected participation.                                            
                                 • Rephrase students’ contributions to exemplify the formulation of a clear response.                | **Frequently used strategy**: rephrase students’ contributions.                                        |
| Provide guidelines           | • Explicitly indicate expected roles or forms of contributing (refer to them in key moments).               | **Objective**: guide participation, explicitly and concisely reminding students of expectations and key information.  
                                 • Recap key contributions, steps, or indications in a concise form.                                  | **Frequently used strategy**: repeat information                                                        |
| Examine thoughts and emotions| • Talk openly about talk, including the students’ participation in discussions and the purpose of specific steps or forms of contribution. 
                                 • Control for any discomfort or misunderstanding.                                                     | **Objective**: provide feedback and monitor students’ understanding and experience.                    | Infrequent strategies.                                                                                     |
Table 6.18. Simplified version of Design Framework 2 (continuation)

<table>
<thead>
<tr>
<th>Pragmatic principles</th>
<th>Summary of strategies in each principle</th>
<th>Objectives and frequently used strategies</th>
</tr>
</thead>
</table>
| **Modify/adjust the environment**             | • Associate a specific classroom layout with discussions.  
• Adjust environment with consideration of students’ sensory and communication preferences (including classmates’ behaviour).                                                                                                               | **Objective**: prepare a friendly environment that can guide students’ participation.  
**Frequently used strategy**: use a consistent layout for discussions.                                                                                                                                                             |
| **Provide opportunities to interact with others** | • Provide advice, clarify students’ contributions and promote others’ engagement with them.  
• Plan collaborative or peer-mediated activities with accessible materials and exercises (shared by all) and pair students with teammates willing to guide them.                                                                                       | **Objective**: mediate students’ engagement with peers and whole-class discussions.  
**Frequently used strategy**: rephrase students’ contributions.                                                                                                                                                                      |
| **Add features that are intrinsically motivational for students** | • Incorporate characteristics or outcomes that motivate students. Include provision of some sense of control or responsibility.                                                                                                               | **Objective**: motivate students to participate and show them that their participation is valuable.  
**Frequently used strategy**: display praise through use of a physical method (Classroom A).                                                                                                                                 |
| **Use/encourage different communication modalities** | • Propose and/or negotiate different ways of contributing, including verbal or non-speech forms of communication and ‘out-of-time’ ideas.  
• Accompany speech with ‘clarifying’ body language, pointing, showing objects or writing.                                                                                           | **Objective**: create accessible opportunities for students to contribute to discussions.  
**Frequently used strategy**: accompany speech with body language or writing.                                                                                                                                                       |
It is necessary to mention that not all the strategies in the design framework were dialogic per se. Some examples were the planning of accessible activities and often repeating information. My findings highlighted that some strategies that supported students’ participation were not archetypally dialogic. Different aspects hindered or enabled the students’ engagement and understanding of the discussions. These aspects included environmental stimuli, instructions (e.g., concise vs. extended) and the teachers’ style of speech (e.g., figurative language or asking many questions at once). The non-speech forms of communication did not seem to be dialogic, but they played essential supportive roles for the focus students. These aspects accompanied the dialogic strategies, and I suggest that they could become dialogic once teachers and students negotiated and became familiar with them.

The teachers implemented some of the strategies described here to support other students or the class in general. Therefore, I suggest that the use of these strategies also clarified discussions for the whole class.
6.3 The participation of the focus students in class discussions and the creation of an adjusted coding scheme

6.3.1 Introduction to the section

In this section, I present the overall findings from the analysis of the students’ participation. The section highlights the behaviours and neurodiverse forms of participation that the three students had in common, according to my identification. I describe the features that the coding scheme did not include initially. I delineate how they signalled students’ engagement with class discussions and specific difficulties. I also introduce the codes that I created to register them. I outline how I adapted the coding scheme. Throughout this section, I illustrate the students’ forms of participation with segments of transcripts of class interactions. I summarise the findings at the end of the section.

6.3.2 Students’ forms of contribution and behaviour in class discussions

I noticed specific responses and behaviours that the focus students displayed during discussions and which they had in common. Some of these responses and behaviours accompanied the students’ dialogic forms of participation, while others seemed to signal students’ difficulties or misunderstandings. I created 14 new codes for their registration, adjusting them iteratively based on my observations in the classrooms. I added them to the coding scheme in order to analyse the interactions within the class. I grouped them into the three categories I list below, according to their shared characteristics:

- The students contributed to dialogue by focusing on details and repeating information.
- The students seek support to participate in discussions or to regulate discomfort.
- The students express common responses, thoughts, or actions.

Some of the 14 behaviours applied to the three focus students, while others were more evident for one student. Although Children A, B and C had different
difficulties and communication characteristics (and they required different levels of support to help them to communicate), they displayed behaviours from the three categories. Similarly, some of the dialogic features and non-speech communication that I identified frequently in the students’ contributions during small-group activities were the same.

I present in the following tables how often I identified the new codes (I present the frequencies of each category of the students’ behaviours), and the dialogic features and non-speech contributions for each student per activity arrangement: class discussions and group/one-to-one interactions respectively.

Table 6.19. Frequencies of occurrence of dialogic features, new codes and non-speech contributions that were identified in students' speech during whole-class activities

<table>
<thead>
<tr>
<th>Features</th>
<th>Frequencies during whole-class discussions</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Child A</td>
<td>Child B</td>
</tr>
<tr>
<td><strong>Dialogic codes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IB</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td>CH</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>IR</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>R</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>CA</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>RD</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>G</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td><strong>Non-speech codes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use resources</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Non-speech communication</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Ask for break</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Student behaviour</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Details and repetitions codes</td>
<td>18</td>
<td>0</td>
</tr>
<tr>
<td>Support codes</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Expressions codes</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

I highlight the four most frequently identified codes per agent (columns), in increasing order from light to dark shades of red. For explanation of the codes see Appendix F.
Table 6.20. Frequencies of occurrence of dialogic features, new codes and non-speech contributions that were identified in students' speech during small-group or one-to-one interactions

<table>
<thead>
<tr>
<th>Features</th>
<th>Frequencies during small-group/talk in pairs or during one-to-one interactions</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Child A</td>
<td>Child B</td>
</tr>
<tr>
<td>Dialogic codes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IB</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>20</td>
<td>55</td>
</tr>
<tr>
<td>CH</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>IR</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>R</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>CA</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>RD</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>G</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>E</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Non-speech codes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use resources</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Non-speech communication</td>
<td>8</td>
<td>24</td>
</tr>
<tr>
<td>Ask for break</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Student behaviour</td>
<td>Details and repetitions codes</td>
<td>27</td>
</tr>
<tr>
<td>Support codes</td>
<td>5</td>
<td>21</td>
</tr>
<tr>
<td>Expressions codes</td>
<td>9</td>
<td>24</td>
</tr>
</tbody>
</table>

I highlight the four most frequently identified codes per agent (columns), in increasing order from light to dark shades of red. For explanation of the codes see Appendix F.

The frequencies of occurrence represented 65% of the students' turns, which I qualified as dialogic features (34%), non-speech contributions\(^\text{72}\) (13%) and behaviours from the new categories (38%).

The tables show that, for both whole-class and small-group (or one-to-one) interactions, I qualified most of the students' coded turns with the dialogic feature of 'build on ideas'. This feature was reflected in their participation during whole-class discussions when they responded to teachers' invitations to contribute to the activity. Students either provided an idea related to those that had been previously mentioned (B) or to a shared, new, relevant idea (E) and they frequently clarified (B) or explained their contributions (R) at the teachers' requests. Likewise, during small-

\(^{72}\) The non-speech contributions included referral to or pointing at resources, communication through signs, writing or signalling wanting a break.
group or one-to-one interactions, Children A and B often responded to invitations from the teacher or TA by adding information to previously shared ideas or by elaborating their own (B). The elaboration was frequently related to teachers’ guided questioning. Child C required less help than Children A and B to engage in small-group activities. He replied to classmates’ contributions by adding information (B) or by focusing the conversation on specific details (G) or experiences (C), and he constantly elaborated on or referred to his previous contributions (B). These forms of participation in class discussions were standard for all the students in the three classrooms.

I also frequently observed two of the newly identified categories of students’ behaviours in the students’ participation in small-group activities. These were: a) the students contributed by focusing on details or they repeated information; and b) they used expressions that represented self-talk or students’ verbalisation of thoughts or actions. I observed some of these features alongside dialogic features and others when students seemed to be distracted. In the following three subsections, I describe the behaviours that were classified under these two categories and those that were placed under the other category, which was related to looking for support. In each one, I describe the forms of participation that I associated with each category and I list the dialogic features and non-speech communication that I observed to be related to them. Table F.3 in Appendix F contains a complete description of the codes I created to register these behaviours.

6.3.2.1 Focus on details and repeat information

Sometimes the three students repeated words or phrases or elaborated on specific details from others’ contributions, past discussions or experiences. The students did this when they responded or reacted to others’ utterances in whole-class or small-group arrangements. I created five codes to register these behaviours. Two of these were those I identified most frequently in the students’ participation. I qualified more

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73 Audible speech addressed to oneself, typically uttered at a lowered volume, sometimes comprised of repetitions and accompanied by averted eye gaze (Park, 2019).
than half (54%) of the turns that I coded with the new categories with the use of codes from this category (see Figure 6.2).

On some occasions, students’ repetitions denoted their attention to the ongoing discussion and represented their attempts to contribute to it. In other cases, they signalled that students were distracted or had difficulties disengaging from a previous idea, activity, or experience. I include below examples of these two conditions and introduce the codes I created for these behaviours.

**Codes ‘repeat others’ contributions’ (RPT) and ‘repeat own contributions’ (RPT2)**

Children A and B sometimes repeated information from others’ contributions (a word, phrase or even body movement74) when they had difficulties formulating responses. One example was the choice and repetition by Child A of one of the options offered by Teacher A as part of her guidance (as described in Section 0). Alternatively, students repeated information unprompted as part of their engagement with the information shared by others or to remind others about their contributions. In the former case, Child A repeated information that had been told to the TA by the teacher. This represented a way for him to register what he had heard. In the latter case, which was distinctive for Child C, he repeated his contributions when his teammates did not consider his ideas. I qualified most of these repetitions as non-dialogic, excepting the cases in which students added words or another idea to what they repeated (coded E – ‘express ideas’, or B – ‘build on ideas’).

I suggest that these repetitions showed that students listened to and thought about what had been said and that they intended to participate. The repetitions that signalled distraction included repeating unrelated comments, while those that signalled students’ difficulties disengaging from their previous responses included continuously answering with their same previous (and sometimes incorrect) response or focusing only on their own answers.

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74I observed a few instances of repetitive body movements in classrooms A and B, which were related to behaviour regulation and to the outcome of one specific activity (respectively). See Section 6.5.1.2.
Students sometimes elaborated on details from teachers’ or classmates’ utterances. They shared ideas that were related to a particular word or aspect of the previous contribution. However, these contributions often seemed to be ambiguous or were unrelated to the discussion. On the one hand, I suggest that these responses showed students’ engagement with and responsiveness to others’ contributions because the students retained some information, which they then shared. On the other hand, they also revealed their focused attention on one specific detail that led them to misinterpret a previous contribution.75

I include an example in Table 6.21 of an interaction within the class in which Child A elaborated on a specific detail (and repeated information). This example shows that Child A picked up that Teacher A had mentioned grandmothers and being with family; building on that, he specified when he would see his grandmother (turn 24, B - BD, C). Teacher A invited him to elaborate on his contribution and guided him to relate his contribution to the discussion’s topic (offering two options, good or bad). He repeated one of the options (turn 26, RPT), which offered the chance for Teacher A to ask why he had chosen this option (turn 27, IR). The example shows that Child A did not comprehend Teacher A’s complete statement but that he attempted to respond to the words he understood. The example shows that teachers can redirect students’ attention and guide them with concise invitations when they are engaged but misinterpret the discussion.

I qualified with the new code and the dialogic feature ‘build on ideas’ (B) the turns in which students elaborated on specific details, in order to register the students’ consideration of others’ ideas.

75 In Table 6.13 (Section 6.2.2.4) I present an example of child B elaborating on a specific detail. In turn 14, child B seemed to focus on the last two words of the TA’s question (“how many?”) and answered the total number of pieces of the figure (instead of the number of pieces that comprised half of it).
Table 6.21. Example of Child A repeating and building on a detail

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
<th>Code 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>23.</td>
<td>T</td>
<td>Who is happy when they are with their mummy or their daddy or their nanny or their grandpa? Child A, do you like being with your family? ((Child A was touching the audio recorder))</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>Child A</td>
<td>Ah, nanny pick me up on Wednesday</td>
<td>B, C</td>
<td>BD</td>
</tr>
<tr>
<td>25.</td>
<td>T</td>
<td>Nanny is picking you up on Wednesday. Is that a good thing or a bad thing?</td>
<td>IB, G</td>
<td></td>
</tr>
<tr>
<td>26.</td>
<td>Child A</td>
<td>Good thing</td>
<td>U</td>
<td>RPT</td>
</tr>
<tr>
<td>27.</td>
<td>T</td>
<td>Why is it a good thing?</td>
<td>IR</td>
<td></td>
</tr>
<tr>
<td>28.</td>
<td>Child A</td>
<td>Because I am happy with me</td>
<td>R</td>
<td>1RESP</td>
</tr>
<tr>
<td>29.</td>
<td>T</td>
<td>Because you are happy with nanny</td>
<td></td>
<td>B</td>
</tr>
</tbody>
</table>

Codes ‘build on specific previous experiences’ (BSC) and ‘building on previous dialogue or activity that has ended’ (BP).

Something similar happened when the students contributed to discussions with ideas that were related to a discussion that had ended or to a specific experience that had happened outside the classroom. Literature on classroom dialogue suggests that establishing connections between the ongoing discussion and previous conversations or experiences is characteristic of productive dialogue (Alexander, 2008; Michaels, O’Connor, & Resnick, 2008). However, the behaviours I identified implied persistent referrals to those previous discussions or experiences, which distracted students from the discussion at hand. On some occasions, these references were relevant (in these cases, I coded them alongside the dialogic feature C – ‘connect ideas’). An example is given in Table 6.9 (Section 6.2.2.2); Child A contributed to a whole-class discussion by sharing an idea he had discussed with the TA in a previous activity (turn 16, BP). Child A’s contribution was relevant and answered Teacher A’s question.77

76 Productive dialogue reflects the cumulative principle of dialogic teaching as suggested by Alexander (2008) (i.e., the temporal development of learning).

77 Child A shared a similar response in another activity later in the same lesson (see Table 6.1, turn 42). This illustrated that child A could refer continuously to the same previous response.
Nevertheless, sometimes students started to build on unrelated details about those previous discussions or experiences if the teachers did not redirect them. Table 6.22 presents an example in which Child C referred to a previous activity outside the classroom. In this example, Child C provided an idea that helped to advance the dialogue (B, turn 8) and associated it with a school contest (B - BSC, turn 10). He added extra unrelated details about the contest (B, turns 12 and 14), which led Teacher C to redirect his attention to the aim of the discussion (by asking a question that was based on his original idea).

Table 6.22. Example of Child C referring to a previous experience

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
<th>Code 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.</td>
<td>Girl</td>
<td>The only special thing about winning is that you’re proud of yourself.</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>T</td>
<td>What do you think? <em>(points at Child C)</em></td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Child C</td>
<td>And then it still going to be boring if the same people keep winning.</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>T</td>
<td>Yeah, that’s true</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Child C</td>
<td>Just like rubber, in year three and year four</td>
<td>B, C</td>
<td>BSC</td>
</tr>
<tr>
<td>11.</td>
<td>T</td>
<td>Yeah</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Child C</td>
<td>And then is going to be this year</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Boy</td>
<td>Probably</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Child C</td>
<td>So, it’s going to be like three years in a row</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>T</td>
<td>Do you think that it, maybe if you win all the time, you could be, you could say “oh I am really good at it, now I need to teach other people how to do it”?</td>
<td>G, B</td>
<td></td>
</tr>
</tbody>
</table>

The example shows that Child C was able to connect the topic with a relevant experience. However, it also illustrates that he could become carried away by talking about this previous experience.

In other cases, Children A and C referred to ideas from previous discussions that were unrelated to the ongoing activities. It seemed that they thought continuously of those ideas, which hindered their engagement in the activity. An example of this was when Child A constantly answered Teacher A’s questions in a one-to-one interaction with ideas from a previous activity in the lesson *(T: “What do
you find difficult at school?” Child A: “Because Malala resilient”). Child A had found it difficult in the previous activity to respond to questions that were related to a different topic (how were some role models resilient?). He seemed to continue to think about that topic during his later interaction with Teacher A and repeated the contributions he had shared in the previous activity. Similarly, Child C sometimes seemed to have difficulty disengaging from ideas that had been expressed in previous discussions and which he found uncomfortable. I observed an example of this during the baseline recording when he stopped participating in an activity because he was upset about unrelated information that Teacher C had announced at the beginning of the day.

I identified these students’ referrals at lower frequencies than the students’ repetitions or their building on specific details (in only five of the 30 examples). However, I registered them because they illustrated some ways in which thinking about other ideas impacted the students’ participation in an activity. I suggest that they also prove the importance of creating opportunities for students to comment on previously discussed ideas (a strategy that is included in the principle ‘encourage different forms of communication’). These opportunities can help students to share what they are thinking, find closure and move on to the discussion at hand.

As a general comment on this category of behaviours, I suggest that it is relevant to discern whether students’ repetitions or contributions that are focused on details signal distraction or engagement with the discussion. Depending on the case, teachers can determine what support is needed to aid students to understand the activity or to re-engage with it.

6.3.2.2 Seek support to participate or to regulate discomfort

I observed the three students seeking support to understand, contribute to, or cope with class discussions. I observed that these happened less often in the selected examples compared with the other categories (17% of the turns that were coded with the new categories). I observed three of these behaviours exclusively in examples from class B. To register these behaviours, I created five codes that represented
each of the different ways in which students asked for help, and indicated that they were in difficulty or sought comfort. I introduce these below.

**Code ‘asking for clarification of activity, dialogue, materials or others’ contributions’ (CLARIFY).**

In three instances, Children B and C asked for clarification regarding the activities in which discussions occurred, their materials or the discussions themselves. Students asked who would participate in the activity (i.e., whether the TA would carry out the activity too), about specific aspects of the task (i.e., whether the student was required to write complete sentences), and the teacher’s guidance. As part of my macro-level analysis of the lessons, I noticed more instances in which Child C tended to ask questions about the materials that inspired the discussions (e.g., “how is this a poem?”).

I registered these behaviours (despite their low frequency, n=3) because they showed how students’ doubts could distract them. I suggest that they confirm the usefulness of concise repetition of guidance and redirection of students' attention.

**Codes ‘express difficulties during discussions’ (DIF) and ‘ask for an adjustment of answer’ (ADJ).**

Two behaviours represented Child B’s reactions to challenges that he experienced during participation in the discussions. He ‘expressed his difficulties participating in the activity’ and ‘requested adjustment of how he would respond during dialogue’. Child B mainly expressed difficulties that were related to his classmates’ behaviour and his collaboration with them. He expressed discomfort because his classmates looked at him when he contributed (see turn 2 in Table 6.14), did not consider his work (“no one is reading mine, I feel upset”) or shared ideas similar to his before he did. Concerning adjustments to how he would respond, Child B asked the TA for more time to answer (e.g., “…wait, I have got a good idea, let me say it”). As part of my macro-level analysis, I also noticed a few instances in which Child A named or pointed at a classmate who could contribute in his place to a discussion. I registered this as a way of asking for an adjustment in his participation.
Child B’s expressions of difficulties and requests for adjustments in his participation reflected his reliance on close support to interact with peers. These expressions and requests also made clear that he was not accustomed to interacting with peers during class discussions. I suggest that acknowledgement and registration of these expressions are vital to pinpoint specific arrangements that could make class discussions friendlier for these students.

*Codes ‘look for comfort during discussions’ (COMFORT) and ‘ask for confirmation that they had participated as expected’ (REASSURE).*

Two behaviours seemed to help students to cope with difficult or uncomfortable aspects of class discussions. One involved looking for comfort from teachers or soothing stimuli when the students found it difficult to respond or to carry out practical aspects of an activity. I observed Children A and B moving closer to their teachers (or TAs) or asking the adult to take over practical aspects of the task (e.g., spelling a word, erasing writing). I also registered points at which they displayed excitement after they had received this support (because its receipt denoted that the support soothed them). Alternatively, they sought soothing sensory stimuli (e.g., Child A touched the teacher’s lanyard, Child B caressed his nose).

Regarding the REASSURE code, I observed Child B in Classroom B asking for confirmation of whether he had participated (or carried out the activity) as expected (“Am I doing super well?”) Child B asked for this reassurance after he had shared an idea or completed a step in an activity.

These behaviours that were related to looking for comfort or reassurance illustrated the impact of sensory or social discomfort and insecurities on students’ participation. I suggest they also highlight the usefulness of close support and adjusted discussions that offer friendly opportunities to participate (considering students’ preferences).
Overall, I qualified this category's behaviours as non-dialogic. Instead, they represented students’ forms of coping with discussions or communicating their difficulties. Based on these behaviours, I propose that it is essential to check in regularly with students to monitor their thoughts, understanding and emotional states (i.e., level of discomfort), and to identify any source of difficulty and students’ preferred forms of responding (which can be incorporated into activities).

6.3.2.3 *Express usual responses, thoughts, or actions*

The final group of behaviours involved students' audible, self-directed or self-centred talk and “usual responses” during discussions. I noticed these mainly during small-group (or one-to-one) interactions, and I qualified most of them as non-dialogic. I created four codes that represented the different kinds of student expressions and verbalisations of thoughts and actions. I qualified 32% of the turns that I coded under the new categories with codes from this category. One of these codes represented the behaviour I identified with the second-highest frequency in the students’ participation. I introduce this category’s codes below.

*Codes ‘self-talk during discussions’ (IND), ‘describe own actions or thoughts’ (CM.AC.) and ‘narrate what takes place’ (NRT).*

Sometimes, the three students shared short descriptive comments or uttered words, phrases, or repetitive noises during discussions. These responses were centred on their thoughts or actions and appeared to reflect the students’ focus of attention. Students described what they were doing or were thinking (CM.AC. - e.g., “I draw turtle”, “I am confused”) or mentioned words that were related to the activity or materials (IND) unprompted (n=11) and on very few occasions as a response to teachers’ invitations (n=5, Children A and B). More than half (n=27, 63%) of the expressions were unrelated to the discussions. They involved making repetitive

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78 Except when students asked teachers to take over practical aspects, which I coded G to acknowledge their proposals of courses of action.
sounds or uttering words or phrases\textsuperscript{79} (IND, n=23) and describing what was happening in the classroom\textsuperscript{80} (NRT, n=4).

For the most part, the unprompted utterances seemed to help students process information; they were a way of thinking aloud. I suggest that these utterances may have supported students as they tried to regulate their behaviour, either by thinking through what they were doing and what was happening or by soothing themselves during collaborative activities (repeating sounds). Students’ release of sounds or unrelated words was the behaviour I identified with the second-highest frequency (of the three categories). It was of particular relevance for Child B (I identified more than half of these expressions in examples that involved Child B), who uttered repetitive sounds during small-group discussions (which seemed to help him to cope with the activity).

\textit{Code ‘usual response to invitations’ (1RESP)}

I observed on a few occasions that students replied to teachers’ or TA’s invitations to take part in different discussions with a characteristic response (n=13 in the selected examples). I qualified these responses as students’ ‘signature phrases’. These usually represented the students’ first attempt to respond to a question. In the cases of Children B and C, their immediate response implied that they did not know the answer. They responded in this way to questions that seemed unclear for them (Child C, n=8) or when they seemed to be unclear regarding what they had to do (Child B, n=2; Child B’s responses accompanied behaviours that indicated discomfort). Child A replied to Teacher A’s invitations to provide reasons for his answers by indicating whether something was “happy” or “good” (n=3) (e.g., “Resilience is good and happy”, “Because this is birthday, is happy” or “Because I am happy with me”; see Section 6.2.2). It seemed that Child A used this method first to judge the ideas or topics that were under discussion in class, and use of this technique enabled him to contribute to the discussion. I qualified Child A’s responses

\textsuperscript{79} Some unrelated utterances represented reactions or playful remarks about comments made by others.

\textsuperscript{80} Children B and C only referred to the microphones and video recording of the lesson. I registered in my macro-level analysis an instance in which Child C described the class’s behaviour (e.g., “the majority chose tables”).
with dialogic features only, because these implied elaboration on or explaining his previous responses (B and R) and replying with an opinion (E).

It seemed that these responses helped students to reply quickly. On the one hand, they signalled that students found it difficult to understand questions or requests and enabled them not to spend more time working out the meaning of those (Children B and C). On the other hand, it also represented Child A’s first thought. His responses sometimes seemed ambiguous. However, they also reflected an intention to respond. Teacher A particularly had also noticed this form of response from Child A (corroborated in her baseline interview). I suggest that identification of students’ usual responses (sometimes dismissed in classrooms) and elucidation of whether these responses indicate difficulties or engagement with an activity can help to determine the best way to support students’ participation.

6.3.3 Summary of findings and adjustments to the coding scheme

The responses and behaviours that I present in this section provided evidence of the students’ foci of attention, engagement with the discussions and difficulties that they experienced (which sometimes hindered their participation). I qualified over 70% of the turns in which I identified these new behaviours as non-dialogic. Despite this result, some of the behaviours reflected the students’ intention to engage in discussions; they listened and attempted to contribute when prompted (e.g., they repeated information that they remembered (RPT) or elaborated on the details on which they focused (BD)). Other behaviours reflected the ways in which students experienced and reacted to class discussions (e.g., the categories ‘look for support’ and ‘express usual responses’). They showed whether or not students experienced difficulties (including social or sensory discomfort or misunderstandings), were distracted, or tried to make sense of the discussions’ contents (often through thinking aloud).

These behaviours or responses had in common that they sometimes were, or seemed, ambiguous or unrelated to the ongoing activity. However, I suggest that these behaviours represented the students’ neurodiverse forms of participation and reflected their skills, preferences and specific difficulties. The behaviours were
congruent with some of the characteristics associated with autism in the APA's (2013) diagnosis manual. I specifically refer to reduced reciprocity, repetitive speech or movements, strong attachment to objects or ideas and hyper-reactivity to environmental stimuli. Under a neurodiversity paradigm, I argue that these characteristics denoted: their attention to detail and their sustained focus on those details; their preference for repetitive tasks; and their alternative forms of communicating (skills and characteristics that literature on neurodiversity has associated with autism, e.g., Hughes, 2021).

On the one hand, considering the neurodiverse forms of perceiving and processing information identified in autistic individuals, their behaviours indicated: the students' difficulties disengaging from an attention focus; their strong focus on specific details (including their own ideas); their difficulties verbalising their ideas; and the ease with which they became distracted or overwhelmed by environmental stimuli. The acknowledgement of these potential underlying mechanisms or causes of their behaviours helps to make informed decisions regarding how to support the students best. On the other hand, despite the apparent unrelatedness of their behaviours to the discussions, the behaviours indicated that the students registered the information previously shared. The behaviours also seemed to help them respond to initiations or contribute to discussions in a more accessible way by repeating or referring (verbally or non-verbally) to previous contributions, ideas or materials. Some behaviours also appeared to help them soothe themselves when overwhelmed (e.g., hand movements). Consistent with this view, previous studies have associated repetitions with interactional goals and monitoring interlocutors' behaviour (Sterponi et al., 2015; Sterponi & Shankey, 2014). In either case, the teachers' support that I observed indicated that it was helpful for both teacher and student if the teacher followed up on students' expressions or behaviours (rather than dismissing them). The attention to the students' mannerisms helped the teachers to acknowledge students' participation, monitor potential difficulties, or decide how to guide further participation. In my analysis, it was essential to consider the context in which the behaviours occurred and the students' individual characteristics to interpret the behaviours and understand their functionality.
In general, the behaviours emphasised the relevance of guiding students’ attention to the discussion topics, concisely repeating relevant information (indications, key contributions, or steps) and planning friendly discussions and forms of participation (with consideration of their usual responses and the difficulties they communicated).

Figure 6.2. Percentages of new codes identified per category

Figure 6.2 shows the rates at which I identified the behaviours from the three categories (considering the total number of turns that were qualified with the new codes). The behaviours that were identified at the highest frequencies were: repeating information (from others’ contributions or their own); and self-directed talk (which included unprompted utterances that were related to the activity and unrelated comments or sounds). I identified more instances of these behaviours than of most dialogic features, particularly during small-group discussions. They seemed to be associated, on the one hand, with distractions and the difficulties that students had formulating responses and, on the other hand, with paying attention to information shared during discussions, thinking aloud, and coping with class discussions. Accordingly, I suggest that these behaviours confirm the importance of monitoring students’ emotional states (to ensure students’ wellbeing) and guiding their responses closely.
Although I qualified most turns in which the new behaviours were seen as non-dialogic, some of these behaviours and the support that teachers provided in response to them impacted the dialogic features that I identified in the students’ speech. Specifically, the high frequency of notation of code B was influenced by the teachers’ guided questioning after the students repeated information (RPT) or elaborated on specific details (BD, BP, BSC). This indicated that when teachers engaged dialogically with autistic students’ neurodiverse communication attempts and engagement, they could identify students’ potential difficulties or attention focus (e.g., what they built on) and promote their further and more evident dialogic participation.

Figure 6.3. Codes included in the adjusted coding scheme (codes that were added after Cycle3 are shown in green)

Based on my observations of the students’ participation, I enriched the coding scheme that I used then to analyse the selected examples in-depth (see a summary of the scheme’s codes in Figure 6.3). The scheme initially included adjusted versions of the 10 dialogue categories of the T-SEDA, which were used to identify dialogic features, and eight...
codes that were related to the non-speech strategies for the promotion of friendly discussions. After the intervention, I adjusted the dialogic and non-speech codes according to the teachers’ implementations of the strategies and added the 13 new codes that were related to the students’ participation. Consequently, after Cycle 3, the scheme comprised 31 codes that were grouped into three main categories: dialogic features, non-speech contributions and students’ behaviours. I clustered the codes within the latter two groups based on the similarities in their functionality.

Some specific behaviours were identified at low frequencies (the least frequently observed behaviours were seen once and three times). However, these figures represent only the frequencies at which I identified the categories in the examples that I selected for in-depth analysis. I enriched the descriptions of the behaviours in the coding scheme based on my general observations and notes that I made during my macro-level analysis of the complete lessons.

Sections 6.4, 6.5 and 6.6 provide more detail regarding the dialogic features and behaviours that I identified in each student’s participation and which situations. First, I introduce the type of activities that teachers usually carried out. Second, I present the types of dialogic features that I identified in general during class discussions and the frequencies of their occurrence. I also describe the usual ways in which teachers supported the focus students and these students’ usual forms of participation. Third, I delineate how I collaborated with each teacher throughout the intervention study. At the end of each section, I summarise the findings from each classroom that contributed to the adjustment of the design framework. The findings I present in these sections derived from my macro and micro-level analyses of the lessons I observed in each classroom. Namely, the units of analysis that I delineated from the observed lessons through using tools from the EoC (CS and CE; see example of segmentation of a lesson in Appendix D ) and the in-depth analysis of examples of class interactions with the adjusted coding scheme. The selection criteria and procedures of these examples was previously explained in this chapter (Section 6.1) and in Section 4.4.3.
6.4 Class observations in Classroom A

6.4.1 General observations from Cycles 2 and 3

6.4.1.1 Macro-level analysis of lessons in Classroom A

I observed six lessons in religious education on different days in Classroom A (a year 1 class) over six months (three per trial cycle), as had been agreed after the initial workshops. Based on my macro-level analysis of the lessons, I identified general characteristics related to the structure of the lessons, which were consistent throughout the two cycles. I present these characteristics in Table 6.23.

Table 6.23. Overview of the lessons observed in Classroom A

<table>
<thead>
<tr>
<th>Type of class activity (frequency)</th>
<th>Cycle 2</th>
<th>Cycle 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject (no. of lessons observed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religious education (3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whole-class activities (26):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- discussions (19)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- teacher talk (4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- relaxation (3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small-group activities (5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual activities (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whole-class activities (22):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- discussions (14)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- teacher talk (5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- relaxation (3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small-group activities (4)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Most of the teaching that Teacher A planned for the lessons I observed took place in whole-class activities. The majority involved whole-class discussions that were related to the lesson topic. Some of these followed up on small-group activities. Others represented events in which Teacher A shared guidance or introduced the timetable or the topics of discussion (‘teacher talk’), plus relaxation activities and discussions related to the class rules of talking. The class engaged in one to two small-group activities per lesson and, during Cycle 3 only, in one individual activity.

Teacher A’s focus on whole-class activities showed her interest in creating opportunities for students to contribute verbally to the class and enabled her to keep the students’ attention on the ongoing activity and to guide their participation.

Teacher A guided Child A closely. She invited him to contribute to most whole-class
discussions; she often joined him during small-group activities; and she supported his development in the individual activity. The teacher's guidance and class discussions supported students by informing their work (e.g., written outcomes).

From the beginning of the study, Teacher A reminded students of the class talk rules and promoted relaxing activities in every lesson. This consistency confirmed her commitment to the goals she had set for her lessons: creating a calm environment and familiarising the students with dialogic ways of contribution to discussions. I describe in the following subsection the dialogic features, strategies, and participation I identified in Classroom A’s class discussions.

6.4.1.2 Findings from an in-depth analysis of Classroom A’s discussions

I selected two examples per lesson I observed in the two cycles (three lessons per cycle, see criteria in Section 6.1). In total, I analysed 12 examples of class interactions from the six lessons. The examples comprised excerpts from six whole-class discussions, five small-group activities, and one one-to-one interaction between Teacher A and Child A. The following figures show the dialogic features, non-speech contributions/strategies and new behaviours that I identified during these class interactions.

I recognised, at least once, all the dialogic features except ‘reflect on dialogue’ in the examples. The frequency with which I recognised these features was similar for the two cycles and two types of class discussions (whole-class discussions and group/one-to-one interactions). The dialogic features that occurred at the highest frequencies were ‘build on ideas’ (B), ‘guide direction of dialogue’ (G), ‘invite to build on ideas’ (IB), and ‘express or invite ideas’ (E). These frequencies showed how often Teacher A invited students to share ideas or asked them to elaborate on their own (or others’) contributions while she highlighted relevant information to guide their responses. Teacher A also synthesised information (CA) to support the whole class.

81 I selected the one-to-one example instead of a small-group activity because it displayed child A’s participation in a conversation for a more extended time than was seen in the other examples and the strategies that Teacher A used to support his development of an activity.
She similarly supported Child A (as shown in Table 6.1 and Table 6.2). The only exception was that the teacher only challenged his classmates’ contributions.

Figure 6.4. Frequencies of identification of codes ascribed to dialogic, non-speech and behaviour events identified in Classroom A’s whole-class discussions

Figure 6.5. Frequencies of identification of codes ascribed to dialogic, non-speech and behaviour events identified in Classroom A’s small-group discussions
Child A and his classmates responded to the teacher’s invitations by sharing their opinions (E), elaborating or explaining their contributions, and adding information to others’ ideas (B - often as part of brainstorming and R). Other less frequent features that I observed in the classmates’ contributions but not on Child A’s were explaining others’ ideas (R) and taking a position in the discussion (CH and CA – (dis)agreeing with and challenging others’ ideas). The contributions of all the students to discussions were especially motivated by praise from Teacher A that she presented in a physical form (e.g., behaviour chart).

Figure 6.6 shows the features I identified in Child A’s participation. Like his classmates, he mainly responded to Teacher A’s invitations. His participation often involved sharing his opinion and elaborating on his previous contributions and on details highlighted by the teacher, prompted by the teacher’s support. He rarely engaged with others’ ideas unprompted. Child A also consistently repeated information (RPT), responded to invitations stating that something was "good" or "happy" (1RESP) and contributed with non-speech communication (TEMP, ALT, i.e., pointing at physical resources, hand signs or movements accompanying his speech). He seemed to recur to these when he struggled to express his ideas or needs clearly, to respond to the teacher’s invitations or, unprompted, to engage with the information that was being shared during the discussion.

Child A often found it difficult to speak in complete sentences, and his speech could be difficult to understand. Therefore, Teacher A and I observed his behaviours and utterances closely to identify contributions that otherwise we might have missed and his preferences. We noticed that he:

- communicated discomfort by mimicking specific Teacher A actions82,
- seemed to process information by repeating responses he heard, or reading out loud text that had been written by the teacher, directly to an audio recorder or to the TA during discussions, and
- enjoyed guiding class activities (mainly assuming a directive role, e.g., taking the register).

82 A finding from the baseline observations inspired our close observation of child A’s behaviour. He communicated discomfort related to loud noises by mimicking Teacher A’s actions to stop class activities (e.g., clapping his hands).
Child A also repeated contributions and referred to objects when he was distracted. He was easily distracted, sometimes due to his hypersensitivity to sensory stimuli (including sensitivity to loud noises and constant search for haptic stimulation\(^{83}\)) and sometimes because he found it difficult to sustain attention (particularly during long activities). For this reason, Teacher A provided him with a soothing object during long discussions.

Teacher A asked Child A to contribute to most whole-class discussions and closely guided his participation during small-group activities. She supported Child A in specific ways to respond to his characteristics; she clarified information frequently, guided his attention and participation, and ensured that the environment was conducive to his participation.

She clarified information in different modalities. Verbally, she constantly repeated or rephrased her invitations and the contributions of his classmates (B). Visually or physically, she displayed resources (with concise information or visual

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\(^{83}\) He showed this through a particular attraction to the teacher’s lanyard.
examples; TEMP), she wrote key information on the board, and she reasserted her speech through the use of hand signals or body language (ALT). The resources and body language provided a visual representation of the discussions and redirected his attention and guide his behaviour. Teacher A was the only teacher who used hand signals strategically to support the focus student. She used Makaton signs for indications\(^\text{84}\) and signs from the class’s relaxation activity to help him when he appeared overwhelmed (see Section 6.2.2.8).

Teacher A guided Child A’s responses mainly through guided questioning (IB or IR and G). As part of this strategy, she sometimes provided more directive support when he struggled to understand her questions or the discussion. Child A’s difficulties were sometimes evident when he misinterpreted the invitation and built on specific details (BD). Her directive support included asking closed questions, offering options to choose from, inviting him to finish a sentence, asking simplified questions and indicating him to elaborate on a detail she highlighted. Use of these strategies reduced the amount of information that Child A had to consider. Teacher A also formulated questions that were related to his experiences with his family to associate the discussions with concrete experiences (e.g., “…where would you put your sister’s things?”).

Teacher A mediated Child A’s interactions with his peers during whole-class and small-group discussions. She oriented his attention to the task and his classmates’ contributions and rephrased those of Child A to make them clear to others and promote his partners’ engagement with his ideas. (Table K.2 in Appendix K shows an example of this form of mediation). Through this strategy, she sometimes encouraged the expansion of Child A’s contribution by his classmates (as mentioned in section 6.2.2.6). She also advised him regarding how he could advance the activity and invited him to contribute his ideas through drawing\(^\text{85}\) to relieve his difficulties with expression and writing (see Section 6.2.2.8).

\(^{84}\) The TA also helped to regulate child A’s behaviour during whole-class discussions through the use of signs that showed him how to sit down, and she pointed at the speakers.

\(^{85}\) “You want to write down your idea or draw a picture?”
During paired activities, the teacher matched Child A with classmates who were keen to guide him and direct the activity and assigned specific roles to clarify Child A’s tasks. She especially assigned him the role of registering the team’s ideas based on our observation that Child A repeated information to the audio recorder. The teacher took advantage of his usual behaviour to encourage him to listen to his peers. Therefore, she offered him a relevant and friendly way to contribute to the activity. The role also gave him the chance to take responsibility for an essential aspect of the activity that potentially appealed to his interest in directing activities. Initially, his role implied that he would write down the team’s ideas. However, Child A struggled to write. For this reason, the teacher invited him to draw the ideas (as shown in Figure 6.7) and planned an activity that allowed him to register the ideas by talking to an audio recorder instead.

![Image](image.png)

*Figure 6.7. Example of Child A’s drawing that registered his team's ideas*

Child A often asked for support from Teacher A instead of from the TA. I registered this as a request for an adjustment in the support he received. This preference was due to constant changes in the class TA after the first TA who had supported him left the school early in his study. For this reason, Teacher A became the principal supporter of Child A.

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86 Figure 6.7 shows Child A’s handwriting and drawing of a turtle in his team’s sheet of paper. As part of a small-group discussion, the students talked about ways in which they could help to prevent pollution of the oceans.
Teacher A’s constant guidance seemed to promote more varied participation from Child A during Cycle 3 than during Cycle 2. On a few occasions, he provided reasons (R), referred to previous activities, his and others’ contributions, and personal experiences (C), and suggested how his team could continue with an activity (G). He also seemed to be more responsive to discussions and his classmates’ contributions in small-group activities in Cycle 3. He volunteered to participate a few times and sustained his attention on the task (except when there were noticeable environmental changes). I suggest that this participation reflected the familiarity he had gained with discussions. Table K.1 in Appendix K shows an example of a whole-class activity in which Child A referred to a classmate’s previous contributions and his own participation in the discussion.

Teacher A’s support also impacted the interactions between Child A and his classmates during small-group activities. His peers adopted some of Teacher A’s strategies to guide his attention (as described in Section 6.2.2.6), remove distractions and regulated turn-taking (e.g., “[Child A] do you want to start?”).

6.4.2 Collaboration with Teacher A

From the beginning of the study, Teacher A showed her interest in and commitment to it. She participated in the three initial workshops as planned. I introduced the prototypical strategies I had developed based on the literature to her, and we prepared together the first version to be trialled. This version was the one I presented to Teachers B and C. She had a clear goal for her participation in the intervention study. She was developing a project that was related to the adoption of a dialogic approach for the teaching of religious education (which indicated that she was familiar with dialogic teaching). Additionally, she was interested in the development and promotion of accessible class activities that addressed the needs of many of her students (e.g., her students who had English as an additional language).

With the support of the first TA, she conducted live coding of the discussions that she promoted in her class between the workshop sessions to evaluate her talk (see Appendix L). In the first lesson of the intervention, she established ground rules
for talking. She carried out an activity that was inspired by the one suggested in the workshops and invited students to select the rules for their class. Throughout the study, Teacher A consistently reminded her students of the rules and potential ways in which they could participate before she promoted the discussions (see quotes below).

“…what makes your life happy, and can you tell me why? Maybe you could listen to somebody else’s idea and see if you can build on it.” (Whole-class discussion in Cycle 3)

“Can you talk to your partner, your turn, my turn, what could we do to help the oceans?” (Indications for pair talk in Cycle 3)

To make the rules friendlier for the class, she related the rules to specific icons that she often displayed on the board (see Appendix L ). She also represented visually and physically how the students had enriched a discussion (i.e., she created a pile of blocks by adding one block per idea shared or passed a thread around to indicate the growth of the discussion with each contribution).

![Icons for talking]

*Figure 6.8. Examples of icons used in Classroom A that showed rules for talking*

To promote a calming environment, she began each lesson with a relaxing activity that was led by her or the TA. Child A sometimes accompanied them when they indicated the movements that the class had to repeat. She suggested that her students should recur to the movements of this activity if they experienced

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87 The suggested activity was the ‘fishbowl activity’ (Davies & Meissel, 2016). Teacher A decided to act out a conversation with the TA that showed an example of a badly conducted discussion. She asked students to provide their opinions.
discomfort during discussions (as suggested in the strategies). However, only the
teacher, the TA and Child A carried out the movements during discussions.

Throughout the periods during which the strategies were trialled, Teacher A
followed most of the suggestions that were shared in the workshops and trialled
most of the design framework’s strategies. She also attended five of the six planned
joint analysis sessions (three during Cycle 2 and two during Cycle 3). In our
sessions, we discussed how she could improve the promotion of dialogue, Child A’s
participation, and the activities that could be accessible to him. The sessions were
helpful for Teacher A because the TA who had closely supported Child A left the
school at the beginning of the year.

I noticed an impact of our meetings and discussions on her talk and lesson
planning, particularly during Cycle 3. Teacher A planned changes to encourage
students to listen and engage more with their classmates’ ideas. She made it explicit
that she expected them to talk and reason about their classmates’ ideas (e.g., “who’s
partner had a good idea... why is it good talking in our classroom?”). Teacher A also
seemed more confident in her planning of class discussions in Cycle 3. She planned
small-group activities that required students to ask for their teammates’ ideas and to
remember what they each said (e.g., to interview each other). Additionally, she
promoted whole-class discussions in which students’ participation was associated
with specific actions (e.g., students sat inside a circle after they had participated).
This system showed clearly who had participated and made the discussions more
dynamic.

Related to the adjustments in her lesson planning to support Child A, Teacher
A promoted dialogue during activities that he was familiar with and interested in. She
assigned him purposefully the role of the registrar of ideas and trialled a proposal
that he be given a microphone to prompt the verbalization of his thoughts and
interview his teammates. She also created a visual timetable to guide the behaviour
of Child A and the class, which was one of her initial support goals. She and

88 Teacher A invited me to help review Child A’s needs for his EHCP and I joined a session with his
parents to discuss his advances during the school year.
dedicated a moment at the beginning of the lessons to introducing the activities that would take place.

6.4.3 Summary of findings from Classroom A

The observations that were noted in Classroom A highlighted that the primary forms of support for Child A involved:

- guidance of his attention (in response to distractions or misinterpretations);
- reduction of degrees of freedom related to his participation;
- preparation of an environment conducive to his participation (calm and with resources that reasserted relevant information); and
- constant reminders and clarification of information.

Child A’s tendency to focus on specific details alongside his difficulties (such as the ease with which he could become distracted and his unclear verbal communication) impacted his understanding of the discussions and others’ understanding of his contributions. Teacher A and I noticed how essential it was to maintain the consistent availability of relevant information in a concise form. This information included what he was expected to contribute, general indications, contributions shared by others, and the discussion's purpose. Thanks to Teacher A’s constant guidance and invitations to participate, Child A had many opportunities to practice sharing his ideas with others. I may not have identified instances of the feature ‘reflect on dialogue’ in the examples because such reflection would have involved abstract thinking about dialogue. Child A would have found it difficult to access this form of support, considering his stage of development and the difficulties he had with the processing of abstract information.

The adjustments made to the strategies in Design Framework 1 that were inspired by the observations in Classroom A included:
• offer directive support: repeat information and indications, ask closed questions, offer options (including dialogic forms of participation), and invite students explicitly to build on the teacher’s contribution;
• use objects, resources, and non-speech forms of communication to elicit participation and to clarify discussions or to help students to cope with discussions (soothing objects);
• mediate interactions with peers by revoicing ideas and providing advice; and
• monitor students’ usual behaviour and communication, and accordingly plan accessible forms of participation and motivational discussions.
6.5 Class observations in Classroom B

6.5.1 General observations from Cycles 2 and 3

6.5.1.1 Macro-level analysis of lessons in Classroom B

I observed five lessons on different school days in Classroom B (a year 5 class) during the intervention study over four months (one lesson less than expected during Cycle 3). I initially observed maths lessons. However, due to difficulties that were related to the trialling of the strategies and collaboration with Teacher B (see section 6.5.2), I later observed three English lessons. The four lessons were structured as in Table 6.24.

Table 6.24. Overview of the lessons and activities observed in Classroom B

<table>
<thead>
<tr>
<th>Subject (no. of lessons observed)</th>
<th>Cycle 2</th>
<th>Cycle 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maths (2)</td>
<td></td>
<td>English (2)</td>
</tr>
<tr>
<td>English (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of class activities (frequency)</td>
<td>Whole-class activities (6):</td>
<td>Whole-class activities (12):</td>
</tr>
<tr>
<td></td>
<td>- discussions (4)</td>
<td>- discussions (6)</td>
</tr>
<tr>
<td></td>
<td>- silent or repetition (2)</td>
<td>- teacher talk (5)</td>
</tr>
<tr>
<td></td>
<td>Mixed activities (4)</td>
<td>- silent (1)</td>
</tr>
<tr>
<td></td>
<td>Pair/individual + whole-class</td>
<td>Small-group activities (3)</td>
</tr>
<tr>
<td></td>
<td>Activities in pairs (1)</td>
<td>Individual activities (1)</td>
</tr>
<tr>
<td></td>
<td>Individual activities (4)</td>
<td></td>
</tr>
</tbody>
</table>

The two maths lessons were characterised by long activities interspersed with periods of whole-class discussion and pair talk or individual work (mixed activities). These activities required students to solve maths exercises one by one and to explain their solutions to their partners before they engaged in whole-class discussions about their solutions. This arrangement enabled students to prepare for the whole-class discussions. However, the pair-talk intervals often were short and mainly required one student to explain the solution to the other one. Discussion was not explicitly required. These lessons also included one long individual activity in which students solved maths exercises on their own. The subject matter and
activities of these lessons limited Child B’s participation. He did not usually engage with the maths curriculum that was set for the rest of the class; therefore, he required a high level of support. Additionally, he often struggled to finish the exercises during the pair-talk intervals. For these reasons, I observed English lessons during the next visits to the classroom.

More activities took place in the English lessons than did in the maths lessons; there were whole-class discussions and teacher talk events in which instructions were shared. To help students to focus before the lesson, Teacher B promoted individual or whole-class activities in which the class solved maths exercises or finished previous work. Afterwards, he promoted introductory whole-class discussions and small-group (or pair) activities that were based on the introductory sessions. He followed the small-group discussions with whole-class ones in which students shared their groups’ ideas. This structure provided more opportunities for peer interactions than did the structure of the maths lessons. Child B joined most of the group activities with the support of the TA.

Teacher B’s lesson planning reflected his priority that the class should be engaged actively in the advancement of an activity. Child B was able to advance at his pace and had some individualised activities, and often this resulted in him primarily following the TA’s guidance. Accordingly, in some lessons, he had little opportunity to contribute to whole-class activities. Regarding small-group activities, sometimes Teacher B planned for Child B to work directly with the TA due to the difficulty of the activity. I describe in the following subsection the features, strategies, and participation I identified in the selected examples of class discussions.

6.5.1.2 Findings from an in-depth analysis of Classroom B’s discussions

From the five lessons, I extracted 11 examples of interactions within the classroom that included Child B (two per lesson and one extra, see selection criteria in 6.1). These included four whole-class discussions, three small-group (or pair) activities and four 1-on-1 interactions with the TA or Teacher B. I selected an extra example of a one-to-one interaction because it illustrated the TA’s support and Child B’s participation in a conversation for an extended time. Child B rarely participated in the
whole-class discussions. Sometimes these activities were not conducive to his participation due to their difficulty for him or because they did not involve discussions.89

Figure 6.9 and Figure 6.10 show the dialogic features, non-speech contributions or strategies, and the focus student’s behaviours that I identified in the selected examples.

![Figure 6.9. Frequencies at which I identified occurrence of dialogic, non-speech and behaviour codes in Classroom B's whole-class discussions](image)

I observed, at least once, all of the dialogic features in the examples of whole-class discussions (except for ‘reflect on dialogue’). Teacher B consistently invited students to elaborate on the collective ideas and their classmates’ contributions (IB), while he elaborated on the students’ ideas and occasionally rephrased his indications and explanations (B). He guided the students’ responses by highlighting relevant details and sometimes by providing informative feedback or referring to authoritative perspectives (G).

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89 For example, I could only select examples of one-to-one interactions in the third lesson of Cycle 2 because the whole-class activities involved the reciting of a text.
Teacher B engaged with students’ ideas by asking them to give reasons for their answers (IR), challenging their contributions (CH), and referring to previously shared information (C). The frequencies of occurrence of the non-speech contributions and references to resources reflected how Teacher B often used the board to represent the discussion visually. During Cycle 2 in the maths lessons specifically, Teacher B wrote solutions to equations on the board and, throughout the discussions, referred to the solutions that the class had worked out. Students responded to Teacher B’s invitations and also volunteered to participate in the whole-class discussions. They shared ideas relevant to the ongoing discussions (E), added information to the collective idea, elaborated on their ideas (B), and explained their or their classmates’ ideas (R).\textsuperscript{90}

Child B participated rarely in whole-class discussions. I identified only three instances of his participation in the selected examples (two in Cycle 3). He shared

\textsuperscript{90} It is important to mention that the type of participation identified was affected by the examples of interactions that I selected. As part of my macro-level analysis, I noticed instances in which students challenged others’ ideas, took up positions in the debate or referred to personal experiences.
short responses (sometimes one word), in which he provided a new idea (E), built on the class discussion (B), and explained his contribution (R) at the teacher’s request (see Figure 6.11). Teacher B invited Child B to contribute twice during Cycle 2, by asking short and closed questions (asking for the sum of whole numbers). One of these invitations promoted one of Child B’s contributions. Child B volunteered twice during the lessons I observed in Cycle 3; in these contributions, he commented on a concrete aspect and shared an example.

![Diagram of dialogic features and new codes in Child B's speech](image)

*Categories in **bold** were identified only in Cycle 3.

**Figure 6.11. Frequencies of occurrence of dialogic features, non-speech contributions and new codes in Child B’s speech**

Two TAs worked in Classroom B at different times. They supported Child B’s engagement with the whole-class activities; each in a different way. During Cycle 2, one of them reminded him to look towards the front of the classroom while Teacher B explained the activities and solutions to the maths exercises (e.g., “keep your eyes on the board…”). These reminders mainly helped to regulate Child B’s behaviour (to ensure that he blended in with the class) because he did not work on the same set of exercises. During Cycle 3, the second TA shared brief comments with Child B during the discussions to clarify the content or the purpose of the discussion, to provide
feedback (acknowledging his contributions and their relevance\textsuperscript{91}) or to repeat instructions concisely (to specify his tasks). She also redirected his attention to the ongoing discussion when key information was shared, indicating that he should listen.

The high frequency of the feature ‘build on ideas’ in Figure 6.10 illustrates the primary form of participation displayed by Child B, his teammates and the TA during small-group activities\textsuperscript{92}. His teammates mainly worked on putting together their ideas (B), commented on their teammates’ suggestions, sought agreement, positioned themselves and referred to their teammates’ previous decisions. Child B's usual participation in small-group activities and one-to-one interactions was through elaboration on (B) and repeating (RPT) information that had been shared by the TA or his classmates. The TA usually prompted his participation.

The most common ways in which the TAs supported Child B’s participation during one-to-one interactions and the paired and small-group activities are listed below.

- They guided Child B step-by-step to carry out an activity by highlighting details related to the steps to carry out the activity (“...what you have to do is these shapes... we’ve got to find the quarter”). They made explicit the trajectory of the activity by referring to previously discussed ideas, the completed steps and the ones to come (C). This guidance is illustrated in Table 6.12 in Section 6.2.2.3 and in Table K.3 in Appendix K.
- They proposed courses of action and provided explanations to reduce degrees of freedom.
- Constantly they rephrased their instructions and elaborated on their explanations (B) to clarify information and expectations.

\textsuperscript{91} For example, the TA sometimes pointed out occasions when another student agreed with an idea that child B had shared previously (“There we are, you said that...”). Teacher B also shared a comment like this during a whole-class discussion, acknowledging the movement that child B had contributed to the class’s “movement story”: “Child B, this is your one”.

\textsuperscript{92} More than half of the examples from which I calculated these frequencies were one-to-one interactions between the TA or Teacher B with Child B. I calculated the specific frequencies separately for the turns of child B’s teammates to report the characteristics of their participation.
• She invited him to elaborate on his contributions (IB), usually via focused questioning.

• They used physical or visual resources (e.g., blocks that represented fractions, drawings) to represent abstract problems. Teacher B prepared the resources and checked in with the TA and Child B during the activities to remind them to use the resources. Table K.4 in Appendix K illustrates the use of physical resources and drawings by one of the TAs and a classmate (who took on a tutor role) to help Child B to solve a math exercise.

I noticed that three factors could hinder or support Child B’s participation. One of them was the amount of information and guidance that Child B was required to process simultaneously. I observed that he became confused and disengaged from the activity when more than one person attempted to guide him simultaneously or when others asked too many questions at a time (e.g., “…what’s your half? The whole thing is how many boxes? Or how many squares of chocolate?). Another factor was the close examination of Child B’s behaviour. I often noted that Child B reacted to discussions with sounds or actions (which contributed to the high frequency with which I recorded the code IND, see Figure 6.11) and responded to his partner’s explanations during math activities by manipulating the supporting materials93. Monitoring his behaviour would help avoid dismissing these reactions and responses (Table K.4 in Appendix K illustrates an occasion in which the TA did not take up a suggestion made by Child B). The other factor was being explicit about intentions (of an invitation to participate) and discussing the purpose of specific behaviours during discussions to establish clear expectations and guidelines (as described in Section 6.2.2.4).

The TAs mediated Child B’s interactions with his peers (G), particularly during Cycle 3. One TA advised him on ways in which he could collaborate with them, redirected his attention to their contributions (e.g., “…look at boy 2, he is reading”). She also made Child B’s ideas explicit to his teammates and vice versa (by rephrasing them) and invited his teammates to comment on his ideas (e.g., "What

93 Child B also seemed to communicate by uttering repetitive noises, most of which seemed to soothe him. In their questionnaire, his parents highlighted that they believed that these sounds helped him to process information and to communicate.
about rattlesnakes, everyone?"). Additionally, she proposed courses of action for their collaboration (e.g., “…Child B and I can read it together… and then you can decide if you would prefer him to do this text”). Sometimes the TA’s support promoted two simultaneous conversations, one between Child B and the TA and the other among his teammates. This arrangement allowed Child B to formulate the responses he would share with the group with the support of the TA while his teammates continued to carry out the activities.

Child B seemed to be more responsive to his classmates, made more verbal contributions and engaged for longer in the small-group activities during Cycle 3 (English lessons) than during Cycle 2 (math lessons). The change in subject matter and the type of activities from Cycle 2 to Cycle 3 seemed to cause the change in his participation. It was difficult for Child B to engage with the content of the activities of the maths lessons and to respond verbally to his partner. Additionally, he often carried out different activities from the rest of the class. Therefore, I suggest that he was not used to being expected to contribute to the class activities or to follow all the instructions that the teacher shared with the class. It also seemed challenging for his partner to guide him (as in this role, the partner could not solve as many exercises as he would have done otherwise). These observations affected the teacher’s planning for the following lessons I observed for the study (see Section 6.5.2).

I noticed that the accessibility of pair and small-group discussions could be improved for Child B if such discussions were based on familiar information or previous work, involved accessible materials that were the same for all, and were prefaced with specific instructions. An example of an activity that seemed to be more accessible than others to Child B involved the remembering and repetition of a series of movements that, taken together, represented a text (i.e., a pictographic story). It promoted his continuous engagement and enabled him to adopt a guiding

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94 For example, the TA asked another student to make enough space so that child B could get closer to the group’s piece of paper in order to write on it.
95 For example, in one lesson, Teacher B indicated before a small-group activity that child B would contribute to the activity with the introduction of a text. His teammates were aware of this and respected and supported his role.
role in his one-to-one interaction with the TA and Teacher B. I suggest that this role motivated Child B and confirmed to him that he remembered the information and could help to advance the activity. The latter was relevant for Child B because he often asked for reassurance that he was participating as expected or correctly (“Am I doing super well?” “Is that bad or good?”).

As mentioned in Section 6.3.2.2, some of Child B’s characteristic behaviours were: asking for reassurance, expressing difficulties (e.g., turn 16 in Table 6.14), asking to adjust his participation and asking for breaks (“I am kind of tired, so, after this, I will have a little (nap)”). It was noteworthy that I noticed these expressions and requests because Teacher B indicated in his baseline interview that Child B found it difficult to ask for help. I suggest that they reflected his reaction to being required to engage actively for an extended time (which he seemed to regard as unusual) and may have indicated he monitored whether or not he did well.

6.5.2 Collaboration with Teacher B

From the start, I adjusted the schedule of the different activities that comprised the intervention study to accommodate the time that Teacher B had available, and his objectives, additional responsibilities, and perspective towards the study.

Due to time constraints, we held a single, one-hour meeting instead of the three introductory workshops. We focused on the discussion of the T-SEDA dialogue categories (we coded an example together), the ground rules for talking that were used in the class and the study’s position regarding autism. I introduced Teacher B to the prototype of the adjusted strategies by sharing them with him via the online shared folder.

During the trial periods of the strategies, we reduced the number of classroom observations (five in total) and joint analysis sessions (only one session in Cycle 2), cancelled the final interview and changed the subject matter of the lessons I

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96 Throughout their one-to-one interaction, Teacher B guided child B with movements to help him to remember the text (which impacted the frequency of occurrence of TEMP). Teacher B was impressed with child B’s participation.
attended. These changes were due to two reasons. One was that he had taken on a new role to support a trainee teacher and he intimated that this role placed extra strain on him. He indicated that he was happy to be observed and to adopt dialogic strategies and stated that he already knew enough strategies.

Another reason were the difficulties he noticed that Child B and his partner experienced during their pair work in maths. Teacher B initially set a goal of promoting his students’ reasoning abilities during math lessons and of pairing Child B with a peer that could guide him in these lessons’ activities. However, the first lessons I observed in Cycle 2 showed that promotion of his participation during these lessons presented a challenge. Child B had difficulty responding to the teacher, the TA and his partner. The TA explained that the lesson had been “hard” for him and that usually she would have taken him out of the classroom for him to complete his maths studies with her alone. Teacher B worried that Child B’s partner had missed out during the lesson because he was unable to do as much maths as he would usually have done. For these reasons, from the third observation day, Child B worked directly with the TA in Cycle 2. The change in the subject matter enabled me to observe several instances of Child B participating in group work in Cycle 3. I focused on observing the support that the TA provided to help Child B to engage with the activity and his peers. Teacher B supported Child B through the provision of individualised instructions for his participation.

Concerning the establishment of ground rules for talking, Teacher B mentioned in his baseline interview that he had prepared a set of rules with this class years earlier. It was unclear whether he reincorporated those rules during the trials of the dialogic strategies. However, in one of the lessons, I noticed a new sheet of paper that carried handwritten rules. I did not observe any referral by the teacher to these rules during whole-class discussions (nevertheless, he asked the students to

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97 Teacher B mentioned in his baseline interview that he was familiar with dialogic teaching and had received a brief course on dialogic strategies. However, he expressed a lack of confidence in their theoretical underpinnings.

98 The rules included: stay relevant, look at the speaker, listen, respond, and actively challenge.
build on their classmates’ ideas and to provide reasons). As part of his guidance for small-group activities, he explained that the students could talk to each other.\textsuperscript{99}

6.5.3 Summary of findings from Classroom B

The findings from Classroom B illustrate how the TAs supported Child B’s participation in the class activities that required him to listen and to consider others’ ideas (in both whole-class and small-group arrangements). I identified that the TAs adopted three roles in that they:

- guided Child B’s engagement with discussions throughout the activities;
- mediated his interactions with classmates by providing advice and clarifying contributions; and
- clarified expectations and the purpose of specific steps, behaviours, and activities.

Each of the TAs mainly supported Child B by helping him to understand and, therefore, advance the activities. This may explain why I did not identify instances in which any of the TAs invited Child B to provide reasons for his contributions (IR). Child B found some of the class activities challenging, and Teacher B often sought quick thinking and reasoning from his class. At times, for this reason, the teacher and TA’s main expectations of Child B were that he would stay calm and direct his gaze towards the front of the classroom. To create accessible opportunities for Child B so that he could participate, the TA clarified and recapped relevant information and the expectations regarding his participation. As part of their support, the TAs also acknowledged and motivated his participation, which may have helped him feel part of the activity.

The adjustments made to the strategies in Design Framework 1 that were inspired by the observations in Classroom B were that teachers should:

\textsuperscript{99}E.g., “…there will be talking between you. I would like you to work your way round with your partner so that you’re having that chance to discuss…” In his baseline interview, Teacher B mentioned that he promoted small-group activities with implicit rules for group work.
• make comments and focus attention during whole-class discussions;
• represent abstract problems visually or physically while explaining them;
• be explicit about intentions, provide reasons and communicate the expected behaviours that would help the student to advance an activity;
• recap information concisely (e.g., contributions, steps, instructions) and often refer to steps; and
• plan accessible small-group discussions that were based on familiar content and used accessible materials, and they should ask classmates to adjust their behaviour and to provide close support (while the teacher mediates interactions and provided advice).
6.6 Class observations in Classroom C

6.6.1 General observations from Cycles 2 and 3

6.6.1.1 Macro-level analysis of lessons in Classroom C

I observed four lessons that occurred on different school days in Classroom C over four months of the intervention study (one during Cycle 2 and three during Cycle 3). I observed lessons on different subjects. The primary goal of all of them was the promotion of students’ participation in discussions through the sharing of opinions and counterarguments. Table 6.25 presents the overall characteristics of the lessons and activities I observed in each cycle.

Table 6.25. Overview of the lessons and activities observed in Classroom C

<table>
<thead>
<tr>
<th>Subject (no. of lessons observed)</th>
<th>Cycle 2</th>
<th>Cycle 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>English (1)</td>
<td></td>
<td>Guided reading (1)</td>
</tr>
<tr>
<td>Philosophy for children (P4C) (1)</td>
<td></td>
<td>Economics project (1)</td>
</tr>
<tr>
<td>Whole-class activities (5):</td>
<td></td>
<td>Whole-class activities (18):</td>
</tr>
<tr>
<td>- discussions (2)</td>
<td></td>
<td>- discussions (11)</td>
</tr>
<tr>
<td>- teacher talk (2)</td>
<td></td>
<td>- teacher talk (7)</td>
</tr>
<tr>
<td>- silent (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed activities (1): small-group + whole-class</td>
<td></td>
<td>Mixed activities (2): small-group + whole-class</td>
</tr>
<tr>
<td>Small-group activities (1)</td>
<td></td>
<td>Small-group activities (5)</td>
</tr>
<tr>
<td>Individual activity (1)</td>
<td></td>
<td>Individual activity (1)</td>
</tr>
</tbody>
</table>

Teacher C planned more whole-class than small-group activities. These included class discussions and moments during which the teacher provided instructions, presented the timetable and introduced the materials they would discuss. I observed only one individual activity in which students read silently before the lesson started.100

100 This activity was similar to those in Classroom B that were designed to help students to focus.
Teacher C talked about the day’s timetable at the beginning of the school day, allowed students to ask questions about it, and informed them if there were to be any changes from the usual routine. Afterwards, she often asked students to take part in a brief recap of relevant information for the lesson (e.g., previously read information, concepts, previous agreements) and shared indications. The students engaged in one or two small-group activities per lesson (in groups of three to four students). Teacher C followed up these activities with whole-class discussions, during which she asked the students to share their or their group’s ideas. Most of these activities were of sufficient duration for students to work out their ideas. I observed only one example of a "mixed-activity" that comprised two-minute intervals of small-group talk and whole-class debriefs. Teacher C based the discussions on previously known information (e.g., a previously read story) or on a resource that she introduced at the beginning of the lesson (e.g., a video of a poem, statements, or concepts).

Teacher C chose as her goal for the intervention study to help her students to listen to each other and to build on each other’s ideas. The lessons and activities I observed during the intervention and the resources and prompts that were used motivated students to share their ideas, form their own points of view and to provide reasons. I describe in the following subsection the features, strategies, and participation that I identified during Classroom C’s discussions.

6.6.1.2 Findings from an in-depth analysis of Classroom C’s discussions

I extracted eight examples from the four lessons (two per lesson, see selection criteria in Section 6.1), which comprised four whole-class discussions and four small-group discussions. Figure 6.12 and Figure 6.13 show the dialogic features, non-speech contributions or strategies, and new behaviours that I identified in the selected examples.
I identified all the dialogic features at least once. Unlike my observations of the other classrooms, I observed a few instances in which Teacher C talked openly about the class talk protocols (RD – ‘reflect on dialogue’, n=4). She referred to the problems that could happen if rules of discussion were not respected (e.g., if someone talked over someone else) and the ways in which students could engage with others’ ideas.\footnote{For example, “Compromise. So that’s when you think, ‘oh, okay, we all are going… I’ll let a little bit go, it’s ok, it’s not my turn this time, my turn is next’, we are going to compromise”.
} She also invited students to suggest other ways. I describe this in Sections 6.2.2.2, 6.2.2.4, and 6.2.2.8 (e.g., Table 6.10).

The features I identified the most, in both the teacher’s and the student's speech, were: ‘invite to build on ideas’ (IB), ‘build on ideas’ (B), and ‘guide direction of dialogue’ (G). The frequency of recording of these codes reflected the frequency with which the teacher asked students to comment on specific ideas and classmates’ contributions (e.g., asking if they agreed), elaborated or commented on their contributions, highlighted relevant details, and provided feedback to guide students.
During whole-class discussions, Teacher C usually highlighted and clarified the students’ positions and ideas. She did this more often than she elaborated on her previous comments or requests. Another noticeable feature in Teacher C’s speech was connecting ideas (C). She referred to previous contributions, experiences and lessons, participation expectations, and steps that made up the activities. The teacher encouraged students to comment on each other’s ideas and she guided their participation through these references. I identified, less frequently, that she invited students to provide reasons, challenge ideas, and used non-verbal forms of communication (mainly to indicate turns and by pointing at resources\textsuperscript{102}).

Students responded to the teacher’s invitations and volunteered to participate. Students were often motivated to volunteer due to Teacher C’s use of lollipop sticks, each of which carried a student’s name, to select a speaker randomly. Of the possible forms of participation, students mostly commented on others’ ideas through exemplification or addition of details to them (B) and made their reasoning explicit (R) in both whole-class and small-group discussions. Due to the type of activities that

\textsuperscript{102} Concerning the use of supporting resources, the TA handed out “participation tokens” to some of the students to motivate their engagement. This support was not solely meant for child C.
Teacher C promoted, including debates based on statements, and her invitations they also expressed their position (CH). I identified other dialogic features in their speech but less frequently (at least once).

Figure 6.14 illustrates the characteristics I recognised in Child C’s participation. Of the three focus students, I identified the most features in his participation (especially during Cycle 3, in which I observed more lessons than in Cycle 2). He volunteered to participate, mostly shared relevant contributions during whole-class discussions and did not have any difficulty understanding the activities or discussions. Teacher C especially recognised that he did well in maths.

The feature I identified most frequently in Child C’s participation was ‘build on ideas’ (B). Usually, he elaborated on his previous contributions. He responded to the teacher's requests to expand his contributions in whole-class discussions and repeated and referred to his previous responses (unprompted) during small-group discussions (RPT2 and C – e.g., “I was the one that said to be specific”). He also enriched and commented on others’ ideas. In fewer instances, he provided reasons

Figure 6.14. Frequencies at which I identified dialogic features, non-speech contributions and new codes in Child C’s speech
(R) and challenged others’ contributions (CH) like the rest of the class did. (Table K.6 in Appendix K shows an example of Child C’s participation in a whole-class debate).

Child C preferred correct and nuanced answers and liked to abide by rules and schedules. These preferences seemed to motivate him to question or amend others’ arguments to what he considered to be correct. For example, Child C replied to a classmate’s advice for team leaders that they should get “everyone under control” by suggesting that they should not “control everyone too much” or be “too bossy”. I recognised his interest in rules when he contributed to delineating how students would communicate (dis)agreement (exemplified in Table 6.16 in Section 6.2.2.8) and when he followed the ‘listening chairs’ dynamic throughout the discussion. He also tended to focus on his ideas, specific details (illustrated in Table K.7 in Appendix K) or previous discussions or experiences (exemplified in Table 6.22). His focus on these specific ideas sometimes led Child C to drift from the topics of discussion. On other occasions, he disengaged from discussions due to distractions or because his teammates did not take up his ideas.

Child C did not often contribute non-speech forms of communication to discussions, nor did he refer often to resources. However, I noticed that he paid attention to the physical and social environment in the classroom. He read aloud or commented on the text that was displayed on resources and he talked to himself about his classmates’ behaviour and comments.

Teacher C supported Child C’s participation in whole-class discussions by asking him to clarify his contributions. She would ask him to elaborate on his ideas or to speak more clearly (because he sometimes spoke fast or quietly). Child C did not display difficulties with his communication of ideas. The main difficulties he experienced were communicating when he felt overwhelmed and coping with making mistakes. Accordingly, Teacher C provided support in the form of monitoring him

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103 Child C turned his chair to look at the speakers during discussions as the teacher had asked the class to do (described in Section 6.2.2.5).
104 The higher frequency of self-talk that child C performed during small-group discussions, and which is presented in Figure 6.14 reflected his distractions (particularly IND, NRT – talking about the cameras and playful comments).
105 Teacher C alluded to this in her baseline interview: “…if he gets anything wrong, he will get really negative self-talk”.

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and providing him with supporting materials to communicate his level of discomfort (via an emotions chart, Figure 6.15) or to help him to calm down (e.g., headphones and soothing videos).

![Emotions charts that Child C used](image)

**Figure 6.15. Emotions charts that Child C used**

Teacher C often checked in with Child C and his team to ensure that they discussed and listened to each other’s ideas. Of four small-group discussions that I observed, she facilitated two and briefly checked in during the other two. As part of her support, Teacher C usually performed the tasks listed below.

- She mediated the interactions within the group. Teacher C directed Child C’s attention to his classmates’ contributions. She revoiced his teammates’ ideas and asked him (and the team) to revoice or to elaborate on each other’s ideas (see turns 24 and 30 in Table 6.15). The teacher also talked openly about the problems that occurred if people did not listen to each other and she modelled the behaviour she expected from them (as illustrated in Table 6.10).
- She redirected Child C’s attention to the topic of discussion and helped him to disengage from unrelated details and distractions. Sometimes this involved building on Child C’s ideas (B) by relating them to the topic of conversation

106 As shown in Table 6.1 and Table 6.2, the TA in Classroom C did not support child C.
(as illustrated in turn 15 in Table 6.22). On other occasions, she helped him to close off distracting thoughts that were irrelevant to the ongoing activity. She answered his questions or engaged in brief informal conversations to redirect his attention (illustrated in Table K.7 in Appendix K).

- She encouraged Child C to contribute to the discussion based on specific ideas or previous experiences when he was distracted or struggled to continue with an activity (thereby reducing his degrees of freedom). It was noticeable when he struggled because he recurred to his characteristic response: “I don’t know”. Teacher C’s support is exemplified in the quote below in which she refers to Child C’s specific experiences, and in Table 6.15 (turn 26).

“Sometimes you get a bit upset if you don’t win. Why do you get upset…? … it’s okay to want to win…, but maybe we have to think about enjoying the whole experience”.107 (Small-group discussion in Cycle 3)

6.6.2 Collaboration with Teacher C

I had limited contact with Teacher C during the intervention study. Consequently, I adjusted the schedule and reduced the number of activities that were conducted.

Due to the late start of the study in this school and time constraints, the head teacher asked me to hurry the initial activities. These included the baseline data collection and introductory workshops. To accommodate this request, these workshops took place in one week. We scheduled the three introductory two-hour workshop sessions on two consecutive days. Teacher C and the TA attended the sessions. I presented all the planned contents as part of these workshops and introduced Teacher C and the TA to the revised version of the strategies that I had prepared with Teacher A.

107 In this case, Teacher C’s question seemed to be challenging because it related to child C’s difficulties. Her following statement helped child C to respond (Child C: “Maybe you can just move on to something else.”).
We could schedule only one observation day and no joint-analysis sessions during Cycle 2. It became challenging to contact the teacher. So, by the end of Cycle 2, we agreed that we would restart the intervention in Cycle 3. In the third cycle, I observed three lessons and conducted one joint-analysis session with the teacher (of the three I planned initially). Therefore, most of the examples I analysed were from the last period of the school year. In our joint-analysis session, we discussed examples of interactions within the class broadly because Teacher C did not feel confident using the coding scheme. I guided her and highlighted the dialogic features I had identified in the examples.

Teacher C referred to participation rules in one lesson only. She had established the rules before the study took place and they were related to the specific activities I observed (i.e., guided reading, P4C). A few resources in the classroom displayed some of the rules, but they were not solely related to participation in dialogue. Therefore, she did not establish a new set of rules for talking. Despite not referring to specific rules often, Teacher C focused on providing clear instructions regarding what she expected from the students’ participation. She also modelled the expected participation in a few instances; for example, she displayed exemplary sentence stems on the board. The quotes below illustrate her indications.

“Does anyone have a counterpoint? So, a reply for her. She said we don’t need teachers, they get it from books, and we can also do that. … Think about what I am saying. I’m asking for your reply, it cannot be your own point that you have been thinking the whole time.” (Whole-class discussion)

“… everyone has to write something … you cannot write anything down unless you have given your group a full sentence … I put some sentence starters on here to help you” (indications previous to a small-group activity).

Teacher C seemed to be encouraged by her participation in the study to be specific in her communication with the class. She talked openly about the class

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108 The rules included: collaborate (all talk and act together), do not talk over someone else, give everybody a turn, ask questions, ask others to repeat themselves and give ideas to others.
discussions and participation expectations. This approach was Teacher C’s way to address her initial concerns that she did not communicate clearly with her class and that her students found it difficult to listen to others. Her approach complemented her interest in fostering the students’ independence because she included them in discussions that were related to the talk protocols. Teacher C also adopted the suggestion that she establish a student role for the monitoring of participation in group discussions.

Teacher C established the goal of encouraging her students to participate voluntarily and to listen and build on each other’s ideas. Teacher C considered that she had a “high-needs” class and she sought to promote activities that were accessible to all. I suggest that this ambition motivated her to commit to the promotion of discussions, the expenditure of time to provide clear instructions and the continuation of her participation in the study. She also focused on the clarity of the students’ speech (including its linguistic form and appropriate volume), which explained her use of sentence stems. I supported her familiarisation with the strategies during Cycle 3 by elaborating a list of sentence stems that were associated with the strategies (see Appendix L).

6.6.3 Summary of findings from Classroom C

Teacher C supported Child C by guiding his attention and monitoring any discomfort or distraction. She mainly:

- helped him to stay on topic and to disengage from unrelated or disruptive thoughts;
- directed his attention to his teammates’ ideas and reminded him to elaborate on those;
- highlighted relevant information that helped him to continue with an activity; and
- supported him when he felt overwhelmed.
Child C was able to comment on or evaluate the contributions that others made without support. He sought particularly to abide by the rules and schedules. He evaluated ideas and provided nuanced comments. He sometimes focused on his ideas rather than those of others, built on specific details that became irrelevant to the activity or became distracted due to intrusive thoughts. Such distraction occasionally prevented his participation. Teacher C was his main supporter when he experienced difficulties.

Teacher C relied less than Teacher A or the TA in class B on the use of non-speech forms of communication or on repeating information. She guided discussions by highlighting relevant details and building often on the students’ contributions, encouraging students to take them up. In her attempts to communicate clearly with the class and to guide students’ participation, she talked openly about talk protocols (and occasionally modelled them).

The contributions from the observations in Classroom C to the strategies in Design Framework 1 were:

- talk openly about expected participation in discussions and explicitly model it;
- monitor students’ thoughts and emotional states during dialogue, ensuring they pay attention to the activity and helping them to disengage from distracting or overwhelming thoughts;
- refer to specific, expected participation that is relevant to the ongoing dialogue; and
- facilitate small-group discussions.
6.7 Summary and preliminary discussion of the findings

I broadly summarise in this final section the findings from the intervention study. I outline the strategies that were implemented most frequently by the teachers, the participation (usually prompted) by the focus students and these students’ common behaviours. I discuss these findings preliminarily, with reference to the literature, the students’ characteristics and the teachers’ involvement in the intervention study.

The three dialogic features that were displayed most often in the three teachers’ speech during support of the focus students and promotion of dialogue in their classrooms were the same. They were guiding the direction of dialogue (G); building on ideas (B); inviting students to elaborate on (their own or others’) ideas (IB). The high frequency of occurrence of IB and B was in line with the teachers’ shared interest in encouraging students to take up others’ ideas. Their invitations, in consequence, promoted the high identification of category B in the students’ participation (including the focus students).

When teachers supported the focus students, they often removed some degrees of freedom. I identified predominantly the feature G in the teachers’ talk. This feature was associated with the strategies of five of the eight design principles. The features IB and B combined with G and C (connect ideas, which was observed frequently during small-group discussions) were often related to directive strategies: for example, the use of verbal prompts and cues via guided questioning (a recurrent strategy). As mentioned in Section 6.2.3, the teachers’ support mostly conveyed relevant information concisely and guided the focus students’ attention. I identified the following main purposes in their support:

- Clarification of the discussions: being explicit about and reasserting concisely the intentions, expectations, and the content of the discussions.
- Redirection of students’ attention and guidance of their participation: highlighting relevant details, modelling participation, and mediating interactions.
- Motivation of students: acknowledging their participation.
Creation of conducive conditions: planning accessible forms of contribution (e.g., roles) and keeping relevant information available.

The observations did not negate the theoretical underpinnings of the design principles. Instead, they delineated the specific forms of support delivery. I noticed that the latter depended on the preferences of each student and the level of support that each required and that each class could offer. For Children A and B, who struggled to contribute verbally and to understand activities, the teachers or TAs:

- communicated multimodally (through the use of visual or physical resources and hand signals);
- often repeated and recapped information; and
- closely guided students throughout the discussions.

To support Child C, whose participation sometimes was affected by disruptive ideas, Teacher C checked in with him. She helped him to close off unrelated ideas (by answering questions or briefly building on them) and she redirected his attention to the activity by highlighting relevant ideas.

Through this directive support, teachers (or TAs in Classroom B) ensured that the students understood and paid attention to relevant information for discussions. They also opened opportunities for others to take up the students' ideas by building on their contributions. They elaborated or reformulated them, acknowledging, clarifying, and relaying their contributions to the discussion. These findings highlight that the creation of equitable opportunities to participate includes:

- keeping relevant information available;
- monitoring students’ understanding and interest in contributing; and
- showing students that they can and have the space to help to advance the activities.

The support provided by the teachers with the strategies responded to thinking, perception and communication characteristics and difficulties often
associated with autism, like a preference for literal language, sensory sensitivities and attention to detail. However, consistent with an approach to inclusion via specialised teaching, the teachers’ use of the strategies was helpful for the rest of the classmates in the participating classrooms (similar to Ravet's (2011) integrative approach, see Section 2.3.2). In general, the strategies that supported the establishment of common ground, reiterated information and opened opportunities for diverse forms of contributing to discussions appeared helpful for all, especially when experiencing difficulties. Some of these strategies include repeating information, guided questioning, establishing rules and using visual supporting resources. I argue that the directive aspect of the not archetypally dialogic strategies in the design framework (inspired by knowledge about autism) complemented the implementation of the traditionally dialogic ones to support students’ understanding.

A higher level of scaffolding through the use of some of the more directive strategies was essential to support the participation of the focus students and their peers who experienced different difficulties (identified as having special needs) in discussions. The teachers (especially A and C) mostly identified students with English as an additional language and with difficulties in behavioural regulation in their classrooms. They decided to provide them with similar support as the one planned for the focus students, which appeared helpful. Depending on the level of support required by each student, teachers increased the frequency in which they provided cues, asked simpler or closed questions and relied on supporting resources. This support represented an intensification and personalisation of the dialogic strategies, as proposed by Lewis's and Norwich's (2004) notion of a continuum of teaching approaches in specialised pedagogy. The intensification supported explicit teaching, small and discrete steps, and constant monitoring of the students’ engagement. The usual goals of this form of support were making sure students paid attention to relevant information and understood the activity, and guiding their contributions to the class. Similar to the support teachers provided for the focus students, depending on how closely teachers mediated the students' engagement with the activities or classmates, the teachers chose to support them only on a one-on-one level or at a group level too.
The focus students’ participation, like their classmates’, primarily involved responding to their teachers’ or TAs’ (direct or open) invitations and sharing their ideas related to the topic (B). However, each student’s elaborations reflected different levels of engagement with the activity and others’ ideas. They ranged from the elaboration on the details highlighted by the teacher, through the gradual formulation of a clear response (Children A and B), to the unprompted elaboration of his ideas and evaluation of others’ ideas (Child C).

The frequent identification of codes IB and B was consistent with other empirical studies on productive classroom dialogue. These studies recognise these features as essential and associate invitations with teachers’ talk and elaborations with students’ replies (e.g., Vrikki et al., 2018). Michaels et al. (2008) suggest that talk that “attends seriously to and builds on the ideas of others” represents the dimension of productive dialogue that is simplest to implement. They associate these interactions with being accountable to the community and propose that teachers can easily adopt conversation openers or extenders to evoke it. I suggest that this finding in this study signalled an initial stage in the development of dialogue in the classrooms in which the teachers guided the students’ elaboration of others’ ideas.

The teachers’ constant directive support for the focus students (represented by the high frequency of occurrence of G) seemed to be consistent with the latter. The teachers’ questioning enabled them to move back and forth between two of the four communicative approaches described by Mortimer and Scott (2003): interactive–dialogic and interactive-authoritative. The teachers and TAs opened space for students to share their views (dialogic). If the students faced challenges, the teachers led them through questioning and recapped key information to help the students to formulate responses that were relevant to the activity (authoritative). Sometimes the teachers referred to others’ contributions as part of the questioning, which I suggest helped the students to practice consideration of others’ ideas. The accountable talk framework (Michaels et al., 2016) recognises the value of adopting a directive approach to support accountability to the learning community (e.g., asking for repetitions or revoicing students’ contributions). The teachers’ directive support, which scaffolded the focus students’ participation, represented how they intensified and personalised their use of general strategies as part of specialised pedagogy.
I observed other usual behaviours that the dialogic features did not always capture but which represented the neurodiverse ways in which students responded to or coped with discussions. These behaviours were congruent with the language characterisation of autism (as described in APA, 2013). I argue that, as suggested in Section 6.3.3, under a neurodiversity perspective they represented neurodiverse participation and reflected the students’ skills, preferences and specific difficulties. The behaviours included contributions focused on specific details, repeating information, requesting support or expressions of difficulties, and audible, self-directed talk. By interpreting them considering contextual factors and the autistic students’ characteristics, I identified their functionality and the potential underlying cause of the difficulties students experienced. According to some studies, these forms of contribution can serve cognitive and communicative functions (Sterponi et al., 2015). Therefore, I found it relevant to create 13 new codes to register them. The codes registered whether or not students were engaged in the discussions or experienced difficulties. I identified frequent displays of two behaviours: repeating information (RPT/RPT2) and self-directed expressions (IND). In some instances, these behaviours represented contribution attempts and aloud processing of information and, on other occasions, difficulties disengaging from unrelated ideas and distractions. In both cases, the students’ responses sometimes seemed ambiguous or unrelated to the discussions. This finding highlighted the importance of observing the students closely and the impact of contextual factors on their behaviour to identify whether their seemingly off-topic responses were related to details from the discussion (to avoid dismissing them). Their high frequency of occurrence explains why the teachers generally supported the students by redirecting their attention.

The three teachers’ engagement with the study varied noticeably. The main influencing factors were time availability, the teachers’ teaching priorities (for the class and the focus students) and their intrinsic motivation to participate. For example, Teachers A and C were interested in accessible dialogue, so they dedicated time to the promotion of discussions and discussion of participation expectations. Teacher B was focused on the promotion of all the students’ explicit reasoning and ‘active learning’, which led him to promote fast exchanges (which
were usually inaccessible to Child B). The teachers’ specific goals for the focus students also affected how they implemented the strategies and, consequently, the children’s frequency of participation. I discuss this in Chapter 9.

In Chapter 7, I compare the baseline and post-study observations from each classroom to register how the discussions evolved in each classroom. I focus on the study’s potential impact on the teachers’ strategies and the focus students’ participation. I discuss the findings, with consideration of the differences in the teachers’ engagement in the development and trialling of the strategies. Also, due to the differences in the teachers’ participation levels and because I updated the design framework after the intervention study had ended, I decided to conduct one last evaluation of the strategies (Cycle 4). I updated the strategies and design principles based on the study findings to create Design Framework 3. I evaluated the revised strategies through consultation with practitioners in England via an online course. Chapter 8 presents Design Framework 3 and the findings from the online course.
7 Comparison of pre-and post-intervention observations

7.1 Introduction

This chapter compares the findings from the analyses of the baseline and post-intervention observations in each classroom (15 lessons in total) in order to assess the levels of change. I focus on the variety and frequency of the features I identified in the teachers’, autistic students’, and classmates’ speech. The features include dialogic features, non-speech strategies (or contributions) and the new codes for the autistic students’ participation. I enrich these findings with results from the macro-level analysis of the lessons and some of the themes I identified in the final teacher interviews109. I describe the findings from each classroom in the first three sections. I summarise the results at the end of the chapter, highlighting similarities and differences, and share a conclusion.

I obtained these findings from the macro and fine-grained analysis of the 15 lessons and the 12 Communicative Events (CE) I retrieved from them. The CE corresponded to four events per classroom, adding up to 1325 turns (2 hours 12 minutes of class interactions). I established the following criteria for choosing the communicative events.

- I selected communicative events where the focus students most frequently contributed to, responded or reacted verbally or with an action to a discussion or an interaction with the teacher, TA, or peers.
- The students’ interactions had to be related to the activity.
- I selected two events per observation (baseline and post-intervention) per classroom. I chose one that represented a whole-class discussion and another that corresponded to a small-group activity (when possible).

In contrast to the examples retrieved during the intervention, I analysed more extended exchanges to register each classroom’s overall participation. The selected CE represented class discussions over a specific topic in a particular arrangement.

109 When relevant, I refer to themes that I recognised in their baseline interview.
and with a determined group of speakers. Due to the length variability of the chosen CE, I limited their duration by analysing up to 18 minutes of the longest CEs\textsuperscript{110}.

\textsuperscript{110} The chosen exchanges had durations from seven to 18 minutes. I delimited the exchanges within the CEs that were related to a specific exercise (e.g., the solution of a particular multiplication) in the activity and removed transition moments (e.g., retrieving materials).
7.2 Classroom A

7.2.1 Classroom observations

7.2.1.1 Findings from the macro-level analysis

Figure 7.1 presents the characteristics of the pre-and post-intervention observations in Classroom A. I observed three lessons on the two observation days, corresponding to the same subject matters (English, phonics, and maths).

Similarly, most of the pre-and post-intervention activities had a whole-class arrangement. They mainly involved discussions, and there was only one individual activity in each observation. Some changes between pre-and post-intervention activities were that the teacher planned activities to talk about the timetable (CE2) and the rules for talking (CE3) post-intervention. Teacher A also incorporated more extended pair interactions into two whole-class discussions than the brief pair talk in the baseline’s CE2 (a quick consultation with a peer nearby).

I selected and analysed similar CE from each stage. They included two whole-class activities (one of them including pair talk) corresponding to the English and math lessons per observation. I describe the findings from the in-depth analysis in the following sub-section.

7.2.1.2 Findings from in-depth analysis

Figure 7.2 shows the total frequencies of the features I identified in the selected CE from the pre-and post-intervention observations for the whole class. Table M.1 in Appendix M displays these frequencies per agent (teacher, TA, classmates and focus child). The dialogic features with the overall highest frequencies were consistent in the two stages, including ‘Build on’ (B), ‘Express or invite ideas’ I, ‘Guide dialogue’ (G), and ‘Invite Build on’ (IB). The codes for non-speech communication and referring to resources were also recurrent.
Figure 7.1. Communicative situations and events delineated for Classroom A’s baseline and post-intervention observations (selected CE marked in yellow)
Regarding Teacher A’s talk, I frequently identified codes G (over 30 per cent of her turns), IB, B, and E, and the strategies related to non-speech communication and referring to resources in both stages. These features reflected her consistent guidance, invitations to share and elaborate on ideas, and her elaborations on her or the students’ contributions. However, Teacher A invited students to build on others’ contributions more often in the post-observation\(^\text{111}\) (nine times) than in the baseline (twice). Teacher A more frequently asked them to elaborate theirs at baseline \((n=19)\) to help them formulate a response. Her post-intervention indications also specified the expected participation, referring to a talk rule, stating required actions and the purpose of pair talk, and reasserting instructions with hand signals.

“…we are going to be saying ‘your turn and my turn’ with your partner.”

“When you have an idea, you’re going to stand up and tell [it to] the class.”

Additionally, Teacher A promoted activities in the final observation that allowed all to participate (e.g., the open-ended CE17\(^\text{112}\)), share different opinions and experiences related to correct answers, and position themselves (e.g., a debate in CE5).

The teacher’s support and activities seemed to promote changes in the students’ post-intervention participation. Although the students’ involvement was similar in both observations (mostly involving codes B and E), they built on others’ contributions more frequently post-intervention. The proportion of B and E in their post-intervention participation was also more balanced than the baseline. Additionally, I identified slightly higher frequencies of the codes ‘explicit reasoning’ I and ‘connect ideas’ I.

\(^{111}\) Teacher A built on students’ contributions and asked the class to elaborate on details of others’ responses (“What would your idea be? Child A thinks it’s going to keep getting bigger, Girl thinks they might make a sail.”)

\(^{112}\) In this activity, the students sat on the carpet, forming a circle, and each student could contribute with an idea (at least once) to sit in the middle of the circle.
Figure 7.2. Pre-and post-study frequencies of features identified in Classroom A.

Codes G (in over 40 per cent of her turns), IB and B were also recurrent features in Teacher A’s speech when she supported Child A in both observations. However, she guided Child A more often with non-speech communication and physical/visual resources post-intervention. She directed his attention, referring to relevant resources and using body language to clarify her speech, the activity and turns. Her guidance of Child A’s attention with hand signals\textsuperscript{113} allowed her to develop the class discussion simultaneously. The dialogic features in her turns when addressing him were more varied than in the baseline (seven codes compared to four). Besides inviting him to share ideas and guiding him through questioning, she asked him to share his reasoning, challenged his answer (once) and referred to the timetable. Further, she facilitated Child A’s interaction with a peer during pair talk, different from the baseline observation in which she had a 1-on-1 with him instead.

Regarding Child A’s participation, he mostly responded to initiations from the teacher in the pre- and post-intervention stages (76 and 61 per cent of his turns). I categorised around 40 per cent of his turns as dialogic in both observations, mainly

\textsuperscript{113} Movements from the relaxing activity (see Section 6.2.2.8).
with codes B and E (like his classmates). He predominantly shared short responses and elaborated or corrected them (by the teacher’s request). Post-intervention, I identified five initiations in his participation, including offering to write an answer, an unprompted elaboration on his response and comments on turn-taking\textsuperscript{114} (see quotes below).

“Your turn” (1-on-1 interaction with Teacher A).

“I had my talk” (response in a whole-class discussion)

The comments showed awareness of turn-taking protocols (inviting the teacher to participate first) and his participation in the discussion (indicating he already contributed). Child A often referred to and pointed at resources, mimicked actions, and repeated information related to the activity post-intervention. These features reflected his engagement in the activities and his adoption of the non-speech communication Teacher A used to communicate with him. Unlike the baseline observation, Child A did not ask for a break or help from a classmate to respond.

If Child A appeared distracted in the final observation, Teacher A redirected his attention\textsuperscript{115}, solved unrelated doubts and invited him to participate (guiding him step by step and asking straightforward questions). However, she did not insist (especially when the activity was prolonged). One post-intervention discussion (CE17) that invited one contribution per student also removed any pressure for contributing more than once and motivated Child A to be one of the participating students (sitting on the carpet).

7.2.2 Final teacher interview

Teacher A expressed that she noticed improvements in her understanding of how to promote class dialogue thanks to our collaboration.

\textsuperscript{114} I observed instances of this kind of utterances from Child A during the intervention. His partner in the post-intervention observation also shared similar comments.

\textsuperscript{115} She sometimes redirected his attention physically, positioning her hand on his head and encouraging him to turn to the front.
“...the joint planning aspect was really helpful... the help I've had in developing my understanding of... how to promote different forms of dialogic utterances has been really helpful in my role guiding.”

Her comments evidenced how regularly she facilitated discussions and reinforced the ground rules for talking. They also reflected her awareness of activities and guidance that encouraged her students’ participation and her critical view of the dialogue in her classroom. She indicated that talk rules, constant scaffolding, student roles, visual prompts, and discussions on topics children could connect to and with specific arrangements (e.g., splitting the room for a debate) effectively promoted participation. Additionally, she mentioned that she regularly encouraged reasoning and aimed to encourage more building on others’ ideas and connecting ideas. The quote below illustrates how familiar she was with the coding of dialogue.

“I became more aware of how to listen to the children’s contributions... I was... able to code in my head... you become more aware of the kind of responses that you’re looking for, and then you guide towards them...”

She mentioned that her students enjoyed the experience, learned the rules, were more respectful of others’ feelings and improved their listening and communication with classmates. However, despite these improvements, she felt she was experimenting and would have liked to receive more training. The intervention did not go as expected, and she regretted not having the school’s full backup to promote dialogic lessons.

“I wanted to see a clear, upward trajectory, but that didn’t manifest.”

Regarding Child A’s participation, she noticed improvements in his spoken language (clearer and longer sentences), his ability to listen and pick up a classmate’s idea, and volunteering to contribute to a discussion if he knew the topic. However, she recognised it was sometimes challenging for him to engage when expectations were beyond his abilities. Teacher A indicated that it was essential to
ensure he was in the right “headspace”, keep consistency, repeat information (like the rules), keep him motivated and on track, and allow time for him to participate.

“…make sure he’s… relaxed and he hasn’t got overly stimulated by external factors.”

“…spending time to listen and encourage him to contribute is helpful, asking him and reminding him to stay on track...”

Consistent with the observations, other strategies she indicated were helpful to support him included visual prompts and roles and highlighted not to expect him to be constantly focused. She also emphasised the importance of providing explicit guidelines on the expected participation (e.g., modelling and discretely teaching skills). As part of her suggestions for improvements to the strategies, she focused on materials that could be developed, like social stories and video examples of class interactions.

7.2.3 Summary of findings from Classroom A

I observed three lessons on the same subject matters pre-and post-intervention, making it easier to find similar communicative events to analyse and compare. The most frequent features in the teacher’s and students’ speech were consistent in both observations (IB, B, G, E, ALT, and TEMP). However, unlike the baseline observation, Teacher A asked the students to build on others’ contributions more often post-observation. Consequently, students elaborated on their classmates’ ideas more frequently. Teacher A also specified participation expectations and promoted discussions on the class’s talk rules. She guided Child A more frequently with non-speech communication and supporting resources and facilitated his interaction with a peer post-intervention. Child A took up the teacher’s non-speech forms of communication, shared unprompted comments on turn-taking, and displayed a few initiations in the final observation. The teacher interview confirmed she identified improvements in her students’ (including Child A) participation and her dialogic strategies. She suggested creating more supporting resources and
expressed interest in more training (and school support) to gain more confidence in promoting dialogue.
7.3 Classroom B

7.3.1 Classroom observations

7.3.1.1 Findings from the macro-level analysis

Figure 7.3 shows the macro and meso units of analysis of the pre- and post-intervention observations in Classroom B.

Teacher B mainly promoted whole-class activities (mostly involving discussions) and started the school days with an individual activity in both observations. I observed two instead of three lessons of a different subject matter post-intervention (i.e., geography instead of maths). This difference was related to the reduction of observation hours I agreed with Teacher B and the challenges we faced in promoting Child B’s participation in maths. Unlike at baseline, I only observed one individual activity in a post-intervention lesson\(^{116}\), and the interactions between students primarily involved pair talk. The latter created opportunities for controlled peer interactions because they only involved two speakers. However, in both stages, the peer exchanges included in whole-class discussions were too quick for Child B to finish an exercise (baseline) or fully engage with his partner (post-intervention CS3).

I selected communicative events of a whole-class discussion and a pair activity per observation to analyse in-depth. However, the selected events were not fully matchable due to changes in the subject matter. I describe these interactions in the following section.

\(^{116}\) Though infrequent, the individual activities in the baseline lasted a prolonged time (from 17 to 20 minutes). The individual activity in the final observation lasted 7 minutes.
Figure 7.3. Communicative situations and events delineated for Classroom B’s baseline and post-intervention observations (selected CE marked in yellow)
7.3.1.2 Findings from the in-depth analysis

Figure 7.4 includes the total count of the features I identified in the baseline and final observations for the whole class. Table M.2 in Appendix M displays these frequencies per agent. The codes I used to qualify the overall interactions pre-and post-intervention were similar. The codes ‘build on ideas’ (B), ‘non-speech communication’ (ALT), ‘references to resources’ (TEMP) and ‘guide direction of dialogue’ (G) were the most frequent in both stages.

I identified seven dialogic features in Teacher B’s speech pre-and post-intervention. However, he mainly promoted dialogue in both observations by highlighting essential information (G), building on the students’ contributions (B), inviting students to build on others’ ideas (IB), and in a lower percentage connecting ideas\(^ {117}\) (C). The difference I recognised in his speech post-intervention was a lower percentage of dialogic turns (mainly, a lower proportion of invitations to build on others’ ideas and non-speech communication and no invitations to provide reasons). Regarding Child B’s classmates’ participation, I identified a similar variety of dialogic features in both observations, being codes B and E consistently the most frequent. Nevertheless, I identified less explicit reasoning and more expression of ideas post-intervention than at baseline. I noticed that the slight differences in the teacher’s and classmate’s speeches were due to the characteristics of the communicative events I analysed from each observation. I selected events that visibly showed Child B’s participation\(^ {118}\) in discussions which were infrequent pre-and post-intervention. Therefore, the potential examples for analysis were limited and could not have reflected the complete variety of features in their speech. Additionally, the pre-and post-intervention events did not fully match because I observed lessons on different subject matters with varying expectations and difficulty levels.

\(^{117}\) He referred to previous steps at the baseline activities and past and future activities in the final activities.

\(^{118}\) His participation was evidenced by his verbal and/or non-speech contributions or reactions to the discussions.
The pre-and post-intervention events that I analysed involved brainstorming activities, direct guidance from the TA for Child B and the use of physical supporting resources. It was challenging for Child B to contribute to math activities at baseline. Therefore, the baseline examples displayed his interaction with the TA while the rest of the class engaged in the joint solution of multiplications (including explicit reasoning). In contrast, the final geography lessons appeared more accessible for Child B. The post-intervention examples displayed one contribution from Child B to a whole-class discussion (encouraged by the TA) and his engagement in a pair activity with a classmate and the TA.

Child B’s participation in both observations mostly involved responses to the TA’s initiations (48 and 45 per cent of his turns). I frequently identified the dialogic codes B and E, non-speech communication (ALT) and referring to resources (TEMP). The latter two reflected how physical resources consistently facilitated his participation in activities (e.g., responding by writing or manipulating materials). Despite these similarities, Child B shared more ideas I, spoke more often during the

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119 The difficulty level of the activities reflected in the post-intervention examples appeared lower than the baseline ones. They did not necessarily require explicit reasoning or critical engagement with other ideas.
pair activity (reflected by frequent individual expressions – IND\(^{120}\), did not ask for a break (which he did three times at baseline) and made two suggestions post-intervention. His initiations implied fewer clarifications and more suggestions or invitations for the TA to share her opinion. Nevertheless, he sometimes seemed distracted and preferred manipulating the materials independently.

The TA primarily supported Child B. In both observations, she guided him by highlighting relevant information (G), referring to previous and following steps I, elaborating on her indications and explanations (B), and using and pointing at supportive resources (ALT and TEMP – exemplifying abstract problems and redirecting his attention). Unlike the baseline observation, the TA asked him more open questions I than to elaborate on his responses, facilitating his engagement in the pair activity.

Teacher B rarely addressed Child B in the pre-and post-intervention examples. I identified fewer dialogic features in his speech when supporting him than when addressing the class. However, he talked to Child B in a higher number of turns (nine turns instead of two), and his support was more varied in the final observation. Teacher B also encouraged Child B to interact with a classmate in the post-intervention pair activity different from the baseline observation (see quotes below).

“Boy work with [Girl], Child B will work with these numbers, times 10” (asking the classmate next to Child B to work with someone else at baseline).

“Child B, you need to be looking at the same one as Boy” (asking Child B to work with the same materials as his partner at the post-intervention pair talk).

\(^{120}\)Not all of his expressions during the pair activity were related to the activity.
7.3.2 Final teacher interview

Teacher B did not participate in the final interview because he preferred only to be observed (see Chapter 6). However, considering his baseline interview, Teacher B’s interest in promoting students’ explicit reasoning and sometimes implicit peer interaction rules could explain why he did not refer to talk rules or expectations.

7.3.3 Summary of findings from Classroom B

The most frequent features in the students’ (including Child B), the teacher’s and TA’s speech were consistent between the pre-and post-intervention observations (B, G, E, ALT, and TEMP). The TA continued to be Child B’s principal supporter, and the main noticeable change in Teacher B’s interaction with him post-intervention was encouraging him to collaborate with a peer. Unlike the baseline, the post-intervention activities facilitated his engagement in pair work and his verbal contribution to a whole-class discussion. The examples that I analysed highlighted that the TA could promote Child B’s contributions to discussions if the subject matter and participation expectations were accessible to him and he used supporting physical materials. There was no explicit reference to talk rules or dialogue expectations pre-or post-intervention.
7.4 Classroom C

7.4.1 Classroom observations

7.4.1.1 Findings from the macro-level analysis

Figure 7.5 shows the characteristics of the pre-and post-intervention activities in Classroom C. I observed two lessons in each observation, which were all interrupted by school assemblies\textsuperscript{121}.

Most of the activities from each observation involved a whole-class arrangement. However, the pre-and post-intervention activities corresponded to different subject matters and noticeably differed in duration. Teacher C promoted 20 to 30-minuted activities at baseline that involved continuous 3-minute intervals of whole-class and pair (or individual) exchanges. In contrast, she planned post-intervention activities with similar durations and a specific class arrangement. The latter allowed more students to contribute to each whole-class discussion and more time for peer interactions. Teacher C also promoted an activity post-intervention to discuss participation expectations (CE4 – modelling and talking about good listening).

Due to these differences, it was challenging to select matchable baseline and final examples. Child C also experienced difficulties at baseline that noticeably impacted his participation. Consequently, there was no fair comparison of his pre- and post-intervention participation. I analysed two segments of baseline activities that involved a combination of a whole-class and pair and individual arrangements and, from the final observation, one small-group and one whole-class discussion. I describe these examples in the following section.

\textsuperscript{121} The constant interruptions reflected that timetable changes were common throughout the school year.
Figure 7.5. Communicative situations and events delineated for Classroom C’s baseline and post-intervention observations (selected CE marked in yellow)
7.4.1.2 Findings from the in-depth analysis

Figure 7.6 displays the features I identified at the baseline and post-intervention examples (Table M.3 in Appendix M displays these frequencies per agent). Similar between the two observations, codes B, C and G were some of the most frequent dialogic features. However, there were some differences between the teacher’s and students’ pre-and post-intervention speech\textsuperscript{122}. Regarding Teacher C’s talk, she had a lower number of turns, and I identified a smaller variety of dialogic features post-intervention. Additionally, she did not rely on non-speech communication or resources in the final observation. The students’ post-intervention speech, in contrast to the baseline one, included challenges, disagreements, slightly more frequent explicit reasoning and less expression of opinions. I also identified more instances of students building on others’ contributions and referring to a classmate’s contribution.

I associate the differences I identified with three conditions:

- As part of the post-intervention whole-class discussion, Teacher C stepped back and asked students to be the ones to share ideas and arguments.
- The post-intervention examples did not reflect all the teacher’s indications and explanations.
- Teacher C did not support Child C during the post-intervention small-group activity, allowing his team to work independently.

Although I identified differences between Child C’s pre-and post-intervention participation (as reflected by Table M.3 in Appendix M), the examples I analysed from each observation were not comparable\textsuperscript{123}. Child C stopped participating in the first lesson’s activities on the baseline recording because he was upset about a comment made at the beginning of the day. The latter was related to his difficulties regulating emotions and negative thoughts, which happened occasionally.

\textsuperscript{122}I did not observe many instances of the TA contributing to the selected communicative events.

\textsuperscript{123}Due to constraints in time availability in this classroom, it was not possible to fit another baseline observation. Despite visiting the classroom on two different occasions before the intervention, I was not able to obtain other audible examples of Child C contributing to the class activities.
Figure 7.6. Pre-and post-study frequencies of features identified in Classroom C

Child C mostly responded to the teacher’s initiations with non-speech communication and supporting resources and contributed once to a whole-class discussion with a short verbal answer at baseline. In contrast, he had a similar percentage of initiations and responses post-intervention (all verbal). He volunteered twice to contribute to the whole-class discussion and was one of the students that discussed the requested topic during the small-group activity. He shared ideas and explanations, mainly elaborated unprompted on his contributions, and challenged and commented on details of others’ responses.

The different observation conditions reflected Teacher C’s diverse forms of support for Child C and how non-speech communication and supporting resources were helpful for him when he struggled to communicate. At baseline, Teacher C invited him to express what upset him during the activity, provided resources to soothe him and help him communicate non-verbally, and talked to him about what bothered him. She invited him to take a break and later helped him engage in the activity by facilitating his interaction with his partner. She addressed him less frequently post-intervention, letting him independently carry out the activities. She helped when he contributed to the whole-class discussion, asking him to clarify his
contributions, explaining a classmate’s contribution, and revoicing his opinion to the class.

Unlike the other teachers, I identified the code ‘reflect on dialogue’ in Teacher C’s pre-and post-intervention speech. Three of these instances corresponded to her monitoring Child C’s state at baseline. However, I also noticed one to two instances in which she shared feedback about the conversation and suggested how students could contribute to it (see quotes).

“...if you’re not listening, you’re losing out. And this is so important for our acting.”

“…very good persuasive technique… she’s given some advice and some alternative ideas for what we could do.”

7.4.2 Final teacher interview

Teacher C expressed feeling insecure about being clear when speaking to the class. She referred to the study’s materials as being helpful. However, she also mentioned that she was unsure how to implement some suggestions. She found it unclear how to describe dialogic teaching in her classroom. It was her first teaching year, so she explained that it was challenging to simultaneously handle different tasks and training.

“...sometimes you get these really good ideas, but then you’re like... How do I use that?”

Despite these insecurities, the teacher indicated that she was interested in promoting discussions, mostly doing so in guided reading, English and P4C lessons. She recognised that students would benefit and learn from their participation, so she tried to plan and assign time for discussions (which appeared not to be always possible). However, she also emphasised that it was essential to

124 Philosophy for children (Lipman et al., 1980).
clarify to her students that participating in dialogue was also learning. Perhaps, because they were not frequent at times, students forgot about their role in them.

“I try to plan a lot of talking lessons… while there’s time for talk… sometimes it was only if I knew that you were coming”.

Regarding her strategies, Teacher C mentioned that she mainly used the strategies ‘rephrasing’ (rephrasing her students’ contributions and asking them to do it too), ‘modelling’ and ‘clarifying’. Despite expressing that her class had rules for talking, these were not consistent (they changed sometimes) and were not constantly displayed. The latter could have explained why she had to remind her students about following the rules.

“I feel like we know what the rules are… and we remind each other of the rules… if I had put a proper display up, it would have been more useful.”

Teacher C noticed improvements in students’ participation, including their summarising of others’ ideas and confidence growth from many of them. She was surprised to discover the engagement in class discussions and volunteering to participate of students she did not expect. It was also reassuring for her to identify that the students took up what she modelled in class (e.g., expressing agreements). One of the challenges she identified was promoting participation from quieter students. She prioritised creating a safe environment, building their trust, and emphasised that students’ participation should be their choice (reflecting empathy for her students).

“Some of my kids wouldn’t have spoken in front of the whole class at the beginning. And they wouldn’t have put their hand up.”

“… it’s just trying to get something just for the sake of getting it, rather than it’s actually they do have a really good idea that they want to share.”

Regarding Child C’s participation, she identified that he enjoyed clarifying and challenging others’ contributions. As part of her support, she tried to be more open to
comments and questions from Child C that could appear unrelated and encouraged him to find reasons to agree with someone else’s idea. Sentence stems and praise also facilitated his participation. Teacher C recognised that Child C sometimes experienced difficulties that limited his engagement. She focused on accompanying him and guiding him throughout the activity in those situations. Like Teacher A, she highlighted that clear participation aims, goals and expectations were essential to support Child C’s (and his classmates’) participation.

7.4.3 Summary of findings from Classroom C

The differences in subject matter, class arrangement, and Child C’s condition between the observations made it challenging to compare the’ pre-and post-intervention exchanges. Nevertheless, three of the most frequent codes were consistent (B, C, G). Teacher C promoted an activity on listening expectations and more extended peer exchanges and asked students to be responsible for providing arguments during a whole-class discussion post-intervention. The students’ participation was more varied and included more building on others’ ideas. Teacher C’s pre-and post-intervention feedback on the class conversations (RD) evidenced her interest in promoting dialogue. She confirmed this interest in her final interview. Despite experiencing insecurities about facilitating discussions, she identified helpful strategies for promoting discussions and reported improvements in her students’ participation.

Regarding Child C, he benefited from non-speech communication and the use of supporting resources when overwhelmed. Otherwise, he could follow and contribute verbally to discussions (often elaborating on his contributions and commenting on or challenging others’ contributions). Teacher C mainly helped him stay on topic and clarify and revoice his contributions.
### 7.5 Summary of findings

#### 7.5.1 Classroom observations

Like the observations from the discussions that occurred during the intervention study, the features I most frequently identified pre-and post-intervention in the three classrooms were consistent:

- ‘Build on ideas’ (B),
- ‘Invite or express ideas’ (E),
- ‘Guide the direction of dialogue’ (G),
- Non-speech communication, and
- the use (or reference to) supporting resources.

These codes highlighted that the teachers’ general approach to promoting discussions (guiding students’ participation), their interest in students’ more elaborated responses and consideration of others’ ideas (promoting cumulative talk) were consistent. These features reflected a focus on accountability to the community (Michaels et al., 2008) and on students learning how to participate in a discussion in both observations. Children A, B and C mostly built on their contributions pre-and post-intervention despite this former focus. \(^{125}\) The focus students continued to benefit from the teachers’ scaffolding (redirecting students’ attention and highlighting relevant information), which helped them avoid distractions, work with a manageable amount of information and understand the activity. Additionally, the use and consideration of non-speech contributions and supporting resources allowed them consistently to engage in discussions or communicate when experiencing difficulties.

Despite the similarities, I noticed changes in the promotion of class discussions in the three classrooms and changes in the focus on students’ participation post-intervention. The three teachers promoted longer peer exchanges, and Teachers A and C planned conversations on participation expectations and suggested to students how they could contribute. Teachers A and B also

\(^{125}\text{In the case of Children A and B, their teachers promoted the elaborations on their contributions.}\)
encouraged their students to collaborate with a partner, unlike at baseline. Regarding the focus students’ participation, they were more vocal, shared more ideas and had more initiations (infrequent for Children A and B).

I identified more evident differences in Classroom A. Teacher A more strategically promoted discussions, reminding students about talk rules, specifying expectations and planning activities that encouraged more varied participation from the class. She also invited students to build on others’ ideas more often, accompanied her speech systematically with non-speech communication and referred to resources to help Child A understand the activity. Child A adopted these forms of communication, displayed more initiations than before, remained attentive post-intervention and shared comments on turn-taking. In the case of Children B and C, the conditions of the post-intervention observations seemed to be the ones that promoted the changes in the students’ participation. These included more accessible subject matter and activities for Child B and a calmer emotional state for Child C.

The teachers’ involvement in the study’s activities, interest in the dialogue itself and teaching priorities influenced post-intervention changes. Teachers A and C prioritised addressing special needs, clarifying discussions for all, and helping the focus students to contribute clearly, which could relate to their references to participation expectations and closer support for the focus students. Teacher B prioritised students’ explicit reasoning and mainly aimed to help Child B understand his individualised activities. So, students’ (and especially Child B’s) interaction with others could have not been one of the priorities. Additionally, the selected examples were not fully representative because I focused on choosing the CEs that displayed the most participation from the focus students.

7.5.2 Teacher interviews

I provided teachers with design principles with some associated strategies that represented the reasoning behind those strategies that aimed to promote autistic students’ participation in discussions. This way, I sought to open the opportunity for them to suggest other strategies they found helpful in their classrooms. However, Teachers A and C expressed feeling insecure or confused when coming up with their
own. This finding suggests they preferred receiving a more exhaustive list of strategies.

Based on their experience and knowledge of the strategies, both emphasised the importance of clear guidance, modelling and supporting resources. Teacher A, who participated in all of the study’s activities, reflected a clearer understanding of how to encourage students’ participation and more experience trying out the dialogic strategies in Design Framework 2.
7.6 Conclusion

The consistency of the frequent features in the classrooms’ discussions between the pre-and post-intervention observations signalled that the participating teachers adhered to the strategies they were comfortable with and knew. Despite this, I did identify changes in class arrangements and teachers’ indications to create opportunities for students to participate in discussions and support the focus students. The teachers’ participation in the study may, to some extent, have promoted these changes. Teacher A particularly specified in her final interview how the collaboration helped her improve the promotion of dialogue and encourage Child A’s participation. However, except for Child A, the changes I identified in Children B’s and C’s participation could have not necessarily reflect the impact of my collaboration with their teachers. In these cases, the pre-and post-intervention observations showed how different conditions helped and hindered their participation. Teachers A’s a C’s final interviews also provided information about the specific strategies they found helpful, some of which the Design Framework 2 did not include, and their insecurities related to promoting dialogue and supporting their autistic students.

Based on the detailed information from the observations (pre-, during and post-intervention) and the final interviews on the strategies teachers implemented (naturally or prompted by my suggestions), I decided to update the design framework. I created Design Framework 3, re-arranging and renaming the design principles to more explicitly reflect the strategies associated with them and worked on the description of the strategies. The following chapter introduces Design Framework 3 and how I evaluated the new principles and strategies via an online course.
8 Cycle 4: Design Framework 3 and online course findings

8.1 Introduction

In this chapter, I present the third version of the design framework, the findings from its evaluation via an online course and its resulting fourth version. As Figure 8.1 shows, I created Design Framework 3 by re-arranging the strategies that were associated with each design principle in Design Framework 2 and grouping them into new design principles. I introduce these new principles in the first section of the chapter.

![Diagram showing cycle 4 process]

**Figure 8.1. Design cycle 4**

In the second section of the chapter, I describe the online course for practitioners that I created based on Design Framework 3 to evaluate its strategies. I summarise the activities that the participants carried out and their feedback on the course, the usefulness of the strategies, and the likelihood that they would implement them in their classrooms. Finally, I present Design Framework 4, which represents the final version of the framework, and a short conclusion at the end of the chapter.
8.2 Creation of Design Framework 3

8.2.1 The regrouping of the strategies of Design Framework 2 and the creation of new design principles

As I described in Chapter 6, I created Design Framework 2 by updating its first version based on the findings from the intervention study (class observations and interviews). I adjusted the strategies that had been associated with the original eight design principles and added new strategies to some of them. However, after my in-depth analysis of the class interactions, I noticed that the initial principles did not wholly illustrate the strategies I had added to them. I also identified similarities between strategies that corresponded to different design principles. For these reasons, I regrouped the updated versions of the strategies and refined the design principles by which they had been grouped, to create Design Framework 3. I aimed to make the principles match the strategies more closely than had Design Framework 2. I enriched them by adding details about the aspects and forms of support that I had observed in the participating classrooms. So, I transformed the purely theoretical principles of Design Framework 2 into empirically informed principles to produce Design Framework 3.

I regrouped the strategies of the design framework into eight principles that were similar to those used previously. Table B.4 in Appendix B maps the similarities, based on which I conducted this regrouping. It includes the complete list of 39 strategies and more details about the principles. I identified some strategies that helped in the preparation of accessible discussions and others that characterised the teachers' contingent support of the autistic students' participation.

I extracted the following two principles, which comprised the strategies associated with planning discussions:

- Prepare the classroom environment. This includes the space/seating arrangement, the removal of distractors, and the control of stimuli.
- Plan accessible activities and potential forms of participation for discussions.
For the strategies related to the teachers’ contingent support, I created the following six principles:

- Incorporate visual or physical representations into verbal contributions.
- Provide options.
- Be explicit.
- Break down tasks into steps or recap the sequence of essential information.
- Mediate dialogue between the student and peers and the student’s engagement with whole-class discussions.
- Check-in with the student to provide one-to-one support.
8.3 Evaluation of Design Framework 3

8.3.1 Creation of an online course for teaching practitioners

I evaluated Design Framework 3 by introducing its new design principles and strategies via an online course to a group of practitioners in England, separate from those with whom I had conducted the trials, and by gathering their feedback.

I decided to create an online, self-paced, professional development course for four reasons:

1. The course allowed me to refine the design framework based on the feedback of teachers who had experience teaching autistic students in mainstream contexts. I deemed it particularly relevant because teachers will be the end users of the strategies. As suggested in research on dialogic teaching and inclusive pedagogy, teachers’ shift in mindset is essential to adopt a new pedagogy (e.g., Hennessy & Davies, 2020). Therefore, I aimed to consult whether they thought the strategies were helpful and desirable and if they could implement them. It was enriching to consult another set of practitioners in the UK because they had experiences with students who had different needs from the needs of those who had participated in the intervention. It also helped complement the data from the intervention study in which two teachers were less involved in the development of the strategies. Additionally, the three teachers who had participated in the intervention had limited availability after the study.

2. Through participation in the course, teachers were able to engage with the course materials they preferred and at a time that suited their schedule (within a time span of two months). These characteristics were particularly desirable because I implemented this course during the first year of the COVID-19 pandemic. I could not visit schools or schedule meetings with teachers to evaluate the design framework because the pandemic started after I had refined it. Due to the pandemic, all lessons were given remotely, and teachers’ schedules and workload significantly changed (often incrementing).
3. I was able to provide teachers with elaborate explanations of each principle, examples of the implementation of the strategies and models of supporting materials. This format permitted me to clarify the design framework, which throughout the intervention study was in development and could have been confusing for teachers.

4. Although I found it desirable to consult the autistic students’ opinions of the strategies during the intervention study, it would have been challenging to engage in an in-depth discussion about them with the students. The strategies were not developed to a level accessible to the students. I also had limited opportunities to interact with them.

Figure 8.2. The start-up screen of the online course.
Figure 8.2 shows the course’s start-up screen that indicated the teachers that the course was divided into six sections of course materials. Table 8.1 displays the activities that were related to each section.

Table 8.1. Sections of the online course and their related activities

<table>
<thead>
<tr>
<th>Section</th>
<th>Activities involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Common school experiences of autistic students.</td>
<td>- Reading of introductory information, recommendations, and example materials.</td>
</tr>
<tr>
<td>2. Introduction to classroom dialogue and dialogic teaching.</td>
<td>- Engagement with interactive slides (multiple-choice questions) and sharing examples.</td>
</tr>
<tr>
<td>3. Strategies for planning class discussions that are friendly for autistic students.*</td>
<td>- Reading descriptive information about the strategies and examples.</td>
</tr>
<tr>
<td>4. Strategies for the support of autistic students' participation in discussions.*</td>
<td>- Engagement with an interactive video (multiple-choice questions).</td>
</tr>
<tr>
<td>5. Video example of how to use the strategies.</td>
<td>- Feedback shared in an open box and through a feedback survey (Likert scales and ranking). - Participation in an asynchronous online forum.</td>
</tr>
<tr>
<td>6. Feedback activities and a forum.</td>
<td></td>
</tr>
</tbody>
</table>

The sections comprised background information to facilitate the participants’ understanding of the strategies (on autism and educational dialogue, in Sections 1 and 2), a description of the principles and their strategies (Sections 3 and 4), an interactive video example (Section 5) and feedback activities (Section 6). The teachers could choose the sections that they wanted to complete. However, all were encouraged to consult those that were related to the principles and to provide feedback on them.126

Consistent with the last update of the design framework, I presented the principles and strategies that were associated with the planning of class discussions and the support of students' participation127 in separate sections. In each section, I

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126 Teachers who completed these sections received a certificate of participation.
127 The aim of separating the principles into two groups was to highlight the importance of reflection on the characteristics of class discussions that could hinder or promote students’ participation even before support had been provided.
introduced the principles one by one. To facilitate presentation of the design framework, I no longer displayed its strategies through the use of the T-SEDA coding scheme. Additionally, I clarified the thought process behind the principles to enable the teachers to develop their own strategies based on these principles.

I included an open box, a survey, and an online forum through which I could gather the teachers’ feedback. I invited them to share:

- comments on the strategies and the course;
- their thoughts regarding the usefulness of the principles, how likely they were to implement the strategies (they scored the likelihood through the use of Likert scales) and specific strategies that they would use; and
- their experiences of support of autistic students; and
- questions to start conversations (in the asynchronous forum).

8.3.2 Trial of the online course

I enrolled 16 teachers in the course (I describe the participants’ characteristics and my sampling technique in Section 0). Six were trainee teachers; six were involved with the SEND provision of their schools; two held directive roles (i.e., acting deputy and head teachers); and two were involved in teacher professionalisation. Most of them worked in mainstream primary schools. Among these teachers, 11 consulted the design principles and strategies and participated in some of the course’s activities.

Two supporting documents resulted from the teachers’ participation. One of them involved a list of general recommendations regarding the assistance of autistic students in classrooms. Nine of the participants shared suggestions regarding the list of general recommendations that I provided in Section 1 of the course. I compiled and categorised these recommendations into eight groups, which were: 1) provision of structure; 2) provision of one-to-one support; 3) control of sensory stimuli; 4) adjustment of language; 5) alteration of environment; 6) characteristics of supportive activities; 7) instructions and materials; and 8) collaboration with parents. This set of recommendations showed the teachers’ experience in the support of autistic
students and their awareness of how different aspects influence such students’ engagement in activities.

The other document was a summary that was elaborated voluntarily by one of the teachers. It comprised the teacher’s main takeaway points from the online course (see Appendix L). I reviewed this document with the teacher and then shared it in the course forum. The teacher shared it with her students (trainee teachers). I suggest that the teacher’s unprompted elaboration of the summary reflected her interest in the subject and her consideration of the course as a valuable professional development resource.

Only five participants shared an example of a dialogic activity that they had developed previously in their classrooms. The low number of responses could either reflect that few teachers were familiar with dialogic pedagogies or that few teachers were inclined to engage with that course section. The five participants mainly indicated or described the specific activities (e.g., dialogic gatherings, Lego therapy, talking partners, P4C) and tools (e.g., talk rules, sentence starters, and role cards) that they used.

8.3.3 Findings from the participating teachers’ feedback on the course

8.3.3.1 Teachers’ comments

Regarding the teachers’ general feedback, nine filled in the open box to comment on the strategies and the course. All their responses were positive. The main suggestion for improvement was that the course should include more ‘real-life examples’ and interactive activities. The common topics I identified in their entries are listed here (organised from the most to the least frequently mentioned).

- The presentation of the course materials was accessible and engaging (mentioned by five teachers).
- Teachers appreciated the interactive video example of how the strategies could be implemented.
Teachers talked about the use of the strategies. Some referred to specific strategies that could be helpful for their students.

The trainee teachers in particular mentioned their interest in the implementation of the strategies in the future and recognised that the course had taught them valuable forms of support (e.g., “I... gain new strategies that I can use in the future (e.g. dialogic visual aids).”).

Two participants highlighted the value of the design principles. They said that the inclusion of these principles showed the logic behind the strategies (see quotes below). One of them worked in teacher training and she sought permission to share the course with her students.\textsuperscript{128}

“I think that the course does enable teachers to think about purposes and alternative solutions... You have made some empowering thinking highly accessible to busy teachers. ... It is important that the strategies are not reduced to tips and tricks for teachers.”

“I think that the strategies... would support the learning of autistic children but not exclusively, I think they would help all pupils in the class.... You have given deep thought into adapting the T-SEDA materials and have presented them in an appealing way which is supportive and useful for classroom teachers. I am sure if this was disseminated wider, it would be a hugely beneficial resource for busy teachers and would build their knowledge in order to pick and choose which strategy would be the most beneficial for individual pupils.”

Eight of the participating teachers took part in the online forum. Five replied to an entry I had made on the challenges and affordances of promotion of autistic students’ participation in class dialogue. The other three replied to the summary that was elaborated by one of the teachers regarding the main takeaway points from the course. In both cases, they emphasised that teachers should choose the strategies that suited the needs of their individual students best. Some referred to non-speech

\textsuperscript{128} “I would very much welcome being able to use this course with our beginning teachers on our English and Communication programme.”
communication as a potential enabling factor and recognised the importance of opening opportunities for students to express their ideas fully.

The teachers’ feedback reflected their agreement with the eight new principles and associated strategies and that they found them valuable and understandable. Several of the teachers in their comments referred to the strategies that were related to non-speech communication, talk rules, and visual and physical support resources.

8.3.3.2 Teachers’ rating and ranking of the strategies

Ten teachers responded to the feedback survey on the usefulness of the strategies and the likelihood that they would implement them.¹²⁹ Table N.1 in Appendix N presents the results of the survey.

All ten indicated that they found each group of strategies (in other words, each design principle) either ‘useful’ or ‘very useful’. Most teachers graded six of the eight principles as ‘very useful’. The principle ‘being explicit’ was the most highly rated, as seven of the 10 teachers rated this ‘very useful’. All the teachers but one¹³⁰ indicated that they would be "likely" to implement the strategies that comprised the eight principles.

All the specific strategies received votes from some teachers to indicate that the teachers would like to try them in their classrooms. Six strategies were the most popular and received votes from all the teachers who completed this part of the survey (n=10). I list these here:

- Show prompts that indicate potential forms of contribution to the activity at hand.
- Think in advance of requirements for class activities (e.g., base discussions on familiar topics, and use accessible materials).

¹²⁹ The options on the Likert scale that was related to the usefulness of the strategies were: not useful at all (score 1), somewhat useful (2), useful (3), very useful (4). The options on the Likert scale regarding the likelihood that the participant would implement the strategies were: definitely not likely (1), probably not likely (2), possibly (3), likely (4), definitely (very likely) (5).

¹³⁰ One teacher indicated that she would ‘possibly’ try two of the principles and was ‘likely’ to try the rest.
• Use forms of communication that are different from verbal contributions and encourage students also to use them (examples include hand signs, pointing, writing or drawing).

• Show visually or physically how ideas are brought up together during a discussion.

• Indicate the specific roles that each student will adopt in a small-group activity.

• Focus/return students’ attention during key moments of a discussion or share brief comments to inform the student about its content.

Next in popularity, nine of the ten teachers selected the strategies listed below:

• Consider students’ sensory sensitivities and communication preferences.
• Explicitly model expected behaviour or forms of contribution.
• Repeat instructions concisely and be explicit regarding each student’s specific goals and tasks.
• Communicate to students what behaviours or forms of contribution would help them to participate in dialogue or to advance an activity.

The least selected strategies (chosen by five of the ten teachers) are listed here:

• Delimit a specific place or seating arrangement for class discussions.
• Block or remove objects or stimuli that are irrelevant to class discussions.
• Revoice a student’s contribution during group work by rephrasing or repeating it to the group.
• Provide advice on how to engage with peers.

Regarding the teachers’ ranking of the principles, I identified the principles that most frequently received the high and low ranks (see Error! Reference source not found. in Appendix N). More teachers assigned high positions to the principles of “planning friendlier class activities and forms of participation” and “incorporating a
visual or physical representation to verbal contributions”, and the lowest ranking was given to the principle of “mediating dialogue between peers during small-group activities”.

Consistent with their comments in the open box, the participants’ responses were overall positive. In particular, they valued strategies that were related to the planning of discussions with consideration of the students’ characteristics (e.g., sensory sensitivities), use of physical and visual resources and non-speech communication, the focusing of students’ attention and being explicit. The variability in the teachers’ ranking of the principles may have reflected differences in the needs of the students who were taught by these teachers and the students’ or teachers’ experiences in school.
8.4 Design Framework 4

Based on the teachers’ feedback in the online course, I updated the design framework a final time. My main adjustments were to the design principles to take account of the teachers’ interest in the strategies for the planning of accessible discussions and the incorporation of non-speech communication. Therefore, I divided the principles that were related to planning discussions (‘prepare classroom environment’ and ‘plan accessible activities and potential forms of participation’) into five new principles. I list these below (Table B.6 in Appendix B shows the complete list of associated strategies).

- Have available temporal or permanent resources that support students’ participation.
- Plan to promote dialogue in activities that are accessible and in which dialogue is essential to advancement of the activity.
- Plan intrinsically motivating discussions or those that acknowledge students’ communication preferences.
- Create opportunities for students to contribute to discussions through different forms of communication.

Through the delineation of these new strategies, I created Design Framework 4, which comprised 11 design principles and 39 strategies. Table 8.2 displays the fourth version of the design framework, and Figure 8.3 outlines the design principles that were associated with each of the four versions of the framework. As Table 8.2 shows, I grouped the 11 principles of Design Framework 4 into three broad categories or meta-principles and I refer to the design principles as ‘pragmatic principles’, according to the nomenclature set out by Kali and Linn (2007) and Kali (2008). According to this categorisation, the pragmatic principles represent abstract guidelines or advice, and the meta-principles correspond to overarching ideas that synthesise clusters of pragmatic principles. I delineated the meta-principles for ease of use and to distil the main characteristics of the design framework. I suggest that these meta-principles represent the three main features of class dialogue that is accessible for autistic students.
Table 8.2. Design principles of Design Framework 4

<table>
<thead>
<tr>
<th>Meta-principle</th>
<th>Pragmatic principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make the structure of discussions explicit and often clarify or recapitulate their content.</td>
<td>1. Incorporate visual or physical representations into verbal contributions.</td>
</tr>
<tr>
<td></td>
<td>2. Be explicit.</td>
</tr>
<tr>
<td></td>
<td>3. Break down into steps or recap the sequence of essential information.</td>
</tr>
<tr>
<td></td>
<td>4. Provide options.</td>
</tr>
<tr>
<td></td>
<td>5. Have available temporal or permanent resources that support students' participation.</td>
</tr>
<tr>
<td>Conduct discussions in response to the students' capabilities, strengths and sensory sensitivities.</td>
<td>6. Adjust overall classroom layout and social environment.</td>
</tr>
<tr>
<td></td>
<td>7. Mediate dialogue between the student and peers and the student's engagement with whole-class discussions.</td>
</tr>
<tr>
<td></td>
<td>8. Check-in with the student and provide one-to-one support.</td>
</tr>
<tr>
<td>Plan discussions with consideration of students' capabilities and communication preferences and promote openness about different forms of participation.</td>
<td>9. Plan to promote dialogue in activities that are accessible and in which dialogue is key to advancement of the activity.</td>
</tr>
<tr>
<td></td>
<td>10. Plan intrinsically motivating discussions or ones that acknowledge students' communication preferences.</td>
</tr>
<tr>
<td></td>
<td>11. Create opportunities for students to contribute to discussions through use of different forms of communication.</td>
</tr>
</tbody>
</table>

The meta-principles describe a form of promoting dialogue in which the barriers that autistic students usually experience are taken into consideration. They reflect the finding that to support students' engagement in discussions, information must be reasserted in diverse modalities, contingent guidance must be provided and the environment and activities need to be adjusted. They also highlight how the promotion of students' participation in class activities involves previous planning and preparation of resources and constant observation and adjustment of expectations and requirements. The students' levels of attention and experiences of discussions are affected by the physical environment, the students' emotional states, thoughts and sensory sensitivities, and others' behaviour. Therefore, the use of different strategies will be helpful for different students and different CEs in the same classroom.
Figure 8.3. Evolution of the design principles of the design frameworks

I suggest that the creation of these meta-principles leads to emphasis on the purposeful, cumulative and supportive principles of dialogic teaching (according to Alexander's (2008) characterisation of dialogic teaching). These characteristics relate to open and explicit communication of goals and of the ways in which knowledge is being built jointly, as well as to the creation of a supportive ethos that values all voices. They also highlight the characteristics that are deemed desirable in the support of autistic students. These characteristics include the use of concrete and explicit communication, the preparation of the classroom's physical and social environment, and the acknowledgement of and space for difference.


8.5 Conclusion

According to the feedback that I gathered via the online course, the design principles and strategies of Design Framework 3 seemed to be accessible and engaging for practitioners. I found it particularly enriching to consult the opinions of professionals at different stages of their careers (e.g., student teachers, SENDCOs and those involved in teacher professionalisation) and who had different roles and background knowledge of autism and educational dialogue. Despite these differences, they rated the principles of the design framework as helpful. Some even commented regarding the usefulness of the strategies to support their students. My grouping of the design principles based on whether their associated strategies served to improve the planning of accessible discussions or to promote contingent support seemed to resonate with the teachers' interest in the planning and adjustment of their lessons to take into account individual differences. The new design principles that were added to Design Framework 4 were designed to address this interest and to specify different aspects that were involved in the planning of discussions.

The participants in the online course highlighted the ways in which explicit guidelines, use of non-speech communication and physical or visual prompts, and guidance of students' attention could enable students' participation in activities. These findings were similar to those of the intervention. However, unlike the intervention, teachers ranked of low importance the strategies that were related to mediation of students' interaction with peers or of contributions to discussions. I suggest that this finding could relate to the lack of opportunities that I had to discuss examples of class interactions with the course participants. The differences in ranking and preferences could also relate to differences in their students' characteristics.
9 Discussion

9.1 Introduction

In this chapter, I discuss the findings of the four design cycles, highlight the limitations of this investigation and share suggestions for further research. I have divided the chapter into two sections. I refer first to the initial research questions and respond to them by drawing on the findings and current literature on autism and dialogic pedagogies. Second, I indicate the limitations of this research and offer suggestions for further iterations of this investigation and future research.

9.2 Addressing the research questions

As mentioned in Section 3.2, I elaborated on one primary “how” question131 (Bakker, 2018) and a series of secondary questions to guide the study’s design. I include the primary question below.

*How can dialogic teaching strategies adjusted to the communication characteristics associated with autism support the participation of autistic students in formal classroom activities that involve interaction with others?*

Through the secondary questions and responding to the primary one, I set out to describe:

- the autistic students’ participation in class discussions in mainstream classrooms;
- the dialogic strategies that consider autistic students’ communication characteristics and promote their participation;
- the teachers’ adoption of adjusted dialogic strategies; and
- the strategies’ effects (if any) on the teachers’ and autistic students’ involvement in class discussions.

131 According to Bakker (2018), there are two types of questions that are mostly used in DBR (what and how questions). Section 3.2 and 3.3.1 describe them.
Consistent with a DBR approach, I recognised that new research questions could emerge. Therefore, I address the secondary questions in the following subsections and point out the emergent themes I identified associated with each question. At the end of this section, I summarise these themes and answers to address the primary research question.

9.2.1 Autistic students’ participation in class discussions in mainstream classrooms

*How do autistic students engage in formal classroom activities that require interactions with others? What are the barriers, if any?*

As part of the intervention study, I noticed similarities and differences between the participating autistic students’ and their classmates’ participation and behaviour during class discussions.

Concerning similarities, the autistic students’ participation displayed the dialogic features I noticed most frequently in their classmates’ contributions. Namely, students often elaborated on their contributions, occasionally built on others’, and provided relevant answers to the activity. I also observed a few occasions when they volunteered to contribute to whole-class and small-group conversations. Similar to what Nadig et al. (2010) discovered in their study, these forms of participation were encouraged if specific contextual factors come into play. The factors included the teachers’ (or TA’s) close guidance, the accessibility and motivational characteristics of class discussions, a conducive physical environment, and the use of physical or visual supporting resources. All of these were related to the design framework’s strategies.

In the case of Children A and B, who required more support than Child C, teachers frequently prompted their elaborations on their contributions. Through these invitations to ‘build’, as part of guided questioning, teachers supported the students’ formulation of relevant verbal contributions to discussions and redirected their attention. Visual and physical resources also facilitated Children A’s and B’s
engagement in discussions. These forms of support were mainly impactful during activities that were accessible to the students and did not involve overwhelming stimuli (e.g., Child B was prevented from engaging in some maths activities because he had difficulty understanding the material). In the case of Child C, Teacher C invited him to clarify his responses to others and, at times, redirected his attention to his classmate’s ideas. In sum, teachers (and TA B) and the supporting resources became mediators between the children and whole-class or group discussions. They ensured that the focus students listened, understood and focused on information relevant to the conversation (e.g., others’ contributions, indications, and the goals of activities).

The codes I developed for better characterisation of the autistic students’ behaviours enabled me to register the neurodiverse forms in which I identified the focus students engaged with the class discussions and their specific difficulties (see Section 6.3 and 10.3Appendix F ). These behaviours were different from those of their non-autistic peers. I categorised them into three clusters of codes that were related to repetitions and specific details, asking for support and students’ self-directed talk. As I described in Chapter 6, these codes were consistent with some features of pragmatic language that are usually associated with ASC (see Sections 2.2.3.2 and 6.3.3). The codes related to the students ‘repeating their and others’ contributions’ and ‘sharing responses that were related to specific details’ illustrate characteristics usually associated with echolalia and ‘weak central coherence’ (e.g., focusing on words from others’ utterances). In my analysis, the students’ repetitions and references to specific details sometimes represented their ways of responding to others’ initiations and contributions and signalled their attention to the discussion (e.g., responding to an invitation by repeating one of the options suggested by the teacher or elaborating on a word mentioned by a classmate). In the case of the students’ self-directed expressions, they seemed to show, at times, that students were thinking aloud about shared information and verbalising their thought processes. At other times, they indicated that the child found it difficult to disengage from unrelated ideas or previous activities (e.g., referral to ideas from prior discussions). Under a normative perspective, these behaviours could appear to be ‘off-task’. However, I argue that they denoted how students engaged in the ongoing discussions. By interpreting students’ behaviours with consideration of contextual
factors and from a neurodiversity perspective, I identified that some of these behaviours served functions such as supporting their understanding of class discussions, facilitating their contribution to class activities and continued engagement.

Based on these observations, I identified two emergent topics that were related to the students’ participation. One was that behaviours that are sometimes considered unusual or ambiguous can have an interactional function. The other was that autistic students can engage in dialogic exchanges under the right circumstances. These topics are consistent with findings in the literature that challenge the assumption that characteristic features of pragmatic language in autism are manifestations of deficits in social relatedness, perspective taking and abstract thought. An example of this supposition is the assumption that individuals’ echolalia is devoid of meaning or that topically incongruent utterances have no function (Jaswal & Akhtar, 2019; Prizant & Duchan, 1981; Sterponi et al., 2015; Sterponi & Shankey, 2014). A neurodiversity perspective helps researchers and practitioners to recognise autistic individuals’ skills that are reflected in these behaviours. It highlights the potential social value of these skills and the need to nurture them. A survey conducted by de Schipper et al. (2016) that consulted the opinion of international practitioners that were experts in autism research (i.e., academics, psychologists, educators and physicians) showed that the majority associated autism with functioning skills such as attention to detail, preference to work on repeated tasks, creative talents, honesty, expertise in specific areas and visual perception (among others).

Sterponi and de Kirby (2016) suggest that discourse analysis enables consideration of nuance, caution, and alternative interpretations to understand language in autism. In the cases of both similarities and differences, my analysis of the students’ talk during interaction (aligned with a neurodiversity perspective) allowed me to notice contextual factors that enabled their participation and their neurodiverse forms of contributing and reacting to discussions. Accordingly, I cannot describe the autistic students’ participation and communication in class conversations without referring to the context in which they occurred.
Practitioners can help establish common ground with the students by challenging normalised or deficit assumptions about students’ behaviours and learning about their communication during interaction with them (“letting them be” – De Jaegher, 2020). Teachers can acknowledge and react to students’ neurodiverse interaction attempts (and signs of experiencing difficulties) and, in response, create accessible opportunities to participate. The latter include reasserting, explaining and synthesising relevant information (ensuring that students pay attention and understand the discussion and expectations) and welcoming (and even using) students’ preferred forms of communication. Similarly, research has indicated that when caregivers engage closely with autistic children’s utterances, they can scaffold their attention by establishing a mutual understanding and adjusting the information to their language level (Fusaroli et al., 2023).

For example, Teacher A took advantage of Child A’s tendency to repeat and invited him to contribute to discussions by repeating one of the options she had offered him. Similarly, Child A adopted some of Teacher A’s usual hand signals (which had a shared meaning) and pointed at resources (as Teacher A did) to respond to the teacher’s invitations. Teachers who participated in the online course also pointed out the importance of considering their students’ needs for completion (ensuring that students finalised their contributions and moved on from previous topics) when they encouraged the students’ engagement in discussions.

9.2.2 Dialogic teaching adjusted to the characteristics of autistic students

How can dialogic teaching strategies be adjusted to the communication characteristics of autistic students and open up opportunities for the students’ participation in these activities?

Initially, I adjusted dialogic strategies that have been described in the literature by enriching them with elements from EBPs that support autistic individuals132. I consulted various practices to be consistent with Simpson’s (2005) suggestion that

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132 I mainly drew on different ‘focused intervention practices’, which comprised individual strategies that were related to specific skills or behaviours (Odom et al., 2010).
the most pragmatic approach is to identify effective interventions for the diverse profiles found in autism. I especially sought accessible ways to communicate information to autistic individuals that are used in and recommended by these EBPs according to the characteristics usually associated with autism. Through this process, I created a design framework that included dialogic strategies and strategies that helped to prepare and clarify the class discussions. These strategies addressed the following.

- Motivational, collaborative, and environmental (including visual and physical supporting resources) aspects of class discussions.
- Diverse forms of communication (including non-verbal ones) and participation.
- Close guidance that was focused on clarification of information, provision of guidelines and probe of students’ states and understanding.

The preliminary strategies were aimed to reduce degrees of freedom when necessary, clarifying expectations, communicating information multimodally (to reassert information and facilitate understanding) and controlling any overwhelming stimuli or thoughts. These characteristics of the strategies were aimed to address the barriers that have been associated with sensory processing, sustenance of attention, negative affect and social interactions that autistic students usually experience in educational contexts (according to Bailey’s and Baker’s 2020 review).

During the intervention, I observed that teachers predominantly used strategies to convey relevant information concisely and to guide the focus students’ attention\textsuperscript{133}. Teachers used directive strategies, which helped students to formulate their contributions (often recurring to verbal prompting via guided questioning) and mediated students’ interactions with others. All of these related to the dialogue move categories of guiding the direction of dialogue, inviting students to build (on their own or others’ ideas), connecting, and building on ideas. Depending on the level of support that each student required, teachers sometimes used physical or visual supporting resources or hand signals, repeated and recapped information and

\textsuperscript{133} See Section for 6.7 for a more detailed summary of the findings from the intervention study and their preliminary discussion.
closely guided students throughout the discussions. Rather than referring mainly to participation rules and expectations (as I expected at the start), teachers’ focused their support on close and continuous reorientation of students’ attention, which ensured the formation of common ground, based on which they could formulate responses. These observations highlighted that the creation of equitable participation opportunities required the teachers constantly to:

- keep relevant information available;
- monitor students’ understanding and interest in contributing;
- support students’ participation through explicit invitations and guidance; and,
- show students that they had the space to help to advance the activity.

At first glance, these requirements are consistent with reports in the literature that show that autistic children often require a constant reorientation of their attention to essential stimuli, which can enhance their sustained attention (e.g., Banire et al., 2021). However, at the same time, they highlight the importance of establishing rules and explicit guidelines to facilitate the focus students’ participation. They indicated that it was very helpful for students if their teachers oriented them to address the conversation topics, their classmates' contributions and the expectations of their involvement. In one case, this orientation permitted the autistic students to achieve what I suggest is the first step towards engagement in discussions. Namely, students attended to and understood what the class discussed, which enabled them to formulate relevant responses to the activities. In another case, this orientation fostered the class’s accountability to the community because teachers encouraged the whole class to build on others' contributions (Michaels et al., 2008). This observation seemed to signal an initial stage in the development of productive dialogue in the three classrooms that was helpful for both the autistic students and their peers because it led them to continue learning to share clear contributions and to engage (sometimes critically) with their peers' ideas. Research suggests that practitioners can teach students oracy skills (Mercer et al., 2017). Therefore, this dynamic could become familiar through practice and repetition.
Nevertheless, these findings also highlight the challenge that Segal et al. (2017) associate with the promotion of a dialogic pedagogy: establishing communication rules while including voices that ‘deviate from those norms’ (mentioned in Section 5.1.1). I suggest that teachers' directive strategies and the associated adjustments in teachers' expectations of students' participation address this challenge. Teachers kept a balance between interactive-dialogic and interactive-authoritative communicative approaches (Mortimer & Scott, 2003) as they led the autistic students to formulate responses when they struggled to respond. Their directive strategies, which included guided questioning, the use of physical or visual resources or the repeating of information, acknowledged the students' usual difficulties and diverse forms of communication. They also permitted students to make adjusted contributions (e.g., responding by pointing to a resource, hand signalling or repeating information). I propose that the next step towards a clearer opening of the space for diverse forms of participation is the inclusion of these adjusted contributions in the class rules for talking (which would establish them as recognised forms of contributing).

I suggest these strategies have the potential to promote the four conditions for exercising one's voice in a discussion (also suggested by Segal et al., 2017). These conditions are having an opportunity to speak, express one's ideas, communicate on one's own terms, and be heeded by others. These conditions should be made available for all in the class. In the case of autistic students, the chance to speak involves both receiving the floor and accessing the class discussion (sometimes this might require teachers to reorientate the students’ attention or reassert information). Open-ended activities and adjustments to teachers' and peers' expectations of students' participation can enable them to express their ideas on their terms. Finally, the teachers' revoicing of students' contributions can encourage others to take up their contributions.

The forms of support that were associated with the design framework’s strategies benefited both the focus students’ and their non-autistic peers. This was because the framework’s strategies originated from dialogic general teaching, which has been tested empirically in mainstream contexts and supports the development of productive dialogue. The elements I extracted from the EBP extended the dialogic
strategies as they complemented their contingent support to promote dialogue on two levels. One level involved guiding teachers’ planning of accessible class discussions. The other level implied the reiteration of information during the discussions and the provision of directive support. Teachers can use the adapted strategies to support the whole class. However, the strategies were inspired by knowledge regarding the communication, sensory perception and thinking characteristics associated with autism (extracted partly from the elements I distilled from the selected EBP and the focus students’ characteristics). Accordingly, the design framework represents specialised practice, similar to Ravet's (2011) proposal of an integrative approach to inclusive pedagogy. It recognises and responds to the autistic students’ neurodiverse forms of experiencing the environment, and it could be used to set an environment that facilitates and guides their participation in discussions while it also supports their non-autistic peers. To implement the strategies, teachers should consider both contextual factors and the students’ specific characteristics and required levels of support. These considerations are consistent with Shakespeare’s (2013) relational approach to the social model of disability.

Teachers used a higher level of scaffolding in order to implement the design framework’s strategies differently to support the focus students compared with their peers. They used the adjusted strategies more frequently with the autistic students than with the rest of the class and reduced more degrees of freedom for the autistic students to match their individual needs. This is similar to the view of specialised education as an intensification and personalisation of general teaching strategies (as suggested by Lewis’s and Norwich’s (2004) continuum of teaching approaches). According to my observations, the ideal support for autistic students required the teachers to balance opening a space for diversity and providing guidelines during discussions. However, I argue that to foster this openness in a dialogic classroom, it is desirable to envision a dialogic pedagogy not only as promoting a specific type of talk or using a set of strategies but also as a stance toward learning and knowledge (Kim & Wilkinson, 2019). Teachers build a discourse culture to foster openness and the value of differences. Particularly at an ontological level, dialogic pedagogy encourages critical and respectful engagement with others’ ideas and collective questioning of ideas. Under this dialogic stance, productive dialogue may be sought
via the use of diverse strategies and the promotion and acknowledgement of
different forms of participation (e.g., verbal and non-verbal). As Boyd and Markarian
(2011, p. 521) put it, a teacher with a “*dialogic stance will try to listen better and seek
out more appropriate foreknowledge in their students to offer more meaningful and
lasting connections between what a student knows and what [the student] is
[learning]*. This study’s design framework offers different strategies, not all of which
are reliant on speech and some of which assume a directive role. These helped
teachers to regulate how they communicated information and to invite diverse and
accessible forms of contribution. By enriching dialogic teaching with a neurodiversity
perspective, I aimed to create strategies that are considerate and respectful of
autistic students’ sensory sensitivities and forms of perceiving and processing
information.

Consistent with the comments above, the findings highlighted that not only
archetypally dialogic strategies supported students’ participation in discussions.
Especially considering autistic students’ potential difficulties (e.g., hypersensitivity to
environmental stimuli, problems understanding figurative language), I suggest that
the use of dialogic strategies should also help to remove barriers that can hinder
their engagement and understanding. I also consider that it is important to assume a
multimodal perspective to describe communication (as other researchers have done
during studies of communication in children with intellectual disabilities, e.g., (Manghi
Haquin et al., 2016). In this study, non-speech communication accompanied
teachers’ dialogic strategies and sometimes represented Children A’s and B’s
contributions to the activities. I argue that this not-spoken guidance and participation
could become dialogic once teachers and students negotiate a shared meaning for
them.

Teaching programmes and assessment tools related to productive
educational dialogue primarily focus on spoken dialogic forms of contributing, hence
the use of the term oracy\textsuperscript{134} (e.g., Mercer et al.’s (2017) Cambridge oracy
assessment toolkit). However, to be open to diverse ways of participating,

\textsuperscript{134} However, ongoing work by Hennessy (n.d.) to develop a coding scheme similar to Teacher-SEDA
but for multimodal dialogic interactions with and through digital technology provides a new tool –
Tech-SEDA—that is also being adopted by teachers inquiring into their practice, and which will be
incorporated into the Teacher-SEDA pack.
researchers and practitioners should consider a broader vision regarding the communication and skills involved in engaging in dialogue and the enabling contextual factors for all in the class. The existence of other studies that have involved analysis of autistic individuals' participation in dialogic exchanges illustrates an interest in understanding and promoting it. For example, Hobson et al. (2012) identified the influence of difficulties in intersubjectivity on the production of dialogic talk (related to problems determining an orientation, which was to be derived partly from that of their conversational partner, on which to construct their subsequent discourse). Conn et al. (2020) recognised two verbal autistic students' interactional competence in dialogic teacher-pupil interactions in break-out spaces in mainstream contexts when they were guided by teachers.

One relevant maxim suggested by De Jaegher (2020) is that, in the face of diversity, practitioners should enhance participation if and when the students desire it, ‘letting the students be’ (acknowledging, respecting and adapting to their forms of interaction).

9.2.3 Teachers’ adoption of an adjusted dialogic pedagogy

*How do teachers implement the strategies in their classrooms? How and to what extent do they facilitate opportunities for students to participate?*

During the intervention study, the engagement of the three participating teachers in the investigation and their commitment to trialling the strategies varied noticeably. Their engagement ranged from full completion of all the set-out activities (Teacher A), through participation in a few joint-analysis sessions and interviews (Teacher C), to being observed while implementing familiar dialogic strategies (Teacher B). As I mentioned in Chapter 6, the time teachers invested at the beginning of the study to learn about the design framework's strategies indicated their levels of engagement throughout the investigation. Teachers A and C participated in three, two-hour workshop sessions and Teacher B in one, one-hour session. Additionally, Teacher A and I prepared the first version of the design framework's strategies, which I introduced later to the other two teachers and updated based on their comments (Teacher C) or class observations (Teacher B). Teacher A established and
consistently reminded students about the rules for talking and planned the dialogic goals of her lessons (sometimes as part of our joint analysis meetings). Teacher C tended to speak about participation in discussions openly and provided precise indications. Teacher B promoted certain dialogic forms of contribution and prioritised students’ explicit reasoning.

The differences in their levels of involvement could have been related to the teachers’ distinct levels of ‘training’ or familiarisation with the design framework. The latter made me question the participants’ trials of the newly created strategies (especially by Teachers B and C). Nevertheless, despite the differences in their participation levels, I identified dialogic features in the three teachers’ speeches throughout the intervention since the baseline observations (as described in Chapters 6 and 7). This finding reflected their previous knowledge of dialogic teaching. Therefore, on a positive note, I identified the usual strategies that teachers (and the TA in Classroom B) implemented and found effective when they promoted classroom discussions. Many of the adjustments I made to the design framework’s strategies and principles originated from these observations. Depending on the support required by each focus student, the teachers (and TA B) opened opportunities for them to participate by clarifying discussions (verbally, visually or physically), mediating their interactions (revoicing the ideas or reorienting their attention) and acknowledging non-speech contributions (see Section 9.2.2).

The differences in the teachers’ levels of involvement in the study were partly related to time constraints, which were in some cases due to school-wide events or unforeseen changes in their responsibilities (e.g., mentoring a PGCE student). However, I suggest that the teachers’ beliefs and priorities, reflected in their baseline interviews (see Chapter 5), also greatly influenced how much they adopted strategies to promote the focus students’ participation.

Regarding the dialogic aspect of the intervention, research has reported that not all professional development programmes that aim to help practitioners put dialogic teaching into practice cause changes in their teaching methods (Reznitskaya & Gregory, 2013). Studies highlight that it is difficult for teachers to change how they use talk for teaching (e.g., forms of questioning) because it implies
routine behaviour (e.g., Oliveira, 2010). Second, studies suggest that, to be successful, professional development programmes should provide teachers with materials and guidance that enable them to engage in systematic reflection of class interactions and to understand how theoretical and practical knowledge are integrated (Davies et al., 2017; Reznitskaya & Gregory, 2013; Sedova, 2017; Sedova et al., 2016).

I planned the sessions of joint analysis of video recorded lessons to create a space for teachers to reflect on dialogue. In this space, we could contextualise the design framework’s dialogic strategies in their classrooms and discuss steps for putting them into practice (Sedova et al., 2016). However, mainly Teacher A took advantage of these sessions to plan and discuss her promotion of class discussions and Child A's participation. Teachers' opinions at baseline and after the intervention reflected difficulties in bridging theory and practice (particularly for Teachers B and C). For example, they worried about achieving their curriculum goals and ‘carving out’ moments in which to promote discussions, and they shared insecurities regarding the implementation of dialogic strategies. The latter, combined with facing the inherent tensions in the development of dialogue (Sedova et al., 2014) and supporting the focus students, may have deterred them from engaging in the study's activities. Additionally, headteachers selected Teachers B and C to participate in the study, which could explain their different motivation levels compared to Teacher A (who volunteered to participate).

Similar to the impact that teachers' epistemologies have on their instruction and interaction patterns with their students (e.g., Johnston et al., 2001), teachers' attitudes towards inclusion seem to influence their adoption of inclusive practices. The Inclusive pedagogical approach in action (IPAA) framework developed by Florian and Spratt (Florian, 2014; Florian & Spratt, 2013) enables the evaluation of teachers’ enactment of inclusive pedagogy. It considers three assumptions and their associated actions and challenges that facilitate or inhibit inclusive practices:

\[\text{IPAA is based on a concept of inclusive pedagogy as an approach to teaching and learning to respond to individual differences between students and to avoid marginalisation.}\]
1) difference is an essential aspect of human development;
2) teachers believe they are qualified and capable of teaching all students; and,
3) teachers continually develop creative new ways of working with others.

Based on this framework, I noticed that all three teachers recognised the value of continuous development of new ways of supporting the focus students and collaborated with their TAs to create new materials. However, I identified comments in interviews mainly with Teachers A and C on actions that were congruent with the first two assumptions. They shared the goal of developing practice for all in their classrooms and promoting the focus students’ sense of belonging, and they envisioned diversity as both a challenge and a learning opportunity (see Section 5.2.2). Despite not always feeling prepared, they also showed a drive to take risks and change strategies. In comparison, Teacher B mentioned that inclusion was sometimes not at the forefront of teachers’ thinking due to their heavy workload and their prioritisation of students' proactivity. He chose to differentiate materials for Child B, and sometimes he struggled to “differentiate them down” because he identified that Child B was "unable to access" them.

The teachers' comments illustrated different perspectives. On the one hand, Teachers A and C were interested in identifying enabling factors that would allow all students to engage in discussions. On the other hand, Teacher B focused on what Child B could not do and planned differentiated activities (so that he could lead the class while the TA supported Child B). His comments suggest that the study did not address his priorities, which may explain why he decided to stop participating in its activities.

Finally, I suggest that Teacher A’s participation illustrated the enactment of her agency. Based on the suggestions associated with the design framework and our discussions, she developed materials (e.g., visual representation of talk rules) and planned lessons that addressed her inquiry goals. As emphasised by Calcagni et al. (2023), the coding of class interactions made the features of

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136 Teacher A related her participation in the intervention study to an inquiry she had carried out as part of a degree she was completing.
productive dialogue more visible for Teacher A and led her to evaluate critically how her dialogue goals had evolved. Biesta et al.'s (2017) ecological approach to teacher agency highlights that teachers' evaluations and their consideration of alternative ways to act (prospective dimension) are essential to give direction to their everyday practices.

Teacher A's engagement with the intervention indicated that the design framework can be used to guide trials of its strategies by other motivated teachers. Drawing on Cycle 4's findings, I suggest that the introduction of teachers to Design Framework 4 via the online course could support its implementation by teachers. Such an introduction would enable teachers to engage with materials in their own time and to receive remote guidance. Most of the teachers who participated in the online course indicated that they were interested in using the strategies (however, I did not test this).

9.2.4 Effects of an intervention with adjusted dialogic strategies

*What effects do the teachers' trials of the strategies have on teachers' and students' participation in these class activities?*

As illustrated in Chapters 6 and 7, the dialogic features and strategies that I identified most frequently in the teachers' and students' participation in discussions were consistent throughout the study (mostly build on ideas, invite or express ideas, guide direction of dialogue, non-speech communication). Nevertheless, as part of my comparison of pre- and post-intervention data, I discovered that teachers changed class arrangements and their indications and made more invitations to build on others' ideas. The three teachers promoted extended peer exchanges and encouraged the focus students to collaborate with peers (which was not always the case at baseline). Teachers A and C openly discussed participation expectations with their students, and Teacher A also systematically used non-speech communication and referred to visual resources. The focus students were more vocal and shared more ideas and initiations (although infrequently in the cases of Children A and B).
I suggest that the teachers' participation in the study reoriented their attention to their use of talk, the time they set aside to promote discussions and how students reacted to the discussions. They all had previous knowledge of productive dialogue and were interested in encouraging students to engage in conversations relevant to the subject matter. Therefore, they were inclined to promote discussions and to facilitate factors that would enable the focus students’ participation (including teacher guidance, accessible subject matter or activities and students' calmed emotional state), especially in the post-intervention observation.

The influence of the enabling factors on the autistic students' participation (e.g., more verbal utterances) highlighted that it was possible to promote their engagement in class discussions. I suggest that the instances in which the students volunteered to contribute to the discussions showed that they were engaged and felt able to contribute. I relate the latter to the students' enactment of agency, especially referring to Clarke et al.'s (2016) hybrid model. These authors define agency as the intention and capability to take action and to change the course of events (highlighting students' self-regulation and capability). On one side, I propose that teachers created accessible opportunities when they reduced degrees of freedom and adjusted participation expectations. On the other side, it is possible that having these opportunities and being invited by teachers (or the TA) to share their ideas could have fostered the students' sense of agency.

I consider it crucial for students to feel part of the activities in order to promote their participation and sense of inclusion. I draw on Goodall's (2020) work, which indicates that, for autistic students, inclusion means feeling that they belong and are valued (rather than attending to a particular place, like a mainstream classroom). I suggest that their sense of belonging also involves noticing that teachers believe that they can contribute to the class and expect them to do so. Snell and Lefstein (2017) propose that dialogic pedagogy's potential to promote equity requires the adoption of an ideology that considers a student's ability as dynamic, context-dependent and socially constructed. Teachers' preconceived ideas about students' abilities (e.g., low achievement) can lead them to implement differentiated instruction that may promote students' development of the identity of poor performance. This means that teachers may sometimes communicate implicitly their low expectations to students, who may
respond by becoming less interested in activities (or by assuming that teachers do not expect them to participate).

The design framework's principles and strategies aim to offer teachers optional ways in which they can create accessible opportunities and remove environmental barriers to their students' participation. By orienting autistic students' attention, teachers may help them to focus on socially relevant contextual features and highlight the associated expected behaviour. I suggest that the latter may address prediction difficulties that are commonly associated with autism (Cruys et al., 2014). Additionally, by inviting and guiding students' contributions, teachers can give the students the chance to share responses that help to advance the activity. To achieve these goals, teachers should foster an inclusive culture which requires continuous effort (given that inclusion is a process and not a static state; Ainscow, 2005).

In the case of this investigation, the stable context of primary school education and the participating students' ages may have facilitated the observation of positive outcomes in students' levels of engagement. Mamas et al. (2021) highlight that studies on autistic students' social participation at the elementary school level seem to produce more promising results than similar studies at the secondary school level (which is associated with more social and cognitive challenges). Future iterations of the design framework can explore other enabling or hindering factors in secondary education. However, the positive outcomes may also be related to publication bias (favouring intervention studies with positive results).

Considering this investigation's findings, I suggest that the adoption of a neurodiversity approach can lead to educational innovation during the development of inclusive practice. I propose that future research on practice that supports autistic students' participation should concentrate on the relationships among the classroom community members (similar to the framework suggested by Florian, 2014). This approach would avoid a sole focus on autistic individuals' difficulties and recognise the ways in which others' behaviour impacts their participation.
9.2.5 Summary and response to the primary question

In sum, as Design Framework 4\textsuperscript{137} suggests, the use of dialogic strategies that have been adjusted to the communication characteristics of autistic students can support their participation in discussions by helping to do the following.

- Make the structure and content of discussions explicit (often through clarification and recapitulation of information verbally, visually or with non-speech communication),
- Adjust degrees of freedom in response to students' capabilities and sensory sensitivities (through the removal of overwhelming or distracting stimuli, reorientation of students' attention, the prompting of elaborations, and monitoring of their understanding and state).
- Plan accessible discussions with consideration of students' capabilities and communication preferences (with clear guidelines, accessible and intrinsically motivating topics or goals, and opportunities for various forms of contribution).

To carry out these adjustments, I advise teachers to challenge their normalised assumptions regarding their students' behaviour, communication and ability.

Concerning communication, I noticed the interactional function of some of the students' behaviours and the contextual factors that promoted and facilitated their contributions to discussions. I suggest that if teachers identify these for their students, they may help to establish common ground. First, they can acknowledge students' attempts to communicate and welcome (and even use) their preferred forms of communication. Second, they can create accessible opportunities for the students to participate by becoming mediators between the students and their peers and information shared during discussions and by adjusting participation expectations. The establishment of common ground can help to avoid a 'double empathy problem' that researchers often identify in interactions between autistic and non-autistic individuals (Milton, 2012). Additionally, this form of support seems

\begin{footnotesize}
\textsuperscript{137} I particularly enlist in this subsection the meta-principles and describe the principles they comprise. A full list of the principles is included in Table 8.2 (Section 8.4).
\end{footnotesize}
relevant, considering that research suggests autistic individuals can make generous assumptions of common ground (Heasman & Gillespie, 2018).

The findings highlight that the establishment of guidelines is helpful to orient students’ participation. Teachers may resort to directive strategies (and physical or visual supporting materials) to ensure that students pay attention to and understand the discussion and expectations and to help them to formulate verbal contributions. Teachers may also adopt strategies that are not archetypally dialogic (e.g., remove overwhelming sensory stimuli) to remove any barriers to their participation. Additionally, teachers’ adoption of particular stances regarding dialogic teaching, inclusion and students’ ability is key to fostering the required openness to different ideas and forms of contribution. Teachers should consider students’ ability to be dynamic and context-dependent, aim to create learning opportunities that are sufficiently available for everyone and envision dialogic pedagogy as a stance toward learning (Florian & Spratt, 2013; Kim & Wilkinson, 2019; Snell & Lefstein, 2017).

This investigation joins other studies that have described autistic individuals’ participation in dialogic interactions (e.g., Conn et al., 2020). I have identified an existing programme that aims to create spaces for autistic individuals in which they can communicate with clear guidelines, namely the Autism Dialogue Approach® (Dialogica, 2022). However, there is no intervention or framework (to my knowledge) that provides a set of principles that may support the creation of accessible dialogue in mainstream classrooms that include autistic students. Therefore, the design framework derived from this investigation represents a theoretical and practical contribution that can interest researchers and practitioners alike. However, considering this study’s small sample and qualitative measures, it should be trialled further and adjusted to the contexts in which others may use it.

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9.3 Limitations and future research

In this section, I briefly describe the limitations I identified in the design and implementation of this investigation.

9.3.1 Design-based approach

Concerning the study's design, the design-based approach was pragmatically beneficial for the development of a practical theory that could be useful for local practice. However, as Alghamdi (2013) argues, this approach may challenge the study's internal validity. Researchers can address the latter in DBR by conducting several iterations over time and repeating the analyses.

I could carry out only a limited number of iterations (or design cycles) in this investigation due to time constraints. Nevertheless, I set out not only to analyse the impact of teachers' implementations of the design framework's strategies on their practice and students' participation. As part of the development and refinement of the design framework, I also focused on describing the teachers' usual strategies that helped them to promote discussions and encourage their autistic students' participation. These observations helped me to refine the design framework's principles and strategies, which I evaluated later via the online course. The interviews with the teachers and the parents' answers to the questionnaires also helped to enrich the design framework.

9.3.2 Sampling and collaboration with the participants

9.3.2.1 Intervention study

I recruited only three primary school classes because the intervention study involved constant engagement with the teachers, collection of data over a prolonged period (with recurrent videoing) and fine-grained analysis of class exchanges. This number of classes allowed me to gather a generous amount of data from each class, the analysis of which was feasible for me in the time frame I had available. Observing
more than one class permitted me to notice how the framework could support students and classes with different characteristics. However, I recognise that these features do not represent all autistic people. Therefore, I could also explore how the design framework could support autistic individuals with different characteristics (e.g., minimally verbal individuals) in diverse educational contexts and levels in future iterations.

Regarding my collaboration with the participating teachers, clearer communication and recurrent reassertion of both parties' goals and expectations of this study could have been beneficial. This investigation set out to develop strategies in collaboration with the teachers throughout the school year. Therefore, I invited teachers to create their own or discuss the preliminary strategies with me to clarify their purpose and implementation forms (e.g., via joint analysis sessions). Nevertheless, the process by which these update and creation steps were due to occur did not suit the three teachers' schedules or seemed to be challenging (e.g., Teachers A and C expressed feeling insecure coming up with their own strategies). The longitudinal and fine-grained (time and effort-demanding) characteristics of the study may partly have influenced the difficulty I experienced maintaining contact with the teachers (particularly B and C). The teachers had to prioritise activities; while they remained open to continued participation in the study, they had to handle the schools' expectations of their participation in the study and the continuation of their everyday practice. The three teachers also had additional roles and had to adjust their practice based on school-wide activities and unforeseen circumstances. Additionally, in the case of Teacher B, the study's focus on the development of support for one student seemed not to match his priorities (which partly influenced his decision to stop participating in some activities). I suggest that future collaborations should include the creation of a descriptive manual and written agreement, which can be revised throughout the study.

Considering these pressures, I aimed to adjust the study to match the teachers' preferences. This situation limited how much I could visit the schools, interact with the autistic students and receive feedback from the teachers. The unpredictable schedule of observations and meetings impacted my data collection and delayed my data processing and analysis, which caused time limitations in the
analysis of some data. Nevertheless, these adjustments were essential to be able to continue with the interventions at the participating schools.

It would have been desirable to consult with the participating autistic students to discuss their experiences in class discussions and their opinions regarding their teachers’ support using the strategies, in order to enrich the design framework. As I mentioned in Chapter 4 (Section 4.2.3), I asked for the opportunity to interview the students before and after the intervention. However, due to the different time and access constraints that I faced (e.g., Teacher B asked me not to conduct any further interviews) in the three classrooms, I could not interview and engage at the same level with each of the three students. Also, I attempted to maintain distance from the students to avoid causing them any distress or attracting unwanted attention to them. Nevertheless, as I explained in Chapter 8 (Section 8.3.1), the strategies were not developed to a level that would have been accessible to the participating students during the intervention study so that they could discuss them with me in depth. I suggest that, in a future iteration of this investigation, I could consult the opinion of autistic individuals who experience or have experienced mainstream education regarding the design framework’s principles and strategies. The latter would involve the adoption of data collection methods that would be accessible to the participants (as illustrated in Goodall, 2020).

I aimed to maintain direct communication with the parents of the focus students throughout the study to answer their questions and understand better the students’ school experiences. However, I could not contact them all easily. Luckily, they shared the teachers’ ideas regarding support priorities and expressed satisfaction with the teachers’ assistance (according to their baseline questionnaires).

9.3.2.2 Online course

Although I had conducted all the class observations and interviews for the intervention study before the COVID-19 pandemic occurred, the pandemic limited my subsequent access to schools to meet with teachers or students to evaluate the design framework. In response to this situation, I developed a short online course to
gather teachers' feedback. Due to time limitations, it was available for a limited amount of time. It mostly involved reading activities and asynchronous engagement from the participating teachers. In a future iteration, I would include more interactive activities (as suggested by the practitioners that tested the course), examples and synchronous forums through which I could guide teachers in trialling the design framework's strategies.

The decision to carry out the course caused some delays and limitations related to data gathering and analysis in Cycle 4 (e.g., due to time limitations, I could not analyse in more detail the post-intervention interviews, as I mention in Section 9.3.3). This was because I required more time to prepare the course materials and I allowed two months for the teachers to engage with the materials.

9.3.3 Data analysis

9.3.3.1 Class discussions

I selected short segments of class interactions during the intervention so that I could analyse a large number of examples finely. These segments specifically illustrated the autistic students' participation. Therefore, these examples may not have been representative of the contributions of the focus students' classmates or teachers to class discussions. Additionally, as mentioned above, I observed that the students' participation depended greatly on the contextual factors in those discussions. So, their participation may have been different in other subject matter lessons that I did not video record.

I created an adjusted coding scheme to analyse the transcripts based on existing and empirically tested frameworks. Namely, I used T-SEDA and SEDA in a complementary manner and enriched their categories with the design framework's strategies (including non-speech forms of communication). The latter involved consideration of strategies from EBP that support autistic individuals. I deemed it necessary to update the coding schemes because researchers had developed them
based mainly on non-autistic behaviour\textsuperscript{139}. To ensure the reliability of my coding with this scheme, I invited a colleague familiar with T-SEDA and SEDA to analyse part of my data. In preparation for the reliability measurement, we agreed on how to use the new codes I had added to the existing schemes (especially the one related to non-speech contributions and strategies). Nevertheless, I will adjust them further to clarify their use in future research, with the aim of improving their coding reliability.

\textit{9.3.3.2 Interviews}

I used IPA methods to analyse the baseline teachers' interviews and parents' questionnaires. These analyses enabled me to examine in detail their experiences and beliefs related to the autistic students' experiences in school and their priorities regarding schools' support for the students. One of the critiques of this form of analysis is that the context behind the participants' experiences may be absent when the analyser focuses only on their accounts (Willig, 2022). However, I suggest that consultation with the teachers and parents helped me to obtain a more comprehensive understanding of the type of support the students received and why. Nevertheless, it would have been desirable to analyse the students' accounts regarding their experiences. Additionally, I could examine the final interviews with Teachers A and C with the use of IPA methods in future research to understand better their experiences in the intervention study and to update the design framework further.

\textsuperscript{139} Other researchers, such as Heasman and Gillespie (2018), have faced this difficulty during exploration of autistic individuals' social interactions.
10 Conclusion

10.1 Summary and contributions of research

This investigation contributed pragmatically and theoretically to the current knowledge on practices that support autistic students in mainstream schools. It originated from my motivation to explore how teachers can facilitate and encourage autistic students’ participation in class activities, adopting a neurodiversity perspective. I proposed this as a relevant topic for investigation due to the growing number of autistic students attending mainstream classrooms in the UK (DFE, 2019) and reports suggesting they often experience sensory, social and understanding difficulties in this context (Saggers et al., 2011; Waddington & Reed, 2017). I focused on their participation in class activities that involve discussions because autistic students’ often experience social difficulties (Mamas et al., 2021; Moore, 2016). Additionally, teachers mainly transmit content through the spoken word and frequently ask students to contribute verbally or collaborate with others.

To address this issue, I adopted a design-based approach to develop teaching strategies that could facilitate autistic students’ participation in class discussions alongside an underpinning practical theory for the strategies. This theory took the form of design principles, serving as heuristics for using dialogic teaching strategies in mainstream classrooms considering autistic students’ potential difficulties and differences in thinking and communicating. The principles and strategies comprised a design framework that I designed, tested and refined throughout four design cycles. These cycles involved developing a prototype of the framework based on literature (Cycle 1) and testing and refining it in a multiple-case intervention study (Cycles 2 and 3) and an online professional development course (Cycle 4).

I created the prototype of the design framework based on the literature on dialogic pedagogies and EBP for supporting autistic individuals. I used dialogic teaching strategies as the basis because they create a space for sharing different ideas and help make goals and participation expectations explicit. I enriched these
with elements of EBP related to the forms of communicating and presenting information to autistic students used in these practices. As part of the intervention study in three primary classrooms, I refined the design framework twice based on baseline parent questionnaires and teacher interviews, the analysis of class interactions while teachers trialled the framework's strategies, and teachers' input (when possible). Finally, the creation and implementation of the online course allowed me to introduce other practitioners to the revised version of the design framework and obtain further feedback to refine it again. As a result, I developed four iterations of the design framework. The fourth version included 11 design principles and 39 strategies.

The primary research question of this research was:  

_How can dialogic teaching strategies, adjusted to the communication characteristics associated with autism, support the participation of autistic students in activities that involve interacting with others?_

During the intervention study, I observed that the three autistic students were able to engage and contribute to whole-class and small-group discussions. When specific contextual factors were present, I noticed that their speech displayed the dialogic features I most frequently identified in their classmates' contributions (namely, building on their and others' ideas and expressing ideas). These factors included the teachers' (TA's) close guidance, the accessibility and motivational characteristics of the discussions, a distraction-free physical environment, and the use of physical or visual supporting resources. Additionally, by registering the behaviours that the focus students had in common, I noticed that sometimes their seemingly unrelated repetitions, verbal expressions or behaviours indicated their engagement in discussions. Specifically, they signalled that they paid attention to the information, experienced difficulties related to their participation in the activity or attempted to contribute. All of these findings provided proof of principle. In other words, they indicated that it is feasible to support autistic students' participation in class activities that require interacting with others using dialogic strategies.

This investigation has theoretical and practical contributions that can impact practice. The design framework's principles (see Section 10.2) represent the
practical theory developed throughout this research. These principles represent heuristics based on which teachers and researchers can develop strategies to support autistic students that match the needs of their contexts. The investigation’s pragmatic contributions are the design framework’s theoretically based and empirically tested strategies to guide practitioners’ support for verbal autistic students’ participation in activities. Additionally, the online professional development course represents an innovative ready-to-use resource for practitioners that provides background information to understand the framework with examples of supporting materials.

10.2 Design principles for supporting autistic students’ participation in class discussions

To summarise how Design Framework 4 advises supporting autistic students’ participation in class discussions, I list below its meta-principles (which cluster the framework’s 11 principles) using van den Akker’s (1999) format\textsuperscript{140} for design principles (in italics).

\textit{If you want to design dialogic teaching strategies that are accessible for autistic students to support their participation in class activities that require interacting with others in mainstream classrooms, then you are advised to:}

- **Make the discussions’ structure explicit and often clarify or recapitulate their content.** Teachers can clarify the discussions by 1) incorporating visual or physical representations into verbal contributions, 2) being explicit, 3) breaking down into steps or recapping the sequence of essential information, 4) providing options, and 5) having available temporal or permanent resources that support students’ participation.

- **Conduct discussions in response to the students’ capabilities, strengths and sensory sensitivities.** The support may involve 1) adjusting the overall

\textsuperscript{140} van den Akker’s (1999, p. 9) format: “If you want to design intervention \(<x>\) for the purpose \(<y>\) in context \(<z>\), then you are best advised to give that intervention the characteristics \(<a,b\text{ and }c>\) (substantive emphasis), and to do that via procedures \(<K,L\text{ and }M>\) (procedural emphasis), because of arguments \(<P,Q,\text{ and }R>\).”
classroom layout and social environment, 2) mediating dialogue between the student and peers and the student’s engagement with whole-class discussions, and 3) checking in with the student, providing 1-on-1 support.

- **Plan discussions considering students’ capabilities and communication preferences and promote openness about different ways of participation.** The planning includes 1) accessible activities in which dialogue is key to advance, 2) intrinsically motivating discussions, considering students’ communication preferences, and 3) opportunities for contributing to discussions for diverse forms of communication.

The advice above considers the preference for literal language and predictability, the differences in sensory perception (and their impact on attention) and social difficulties associated with autism (Kinnealey et al., 2012; Moore, 2016; Norbury, 2013; Robertson & Baron-Cohen, 2017). The principles draw on the use of visual cues and objects, modelling, prompting, social narratives, peer mediation and adjustments to the physical environment in EBPs to motivate, facilitate communication and transitions and keep information accessible (Mesibov et al., 2005; Prizant et al., 2003; Sulzer-Azaroff et al., 2009). They relate to the purposeful (clear goals), cumulative (connect information, in this case, on a smaller scale) and supportive (ethos where students share ideas freely and scaffolding) principles of dialogic teaching (Alexander, 2008).

### 10.3 Implications for practice and research

The intervention study findings and the feedback retrieved in the online course indicated that the design framework has the potential to impact teachers' practice and is accessible to practitioners. Post-intervention observations showed that the teachers' participation in its trial motivated them to plan extended peer exchanges, autistic students' collaboration with peers, conversations on expectations about participation and use of non-speech communication. The course's participants expressed their interest in trying out the strategies and reflected their understanding by sharing examples of how they could implement them.
Teachers’ most frequent forms of supporting the focus students (reorienting their attention, verbal prompting, clarifying and using supporting resources) reflected that, besides encouraging verbal contributions, promoting their participation included the following.

- Ensure students understood the discussions and expectations.
- Take time to help them formulate their responses.
- Welcome and acknowledge their verbal or non-speech contributions.

These actions can allow teachers to establish common ground by redirecting the students’ attention, reiterating information and adjusting participation expectations to the students' communication preferences. In other words, to achieve a common ground, teachers can look for a balance between providing guidelines and adapting these considering students' characteristics. Sometimes, teachers' support of the students' understanding may be enough, considering that not all students can contribute to all discussions and that students may not want to contribute to them. Nevertheless, teachers' invitations, openness to the students' forms of participation and willingness to take the time to guide their responses are relevant to fostering students' feeling of belonging and being able to contribute.

Overall, the framework highlights that not only archetypically dialogic strategies create opportunities for all to participate in discussions (like directive strategies or non-speech communication). It emphasises contextual aspects of promoting conversations and how these may impact students' participation. Some aspects include a distraction-free physical environment, consideration of multimodal communication and the motivating elements and difficulty levels of discussions. I suggest that considering these aspects when promoting discussions can partly address the mismatch between schools' expectations and forms of delivery, and autistic students' characteristics and preferences. The framework also suggests adjusting participation expectations to make participation opportunities available for all and notice all students' attempts to contribute. Per the framework's suggestions, implementing dialogic teaching implies adopting a dialogic stance (Boyd & Markarian, 2011) that leads teachers to draw on (rather than being limited by) dialogic strategies and indicators suggested by research.
All these considerations are relevant due to the growing interest in fostering classroom dialogic interactions (Teo, 2019) and the reality that mainstream schools include students with diverse educational needs (DFE, 2019). If dialogic pedagogies aim to create a space for different voices and promote openness to diverse ideas, then it is desirable to find ways of including various forms of participation. The latter would allow making the participation opportunities openly available to all students in class.

The codes I developed to register the framework's strategies and the autistic students' behaviours in the analysis of class interactions may help practitioners monitor their implementation of the strategies and their students' responses. However, the adjusted coding scheme comprising these codes requires further refining and reliability measures.

I suggest that future iterations of this research should consult autistic individuals' opinions on the design framework. At the same time, it is desirable to trial its strategies in other educational contexts to support autistic students with different characteristics. Future tests of the design framework could use the online course to introduce practitioners to its principles and strategies and guide their implementation of the strategies. These trials will also allow further improvements to the framework and online course, permitting the addition of examples of new strategies and materials.
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Appendix A  Information sheets and consent forms

A1  Intervention study

Head Teacher Information Sheet

Dear Head Teacher,

I am a graduate student of the Faculty of Education at the University of Cambridge, and I will conduct a study on how social interactions in inclusive primary classrooms can be adapted to the needs of children with autism. This study involves a year-long intervention in which I will collaborate with primary teachers to develop adjusted teaching strategies for these students. The strategies will aim to adjust whole-class and group activities to the communicative characteristics of students with autism and encourage these students’ participation in them. As part of this study, I will provide workshops on implementing best practice in classroom talk. I would like to invite your school to collaborate with me in this intervention study that will take place between the months of November 2018 and July 2019.

What does participation in the study involve?

Before the intervention takes place, I will observe and videotape four lessons in the classrooms of teachers in your primary school that teach students with autism. I will also conduct an interview with these teachers (45 minutes) and send a questionnaire to the parents of the students with autism to gather information about their opinions on the inclusion of these students. Each student with autism will be interviewed (15 minutes) about his/her experiences in school. The observations, interviews and questionnaires will allow me to identify the students’ specific characteristics and difficulties and tailor the intervention to the characteristics of each child. Next, I will conduct three workshops with the teachers on implementing best practice in classroom talk and the communicative characteristics that have been associated with autism. As part of these workshops, I will collaboratively design with the teachers a set of strategies that will aim to be adjusted to the communicative characteristics of their students with autism. The teachers will be invited to put into practice these strategies in their classrooms during two trial periods (January – February and May – June 2019). During these trial periods, I will visit the participating classrooms to observe and videotape the social interactions of three lessons. I will also meet with the teachers three times to collaboratively analyse the classroom dialogue and discuss how the strategies can be refined. After each trial period, I will conduct interviews with the teachers and students with autism and send a questionnaire to the parents of these students to gather their opinions regarding the inclusion of these students. The information gathered through these interviews and questionnaires will allow me to refine the adjusted teaching strategies. At the end of the intervention, three lessons from another school day will be observed and videotaped.

Will the school’s taking part in this project be kept confidential?

The study adheres to the ethical guidelines of the British Educational Research Association. All the information gathered during the observations, the interviews and the questionnaires will be strictly confidential and will be stored in an encrypted hard drive. This information will be exclusively used by my supervisors and me at the University of Cambridge for academic purposes. All data will be identified only by a code, so all of the participants will remain anonymous. The collected personal information will be used to carry out academic research in the public interest.
Before the study takes place

I will seek the agreement of the teacher, the students and their parents in participating in the study before the observation takes place. I will provide the teacher and the students’ parents with information sheets with details about the investigation and contact details to allow them to ask questions or request more information about the study. I will also provide them with consent forms.

In consideration of the sensitivity of disclosing the diagnosis of autism of one or some of the students from your school, I will provide special information sheets and consent forms to the parents of the students with autism. Only the families of these students will be aware of the study’s focus on the inclusion of students with autism. A different version of the information sheet and consent form will be sent to the other students’ parents. It will inform the study’s interest in inclusive forms of dialogue for students with different forms of communication.

Supervision of the study and contact details

I have a DBS certificate, and the study is supervised by two professors in the Faculty of Education at the University of Cambridge, Dr Jenny Gibson and Dr Sara Hennessy. If you have any questions or require further information about the study, you are welcome to contact me in person or at [email] or [mobile].

Your school’s participation

Your participation in the study would be voluntary, and you would have the right to withdraw at any time without the need to give an explanation. If you agree to participate in the study, I would be very grateful if you could contact me via email or phone call. Thank you for taking the time to read this information sheet. It is for you to keep.

Yours sincerely,

[Signature]

Ana Laura Trigo Clapés
Head Teacher Consent Form

November 2018

Please complete this consent form if you are willing to participate in this study. Fill in the blank spaces and circle Yes or No accordingly.

I, ........................................, head-teacher of ......................................................

[Name]  [School’s name]

school, confirm that:

I have read and understand the information sheet for this study. Yes / No

I have had the opportunity to ask questions about the study. Yes / No

I give permission to the researcher to observe and videotape 13 lessons throughout the school year 2018/2019 in one primary level classroom as part of a study on inclusive forms of interaction for students with autism. Yes / No

I give permission to the researcher to interview the students with autism that are included in the participating classroom in three moments of the school year 2018/2019. Yes / No

I understand that the researcher will interview the teacher of the classroom in different times of the school year 2018/2019 regarding his/her experience teaching students with autism and using the adjusted teaching strategies. Yes / No

I understand that the researcher will send a questionnaire to the parents of the students with autism in three different moments of the school year 2018/2019. Yes / No

I understand that all the information gathered during the observations, interviews and questionnaires will be kept confidential and in a secure location. Yes / No

I understand that participation in the study is voluntary and that I am free to withdraw at any time without giving an explanation. Yes / No

I agree to take part in this study. Yes / No

Signature: .............................................................................................................

Date: ....................................................................................................................
Dear teacher,

I am a graduate student of the Faculty of Education at the University of Cambridge, and I will conduct a study on how social interactions in inclusive primary classrooms can be adapted to the needs of children with autism. This study involves a year-long intervention in which I will collaborate with primary teachers to develop adjusted teaching strategies for these students. The strategies will aim to adjust whole-class and group activities to the communicative characteristics of students with autism and encourage these students' participation in them. As part of this study, I will provide workshops on implementing best practice in classroom talk. I would like to invite you and your classroom to collaborate with me in this intervention study that will take place between the months of November 2018 and July 2019.

**What does participation in the study involve?**

Before the intervention takes place, I will observe and videotape four lessons in your classroom in which a student(s) with autism is (are) included. I will also invite you to participate in an interview with me regarding your experience in teaching students with autism (45 minutes). The interview will be audiotaped so I can fully engage in the conversation and listen back to it later. Additionally, I will send a questionnaire to the parents of your students with autism and interview these students (15 minutes) to gather information about these students' experiences in school. The observations, interviews and questionnaires will allow me to identify your students' specific characteristics and difficulties and develop a tailored intervention for your student(s). Next, I will conduct three workshops with you and other teachers on implementing best practice in classroom talk and the communicative characteristics that have been associated with autism. As part of these workshops, I will collaboratively design with you a set of strategies that will aim to adapt to the communicative characteristics of your student(s) with autism. I will invite you to put into practice these strategies in your classroom during two trial periods (January – February and May – June 2019). During these trial periods, I will visit your classroom to observe and videotape the social interactions of three lessons. I will also meet with you three times to collaboratively analyse the classroom dialogue and discuss how the strategies can be refined. After each trial period, I will invite you to participate in an interview with me regarding your experience teaching students with autism. The opinions of your students with autism and their parents regarding these students' inclusion will also be gathered by means of an interview and a questionnaire. The information gathered through these interviews and questionnaires will allow me to refine the adjusted teaching strategies. At the end of the intervention, three lessons from another school day will be observed and videotaped.

**Will the school's taking part in this project be kept confidential?**

The study adheres to the ethical guidelines of the British Educational Research Association. All the information gathered during the observations, the interviews and the questionnaires will be strictly confidential and will be stored in an encrypted hard drive. This information will be exclusively used by my supervisors and me at the University of Cambridge for academic purposes. All data will be identified only by a code, so all of the participants will remain anonymous. The collected personal
information will be used to carry out academic research in the public interest.

**Before the study takes place**

I will seek the agreement of your students’ parents with the participation of their children in the study before the observation takes place. To do so, I will provide them with information sheets with details about the investigation and contact details to allow them to ask questions or request more information about the study. I will also provide them with consent forms.

In consideration of the sensitivity of disclosing the diagnosis of autism of one or some of your students, I will provide special information sheets and consent forms to the parents of the students with autism. Only the families of the students with autism will be aware of the study’s focus on the inclusion of students with autism in mainstream classrooms. Another version of the information sheet and consent form will be sent to the other students’ parents. These documents will focus on informing the study’s interest in inclusive forms of dialogue for students with different forms of communication. I would like to kindly ask for your help in handing out the information sheets and consent forms inside an envelope to each student for them to take it home to their parents. This way, the differences between the information sheets will not be visible to the students and their parents.

I would also like to ask for your help in informing your students about the study. I would attend to your classroom before the initial observation takes place and explain to your students what will happen during the observations that will occur throughout the school year and answer any questions that they might have.

**Supervision of the study and contact details**

I have a DBS certificate, and the study is supervised by two professors in the Faculty of Education at the University of Cambridge, Dr Jenny Gibson and Dr Sara Hennessy. If you have any questions or require further information about the study, you are welcome to contact me in person or at [email] or [mobile].

**Your participation**

Your participation in the study will be voluntary, and you would have the right to withdraw at any time without the need to give an explanation. Thank you for taking the time to read this information sheet. It is for you to keep.

Yours sincerely,

[Signature]

Ana Laura Trigo Clapés
Teacher Consent Form

Please complete this consent form if you are willing to participate in this study. Fill in the blank spaces and circle Yes or No accordingly.

I, ................................................, teacher of the ...................................................
[Name] [Year of the class]

class in the ........................................................... school, confirm that:
[School’s name]

I have read and understand the information statement for this study. Yes / No

I have had the opportunity to ask questions about the study. Yes / No

I give permission to the researcher to observe and video tape 13 lessons throughout the school year 2018/2019 in the primary level classroom that I teach as part of a study on inclusive forms of interaction for students with autism. Yes / No

I give permission to the researcher to interview the students with autism that are included in my classroom in three moments of the school year 2018/2019. Yes / No

I agree to be interviewed by the researcher in different times of the school year 2018/2019 regarding my experience teaching students with autism and using the adjusted teaching strategies. Yes / No

I give permission to the researcher to audio record these interviews. Yes / No

I understand that all the information gathered during the observations, interviews and questionnaires will be kept confidential and in a secure location. Yes / No

I understand that participation in the study is voluntary and that I am free to withdraw at any time without giving an explanation. Yes / No

I agree to take part in this study. Yes / No

Signature: ..............................................................

Date: .................................................................
Parent/ Carer Information Sheet

Dear parents and carers,

I am a graduate student of the Faculty of Education at the University of Cambridge. I will conduct a study on how social interactions in inclusive primary classrooms can be more comprehensible to all the students in the classroom. This study involves a year-long intervention in which I will collaborate with teachers to develop teaching strategies that will aim to adjust class activities to the communicative characteristics of students with different abilities and different forms of communication. The Head Teacher at [School’s name], [Head Teacher’s name], and [Teacher’s name], class teacher for [Year], have accepted the invitation to participate in the study. [Head Teacher’s name] has kindly given me permission to contact you regarding the investigation and to ask for your approval to video and audio record inside your child’s classroom. The study will take place between the months of November 2018 and July 2019.

Background of the study

Most of the teaching in classrooms is conducted through dialogue. It represents the means through which knowledge is shared. Empirical studies have found that a dialogue between teachers and students that involves the exchange of ideas in collective activities is beneficial for students’ learning and critical thinking. It is important to maintain clear communication in school to allow all students to participate in class discussions and avoid misunderstandings. However, to harness this form of communication, the classroom dialogue needs to accommodate the different communicative abilities of the students in it.

What does participation in the study involve?

Before the intervention takes place, I will observe and videotape four lessons in your child’s classroom. I will make notes of the social interactions that occur during whole-class activities and identify areas of improvement. Afterwards, I will collaboratively design teaching strategies with your child’s teacher based on researched best practices in classroom talk. These strategies will be put into practice in your child’s classroom in two trial periods (January – February and May – June 2019). During these trial periods, I will visit the classroom to observe and videotape the social interactions of three lessons. All the lessons and activities will be video recorded from the back of the classroom. The teacher and I will refine the teaching strategies based on these observations. At the end of the intervention, three more lessons will be observed and videotaped.

Will my child’s taking part in this project be kept confidential?

The study adheres to the ethical guidelines of the British Educational Research Association. All the information gathered during the observations and meetings with
your child’s teacher will be strictly confidential and will be stored in an encrypted hard
drive. This information will be exclusively used by my supervisors and me at the
University of Cambridge for academic purposes. All data will be identified only by a
code, so all of the participants will remain anonymous. The collected personal
information will be used to carry out academic research in the public interest.

Supervision of the study and contact details

The study is supervised by two professors in the Faculty of Education, Dr Jenny
Gibson and Dr Sara Hennessy. If you have any questions or require further information
about the study, you are welcome to contact me in person or at [email] or [mobile]. You
can also contact the child’s teacher, and I will be pleased to get in touch with you.

Your child’s participation

Your child’s participation in this study is voluntary, so your child will take part in it
only if you give consent. In case you decide to permit your child to participate, you are
free to withdraw your consent and to discontinue your child’s participation in the study at
any time. I would like to kindly ask for your help filling in the following consent form and
sending it back to the school. Thank you for taking the time to read this information sheet.
It is for you to keep.

Yours sincerely,

[Signature]

Ana Laura Trigo Clapés
Parent/ Carer Consent Form

Please complete this consent form to inform if you agree or not to your child’s participation in this study. Fill in the blank spaces and circle Yes or No accordingly.

Name of the Child: ..................................................

I confirm that I have read and understand the information statement for this study. Yes / No

I have had the opportunity to ask questions about the study. Yes / No

I give permission to the researcher to observe and videotape 13 lessons throughout the school year 2018/2019 in my child’s classroom as part of a study on inclusive forms of classroom interactions. Yes / No

I understand that the researcher will meet at different moments of the school year 2018/2019 with my child’s teacher to refine the adjusted teaching strategies. Yes / No

I understand that all the information gathered during the observations will be kept confidential and in a secure location. Yes / No

I understand that my child’s participation is voluntary and that I am free to withdraw his/her participation at any time without giving an explanation. Yes / No

I give permission for my child to participate in the study. Yes / No

Signature of Parent/ Carer: ..................................................

Name: ...........................................................................

Date: ............................................................................
Parent/ Carer Information Sheet – for the parents of students with autism

Dear parents and carers,

I am a graduate student of the Faculty of Education at the University of Cambridge. I will conduct a study on how social interactions in inclusive primary classrooms can be more comprehensible to all the students in the classroom. In particular, I am interested in studying how class activities can be adjusted to the communicative characteristics of students with autism. This study involves a year-long intervention in which I will collaborate with teachers to develop adjusted teaching strategies for these students. The strategies will aim to adjust class activities to the communicative characteristics of students with autism and encourage these students’ participation in them. The Head Teacher at [School’s name], [Head Teacher’s name], and [Teacher’s name], class teacher for [Year], have accepted the invitation to participate in the study. [Head Teacher’s name] has kindly given me permission to contact you regarding the investigation and to ask for your approval of your child’s participation in this study that will take place between the months of November 2018 and July 2019.

Background of the study

Most of the teaching in classrooms is conducted through dialogue. It represents the means through which knowledge is shared. Empirical studies have found that a dialogue between teachers and students that involves the exchange of ideas in collective activities is beneficial for students’ learning and critical thinking. It is important to maintain clear communication in school to allow all students to participate in class discussions and avoid misunderstandings. It has been observed that some students diagnosed with autism struggle with coping with the school’s social interactions due to difficulties in understanding complicated directions of the class assignments and sensory overload. Currently, there is an increase in the prevalence of autism and in the number of students with autism that attend mainstream classrooms in the UK. Therefore, there is a need to understand how class discussions can be more accessible for students with autism.

What does participation in the study involve?

Before the intervention takes place, I will observe and videotape four lessons in your child’s classroom. I will also invite your child to participate in an interview with me (15 minutes) regarding his/her experiences in school and invite you to fill in a questionnaire about your opinion on your child’s inclusion. The interview with your child will be audiotaped so I can fully engage in the conversation and listen back to it later. These observations, interviews and questionnaire will allow me to identify your child’s communicative characteristics and develop a tailored intervention for your child. Afterwards, I will collaboratively design teaching strategies with your child’s teacher based on researched best practices in classroom talk and for supporting children with autism. These strategies will be put into practice in your child’s classroom in two trial periods (January – February and May – June 2019). During these trial periods, I will visit the classroom to observe and videotape the social interactions of three lessons. After each trial period, I will invite your child to participate in an interview with me regarding
his/her experiences in school and invite you to fill in a questionnaire about your opinion on your child’s inclusion. Your child’s teacher will also be interviewed. The information gathered through these interviews and questionnaires will allow me to refine the adjusted teaching strategies. At the end of the intervention, three lessons from another school day will be observed and videotaped. All of the lessons will be video recorded from the back of the classroom, and the camera will capture the whole-class interaction.

The analyses of the classroom interactions will particularly focus on the way your child contributes and is included by the teacher and other students in the whole-class activities. I understand the sensitivity of disclosing your child’s autism diagnosis. I would like to assure you that the study’s focus will only be shared with you, your child’s teacher and the head teacher at the school. The parents of the other students will only be informed about the study’s interest in inclusive forms of classroom dialogue.

**Will my child’s taking part in this project be kept confidential?**

The study adheres to the ethical guidelines of the British Educational Research Association. All the information gathered during the observations, the interviews and the questionnaires will be strictly confidential and will be stored in an encrypted hard drive. This information will be exclusively used by my supervisors and me at the University of Cambridge for academic purposes. All data will be identified only by a code, so all of the participants will remain anonymous. The collected personal information will be used to carry out academic research in the public interest.

**Supervision of the study and contact details**

The study is supervised by two professors in the Faculty of Education, Dr Jenny Gibson and Dr Sara Hennessy. If you have any questions or require further information about the study, you are welcome to contact me in person or at [email] or [mobile]. You can also contact the child’s teacher, and I will be pleased to get in touch with you.

**Your child’s participation**

Your child’s participation in this study is voluntary, so your child will take part in it only if you give consent. In case you decide to permit your child to participate, you are free to withdraw your consent and to discontinue your child’s participation in the study at any time. I would like to kindly ask for your help filling in the following consent form and sending it back to the school. Thank you for taking the time to read this information sheet. It is for you to keep.

Yours sincerely,

[Signature]

Ana Laura Trigo Clapés
Parent/ Carer Consent Form – for the parents of students with autism

Please complete this consent form to inform if you agree or not to your child’s participation in this study. Fill in the blank spaces and circle Yes or No accordingly.

Name of the Child: .................................................................

I confirm that I have read and understand the information sheet for this study. Yes / No

I have had the opportunity to ask questions about the study. Yes / No

I give permission to the researcher to observe and videotape 13 lessons throughout the school year 2018/2019 in my child’s classroom as part of a study on inclusive forms of classroom interactions for students with autism. Yes / No

I give permission to the researcher to interview my child in three moments of the school year 2018/2019. Yes / No

I agree on answering a questionnaire about my opinion on my child’s inclusion in three moments of the school year 2018/2019. I will send these questionnaires back to the school inside the envelope that I was provided. Yes / No

I understand that the researcher will interview my child’s teacher in different moments of the school year 2018/2019 regarding his/her experience teaching students with autism and using the adjusted teaching strategies. Yes / No

I understand that all the information gathered during the observations, interviews and questionnaires will be kept confidential and in a secure location. Yes / No

I understand that my child’s participation is voluntary and that I am free to withdraw his/her participation at any time without giving an explanation. Yes / No

I give permission for my child to participate in the study. Yes / No

I agree to take part in this study. Yes / No

Signature of Parent/ Carer: .................................................................

Name: ...........................................................................

Date: ...........................................................................
A2 Online course for practitioners

Information about the online self-paced course:
‘Dialogic strategies for students diagnosed on the autistic spectrum’

Dear teacher,

We include in this document some information about the online professional development course, its activities, the information that will be gathered and how it will be used for research purposes.

- Aim of the course.

This online course was created as part of Ana Trigo’s doctoral research at the University of Cambridge, which involved the creation of adjusted teaching strategies that support autistic students’ participation in class discussions. The strategies are based on dialogic pedagogies and elements of evidence-based strategies for students with autism and aim to adjust to students’ communication characteristics. They were developed in an intervention study in collaboration with three primary school teachers that taught in mainstream classrooms in the UK. In this study, the strategies were iteratively tested and refined based on classroom observations and the teachers’ input. The aim of this course is to present the last updated version of the strategies to practitioners who may find them useful and gather feedback and suggestions on how the strategies can be improved.

- Contents of the course.

This is a self-paced course comprised of the following six sections.

<table>
<thead>
<tr>
<th>Sections of the course</th>
<th>Type of activities included</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Information about the common school experiences of students diagnosed with autism.</td>
<td>- Introductory information.</td>
</tr>
<tr>
<td></td>
<td>- Interactive slides.</td>
</tr>
<tr>
<td>2. Brief introduction to classroom dialogue and dialogic teaching.</td>
<td></td>
</tr>
<tr>
<td>3. Strategies for planning class discussions that are friendly for students with autism.*</td>
<td>- Descriptive information and examples.</td>
</tr>
<tr>
<td>4. Strategies for supporting students’ participation during class discussions.*</td>
<td></td>
</tr>
<tr>
<td>5. Interactive example of how the strategies can be used in the classroom.</td>
<td>- Interactive video.</td>
</tr>
<tr>
<td>6. A space to share feedback and a forum to engage with other teachers and the researcher.*</td>
<td>- Open box to share feedback.</td>
</tr>
<tr>
<td></td>
<td>- Asynchronous online forum.</td>
</tr>
</tbody>
</table>

- What does your participation in this course involve?

The course will be available from February 1st to March 28th, 2021. You will be able to complete the different sections over that period at the times that you choose. As part of the different activities of the course, you will read introductory information, engage with interactive slides and video (including a few multiple-choice questions and spaces to share ideas), share your feedback with the researcher and participate in an asynchronous forum (engaging with other teachers and the researcher). The first two sections provide contextual information that facilitates the understanding of the strategies introduced in the course. They also display useful examples and general
recommendations. The new strategies are introduced in sections 3 and 4. Section 5 presents an illustrative video example. Finally, in section 6, you will have the opportunity to share your opinion and ideas on the strategies, dialogic pedagogies and support for students with autism. You do not need to complete the whole course; you can dip into resources that are useful to you if you are willing to offer feedback on those. A certificate of participation will be provided if you have completed sections 3, 4 and 6 (including sharing your feedback on the strategies and participating in the forum). I would like to encourage you to complete the other sections too. However, you are free to skip them if you have sufficient previous knowledge. Your participation in the course is voluntary, and you will have the right to withdraw at any time without the need to give an explanation.

- **Use of information for PhD research.**

  This course stems from a study that adheres to the ethical guidelines of the British Educational Research Association (2018). All the information gathered in the course will be strictly confidential and will be stored on an encrypted hard drive. The information that will be registered includes:

  - The educational level and type of school in which you teach, your previous experience teaching autistic students and familiarity with dialogic pedagogies.
  - Your responses to the interactive activities.
  - Your comments, questions and responses in the asynchronous forum.

  You will not have to provide your full name or the name of your school in the course if you prefer not to. The information will be exclusively used by my supervisors and me at the University of Cambridge for academic purposes. All data will be identified by a code, and all of the participants will remain anonymous in any research dissemination. We would like to kindly ask you to be careful when sharing details about your students, maintaining them anonymous.

- **Supervision of the study and contact details.**

  This research project is supervised by Dr Jenny Gibson and Dr Sara Hennessy from the Faculty of Education at the University of Cambridge. If you have questions or require more information about this course or my research, please contact me at [email].

  If you agree to participate in the course, please fill in the consent form and send it back to the researcher. You will receive login details to access the course (which is hosted on the University of Cambridge’s Moodle platform).

Yours sincerely,

[Signature]

Ana Laura Trigo Clapés  
PhD candidate in Education
Consent form for participation in the online self-paced course: 'Dialogic strategies for students diagnosed on the autistic spectrum'

Please complete this consent form if you would like to participate in the online course and if you agree with the use of the general information and responses that you share in the course. Type your responses in the blank spaces below and check the boxes to answer each statement (or mark your response with an 'X').

Your input will be very valuable for the further refining of the adjusted teaching strategies!

I, ... [Your name] ..., teacher of the ... [indicate the Year of your class or your role in school] ... in a ... [Type of school and, if you like, the name of your school] ... school, confirm that:

<table>
<thead>
<tr>
<th>Statements</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have read the introductory information for this online course, including the details about how the information that will be gathered will be used.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I was given contact details to ask questions about the course and the study it stems from.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I give permission to the researcher to register general information (i.e., educational level and type of school in which I teach at, if I have received training on autism and familiarity with dialogic pedagogies).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I give permission to the researcher to register the comments and responses that I share in the interactive activities and the forum of this course.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I understand that all the information gathered in this course will be kept confidential and in a secure location. I will remain anonymous in any research dissemination.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I understand that my participation in the course is voluntary and that I am free to stop at any time.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I agree to participate in this course.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix B  Evolution of the design framework

This appendix presents the four versions of the design framework that I created throughout the four cycles of this investigation. I highlight the changes and additions I made to the design framework’s design principles and strategies (pragmatic and specific principles respectively, according to the nomenclature used by Kali and Linn, 2007).

B1 Design Framework 1

The eight elements that I extracted from 28 EBP for supporting autistic individuals represented the design principles of the first version of the design framework. I identified ways in which these principles could help to develop alternative ways to implement some T-SEDA strategies. I selected five categories of the T-SEDA framework that had similar functions to those of the eight principles or that enabled the introduction of supporting EBP resources to the dialogue (‘build on ideas’, ‘challenge’, ‘connect’, ‘reflect on dialogue’ and ‘guide direction of dialogue’). I also created eight new strategies that did not rely on speech. I later introduced these strategies to the teachers and, based on the input provided by Teachers A and C, I updated them. In Table B.1 I introduce the revised version of Design Framework 1 that includes the teachers’ input (the additions made based on their input are marked in bold orange font).

Table B.1. Revised version of Design Framework 1

<table>
<thead>
<tr>
<th>Use prompts or cues</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Physically show how ideas are being built. This may include building a physical</td>
</tr>
<tr>
<td>object.</td>
</tr>
<tr>
<td>2. Display (temporally or continuously) physical or visual prompts/resources</td>
</tr>
<tr>
<td>associated with forms of dialogic contributions (e.g., visual ground rules for</td>
</tr>
<tr>
<td>talking, illustrated with icons or images printed in cards).</td>
</tr>
<tr>
<td>3. Show resources or providing objects that illustrate the conversation topics or</td>
</tr>
<tr>
<td>steps to carry out an activity (e.g., print supporting resources as cards that</td>
</tr>
<tr>
<td>can be displayed on the walls or provided to the students – Print3).</td>
</tr>
<tr>
<td>4. Cue the start or end of a discussion with forms of communication different to</td>
</tr>
<tr>
<td>speech (e.g., music, musical instrument, song).</td>
</tr>
<tr>
<td><strong>Model behaviour</strong></td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>5. Model ways to contribute to dialogue, including use of different forms of communication (including verbal and non-verbal).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Provide guidelines</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Refer to the expected behaviours and forms of contribution during class discussions.</td>
</tr>
<tr>
<td>7. Refer to the timetable of the day.</td>
</tr>
<tr>
<td>8. Indicate roles that students will assume in small-group activities. <strong>This may involve specifying individual tasks, clearly assigning them to each student.</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Examine thoughts and emotions</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>9. Monitor if students experience negative thoughts or feelings during class discussions.</td>
</tr>
<tr>
<td>10. Talk about the different aspects of participating in class discussions (steps or components of dialogue).</td>
</tr>
<tr>
<td>11. Plan breaks or relaxing time from class discussions or encourage students to ask for one. <strong>Create a calm atmosphere (e.g., play calm music, display soothing images, maintaining low noise volumes) and conduct relaxing activities (e.g., meditation).</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Modify/adjust the environment</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>12. Establishing a particular layout (e.g., seating arrangement, space in the classroom, arrangement of chairs) for discussions.</td>
</tr>
<tr>
<td>13. Block distracting objects and plan activities that consider students' sensory sensitivities and communication preferences.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Provide opportunities for students to interact with others</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>14. Promote dialogue in peer mediated activities.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Add intrinsically motivating features for the students</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>15. Promote dialogue in activities with intrinsically motivating characteristics and outcomes (e.g., <strong>opportunities to lead a class discussion or activity; provide praise that materialises in a physical register – chart with names</strong>).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Use/encourage different communication modalities</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>16. Suggest students to contribute using forms of communication different to speech (e.g., <strong>sign language that is familiar for the student – Makaton</strong>); and modelling them.</td>
</tr>
<tr>
<td>17. Provide opportunities to build on ideas that were discussed in a conversation that has ended. <strong>This may include destining a space in the classroom to leave a note or writing a note to share it with the teacher afterwards. Monitor student’s usual movements and sounds and when they happen.</strong></td>
</tr>
<tr>
<td>18. Use different forms of communication besides speech during class discussions.</td>
</tr>
</tbody>
</table>
As mentioned in Section 6.2.3, I drew on the findings from the class observations and the collaboration with the teachers during the intervention study to refine Design Framework 1. I added new strategies to some of the principles and adapted some of the original strategies considering the aspects that appeared beneficial during the intervention study. I illustrate in Table B.2 the evolution of the design framework’s teaching strategies throughout the intervention study. I list below the content of the table.

- Column 1: The original eight pragmatic principles. I include the strategies that stemmed from each of them.
- Columns 2 and 3: The findings from the intervention study that led me to update the principles. These findings include the strategies or activities implemented by the teachers (second column) and my observations from the class interactions (third column).
- Column 4: The adjustments made to the strategies and new strategies added.

Each of the rows in the table represent each of the design principles of Design Framework 1. I colour-coded the strategies to indicate which findings were related to them and the adjustments I made to those strategies.

Table B.3 presents Design Framework 2.
Table B.2. Evolution of Design Framework 1 to Design Framework 2

<table>
<thead>
<tr>
<th>Design framework 1</th>
<th>Activities/strategies carried out by teachers</th>
<th>Observations</th>
<th>Additions and adjustments to DF1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use prompts or cues</td>
<td><strong>Building on ideas</strong>&lt;br&gt;Show physically or visually how ideas are brought together during a discussion.</td>
<td><strong>Observations</strong>&lt;br&gt;Child A appeared to be motivated to help “build the class’s idea physically”. He paid attention to the Lego Blocks and was pleased when he sat in the circle after sharing ideas with the class. Child A constantly approached the board and remembered some of the talk rules. He adjusted his behaviour when he heard the cues to start or end a discussion.</td>
<td><strong>Use prompts or cues</strong>&lt;br&gt;Use a physical/visual representation to accompany the verbal expression of the ideas. Consider also representing an abstract problem (or the process of solving it) physically while verbally describing it.</td>
</tr>
<tr>
<td></td>
<td><strong>Guide dialogue or activity</strong>&lt;br&gt;Elicit specific forms of participation with cues or prompts.</td>
<td>For Child B it was important to have a visual/physical representation of abstract problems (during Maths activities). The TAs and peers that guided him represented abstract problems with physical objects.</td>
<td><strong>Invite students to build on ideas physically, adding blocks or physically changing place.</strong></td>
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<td></td>
<td><strong>Supporting resources</strong>&lt;br&gt;Display/ have available physical/visual prompts associated with the expected forms of contributing.</td>
<td>When the focus students had difficulties replying or when they provided short or ambiguous responses (apparently not related to the topic at hand) the teachers (TAs) recurred to the following strategies: - guided questioning, - feeding in options (of answers or courses of action), topics to develop or steps, - focus students on key moments - refer to objects in the classroom.</td>
<td><strong>Refer to objects present in the classroom to illustrate a point.</strong></td>
</tr>
<tr>
<td></td>
<td>Use prompts that include relevant information on the steps to carry out an activity or the topic of conversation.</td>
<td>Children A and C, at times, provided ideas related to the information displayed on the board or walls. This showed that they paid attention to these resources. The resources could help the student keep them on track with the topic of discussion.</td>
<td><strong>Feed in salient information regarding the steps to carry out an activity through questioning.</strong> Through questioning, teachers can guide students step by step. Alternatively, provide optional answers or courses of action to choose from to solve a problem or carry out an activity.</td>
</tr>
<tr>
<td></td>
<td>Cue the start or end of discussions with other forms of communication besides speech.</td>
<td>The three teachers displayed materials related to the topic they discussed in their lessons (on their boards or walls).</td>
<td><strong>Focus attention on (bring back others) the dialogue at hand when key information is shared. Alternatively, make short comments during a discussion to clarify its content.</strong></td>
</tr>
<tr>
<td>Model behaviour</td>
<td>Guide dialogue or activity</td>
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<tr>
<td>Model ways of contributing to the dialogue, including verbal and non-verbal forms of communication.</td>
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<tr>
<td>Teacher A introduced talking rules to the class by role-playing. She illustrated a “bad conversation” with the TA. She asked the students to comment on it. Teachers B and C conducted role-playing during some of their lessons. (Not necessarily related to dialogue). The three teachers (or TAs) sometimes modelled specific dialogic forms of contributing during class discussions.</td>
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<tr>
<td>At times the teachers rephrased the students' contributions. Besides helping to clarify their participation, it permitted teachers to exemplify how to formulate a clear contribution. For students to be able to take up the modelled forms of contributing, teachers had to make sure that the students: - paid attention, - understood the teachers' intention of modelling how they could contribute. Teacher C occasionally modelled how to participate in a discussion after explicitly talking about dialogue.</td>
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<table>
<thead>
<tr>
<th>Provide guidelines</th>
<th>Connect</th>
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<tbody>
<tr>
<td>Refer back to the expected behaviours or forms of contributing during a discussion, or refer to the components of dialogue.</td>
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</tr>
<tr>
<td>Refer to the sequence of contributions that have taken place during the class discussion.</td>
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<tr>
<td>Refer back to the timetable of the day.</td>
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<tr>
<td>Guide dialogue or activity</td>
<td></td>
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<tr>
<td>Indicating the roles that each student will assume in a small-group activity. It may involve</td>
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</tr>
<tr>
<td>Teacher A referred to specific talk rules before and during class discussions. She mentioned them when providing instructions or inviting students to participate in discussions. The three teachers sometimes asked students to participate in a particular way (e.g., “...build on that”). Based on the attention intervention for Child A, Teacher A developed activities for the whole class that involved paying attention to a sequence of objects related to the discussion.</td>
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</tr>
<tr>
<td>Teacher A referred to specific talk rules when those rules were relevant for the ongoing discussion. Child A adjusted his behaviour accordingly. Teachers in Classrooms B and C referred to known dynamics to indicate the expected behaviours (these were non-dialogic, e.g., lollipop sticks to choose speakers). Reminding students of the sequence of contributions represented sharing too much information for them to process. It was particularly challenging for Children A and B. It was helpful to provide a summary of ideas shared in a discussion to keep relevant information fresh.</td>
<td></td>
</tr>
<tr>
<td>Teacher C occasionally modelled how to participate in a discussion after explicitly talking about dialogue.</td>
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</tr>
<tr>
<td>Teacher A referred to specific talk rules when those rules were relevant for the ongoing discussion. Child A adjusted his behaviour accordingly. Teachers in Classrooms B and C referred to known dynamics to indicate the expected behaviours (these were non-dialogic, e.g., lollipop sticks to choose speakers). Reminding students of the sequence of contributions represented sharing too much information for them to process. It was particularly challenging for Children A and B. It was helpful to provide a summary of ideas shared in a discussion to keep relevant information fresh.</td>
<td></td>
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<tr>
<td>Teacher C occasionally modelled how to participate in a discussion after explicitly talking about dialogue.</td>
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<table>
<thead>
<tr>
<th>Provide guidelines</th>
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</thead>
<tbody>
<tr>
<td>Explicitly invite students to add information or comment on ideas that the teacher has expressed.</td>
</tr>
<tr>
<td>Refer to specific expected forms of contributing that are relevant for the ongoing dialogue or contingently to difficulties experienced during dialogue. Synthesise information previously mentioned in dialogue that helped carry out an activity/ solve a problem (including information mentioned seconds ago).</td>
</tr>
<tr>
<td>To help students continue with an activity it was helpful to keep information about its specific steps clear and in a brief form (guiding students step by step, keeping</td>
</tr>
</tbody>
</table>
| Refer to the steps to carry out a short activity or the different tasks involved. Make explicit what is first
specifying individual tasks related to each role, clearly assigning them to each student.

Teacher A indicated roles for every student in small-group activities. She determined the specific one for Child A. Teacher C created the role of “student manager” but it was not only meant for Child C.

students' attention and helping them retain key information). At times, the TA in Classroom B also explained to Child B the purpose of certain steps or of using a particular material.

It was noticeable that asking too many questions made it more difficult for the students to answer. Also specifying individual instructions for the students gave them certainty (helpful for Child B during a small-group activity).

The assigned roles helped Child A to know what he was meant to do. The teacher assigned him the role of registering the group's ideas inspired by our observations.

and what comes next, so the ‘trajectory’ of a short activity is explicit.

Repeat instructions in a synthesised way. Particularly, emphasise and make explicit individual goals and specific tasks for the student.
<table>
<thead>
<tr>
<th><strong>Examine thoughts and emotions</strong></th>
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<tbody>
<tr>
<td><strong>Challenge</strong> Probe students’ understanding of class activities through questioning or by checking in with the student.</td>
</tr>
<tr>
<td><strong>Reflect on dialogue or activity</strong> Talk about the different aspects of participating in class discussions (steps or components of dialogue).</td>
</tr>
<tr>
<td><strong>Reflect on/ monitoring if students experience negative thoughts or feelings during class discussions (and invite others to reflect on it)</strong></td>
</tr>
<tr>
<td><strong>Planning activities</strong> Plan breaks or relaxing time from class discussions. Create a calm atmosphere and conduct relaxing activities.</td>
</tr>
<tr>
<td><strong>Examine thoughts and emotions</strong></td>
</tr>
<tr>
<td><strong>When Teacher A reviewed the talking rules, she mentioned their purpose and invited students to explain why they were important.</strong></td>
</tr>
<tr>
<td><strong>Child B did not understand when a TA challenged his ideas. It was necessary to explicitly probe his understanding of the activity and the TA’s argument. Another TA explained to Child B that he was able to finish the activity because he listened to others during group work. She also acknowledged when he shared a relevant contribution and when his ideas were shared by others. She openly talked with Child B about his participation, making evident helpful behaviours (motivating too).</strong></td>
</tr>
<tr>
<td><strong>Teacher C talked openly about the talk when the class faced difficulties during a discussion (e.g., talking over others, not listening).</strong></td>
</tr>
<tr>
<td><strong>Teacher A helped Child A to regulate his behaviour and calm down by doing hand signals related to their tapping activities. Child A replied to the teacher using the same signal (Related to alternative forms of communication see principle below).</strong></td>
</tr>
<tr>
<td><strong>Examine thoughts and emotions</strong></td>
</tr>
<tr>
<td><strong>Explicitly ask students if they understand the activity they are conducting. Alternatively, be explicit if challenging one of their ideas.</strong></td>
</tr>
<tr>
<td><strong>Talk about/ make explicit to a student what behaviours/ forms of contributing to dialogue have helped the student to participate/ carry out a class activity.</strong></td>
</tr>
<tr>
<td><strong>Provide reasons or explain the purpose of certain expected behaviours or steps in an activity.</strong></td>
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</tbody>
</table>
| Modify/adjust the environment | Teachers A and C established specific arrangements for discussions:  
  - Teacher A: many whole-class discussions with students sitting in a circle on the carpet; debates dividing the classroom.  
  - Teacher C: encouraged "listening chairs"; some whole-class conversations on the carpet; debates dividing the classroom.  

  Considering Child A's sensory sensitivities, Teacher A:  
  - removed distracting objects,  
  - provided him with a soothing object during some discussions. | Child C willingly followed the rule of the "listening chairs" (turning his chair to see every person that contributed). Child A also followed instructions, knowing when to sit in a circle.  

  Another aspect to regulate was the class' behaviour. Child A was sensitive to the noise caused by classmates. Child B experienced discomfort when his classmates looked at him. Teachers could ask the class to adjust their behaviour as part of arranging the environment. I also observed that classmates could help remove distracting objects or ask others to adjust their behaviour (in Classrooms A and B).  

  Child A was easily distracted by different stimuli and sought haptic stimulation (also constantly approaching the TA). Teacher A provided him with soothing objects. | Modify/adjust the environment | Ask the class to adjust their behaviour during discussions.  

  Have available objects that could be soothing for the child.  

  Place students next to peers that are open to guiding the student during an activity. |

| Physical environment  
Establish a particular layout for discussions (e.g., seating arrangement).  
Adjust the classroom environment and plan activities that consider students' sensory sensitivities and/or communication preferences (e.g., quieter activities). | The three teachers promoted small-group, collaborative activities as part of their day-to-day practice.  
  - Teacher B paired up Child B with a classmate that did well in Maths to help him go through some activities. | In Classroom B, Child B’s participation in the activities (and interaction with others) was impacted by the difficulty of the task, the provision of different materials (for Child B and his teammates). It was important to also support the peer that acted as the tutor.  

  The focus students required closer support from the teacher or TA to participate in small-group activities (especially Children A and B). Teachers or TAs mediated their interaction with their teammates. This included:  
  - Making their ideas and worries explicit to the team.  
  - Providing advice on how to interact/advance the activity | Provide opportunities to interact with others | Plan activities that are friendly for the autistic student to facilitate his/her interaction with peers. This includes:  
  - Base discussions on students' previous work or familiar topics.  
  - Determine one or a couple of specific dialogue goals.  
  - Use materials that are accessible and are the same for students. | Provide opportunities to interact with others | Re-voice a student's contribution to others during a whole-class or  

| Planning activities  
Promote dialogue in peer-mediated activities that involve collaboration between students. A peer can guide the student's participation. |  

  The three teachers promoted small-group, collaborative activities as part of their day-to-day practice.  
  - Teacher B paired up Child B with a classmate that did well in Maths to help him go through some activities. |  

  The focus students required closer support from the teacher or TA to participate in small-group activities (especially Children A and B). Teachers or TAs mediated their interaction with their teammates. This included:  
  - Making their ideas and worries explicit to the team.  
  - Providing advice on how to interact/advance the activity | Build on ideas | Re-voice a student’s contribution to others during a whole-class or |
<table>
<thead>
<tr>
<th>Add features that are intrinsically motivating for the students</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Activities</strong></td>
</tr>
<tr>
<td>Promote dialogue in activities with characteristics or outcomes that are desirable or motivating for the students. Some examples are:</td>
</tr>
<tr>
<td>• talking about topics of interest,</td>
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<tr>
<td>• having opportunities to share &quot;out of the box&quot; ideas,</td>
</tr>
<tr>
<td>• receiving praise that materialises in a physical register (e.g., behaviour chart),</td>
</tr>
<tr>
<td>• having the opportunity to lead a class discussion or activity.</td>
</tr>
<tr>
<td>Teacher A rewarded students that contributed to dialogue by asking them to move their names up in a Behaviour chart. A similar dynamic was already existent in her classroom. However, she related it to participating in discussions.</td>
</tr>
<tr>
<td>Teacher A, at times, asked Child A to coordinate activities (he had shown that he enjoyed it).</td>
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<tr>
<td>The TA in Classroom C provided participation tokens. These tokens were not only meant for Child C.</td>
</tr>
<tr>
<td>I observed in Classroom A that giving the child a sense of control over what was happening in the classroom (including peers' behaviour) seemed to be motivating for Child A. It helped him to sustain his attention in the activity.</td>
</tr>
<tr>
<td>For Child B it was motivating to know that he could guide the teacher or the TA during a 1-on-1 interaction.</td>
</tr>
<tr>
<td>Add features that are intrinsically motivating for the students</td>
</tr>
<tr>
<td><strong>No specific adjustment for this principle.</strong></td>
</tr>
<tr>
<td>Use/encourage different communication modalities</td>
</tr>
<tr>
<td>Build on ideas</td>
</tr>
<tr>
<td>Guide direction of dialogue or activity</td>
</tr>
<tr>
<td>Alternative forms of communicating</td>
</tr>
<tr>
<td>Monitor students’ usual movements and sounds and when they happen.</td>
</tr>
</tbody>
</table>
### Table B.3. Design Framework 2

#### Design framework 2

**Use prompts or cues**

1. Physically and or visually represent how ideas are built during dialogue and abstract concepts or problems (including the process of solving it) while these ideas or problems are described.
2. Invite students to build on ideas verbally and physically, adding blocks or physically changing place.
3. Guide students’ participation through guided questioning, with verbal prompts that feed in salient information regarding the steps to carry out an activity. The questioning can guide the student through each step, one by one.
4. Provide options of answers/courses of action to choose from to solve a problem or carry out an activity.
5. Focus attention on (bring back students to) the dialogue at hand when key information is being shared. Alternatively, make short comments during a discussion to clarify/inform about its content.
6. Display/ have available physical/ visual prompts associated with the expected forms of contributing.
7. Use prompts that include relevant information on the steps to carry out an activity or the topic of conversation. Teachers may refer to objects present in the classroom to illustrate a point.
8. Cue the start or end of discussions with other forms of communication besides speech.

**Model behaviour**

9. Explicitly model ways of contributing to dialogue, including verbal and non-verbal forms of communication. Clarify what it modelled and when. Teachers may accompany open discussions related to specific forms of communication with modelling.
10. Model how to formulate a clear response.

**Provide guidelines**

11. Explicitly invite students to add information or comment on ideas that the teacher has expressed during dialogue.
12. Refer to specific expected forms of contributing that are relevant for the ongoing dialogue or contingently to difficulties experienced during dialogue.
13. Synthetising information previously mentioned in dialogue that helped carrying out an activity/ solving problem (including information mentioned seconds ago).
14. Refer to the steps to carry out a short activity or the different tasks that are involved in it. Make explicit what is first and what comes next, so the ‘trajectory’ of a short activity is explicit.
15. Repeat instructions in a synthetized way. Particularly, emphasise and make explicit individual goals and specific tasks that are expected from a student.
16. Indicate the roles that each student will assume in a small-group activity. Specify individual tasks related to each role, clearly assigning them to each student.

**Examine thoughts and emotions**

17. Explicitly ask students if they understand the activity they are conducting and be explicit if one of their ideas is being challenged.
18. Talk about/ make explicit to the student what behaviours/ forms of contributing to dialogue have helped the student to participate/ carry out a class activity.
19. Provide reasons or explain the purpose of certain expected behaviours or steps in an activity.
20. Monitor if students experience negative thoughts or feelings.
21. Plan breaks or relaxing time for class discussions, creating a calm atmosphere and/or conduct relaxing activities.

**Modify/adjust the environment**

22. Establish a particular classroom layout for class discussions (e.g., seating arrangements, dynamics like “listening chairs”, sitting on the carpet).
23. Adjust classroom environment and plan class activities considering students’ sensory sensitivities and communication preferences. This includes:
   - Ask classmates to adjust their behaviour during whole-class and/or small-group discussions (e.g., regulate voice or noise volume, ask others to not watch the student while the student contributes, leave enough space for classmates).
   - Have available objects that could be soothing for the students.
   - Place the student next to peers that are open to guide the student during an activity.

**Provide opportunities to interact with others**

24. Promote dialogue in collaborative and peer mediated activities that are friendly for the student to facilitate their interaction with peers. This includes:
   - Base discussions on students’ previous work or familiar topics.
   - Determine one or a couple of specific dialogue goals.
   - Use materials that are accessible and are the same for students.
25. Re-voice a student’s contribution to others during a whole-class or small-group discussions. Make evident the relevance of the contribution. Encourage others to engage with the students’ idea.
26. Guide or facilitate students’ participation in small-group activities, providing short advice on how to interact with or reply to others.

**Add features that are intrinsically motivating for the students**

27. Promote dialogue in activities with characteristics and outcomes that are desirable or motivating for the students. Some examples include:
   - Talk about topics of interest.
   - Have opportunities to share “out of the box” ideas.
   - Receive praise that materialises in a physical register (e.g., behaviour chart).
   - Have the opportunity to lead class discussions or activity (giving some sense of control or responsibility).

**Use/encourage different communication modalities**

28. Provide opportunities to build on ideas that were discussed previously in a conversation that has ended. Teachers may assign an area in the classroom to leave a note or invite students to write their opinions and share them afterwards.
29. Propose different alternatives for ways of contributing to class discussions, including particular formats for verbal utterances and ways of contribution different from speech (e.g., drawing). Teachers may do this when negotiating the expected forms of contributing to a discussion; and may try to incorporate the student’s usual non-speech forms of contributing.
30. Use different forms of communication besides speech during class discussions (e.g., show/share an object, hand signals, writing or drawing contributions). Teachers may clarify their speech with body language, pointing at classroom resources or other students and writing.
B3 Design Framework 3

After the intervention study, I noticed that the initial principles did not wholly illustrate the strategies I added to them after the intervention. I also found similarities between strategies that corresponded to different design principles. Accordingly, I regrouped the updated versions of the strategies and refined the design principles to make them match the strategies more closely. Table B.4 maps the similarities based on which I conducted the regrouping.

Table B.4. Re-arrangement of design principles from Design framework 2 to Design framework 3.

<table>
<thead>
<tr>
<th>Design framework 2</th>
<th>Strategies</th>
<th>Design framework 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Use prompts or cues</strong></td>
<td>1. Physically and or visually represent: o how ideas are built during dialogue, and o abstract concepts or problems (including the process of solving them) while these ideas or problems are described.</td>
<td><strong>Incorporate visual and/or physical representation to verbal contributions.</strong></td>
</tr>
<tr>
<td></td>
<td>2. Invite students to build on ideas verbally and physically, adding blocks or physically changing places.</td>
<td><strong>Provide options.</strong></td>
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<td></td>
<td>3. Guide students’ participation through guided questioning, with verbal prompts that feed in salient information regarding the steps to carry out an activity. The questioning can guide the student through each step, one by one.</td>
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<td></td>
<td>4. Provide options of answers/courses of action to choose from to solve a problem or carry out an activity.</td>
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<td></td>
<td>5. Focus attention on (bring back others) the dialogue at hand when key information is being shared. Alternatively, make short comments during a discussion to clarify/inform about its content.</td>
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<td>6. Display/ have available physical/ visual prompts associated with the expected forms of contributing. Teachers may have available general reference materials related to class dialogue.</td>
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<td>7. Use prompts that include relevant information on the steps to carry out an activity or the topic of conversation. Teachers may refer to objects in the classroom to illustrate a point. These prompts can be displayed temporally or continuously.</td>
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<td></td>
<td>8. Cue the start or end of discussions with forms of communication different to speech.</td>
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<tr>
<td>Model behaviour</td>
<td>9. Model ways of contributing to dialogue, including verbal and non-speech forms of communication.</td>
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<td></td>
<td>10. Model how to formulate a clear response.</td>
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<td></td>
<td>11. Clarify what it is modelled and when. Teachers may accompany open discussions related to specific forms of communication with modelling.</td>
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</tr>
<tr>
<td>Provide guidelines</td>
<td>12. Explicitly invite students to add information or comment on ideas that the teacher expressed during dialogue.</td>
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<tr>
<td></td>
<td>13. Refer to specific expected forms of contributing that are relevant to the ongoing dialogue or contingently to difficulties experienced during dialogue.</td>
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<tr>
<td></td>
<td>14. Synthesise information previously mentioned in dialogue that helped carry out an activity/ solving problem (including information mentioned seconds ago).</td>
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<tr>
<td></td>
<td>15. Refer to the steps to carry out a short activity or the different tasks that are involved in it. Alternatively, refer to the timetable. Make explicit what is first and what comes next, so the ‘trajectory’ of a short activity is explicit.</td>
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<tr>
<td></td>
<td>16. Indicate the roles that each student will assume in a small-group activity. Specify the individual tasks related to each role, clearly assigning them to each student. Alternatively, point out the potential roles that students can adopt.</td>
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<tr>
<td></td>
<td>17. Repeat instructions in a synthetized way. Particularly, emphasise and make explicit individual goals and specific tasks that are expected from a student.</td>
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</tr>
<tr>
<td>Examine thoughts and emotions</td>
<td>18. Probe students’ understanding by explicitly asking if they understand the activity they are conducting. Be explicit if one of their ideas is being challenged.</td>
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<td></td>
<td>19. Talk openly about the different components of dialogue and reflect with the class on their importance.</td>
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<td></td>
<td>20. Talk about/ make explicit to a student what behaviours/ forms of contributing to dialogue have helped the student to participate/ carry out a class activity.</td>
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<td></td>
<td>21. Provide reasons or explain the purpose of certain expected behaviours or steps in an activity.</td>
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<td></td>
<td>22. Monitoring if students experience negative thoughts or feelings during discussions (invite them to think about it).</td>
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<td></td>
<td>23. Plan breaks or relaxing time for class discussions, create a calm atmosphere and/or conduct relaxing activities.</td>
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<tr>
<td>Modify/adjust the environment</td>
<td>24. Establish a particular classroom layout for class discussions (e.g., seating arrangements, dynamics like &quot;listening chairs&quot;, sitting on the carpet).</td>
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</table>

Break down into steps or recap the sequence of key information.
Be explicit.
Check in with the student, providing 1-on-1 support.
Prepare overall classroom layout and social environment.
### 25. Block or remove distracting or irrelevant objects or stimuli.

### 26. Adjust classroom environment and plan class activities considering students’ sensory sensitivities and communication preferences. This includes:
- Ask classmates to adjust their behaviour during whole-class and/or small-group discussions (e.g., regulate voice or noise volume, ask others to not watch the student while the student contributes, leave enough space for classmates).
- Have available objects that could be soothing for the students.
- Place the student next to peers that are open to guide the student during an activity.

### Provide opportunities to interact with others.

### 27. Promote dialogue in collaborative and peer mediated activities that are friendly for the student to facilitate their interaction with peers. This includes:
- Base discussions on students’ previous work or familiar topics.
- Determine one or a couple of specific dialogue goals.
- Use materials that are accessible and are the same for students.

### 28. Re-voice a student’s contribution to others during a whole-class or small-group discussions. Make evident the relevance of the contribution. Encourage others to engage with the students’ idea.

### 29. Guide or facilitate students’ participation in small-group activities, providing short advice on how to interact with or reply to others.

### Add features that are intrinsically motivating for the students

### 30. Promote dialogue in activities with characteristics and outcomes that are desirable or motivating for the students. Some examples include:
- Talk about topics of interest.
- Have opportunities to share “out of the box” ideas.
- Receive praise that materialises in a physical register (e.g., behaviour chart).
- Have the opportunity to lead class discussions activity (giving some sense of control or responsibility).

### Plan accessible activities and potential forms of participation for discussions

### Use/encourage different communication modalities

### 31. Propose different alternatives for ways of contributing to class discussions, including ‘particular formats’ for verbal utterances (e.g., sentence stem) and forms of contribution different from speech (e.g., drawing).

### 32. Plan a moment to openly discuss, negotiate with students and explain how students will contribute to a discussion. Try to incorporate the students’ usual or preferred forms of contribution (verbal and non-speech).
33. Provide opportunities to build on ideas that were discussed previously in a conversation that has ended. Teachers may assign an area in the classroom to leave a note or invite students to write their opinions and share them afterwards.

34. Use different forms of communication besides speech during class discussions (e.g., show/share an object, hand signals, writing or drawing contributions). Teachers may clarify their speech with body language, by pointing at classroom resources or other students, and writing.

The new principles of Design Framework 3 were the following.

1. Incorporate visual and/or physical representation to verbal contributions.
2. Provide options.
3. Break down into steps or recap the sequence of key information.
4. Be explicit.
5. Check in with the student, providing 1-on-1 support.
6. Prepare overall classroom layout and social environment.
7. Mediate students’ dialogue with peers and engagement with whole-class discussions.
8. Plan accessible activities and potential forms of participation for discussions.

**B4 Design Framework 4**

After implementing the online course, I adapted the design framework one final time. I took into account the teachers’ interest in the strategies for the planning of accessible discussions and the incorporation of non-speech communication. Therefore, I divided the principles that were related to planning discussions (‘prepare classroom environment’ and ‘plan accessible activities and potential forms of participation’) into five new principles.

*Table B.5. Changes in two design principles of Design Framework 3*

<table>
<thead>
<tr>
<th>Principles from Design Framework 3</th>
<th>New principles (Design Framework 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepare the classroom environment.</td>
<td>• Adjust overall classroom layout and social environment.</td>
</tr>
<tr>
<td></td>
<td>• Have available temporal or permanent resources that support students’ participation.</td>
</tr>
<tr>
<td>Plan accessible activities and potential forms of participation for discussions.</td>
<td>• Plan to promote dialogue in activities that are accessible and in which dialogue is essential to advancement of the activity.</td>
</tr>
</tbody>
</table>
- Plan intrinsically motivating discussions or those that acknowledge students’ communication preferences.
- Create opportunities for students to contribute to discussions through different forms of communication.

Table B.6 displays the eleven design principles of Design Framework 3, each with their associated strategies (which added up to 39 strategies). It also indicates the clustering of the eleven principles into the three meta-principles.

Table B.6. Design framework 4 (meta-, pragmatic and specific principles)

<table>
<thead>
<tr>
<th>Meta-principles</th>
<th>Pragmatic principles (and strategies)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make the structure of discussions explicit and often clarify or recapitulate their content.</td>
<td>Incorporate a visual or physical representation into verbal contributions.</td>
</tr>
<tr>
<td></td>
<td>1. Physically and or visually represent:</td>
</tr>
<tr>
<td></td>
<td>o how ideas are built during dialogue, and</td>
</tr>
<tr>
<td></td>
<td>o abstract concepts or problems (including the process of solving them)</td>
</tr>
<tr>
<td></td>
<td>while these ideas or problems are described.</td>
</tr>
<tr>
<td></td>
<td>2. Invite students to build on ideas verbally and physically, adding blocks or physically changing places.</td>
</tr>
<tr>
<td>Be explicit.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Explicitly ask students to add information or comment on ideas that the teacher expressed during dialogue.</td>
</tr>
<tr>
<td></td>
<td>4. Be explicit if students’ ideas are being challenged or explicitly probe their understanding.</td>
</tr>
<tr>
<td></td>
<td>5. Clarify what it is modelled and when. Teachers may accompany open discussions related to specific forms of communication with modelling.</td>
</tr>
<tr>
<td></td>
<td>6. Indicate the roles that each student will assume in a small-group activity. Specify the individual tasks related to each role, clearly assigning them to each student.</td>
</tr>
<tr>
<td></td>
<td>7. Talk openly about the different components of dialogue and reflect with the class on their importance. Teachers may describe the behaviours and forms of contribution that can be expected during a class discussion.</td>
</tr>
<tr>
<td>Break down into steps or recap key information.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. Refer to specific expected forms of contributing that are relevant to the ongoing dialogue or contingently to difficulties experienced during dialogue.</td>
</tr>
<tr>
<td></td>
<td>9. Synthesise information previously mentioned in dialogue that helped carry out an activity/ solving problem (including information mentioned seconds ago).</td>
</tr>
<tr>
<td></td>
<td>10. Refer to the steps to carry out a short activity or the different tasks that are involved in it. Alternatively, refer to the timetable. Make explicit what is first and what comes next, so the ‘trajectory’ of a short activity is explicit.</td>
</tr>
<tr>
<td></td>
<td>11. Repeat instructions in a synthesized way. Particularly, emphasise and make explicit individual goals and specific tasks that are expected from a student.</td>
</tr>
<tr>
<td>Provide options.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12. Provide options of answers/ courses of action to choose from to solve a problem or carry out an activity.</td>
</tr>
</tbody>
</table>
13. Propose different alternatives for ways of contributing to class discussions, including ‘particular formats’ for verbal utterances (e.g., sentence stem) and ways of contributing different from speech (e.g., Drawing).
14. Point out the potential roles that students can adopt during small-group dialogue.

<table>
<thead>
<tr>
<th>Have available temporal and permanent resources that support participation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. Display/ have available physical/ visual prompts associated with the expected forms of contributing to the activity at hand.</td>
</tr>
<tr>
<td>16. Use prompts that include relevant information on the steps to carry out an activity or the topic of conversations. Teachers may refer to objects in the classroom to illustrate a point. These prompts can be displayed temporarily or continuously.</td>
</tr>
<tr>
<td>17. Teachers may have available general reference materials related to class dialogue.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conduct discussions in response to the students’ capabilities, strengths, and sensory sensitivities.</th>
</tr>
</thead>
<tbody>
<tr>
<td>18. Guide students’ participation through guided questioning, with verbal prompts that feed in salient information regarding the steps to carry out an activity. The questioning can guide the student through each step, one by one.</td>
</tr>
<tr>
<td>19. Focus attention on (bring back others) the dialogue at hand when key information is being shared. Alternatively, make short comments during a discussion to clarify/inform about its content.</td>
</tr>
<tr>
<td>20. Model ways of contributing to dialogue, including verbal and non-speech forms of communication.</td>
</tr>
<tr>
<td>21. Model how to formulate a clear response.</td>
</tr>
<tr>
<td>22. Re-voice students’ contributions to others during a whole-class or small-group discussions. Make evident the relevance of the contributions, and encourage others to engage with the students’ idea.</td>
</tr>
<tr>
<td>23. Guide or facilitate students’ participation in small-group activities, providing short advice on how to interact with or reply to others.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mediate dialogue between the student and peers and the student’s engagement with whole-class discussions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>24. Probe student’s understanding of a class discussion or activity.</td>
</tr>
<tr>
<td>25. Talk about/ make explicit to a student what behaviours/ forms of contributing to dialogue have helped the student to participate/ carry out a class activity.</td>
</tr>
<tr>
<td>26. Provide reasons or explain the purpose of certain expected behaviours or steps in an activity.</td>
</tr>
<tr>
<td>27. Monitor if students experience negative thoughts or feelings during discussions (invite them to think about it).</td>
</tr>
<tr>
<td>28. Provide opportunities to build on ideas that were discussed previously in a conversation that has ended. Teachers may assign an area in the classroom to leave a note or invite students to write their opinions and share them afterwards.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Check in with the student, providing 1-on-1 support.</th>
</tr>
</thead>
<tbody>
<tr>
<td>29. Establish a particular classroom layout for class discussions (e.g., seating arrangements, dynamics like “listening chairs”, sitting on the carpet).</td>
</tr>
<tr>
<td>30. Block or remove distracting or irrelevant objects or stimuli.</td>
</tr>
</tbody>
</table>

Prepare overall classroom layout and social environment.
31. Adjust classroom environment considering students’ sensory sensitivities and interaction preferences. This includes:
   - Ask classmates to adjust their behaviour during whole-class and/or small-group discussions (e.g., regulate voice or noise volume, ask others to not watch the student while the student contributes, leave enough space for classmates).
   - Have available objects that could be soothing for the students.
   - Place the student next to peers that are open to guide the student during an activity.

32. Promote dialogue in collaborative and peer mediated activities that are friendly for the student to facilitate their interaction with peers. This includes:
   - Base discussions on students’ previous work or familiar topics.
   - Determine one or a couple of specific dialogue goals.
   - Use materials that are accessible and are the same for all students.

33. Plan class activities considering students’ sensory sensitivities.

34. Plan breaks or relaxing time for class discussions, create a calm atmosphere and/or conduct relaxing activities.

35. Plan discussions with consideration of students’ capabilities and communication preferences and promote openness about different forms of participation.

36. Plan to promote dialogue in activities that are accessible and in which dialogue is key to advance.

37. Promote dialogue in activities with characteristics and outcomes that are desirable or motivating for the students. Some examples include:
   - Talk about topics of interest.
   - Have opportunities to share “out of the box” ideas.
   - Receive praise that materialises in a physical register (e.g., behaviour chart).
   - Have the opportunity to lead class discussions activity (giving some sense of control or responsibility).

38. Try to incorporate the students’ usual or preferred forms of contribution to discussions (verbal and non-speech) to the ones that will be acknowledged and expected in an activity.

39. Cue the start or end of discussions with forms of communication different to speech.
Appendix C  Interview schedules and questionnaires

C1  Baseline teacher interview for intervention study

Teacher semi-structured interview schedule

- **Characteristics of the interview:**
  Thank you for agreeing to be interviewed for this study. This interview will last between 45 and 60 minutes, during which we will talk about your experience teaching autistic students and the needs that you identify in your current classroom. We will also talk about the classroom dialogue and how do you structure the classroom interactions to encourage the participation of your students. I will audio record the interview, so I can engage fully in the conversation and listen to the recording later.

- **Questions about teaching experience and practice:**

Personal information: Name, Age, Gender

<table>
<thead>
<tr>
<th>Theme</th>
<th>Main questions</th>
<th>Follow up questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience</td>
<td>1. Can you please describe how long you have been teaching for?</td>
<td>1.1 Number of years’ teaching experience?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.2 Are you (have you been) teaching assistant, SENCO, base teacher, other?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.3 Is your teaching experience mainly in Primary or Secondary? What years?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.4 In which setting have you mainly taught? (special schools, special unit within</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mainstream, mainstream school, children with SEND)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.5 Can you describe the types of children that you have experience teaching?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.6 How has your teaching style/philosophy changed over the years?</td>
</tr>
<tr>
<td>Professional</td>
<td>2. Can you tell me about your professionalisation as a teacher?</td>
<td>2.1 Number of years training?</td>
</tr>
<tr>
<td>development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current practice</td>
<td>3. Can you tell me about your role at your school?</td>
<td>3.1 Early years; KS1; KS2; KS3 teacher and/or coordinator; Teaching assistant;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trainee teacher; Newly qualified teacher; Professional development leader;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deputy principal/deputy head; Principal/head teacher; Other/additional roles (please</td>
</tr>
<tr>
<td></td>
<td></td>
<td>specify).</td>
</tr>
<tr>
<td></td>
<td>4. Could you please describe the typical</td>
<td></td>
</tr>
</tbody>
</table>

141 (Lindsay et al., 2014)
142 (Bond et al., 2017)
143 (Billings & Fitzgerald, 2002)
144 (Hennessy et al., 2017)
5. Tell me about the students in your class.\textsuperscript{143}

6. What do you think about inclusion in mainstream classrooms?

5.1 Can you tell me about your current autistic student?

6.1 What are the benefits?

6.2 What are the challenges?

6.3 How should it be regulated?

6.4 What do you think about the inclusion of autistic students?

6.5 What are the main challenges you have encountered in educating children with autism? Can you give an example? Do you have an example with your current student?\textsuperscript{141}

- **Questions about the inclusion of autistic students:**

  The following questions are organised in five categories based on Lindsay et al. (2014) paper regarding the strategies teachers have to include autistic children in classrooms.

<table>
<thead>
<tr>
<th>Strategies (Lindsay et al., 2014)</th>
<th>Main question</th>
<th>Possible follow up questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advocating for resources and essential training</td>
<td>7. What is your approach to teaching children with autism spectrum conditions?\textsuperscript{141}</td>
<td>7.1 What approaches for teaching autistic children do you consider to be the most effective?\textsuperscript{142}</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7.2 What behaviour management approaches for autistic students do you consider to be effective?\textsuperscript{142}</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7.3 What are the strengths and difficulties of the autistic children you have taught?\textsuperscript{142}</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7.4 What are the difficulties of your current student? Are there particular subjects in which, he/she excels in and/or enjoy?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7.5 What are the ways and areas in which you feel you are most effective in working autistic students?\textsuperscript{142}</td>
</tr>
</tbody>
</table>

\textsuperscript{145} (Howe & Stagg, 2016)
<table>
<thead>
<tr>
<th>Tailored teaching methods</th>
<th>8. What works well within your classroom in terms of including autistic children (educationally, and socially)(^\text{141})</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7.6 What are the ways and areas in which you feel you are least effective in working with autistic students?(^\text{142})</td>
</tr>
<tr>
<td></td>
<td>8.1 Are the classroom activities designed with the intention that all students in class participate in them? If so, what elements are incorporated in these activities to make them accessible to all the students? (e.g., visual structure)(^\text{146})</td>
</tr>
<tr>
<td></td>
<td>8.2 Are there particular schedules that you follow regularly? Which ones are those? Do all the students in your class follow the same classroom routines?(^\text{146})</td>
</tr>
<tr>
<td></td>
<td>8.3 What is the best way to communicate with your autistic students? Including the communication about instructions and activities (^{142})</td>
</tr>
<tr>
<td></td>
<td>8.4 Are there particular forms in which you provide communication opportunities in class for your students that consider your autistic student’s strengths and difficulties?(^\text{146})</td>
</tr>
<tr>
<td></td>
<td>8.5 Do you use any particular reinforcer to engage your autistic student in the activity?</td>
</tr>
<tr>
<td></td>
<td>8.6 What do you consider is the best way to deal with a ‘problem behaviour’ from your autistic student?(^\text{146}) Do you deal with this in the same way as with your other students?</td>
</tr>
<tr>
<td></td>
<td>8.7 Do you adapt the learning environment to make it more accessible for your autistic students? How can you adapt it to their sensory needs?(^\text{142})</td>
</tr>
<tr>
<td></td>
<td>8.8 Have you made any adaptations to the curriculum to support these students?(^\text{142})</td>
</tr>
<tr>
<td>Teamwork within the school</td>
<td>9. How can the school best meet the needs of autistic students?(^\text{147})</td>
</tr>
<tr>
<td></td>
<td>9.1 What services do you consider would be important that the school provides to autistic students? Do they include specialised classrooms?</td>
</tr>
<tr>
<td></td>
<td>9.2 Should outside services be incorporated to support the inclusion of these students?</td>
</tr>
</tbody>
</table>

\(^{146}\) (Coman et al., 2013)

\(^{147}\) (Pellicano et al., 2014)
### Building a rapport with parents and students

<table>
<thead>
<tr>
<th>Question</th>
<th>Possible follow up questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. What is the role of the parents of your autistic students in your school?</td>
<td>10.1 How would you encourage the ‘involvement’ of the parents of autistic children in school? 142</td>
</tr>
<tr>
<td></td>
<td>10.2 How would you enhance the collaboration between teachers, staff and parents to help autistic children do well in school? 142</td>
</tr>
</tbody>
</table>

### Building a climate of acceptance within the classroom through disability awareness, education and sensitivity training

<table>
<thead>
<tr>
<th>Question</th>
<th>Possible follow up questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. What are your student’s relationships like with peers and staff in school?</td>
<td>11.1 How does your student’s social interaction compare to that of other pupils?</td>
</tr>
<tr>
<td></td>
<td>11.2 Do you encourage peer mediated activities in which students can support their peers, participate and interact together? 142, 146</td>
</tr>
<tr>
<td></td>
<td>11.3 Do you include in your practice the teaching of social and language skills, as well as appropriate forms of communication? 146</td>
</tr>
<tr>
<td></td>
<td>How do you carry this out?</td>
</tr>
<tr>
<td></td>
<td>11.4 Have you noticed if other students in the class have made fun of contributions that your autistic student has made during whole-class activities? 148</td>
</tr>
<tr>
<td></td>
<td>11.5 Have you noticed if other students have excluded your autistic students from a group activity?</td>
</tr>
<tr>
<td></td>
<td>11.6 Have you noticed if your autistic student has made fun of other pupil’s contribution during whole-class discussions?</td>
</tr>
<tr>
<td></td>
<td>11.7 Have you noticed if your autistic student has excluded other students from a group activity?</td>
</tr>
</tbody>
</table>

- **Questions about the classroom dialogue:**

  The following questions are organised in three main themes that I identified in the questions that I selected for this part of the interview. They are more general in terms of classroom dialogue.

<table>
<thead>
<tr>
<th>Theme</th>
<th>Main question</th>
<th>Possible follow up questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of talk in the classroom</td>
<td>12. How do you use talk in lessons? 144</td>
<td>12.1 Do you have rules for talking in class? What are those rules? 143</td>
</tr>
<tr>
<td>Classroom dialogue</td>
<td>13. Would you say there are distinctions</td>
<td>13.1 How would you describe ‘classroom dialogue’? 144</td>
</tr>
</tbody>
</table>

148 (Chen & Schwartz, 2012)
| Roles in classroom dialogue | 14. Have you used ‘dialogic teaching’ previously? | 13.2 What compels you to carry out dialogues with your students? 
13.3 Which students talk more and less in whole-class dialogues (activities), and why do you think this is the case? 
14.1 How would you characterise a ‘dialogic classroom’? 
14.2 Could you please mention an example? 
14.3 How would you characterise a ‘dialogic classroom’? 
14.2 Could you please mention an example? |
|---|---|---|
| 15. Can you tell me about your role and your students’ roles in whole-class dialogues (activities)? | 15.1 How would you compare your role during a whole-class activity (group dialogue) and your role during other classroom activities? 
15.2 Do you think your students change their participatory style during whole-class dialogues, and if so, how? 
15.3 What roles do different students play during whole-class dialogues? |

- **Closing the interview**

  16. Do you have any suggestions/advice for how educators could facilitate the inclusion of autistic children in the classroom?

  17. Is there anything else that you would like to add that we did not get a chance to talk about?

**Thank you!**

(Questions adapted from: Billings & Fitzgerald, 2002; Bond et al., 2017; Chen & Schwartz, 2012; Coman et al., 2013; Hennessy et al., 2017; Howe & Stagg, 2016; Lindsay et al., 2014; Pellicano et al., 2014b).
C2 Parent questionnaire for intervention study

“My child’s current experiences in school”

Thank you for agreeing to participate in this study and to fill in this questionnaire. I would be grateful if you could complete all five pages.

Name: ……………………………………. Child’s name: …………………………….

Child’s date of Birth (Month in words): …….. Today’s date (Month in words): ………

Part I.

The questions in Part I will help me gain a better understanding of the experiences of your child in a mainstream primary school and your perception of how well your child’s inclusion in the school works (or worked) for your child.

- Your perspective of the current experiences of your child in school

Please rate the following statements about your child’s inclusion in school by ticking a box that reflects your level of agreement with each one of them the most appropriately (1 = strongly disagree, 3 = neutral, 5 = strongly agree). If there is any question that you feel not able to comment, please ask your son, daughter, partner or the person to answer.

*Note: Most of the following questions have been organised in five groups based on the strategies for including autistic children in schools found by Lindsay et al. (2014) by means of interviewing experienced teachers. A column was added to the left to show the questions that are related to each of the strategies.

<table>
<thead>
<tr>
<th>Lindsay et al.’s (2014) strategies</th>
<th>Opinions regarding the current inclusion of your child in a mainstream primary school</th>
<th>Strongly disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly agree (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advocating for resources and essential training</td>
<td>1. I find the school’s approach for teaching my child effective</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td></td>
<td>2. The teacher and school staff use effective behaviour management approaches with my child</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td></td>
<td>3. The teacher understands my child’s strengths</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td></td>
<td>4. The teacher understands my child’s difficulties</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td></td>
<td>5. The services provided so far in the school for my child have been positive for my child and my family</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Tailored teaching methods</td>
<td>6. The curriculum has been adapted to support my child (e.g., the assignments, materials, readings used in the course, lesson activities)</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>

149 (Bond et al., 2017)
150 (Rollins et al., 2016)
<table>
<thead>
<tr>
<th>Statements</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. The tests and assessments to evaluate student learning have been adapted to support my child.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>8. The teacher and school staff personalise learning to meet the needs of my child (e.g., identifying valid educational goals, outlining personalised instructional procedures, including teaching of social skills).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>9. The teacher uses effective strategies to support my child’s understanding of instructions and activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. The classroom environment has been adapted to the sensory needs of my child.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. The teacher knows how to communicate effectively with my child.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. The school staff know how to communicate effectively with my child</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. The teacher communicates my child’s needs with me and the wider school community (e.g., other of my child’s teachers).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. My family has had the chance to get involved with the school to personalise the teaching for my child</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. The school encourages my collaboration with teachers and staff to help my child to do well in school</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. The teacher and/or school has recommended me specific forms of effective communication with my child</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>17. The teacher and/or the school recommended me schedules that can help structure my child’s day.</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>18. Our family and the teachers in school have a shared understanding about the nature of autism</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Our family and the teachers in school have a shared understanding about the appropriate educational goals for my child</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. There are school and class activities that promote cooperative learning between my child and his/her peers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. My child has developed a positive relationship with his/her teachers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. My child has developed positive relationships with some of his/her peers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. My child generally enjoys going to school</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Howe &amp; Stagg, 2016)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. My child’s sensory processing of touch* affects his/her experience in the classroom (*sensitivity to the texture of the materials in class and/or the texture of fabrics, emotional or aggressive reactions to touch).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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151 (Yu, 2013)
152 (Baker, 2013)
153 (Rubenstein et al., 2015)
154 (Dillon & Underwood, 2012)
155 (Howe & Stagg, 2016)
<table>
<thead>
<tr>
<th>Strongly disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly agree (5)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>25. There are positives about how my child experiences touch differences.</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>26. My child’s visual sensory processing* negatively affects his/her experience in the classroom (*stares at all the details in the classroom, discomfort with the brightness of the light in the classroom).</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>27. There are positives about how my child experiences vision differences.</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>28. My child’s hearing sensory processing* negatively affects his/her experience in the classroom (*sensitivity and negative responses to unexpected or loud noises, difficulty working with background noise).</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>29. There are positives about how my child experiences hearing differences.</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>30. My child’s sensory processing of smell* negatively affects his/her experience in the classroom (*deliberately smells objects, sensitivity to smells in a room).</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>31. There are positives about how my child experiences smell differences.</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

Part II.

This is the last part of the questionnaire, it contains open questions about some of your child’s personal characteristics (e.g., in learning and communicating) and your views regarding your child’s inclusion in school. The answers to these questions will allow me to focus on your child's strengths and the issues that you have encountered in your child’s experience in a mainstream classroom to develop personalised teaching strategies.

- **Your views, experiences and suggestions for your child’s inclusion**

Please answer the following open questions writing your views under each question. It would be really useful if you could answer with some examples of your experiences.

1. How would you describe the way your child learns?  

---

155 (Chen & Schwartz, 2012)  
156 (Pellicano et al., 2014)
2. How do you help your child with learning at school?\(^{158}\)

3. How would you describe the way your child communicates? \(^{151}\)

4. How can teachers and school staff promote your child’s communication or provide the ideal language situation for your child? \(^{159}\)

5. Please describe what you know about your child’s opinion regarding school. \(^{151}\)

6. Please describe what you know about your child’s opinion regarding group activities in the classroom.

7. What are the ways and areas in which you feel the school is most effective and the least effective in working with your child? \(^{149}\)

8. Do you have any suggestions/advice for your child’s teachers and school staff for how they could facilitate your child’s inclusion in the classroom? \(^{159}\)

9. What do you think are the benefits and challenges of mainstream schooling for your child? \(^{160,154}\)

10. What do you think needs to be a priority in research on education for children with autism? \(^{161}\)

Is there anything else that you would like to add that was not mentioned in this questionnaire? \(^{161}\)

\(^{158}\) (Carrington & Graham, 2001)
\(^{159}\) (Lindsay et al., 2014)
\(^{160}\) (Lindsay et al., 2013)
\(^{161}\) (Pellicano et al., 2013)
Appendix D  Transcript notation and examples of a coded transcript and analysis with EoC

D1 Transcript notation

I present in Table D.1 the notation system that I used to transcribe verbatim the selected segments of class interactions. I retrieved it from Rojas-Drummond et al. (2017), and it represents a modified version of established procedures proposed by (Mercer, 2000). I used these symbols because they allowed me to create transcripts with sufficient detail to consider the context, speakers’ actions, inaudible and overlapping speech and interruptions. I had utilized these symbols before, so using them made it more manageable for me to create the transcripts.

Table D.1. Notation system for the transcription of class interactions

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>((statement))</td>
<td>Italics between parenthesis</td>
<td>Annotation of non-verbal activity or context.</td>
</tr>
<tr>
<td>[utterance]</td>
<td>Brackets</td>
<td>Indicates the start and end points of overlapping speech.</td>
</tr>
<tr>
<td>[utterance—]</td>
<td>Brackets and m dash</td>
<td>Indicates an interruption of the utterance (in the context of overlapping speech). The utterance is not taken up later.</td>
</tr>
<tr>
<td>“utterance”</td>
<td>Quotation marks</td>
<td>Reading out loud.</td>
</tr>
<tr>
<td>(...)</td>
<td>Inaudible</td>
<td>Indicates that part of the dialogue is inaudible or incomprehensible.</td>
</tr>
<tr>
<td>[...]</td>
<td>Omission of part of the text when speaker reads out loud</td>
<td>Indicates that some part of the text read out loud was omitted from the transcript.</td>
</tr>
<tr>
<td>utterance...</td>
<td>Ellipsis</td>
<td>Indicates an incomplete utterance (which might or might not be taken up again).</td>
</tr>
<tr>
<td>A: incomplete utterance</td>
<td>Interrupted utterance</td>
<td>Indicates that an utterance from speaker A is interrupted by speaker B, and then taken up again by speaker A.</td>
</tr>
<tr>
<td>B: utterance (interruption)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A: ... taken up utterance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**D2 Example of coded transcript**

Table D.2 presents a complete transcript of a CE from the baseline observation in Classroom A. It illustrates the transcript notation I used and how I coded the transcripts. I used two columns for assigning codes to the turns: 1) one for dialogue codes corresponding to the T-SEDA’s categories (and their corresponding codes from SEDA, in parenthesis); and 2) another for non-speech codes and the codes for the autistic students’ behaviours. I marked the codes to which I did not assign a dialogue code with the letter U to highlight that these were uncoded. Each turn represents a speaker’s utterance, and more than one dialogue code could be assigned to them in accordance to their communicative function(s).

*Table D.2. Example of a full coded transcript from a baseline CE from Classroom A*

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1 (Dialogue code)</th>
<th>Code 2 (Non-speech)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Teacher A</td>
<td>Now we are going to be doing some wintery English today. ((Children whisper)) Can someone turn on the lights for me please? ((children gasp)) J could you turn on the lights for me please? Bottoms, good boy ((talking to a child on the carpet)). So, today we are going to be thinking about the winter. Now can anyone remember what they said, in the wintertime, they could see? What could you see in the winter? Remember, I'm looking for, you just say the whole sentence, “I can see” ((writes the phrase while saying it)). And then I want you to give me an adjective and then the noun.</td>
<td>G (G5), C (C1)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Child</td>
<td>(...) that way.</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Teacher A</td>
<td>What is a noun? Can anyone tell me what a noun is? ((a few children put their arms up)) Only one, two, three people know what a noun is? Maybe, if you're not sure, you can whisper into your partner’s or the children’s near you ears what you think a noun is. ((Some children turned to see the children near them, Child A did not talk to others; some children started raising their hands, the teacher raised her hand up)) And up(…). Who has an idea? Much more people. Who has an idea of what a noun can be? ((Child A looks at the back of the classroom)) Boy 1.</td>
<td>IB (I6), G (G1)</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Boy 1</td>
<td>A whisker.</td>
<td>E (E2)</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Teacher A</td>
<td>I'm sorry</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Boy 1</td>
<td>A whisker</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>---</td>
<td>---</td>
<td>---</td>
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<td></td>
</tr>
<tr>
<td>7.</td>
<td>Teacher A</td>
<td>A whisker would be a noun because it's a thing that you can touch or write, a whisker is a noun. What else? What is a noun? What is the (...) word? A noun be, Girl 1.</td>
<td>IB, G</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Girl 1</td>
<td>A hand.</td>
<td>E (E2)</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Teacher A</td>
<td>A hand would be a noun. Is a thing you can touch. A hand is a noun. A noun is a thing. So, for example, if I said, I can see a tree <em>(writes on the board)</em>. The tree would be the noun. Can someone give me an adjective to tell me what that tree is like? Now, an adjective tells me what the noun or thing is like. What do you think...</td>
<td>E (E1), G (G5)</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>TA</td>
<td>Girl 2 <em>(calling out a child; children look back to see the TA, the teacher stopped talking)</em></td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Teacher A</td>
<td>It could, a noun could be like, what could this tree be like? Have a look at the picture <em>(referring to the image on the board)</em>, maybe you’ve got an idea. What could it be like? Child A <em>(many students raise their hands, Child A does it too)</em></td>
<td>B (B2), G (G5)</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Child A</td>
<td>Ahh</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Teacher A</td>
<td>“I” <em>(reading the sentence she wrote on the board and pointing at it)</em></td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Child A</td>
<td>I</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Teacher A</td>
<td><em>(teacher points at the words “can see”)</em></td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Child A</td>
<td>“Can see a tree”</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>Teacher A</td>
<td>What kind of tree?</td>
<td>IB (I6), G (G5)</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>Child A</td>
<td><em>(Turns to look at the board and then turns to see the teacher)</em> Green leaves</td>
<td>E (E2)</td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>Teacher A</td>
<td>I can see a tree with green leaves. Yeah, but what kind of trees can you see in that picture?</td>
<td>G (G5)</td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>Child A</td>
<td><em>(Turns to see the board)</em> Ahh, snow</td>
<td>E (E2)</td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>Teacher A</td>
<td>So, can you say that whole sentence for me? *[“I” <em>(points at each of the words on the board)</em>]</td>
<td>IB (I6)</td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>Child A</td>
<td>*[“I can see a tree”]</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>Teacher A</td>
<td>A snowy tree.</td>
<td>B (B1)</td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>Teacher A</td>
<td>Good. “I can see a snowy tree” <em>(talks while writing the sentence)</em> A snowy tree, brilliant. What else can you see? Can you say the whole sentence? “I can see”. What have we got here? <em>(points at the image)</em> What have we got, this little fellow? <em>(pointing at the bird)</em> “I can see”</td>
<td>G (G5)</td>
<td></td>
</tr>
<tr>
<td>26.</td>
<td>Girl 2</td>
<td>A little bunny.</td>
<td>E (E2)</td>
<td></td>
</tr>
<tr>
<td>27.</td>
<td>Teacher A</td>
<td>Shh, Boy 2 <em>(giving the floor to another child)</em></td>
<td>U</td>
<td></td>
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<tr>
<td></td>
<td></td>
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<td>---</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>28.</td>
<td>Boy 2</td>
<td>Snowman</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29.</td>
<td>Teacher A</td>
<td>Is not a snowman. Did you laugh Girl 3? That is very rude (talking to a girl who laughed after Boy 2's contribution). It's not a snowman, it's a 'b' (moves her arms as a they were wings)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30.</td>
<td>Girl 4</td>
<td>Bird.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31.</td>
<td>Teacher A</td>
<td>It's a bird. Can you give me an adjective for what that bird is like though?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32.</td>
<td>Girl 4</td>
<td>Ah</td>
<td></td>
<td></td>
</tr>
<tr>
<td>33.</td>
<td>Teacher A</td>
<td>What colours is it?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>34.</td>
<td>Boy 3</td>
<td>A black bird</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35.</td>
<td>Teacher A</td>
<td>A black and white bird, I can see a black and white bird. Excellent. What do you think? What else can you see? What else can you see? (children raise their arms up) Boy 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36.</td>
<td>Boy 4</td>
<td>Snow on the ground.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>37.</td>
<td>Teacher A</td>
<td>Can you give me an adjective for what that snow is like?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>38.</td>
<td>Boy 4</td>
<td>Wet.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39.</td>
<td>Teacher A</td>
<td>I can see the wet snow on the ground.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40.</td>
<td>Teacher A</td>
<td>Now, close your eyes. I want you to, now, think about what you might be able to feel (the teacher is rearranging the image displayed on the board while talking, most of the children have their eyes closed. Child A looks at the other students). You put your hands out from our whole classroom, out into the winter, what might you be able to feel? Can you have a word with the children you like about what you can feel?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41.</td>
<td>Teacher A</td>
<td>Remember to use a noun and an adjective.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42.</td>
<td>Teacher A</td>
<td>(After giving the indication to the class, she kneels next to Child A and talks to him). What can you feel in the wintertime?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>43.</td>
<td>Child A</td>
<td>Ahh (looks around)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>44.</td>
<td>Girl 2</td>
<td>Snow (looking at Child A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45.</td>
<td>Child A</td>
<td>Snow (says to the teacher)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>46.</td>
<td>Teacher A</td>
<td>What kind of snow?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>47.</td>
<td>Child A</td>
<td>Cold snow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>48.</td>
<td>Teacher A</td>
<td>Can you say it in one sentence for me?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49.</td>
<td>Child A</td>
<td>I can see snow, cold snow.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50.</td>
<td>Teacher A</td>
<td>Excellent. Really good. Why don’t you tell it to your other friends there?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>51.</td>
<td>Child A</td>
<td>I can see a very cold snow (turns to see the girl next to him)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>---</td>
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<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>52.</td>
<td>Teacher A</td>
<td>Ok, very cold snow. Has anyone got a sentence for me now? About what they can feel? Girl 5 ((stands up and walks towards the board))</td>
<td>E (E1)</td>
<td></td>
</tr>
<tr>
<td>53.</td>
<td>Girl 5</td>
<td>I can feel a ((stops talking))</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>54.</td>
<td>Teacher A</td>
<td>I can feel ((writing the first part of the sentence on the board)), what might you be able to feel? ((Boy 5 raises his hand up, the teacher points at him to give him the floor))</td>
<td>IB (I6)</td>
<td></td>
</tr>
<tr>
<td>55.</td>
<td>Boy 5</td>
<td>Ah, really cold wind.</td>
<td>E (E2)</td>
<td></td>
</tr>
<tr>
<td>56.</td>
<td>Teacher A</td>
<td>Ooh, I can feel really cold wind rushing through my fingers, really, really cold wind ((talks while writing)). I can feel really cold wind rushing through my fingers. What do you think you might be able to hear? Now I will play a video for us. And you might be able to hear. Find it, my goodness, where did it go ((tries to change what is displayed on the board, goes looking at her computer)). And this way you might be able to hear. Oh goodness. ((Plays video of an image of a forest with snow falling)).</td>
<td>B (B1)</td>
<td></td>
</tr>
<tr>
<td>57.</td>
<td>Teacher A</td>
<td>What can you hear? ((there was silence, the audio was playing, and some children were raising their hands)). I am going to wait a little bit longer. I am going to wait until everybody’s hand is up with an idea. ((More children raised their hands, including Child A)). You might be able to hear all sorts of things. I’ve got to wait until Boy 6’s hand is up. Think what you can hear. Girl 6, Girl 7, Yeah, yeah, Girl 8, Boy 7. Hands down, I am going to pick somebody. Oh, I think, I am going to pick Girl 8. What can you hear? (...) ((some children whispered snow))</td>
<td>G (G6)</td>
<td></td>
</tr>
<tr>
<td>58.</td>
<td>Girl 8</td>
<td>Ahh, snow falling down</td>
<td>E (E2)</td>
<td></td>
</tr>
<tr>
<td>59.</td>
<td>Teacher A</td>
<td>Can you give me an adjective for what that is like?</td>
<td>IB (I6)</td>
<td></td>
</tr>
<tr>
<td>60.</td>
<td>Girl 8</td>
<td>Glittery snow, snow falling down</td>
<td>B (B2)</td>
<td></td>
</tr>
<tr>
<td>61.</td>
<td>Teacher A</td>
<td>I can hear glittery snow falling down, can you hear it glittering? What’s the actual sound you can hear?</td>
<td>IB (I6), G (G5)</td>
<td></td>
</tr>
<tr>
<td>62.</td>
<td>Girl 8</td>
<td>Wind</td>
<td>B (B2)</td>
<td></td>
</tr>
<tr>
<td>63.</td>
<td>Teacher A</td>
<td>I can hear windy, glittery snow falling down very good, Girl 8. &quot;I can hear windy, glittery snow falling down&quot; ((talking while writing it on the board)). Excellent.</td>
<td>B (B1)</td>
<td></td>
</tr>
</tbody>
</table>

### D3 Examples of analysis with EoC

Table D.3 and Figure D.1 illustrate how I established units of analysis for each of the observed lessons. They particularly show the CS and CE and CSE that I identified as part of the baseline observation in Classroom A.
Table D.3. Illustration of part of the EoC analysis of Classroom A’s baseline observation, delineating CS and CE (the coded CE is marked in grey)

<table>
<thead>
<tr>
<th>Communicative situation</th>
<th>Communicative event</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS1</td>
<td>CE1 Teacher does the register and all children paid attention to the teacher.</td>
</tr>
<tr>
<td>CS2</td>
<td>CE2 <strong>Whole-class activity</strong>: Class elaborates sentences with a noun and an adjective based on images, video and sound (children share examples to the class)</td>
</tr>
<tr>
<td></td>
<td>CSE1: Introduction “What is a noun?”</td>
</tr>
<tr>
<td></td>
<td>CSE2: Brief pair interaction. “What can you feel?”</td>
</tr>
<tr>
<td></td>
<td>CSE3: Video watching. “What can you hear?”</td>
</tr>
<tr>
<td>CS3</td>
<td>CE3 <strong>Individual activity</strong>: Children write down the sentences of their poem</td>
</tr>
<tr>
<td></td>
<td>CSE4: Whole-class instructions for writing down the poem in the English books</td>
</tr>
<tr>
<td></td>
<td>CSE5: Transition</td>
</tr>
<tr>
<td></td>
<td>CSE6: Individual activity in tables</td>
</tr>
<tr>
<td></td>
<td>CSE7: Brief whole-class sharing of one poem</td>
</tr>
<tr>
<td></td>
<td>CSE8: Individual activity in tables (resume previous activity)</td>
</tr>
<tr>
<td></td>
<td>CSE9: Brief whole-class sharing of ideas</td>
</tr>
<tr>
<td></td>
<td>CSE10: Individual activity in tables (resume previous activity)</td>
</tr>
<tr>
<td>CS4</td>
<td>CE4 <strong>Whole-class activity</strong>: Children get ready to change activity. The teacher asks the students to clean the tables and offers a prize to the tidiest.</td>
</tr>
</tbody>
</table>

Figure D.1. Visual illustration of the EoC segmentation of the baseline observation in Classroom A
## Appendix E  Coding schemes

### E1 Cam-UNAM Scheme for Educational Dialogue Analysis (condensed version)

<table>
<thead>
<tr>
<th>Cam-UNAM SEDA Condensed version ©2016: Cluster and Code Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>I – Invite elaboration or reasoning</td>
</tr>
<tr>
<td>I1 Ask for explanation or justification of another’s contribution R1 Explain or justify another’s contribution</td>
</tr>
<tr>
<td>I2 Invite building on / elaboration / (dis)agreement / evaluation of another’s contribution or view R2 Explain or justify own contribution</td>
</tr>
<tr>
<td>I3 Invite possibility thinking based on another’s contribution R3 Speculate or predict on the basis of another’s contribution</td>
</tr>
<tr>
<td>I4 Ask for explanation or justification                      R4 Speculate or predict</td>
</tr>
<tr>
<td>I5 Invite possibility thinking or prediction</td>
</tr>
<tr>
<td>I6 Ask for elaboration or clarification</td>
</tr>
<tr>
<td>P – Positioning and Coordination</td>
</tr>
<tr>
<td>P1 Synthesise ideas                                           B1 Build on /clarify others’ contributions</td>
</tr>
<tr>
<td>P2 Evaluate alternative views</td>
</tr>
<tr>
<td>P3 Propose resolution                                         C1 Refer back</td>
</tr>
<tr>
<td>P4 Acknowledge shift of position                              C2 Make learning trajectory explicit</td>
</tr>
<tr>
<td>P5 Challenge viewpoint                                        C3 Link learning to wider contexts</td>
</tr>
<tr>
<td>P6 State (dis)agreement/ position                             C4 Invite inquiry beyond the lesson</td>
</tr>
<tr>
<td>RD – Reflect on dialogue or activity</td>
</tr>
<tr>
<td>RD1 Talk about talk</td>
</tr>
<tr>
<td>RD2 Reflect on learning process/ purpose/ value/ outcome      G1 Encourage student-student dialogue</td>
</tr>
<tr>
<td>RD3 Invite reflection about process/ purpose/ value/ outcome of learning G2 Propose action or inquiry activity</td>
</tr>
<tr>
<td>E – Express or invite ideas</td>
</tr>
<tr>
<td>E1 Invite opinions/beliefs/ ideas                             G3 Introduce authoritative perspective</td>
</tr>
<tr>
<td>E2 Make other relevant contribution                           G4 Provide informative feedback</td>
</tr>
<tr>
<td>G5 Focusing</td>
</tr>
<tr>
<td>G6 Allow thinking time [optional when not verbally explicit]</td>
</tr>
</tbody>
</table>

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Cam-UNAM Scheme for Educational Dialogue Analysis (SEDA)
Condensed version ©2016

This document contains the condensed version of the scheme, listing the 33 communicative acts, grouped within 8 clusters. A much more detailed, full version containing descriptions and illustrations of codes is available at https://docs.google.com/document/d/1De48c9GoUZKl0JHjquGR0fNhP9NSjZYeUFEL3IYwhTA/edit?usp=sharing and the cluster scheme is available at https://docs.google.com/document/d/1_cFN7icdlwwGxhuLiPZ9vgIkJ-ZOAM4SjIMc0-e0aS4/edit?usp=sharing.


The Scheme for Educational Dialogue Analysis is made freely available under a Creative Commons Attribution (CC By 4.0) licence (international): http://creativecommons.org/licenses/by/4.0/. It can be used or adapted under conditions of attribution to the original research team using the following statement:

"The Cam-UNAM Scheme for Educational Dialogue Analysis (SEDA: ©2015) was developed by a research team from the University of Cambridge, UK, and the National Autonomous University of Mexico, led by Sara Hennessy and Sylvia Rojas-Drummond and funded through a grant from the British Academy. The original scheme and list of co-creators are available at http://tinyurl.com/BAdialogue."

Under the licence terms you must also indicate if changes were made. We request that those using or adapting SEDA share their applications and findings with us. Please contact us also if you would like to trial one of the sub-schemes under development for use by teachers, for analysing peer dialogue or for contexts of technology use. Contact details: sch30@cam.ac.uk; silviar@unam.mx.

Notes. Criteria used to order codes within clusters

1. Codes concerning others' views rather than own.
2. Higher order dialogue codes (more sophisticated forms).
3. Higher order thinking codes.
4. More specific codes rather than more general category codes (e.g. E2 is the most general).
**E2 Teacher Scheme for Educational Dialogue Analysis (condensed version)**

<table>
<thead>
<tr>
<th>Dialogue categories</th>
<th>Contributions and Strategies</th>
<th>What do we hear? (Key Words)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IB – Invite to build on ideas</td>
<td>Invite elaboration, building on, clarifying or improving own or others’ ideas</td>
<td>‘Can you add’, ‘What?’ ‘Tell me’, ‘Can you rephrase this?’ ‘Do you think?’ ‘Do you agree?’</td>
</tr>
<tr>
<td>B – Build on ideas</td>
<td>build on, elaborate or clarify own or others’ ideas</td>
<td>‘It’s also’, ‘that makes me think’, ‘I mean’, ‘she meant’</td>
</tr>
<tr>
<td>CH - Challenge</td>
<td>Questioning, disagreeing with or challenging an idea</td>
<td>‘I disagree’, ‘But’, ‘Are you sure...?’, ‘...different idea’</td>
</tr>
<tr>
<td>IR – Invite reasoning</td>
<td>Invite others to explain, justify, and/or use possibility thinking relating to their own or another’s ideas</td>
<td>‘Why?’, ‘How?’, ‘Do you think?’, ‘...explain further’</td>
</tr>
<tr>
<td>R – Make reasoning explicit</td>
<td>Explain, justify and/or use possibility thinking relating to own or another’s ideas</td>
<td>‘I think’, ‘because’, ‘so’, ‘therefore’, ‘in order to’, ‘if...then’, ‘it’s like...’, ‘imagine if...’, ‘could’,</td>
</tr>
<tr>
<td>CA - Coordination of ideas and agreement</td>
<td>Contrast and synthesise ideas, express agreement and consensus; Invite coordination/synthesis</td>
<td>‘I agree’, ‘I changed my mind’, ‘to sum up...’; ‘So, we all think that...’; ‘summarise’, ‘similar and different’</td>
</tr>
<tr>
<td>C – Connect</td>
<td>Make pathway of learning explicit by linking to contributions / knowledge / experiences beyond the immediate dialogue</td>
<td>‘last lesson’, ‘earlier’, ‘reminds me of’, ‘next lesson’, ‘related to’, ‘in your home’</td>
</tr>
<tr>
<td>G – Guide direction of dialogue or activity</td>
<td>Take responsibility for shaping activity or focusing the dialogue in a desired direction or use other scaffolding strategies to support dialogue or learning</td>
<td>‘How about’, ‘focus’, ‘concentrate on’, ‘Let’s try’, ‘no hurry’, ‘Have you thought about...?’</td>
</tr>
<tr>
<td>E – Express or invite ideas</td>
<td>Offer or invite relevant contributions to initiate or further a dialogue (ones not covered by other categories)</td>
<td>‘What do you think about...?’, ‘Tell me’, ‘your thoughts’, ‘your opinion’, ‘your ideas’</td>
</tr>
</tbody>
</table>

The resources of the T-SEDA, including its coding framework, can be found at: [https://www.educ.cam.ac.uk/research/projects/tseda/Teacher_SEDA_packv5_290518%20.pdf](https://www.educ.cam.ac.uk/research/projects/tseda/Teacher_SEDA_packv5_290518%20.pdf) (or at [http://tinyurl.com/BAdialogue](http://tinyurl.com/BAdialogue)).
Appendix F  Adjusted coding scheme

I introduce in this appendix the different sections of the adjusted coding scheme I used in this investigation to analyse classroom dialogue, which I enriched iteratively in parallel with the development of the strategies. I first present how I adjusted the T-SEDA coding framework. Second, I include the codes for non-speech strategies and contributions. Third, I describe the codes for the autistic students’ behaviour.

F1 Adjusted version of the T-SEDA coding framework (condensed version)

Colour scheme:
- Additions made to the T-SEDA codes during the intervention in schools are marked with yellow.
- Additions made to the T-SEDA codes after watching the videos that were not analysed with a teacher during the intervention are marked in blue.

Table F.1. Condensed version of the adjusted T-SEDA coding framework

<table>
<thead>
<tr>
<th>Dialogue categories</th>
<th>Contributions and Strategies</th>
<th>What do we hear? (Key Words)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IB – Invite to comment, add information to, clarify, or evaluate ideas</td>
<td>Invite elaboration, building on, clarifying or improving own or others’ ideas. IBP. Invite to comment on/ add information to ideas that were discussed previously in a discussion that has ended I2.2. Explicitly invite others to add information and/or suggest changes to ideas that oneself has expressed in dialogue I2.3. Invite to build on physically on the collective idea.</td>
<td>“Can you add’, ‘What?’ ‘Tell me’, ‘Can you rephrase this?’ ‘Do you think?’ ‘Do you agree?’ I was also saying “maths is the best subject and I don’t care what anyone else thinks”. Do you think that was a good thing to say or you think, maybe, that was not a good thing to say? So, that was a really good point, S. You want to build on our point? ((The teacher shows the pile of Lego’s to S so he can add a new piece))</td>
</tr>
<tr>
<td>B – Add information, comment, clarify or evaluate ideas</td>
<td>Build on, elaborate or clarify own or others’ ideas Physically show how different ideas form a collective one while doing so verbally (B1.2). BP. Enrich/ comment on ideas that were discussed in a previous activity or discussion that has ended (form of contribution from students – after being encouraged to do so or without a prompt) B1. Re-voice/ make explicit a student’s contribution to others during a whole-class or small-group activity (consider coding it with G1.2 when facilitating the</td>
<td>‘it’s also’, ‘that makes me think’, ‘I mean’, ‘she meant’ S1: So, S2, how many, how many of these make that? ((S1 displays in front of S2 a group of individual blocks and then points at a completed column)) S2: ((S2 grabs the loose blocks that S1 positioned in front of him and starts putting them</td>
</tr>
<tr>
<td>Interaction of a student with peers by re-voicing the child’s contribution</td>
<td>T: S1, what do you find difficult at school? What is hard at school? (S1 looks down at his board, and starts moving the piece of paper that he used in the previous activity in which he talked about Malala with other students) S1: Because Malala resilient.</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>CH – Challenge</td>
<td>Question, disagree with or challenge an idea P5.2. Probe student’s understanding of class activities, questioning and/or checking in with the student during the activity *Addition: Explicitly indicate that an idea is being challenged or explicitly probe understanding of an activity</td>
<td></td>
</tr>
<tr>
<td>‘I disagree’, ‘But’, ‘Are you sure…?’; ‘…different idea’ …have you forgotten a little bit?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IR – Invite reasoning</td>
<td>Invite others to explain, justify, and/or use possibility thinking relating to their own or another’s ideas</td>
<td></td>
</tr>
<tr>
<td>‘Why?’, ‘How?’, ‘Do you think?’, …‘explain further’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R – Make reasoning explicit</td>
<td>Explain, justify and/or use possibility thinking relating to own or another’s ideas R1.2. Represent physically an abstract problem and/or the process of arriving to the solution of set problem while verbally explaining it. R2.2. Provide reasons or explain the purpose of certain expected behaviours or steps in an activity.</td>
<td></td>
</tr>
<tr>
<td>‘I think’, ‘because’, ‘so’, ‘therefore’, ‘in order to’, ‘if...then’, ‘it’s like…’, ‘imagine if…’, ‘could’,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TA: we have got time for one more go if you want, before lunch ((the child moved his finger and hummed indicating no)). Go on… Go on… do it for me… just once more ((the child hummed, he covered his face and made high pitched noises)). ((The TA smiled)) because I think we have got it again after lunch.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B: ok.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CA - Coordinatio n of ideas and agreement</td>
<td>Contrast and synthesise ideas, express agreement and consensus; invite coordination/synthesis P1.2. Synthetize/recap key information mentioned immediately previously as part of carrying out an activity/solving a problem to make explicit the process that is being followed throughout the activity.</td>
<td></td>
</tr>
<tr>
<td>‘I agree’, ‘I changed my mind’, ‘to sum up…’, ‘So, we all think that…’, ‘summarise’, ‘similar and different’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C – Connect</td>
<td>Make pathway of learning explicit by linking to contributions/knowledge/experiences beyond the immediate dialogue, C1.2. Refer back to expected behaviours during a class discussion Refer back to different components of dialogue or steps for carrying out a particular class discussion C1.3. Refer to the sequence of contributions that have taken place in a discussion C2.2. Refer back to the timetable of the activity or lesson that it is taking place. Or refer to the timetable of the school day. It includes referring to the steps/tasks</td>
<td></td>
</tr>
</tbody>
</table>

...If there are not enough hands, what am I going to do? |

Does anyone have a counterpoint? So, a reply for her. ...Think about what I am saying, I’m asking for your reply, it cannot be your own point
involved in a short activity, making explicit the trajectory of a short activity

devil’s, ‘talking’, ‘sharing’, ‘work together in the group/pair’, ‘task’, ‘activity’, ‘what you have learned’

When you can’t hear someone, do we just carry on with our lives or do we say, “I can’t hear you, could you repeat that?”

While the teacher replied to another student’s question in whole-class arrangement, the TA mentioned to B: “…you know why you have been able to write on all those things, because you listened.”


“…you need to listen to the others B”; “look towards him, he is reading” G1.2

“You want to write down your idea or draw a picture? You want to write your idea?” (gives a marker to S) G2.3

“Do that first and then we can go back.”; “Well done, so we need to write now.”, G5

“I’ll write it on here and you can write it on there.”, G2.2

“We are carrying on with Camp Green Lake”, “remember when you did that work last week?”. The TA repeats the word “evidence” to B. G5.

After the teacher gave the indications, the TA synthetized the instructions: “…we’re going to start here, and then we go around the three tables. And then you have to talk to the boys”. G5.

After the teacher finished giving indications, the TA explain to B what he was going to do – “Alright.
<table>
<thead>
<tr>
<th>E – Express or invite ideas</th>
<th>Offer or invite relevant contributions to initiate or further a dialogue (ones not covered by other categories)</th>
<th>‘What do you think about…?’, ‘Tell me’, ‘your thoughts’, ‘your opinion’, ‘your ideas’</th>
</tr>
</thead>
<tbody>
<tr>
<td>children with options of course of action)</td>
<td>G5. Focus attention on key moments of a class discussion and/or make comments during a discussion to clarify or inform about its content. G5. Repeat instructions in a synthesized way, emphasising individual goals</td>
<td>we’re going to get this first bit done today and then do the other ones tomorrow’ G5.</td>
</tr>
</tbody>
</table>
**F2  New categories added to T-SEDA: No speech contributions, prompts and cues, and adjusting the lesson or activity**

Table F.2. Non-speech strategies added to the adjusted T-SEDA coding scheme

<table>
<thead>
<tr>
<th>Clustering</th>
<th>New categories</th>
<th>Description of the strategies/categories</th>
<th>What do we see? (examples)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P.ENV.</strong></td>
<td>Adjusting the physical environment for class discussions</td>
<td>Delimit a special place or seating arrangement in the classroom in which students will engage in dialogue (whole-class and/or small-group). A specific seating arrangement for each student can be established. Block irrelevant stimuli or distractors. Plan to conduct a class discussion during activities that consider the sensory sensitivities and/or communication preferences of students.</td>
<td>Plan quieter activities; hide a whiteboard that is distracting for a student; a student moves a distracting material away from another student. Teacher asks students not to look at a student while the student contributes. Ask other students to leave some space for a student to come close to a sheet of paper and write an idea. The TA suggests to the students in the small group to sit down so all of the team members could be at the same level and listen to each other better. A student seconded this proposal - “All right, guys, let’s sit down so we are more in each other’s level”. The TA asked one of the students in the team to make a space for Child B so he could go closer to the sheet of paper and write.</td>
</tr>
<tr>
<td><strong>Resources</strong></td>
<td>Refer to classroom physical or visual resources related to ways of participating in</td>
<td>Display physical prompts during a lesson/activity that support others’ participation in the dialogue and/or activity at hand. The prompts may refer to potential forms of contributing to dialogue or to key information related to the dialogue/activity at hand. Objects present in the classroom may be used to prove a point. Show a prompt during dialogue to encourage a specific form of contribution from other(s).</td>
<td>Present scripts/ sentences stems/ icons of ground rules for talking on the board or have them on the walls. Show a video or images on the board. TA points at her trousers to show that women not only wear dresses.</td>
</tr>
<tr>
<td>Class activities or the topic of the conversation at hand. This includes pointing at these resources.</td>
<td>CONT – Continuously display physical and/or visual pedagogical materials to support/ guide other's participation in dialogue</td>
<td>Have available in the classroom visible physical materials that provide guidance to participating in dialogue. These materials may indicate potential forms of contributing to discussions, steps to carry out a component of dialogue, descriptions of social situations (including recommended responses), and illustrative phrases or sentence stems.</td>
<td>Display icons of rules for talking on the wall.</td>
</tr>
<tr>
<td>---</td>
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<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Non-speech contributions and indications</td>
<td>ST/EN - Indicate the start and/or end of dialogue with a different form of communication to speech</td>
<td>Indicate students when a class discussion will take place, when it starts and when it ends, by making a previously established hand signal/ visual stimuli/ sound. This can happen without a spoken indication or as an addition to the spoken indication.</td>
<td>Singing “can we make a circle” before having a conversation at the carpet.</td>
</tr>
<tr>
<td>Accompany indications with non-speech cues or forms of communication. Or contribute to dialogue with these non-speech cues and forms of communication.</td>
<td>ALT – Use alternative forms of communication (different to speech) to participate in class dialogue</td>
<td>Contribute to the dialogue at hand using alternative modalities of communication to speech. Preferably, these modalities have been previously agreed with the class. The contributions can involve sharing or showing objects, writing or drawing contributions, pointing at classroom resources or other participants, making hand signals, adopting a particular body posture or holding a specific object associated with a particular communicative act. It applies for pointing at resources in the classroom.</td>
<td>Use tapping or Makaton signs or direct attention by pointing at a particular resource.</td>
</tr>
<tr>
<td>Activity characteristics, praise and breaks</td>
<td>DESIRABLE - Promote dialogue in activities that involve desirable outcomes for students associated to their participation in dialogue</td>
<td>Plan to conduct class discussions during activities that involve desirable outcomes for the students associated to their participation in dialogue. This may include talking about particular interests, receiving praise related to their participation (participating in a manner that is expected) which materialises in a physical register and having the opportunity to provide ideas in open activities and/or direct an activity.</td>
<td>Moving their name up on board or getting ‘praise tokens’ after participating in a class discussion. TA: “I think you deserve one of my (...) tickets”.</td>
</tr>
<tr>
<td>PEER - Promote dialogue in peer mediated activities</td>
<td>Plan to conduct class discussions during activities that involve collaboration between students to carry out a shared project and/or jointly solve a problem. A student guides another student’s participation, proposing courses of action or assuming a directive role.</td>
<td>A student has the role of coordinator.</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>----------------------------------</td>
<td></td>
</tr>
</tbody>
</table>
| RELAX – Include breaks in an activity that involves dialogue or ask for a break from a class discussion (whole-class and/or small-group) | Plan to include breaks during the activities that involve dialogue to allow students to stop their participation in a discussion, take deep breaths, relax and think about any uncomfortable/negative experiences or thoughts. This can also be coded when a student asks the teacher for a time out from the discussion or separates from the discussion/activity at hand (e.g., stand up, walk away). | Child moves away from the conversation or expresses that he/she will walk away from the conversation to observe another material. 
T: And [what should the dirty girl] do? She should have a... 
S1: [Stop it. ((looking at the T))] I'll look at the board ((stands up and walks towards board)) 
“Sorry, I just need... I need a deep breath.” |
F3  Student behaviour codes added to the coding scheme

I present in Table F.3 the 14 new codes I created to analyse the focus students’ participation in class discussions. I clustered the codes in three categories based on their similarities.

Table F.3. New codes for analysing the focus students’ participation

<table>
<thead>
<tr>
<th>Clusters</th>
<th>New categories</th>
<th>Description of the forms of participation</th>
<th>Examples</th>
</tr>
</thead>
</table>
| Details and repetition codes    | RPT: Repeat other’s contribution     | Repeat an utterance (or part of it, e.g., one word) or action (e.g., hand signal) previously expressed/ conducted by someone else. It includes when a student repeats part of a teacher’s question or prompt for eliciting a specific form of participation. | T: “Why? Listen to Girl1”  
Child A repeated Teacher A’s “relaxing hand sign”. |
|                                | RPT2: Repeat own contribution        | Repeat own previous utterance. It includes repeating a previous contribution to a discussion or an unrelated expression. | Child A repeated his previous response three times during a small-group discussion.                                                    |
|                                | BD: Build on specific details        | Build on/comment on a specific detail from someone else’s previous utterance. The detail may be a specific word or a characteristic of a supporting resource. The student’s comment may or may not be related to the dialogue/activity at hand. It often relates to a misinterpretation of the previous utterance (e.g., literal interpretation) or focus on one word (potentially indicating difficulty understanding the complete utterance). It may include actions elicited by a word from someone else’s previous utterance. | TA: “What about the safety?”  
Child B: “The safety is to be protected.”  
Child A grabbed a piece of paper after hearing the teacher mentioned the word (despite she indicated they did not have to use it). |
|                                | BSC: Build on specific previous experience | Repeatedly refer to a previous experience to contribute to a discussion (more than one time). It may involve elaborating on specific details related to the experiences that may not be related to the discussion/activity. | “In green team, so there’s green team in the seven teams, only the black team in year one.”                                           |
|                                | BP: Build on previous dialogue/activity that has ended | Contribute to a discussion sharing ideas associated with a previous activity or discussion that has ended. This may show that a student has not disengaged from a previous activity. | T: “What do you find difficult at school?”  
Child A: “Because Malala resilient.”                                                                                           |
**Figure F.3. New codes for analysing the students' participation (continuation)**

| Support codes | CLARIFY: Ask for a clarification of the activity | Ask for a clarification of the activity that involves a discussion, in relation to its expectations, steps and purpose. It may include asking for an explanation of its materials. | “How is this a poem?”
| | | “Wait, who made the question?” |
| | DIF: Express difficulties related to participating in a discussion | Express difficulties experienced related to their participation in a discussion. These may relate to their own (e.g., difficulties formulating a response) or their classmates’ participation (e.g., teammates are not following rules). | “…people are looking at me”
| | | Teammates shared the same response Child B thought about before he did. |
| | ADJ: Ask for an adjustment of form of contributing to a discussion | Ask for an adjustment of the form of contributing to a discussion that is expected from the student. A student may: 31. Suggest a classmate that could contribute to the discussion in the student’s place. 32. Ask for more time to think of an answer. 33. Respond with hand signals or drawing. | “Ah, Jacob” (points at the classmate that answered for him)
| | | “Wait” (responding to the TA’s guidance towards another topic) |
| | COMFORT: Look for comfort | Look for comfort when something not desirable takes place in an activity (e.g., overwhelming stimuli, difficulties understanding). This includes physically approaching the teacher/TA, looking for soothing sensory stimulation, and asking for assistance with practical aspects of the activity. This code also registers students’ displaying excitement when receiving attention or support from the teacher. | Approach the teacher when noise levels were high.
| | | “Help me rubber”
| | | Touching the teacher’s lanyard after having difficulties in an activity. |
| | REASSURE: Ask for confirmation of expected participation | Ask the teacher or TA whether one’s performance or participation in an activity is correct or matches what the teacher expected. | “Am I doing super well?” |
| | | | |
| Self-directed or usual expressions codes | IND: Self-talk during the activity | Express opinions, words or sounds during activities without apparent communicative function. It includes singing songs, making noises, uttering words related to the activity. It may be a reaction to something that happens during a class discussion or someone else’s initiations during a discussion. | Repetitive noises (e.g., “Bullet point, pum, pum, pum”).
| | | | Not enough water, what else? (self-directed talk) |
| | CM.AC.: Describe own actions or thoughts | Communicate what one is doing during the activity, even when the teacher or a classmate doesn’t ask for it. | “I'll get the rubber.”
| | | | “I draw a turtle.”
| | | | “I am confused.” |
| | NRT: Narrate a situation taking place in the classroom | Describe unprompted what other classmates do or say, what happens in the classroom, or the classroom’s physical environment. It may represent a reaction to what happens in the classroom. | Child C described the outcome of a class vote “the majority chose tables”.
| | | | “Awkward” (reacting to a classmate’s challenge). |
| | 1RESP: Usual response | Reply to an invitation with usual responses that represent the student’s typical first response attempt (e.g., “signature phrases”). | “Because it is happy.”
| | | | “I don’t know.” |
Appendix G  Evidence-based practices collected

Table G.1 present the evidence-based practices (EBP) for supporting autistic children that I selected from the 40 I retrieved from the two review papers and associated reports I consulted in Cycle 1 of this research (i.e., Bond, Symes, Hebron, Humphrey, & Morewood, 2016; Bond, Symes, Hebron, Humphrey, Morewood, et al., 2016; Mesibov & Shea, 2011; Simpson, 2005a; Simpson et al., 2005; Wong et al., 2014, 2015). It includes the EBP that have been published in studies between 1990 and 2013. These EBP have diverse types of outcomes in the following areas: social, communication, behaviour, joint attention, play, cognitive, school readiness, academic, motor, adaptive, vocational, and mental health. To organise the EBP, I established six categories of EBP based on the characteristics of their implementation and Simpson et al. (2005) categorization.

Table G.1. EBP selected from the literature search

<table>
<thead>
<tr>
<th>Categories per characteristic</th>
<th>Evidence-based practices</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reinforcement and challenging behaviours</strong></td>
<td>These practices focus on encouraging desirable behaviours, identifying challenging ones and replacing them with others (mainly through reinforcement and cues).</td>
</tr>
<tr>
<td><strong>Reinforcement:</strong></td>
<td>Establish a relationship between the learner’s behaviour/use of skill and the consequence of that behaviour/skill. teach new skills and to increase behaviour.</td>
</tr>
<tr>
<td><strong>Differential reinforcement of alternative, incompatible, or other behaviours:</strong></td>
<td>Teach new skills and increase behaviours by providing positive/desirable consequences for behaviours or their absence that reduces the occurrence of an undesirable behaviour. *</td>
</tr>
<tr>
<td><em>Section in italics not applicable.</em></td>
<td></td>
</tr>
<tr>
<td><strong>Functional behavioural assessment:</strong></td>
<td>Describe the interfering or problem behaviour, identify antecedent and consequent events that control the behaviour, develop a hypothesis of the function of the behaviour, and test the hypothesis.</td>
</tr>
<tr>
<td><strong>Modelling:</strong></td>
<td>Demonstrate a desired target behaviour to promote the imitation of the behaviour by the learner, leading to his/her acquisition of the imitated behaviour.</td>
</tr>
<tr>
<td><strong>Prompting:</strong></td>
<td>Provide verbal, gestural, or physical assistance to learners to assist them in acquiring or engaging in a targeted behaviour or skill.</td>
</tr>
<tr>
<td><strong>Time delay:</strong></td>
<td>Systematically fade the use of prompts during instructional activities.</td>
</tr>
<tr>
<td><strong>Response interruption/redirection:</strong></td>
<td>Introduce a prompt, comment, or other distractors when an interfering behaviour is occurring that is designed to divert the learner’s attention away from the</td>
</tr>
<tr>
<td><strong>Cognitive</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Practices that focus on teaching autistic pupils to monitor their behaviour and performance. | Cognitive behavioural intervention:  
Teach learners to examine their own thoughts and emotions, recognize when negative thoughts and emotions are escalating in intensity, and then use strategies to change their thinking and behaviour.  
Self-management:  
Teach learners to discriminate between appropriate and inappropriate behaviours, accurately monitor and record their own behaviours, and reinforce themselves for behaving appropriately.  
Social narratives:  
Describe social situations in some detail by highlighting relevant cues and offering examples of appropriate responding.  
Cognitive behavioural modification:  
Promote independent behaviour change through techniques such as self-verbalisation, self-regulation and self-reinforcement for appropriate behaviour.  
Cognitive learning strategies:  
Help learners independently solve problems by applying learned techniques in several environments. Techniques, rules, or principles that can be systematically applied to a problem situation that leads to a successful solution. Such strategies typically consist of a series of steps that can be completed to achieve specific outcomes. Generalisation is an important component. It occurs in a one-to-one situation. These strategies are visual in nature, provide predictability, and can be taught in a systematic manner using behavioural techniques. Teachers can generally be trained in the use of modelling, backward chaining, prompting, fading, reinforcement. It occurs in a one-on-one situation in a segregated setting. After students have mastered a strategy in a restricted setting, it can be applied to general classrooms, or other environments. *  
*Section in italics not applicable.*  
Social decision-making strategies  
These strategies assist the child in identifying the problem or mistake, generating alternatives, understanding consequences, and determining how to correct the situation. Some types of social decision-making strategies include: 1) social autopsies, 2) situation-options-consequences-choices-strategies-simulation (SOCCSS), 3) Stop, observe, deliberate, and act (SODA)  
| **Skill-based** |  
| The practices target specific skills, they intend to develop, maintain, or support functional demonstration of those specific skills. | Picture exchange communication system:  
Teach learners to communicate in a social context. Learners are initially taught to give a picture of a desired item to a communicative partner in exchange for the item.  
Task analysis:  
Divide activities or behaviours into small steps in order to assess and teach a skill. The learners are taught to perform each step until the skill is mastered.  
Joint action routines (JARS):  
Ritualised interaction pattern, involving joint action, unified by a specific goal or theme, following a logical sequence. The arrangement of the child’s environment in a way that it supports and increases the opportunities for the child to use language (Koegel & Koegel, 1995). Its methods involve a child-centred approach that relies heavily on social-pragmatic principles that stress the contextual nature of learning how to communicate. JARs are based on the premise that providing
motivating contexts develops communication skills, including opportunities and needs to communicate (Prizant et al., 2000). There are 4 major types of JARs: 1) preparation or fabrication of a specific end product, 2) story or central plot line, including pretend play and community living skills; 3) cooperative turn-taking games (which can take place during activities such as morning circle routine, group music therapy, recreational therapy sessions). A routine needs to be repeated on a daily basis for at least 2-3 weeks, time needs to be devoted to the planning of various routines, which need to be implemented in a systematic manner. The plan of a routine needs also to reflect observable treatment objectives that can measure its actual effectiveness.

Augmentative alternative communication:
Facilitate the learner’s communicative competence through the use of multiple communication modalities that are by their very nature supplementing (augmentative) or replacing (alternative) natural speech.

<table>
<thead>
<tr>
<th>Environment and schedule arrangements</th>
<th>Antecedent-based intervention: Modify the environment/context in an attempt to change or shape a student’s behaviour (modify the environment or activity so that the factor no longer elicits the interfering behaviour).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjustments to the spatial arrangement, the structure of the class activities or schedule.</td>
<td>Naturalistic intervention: Set of practices designed to encourage specific target behaviours based on learners’ interests by building more complex skills that are naturally reinforcing and appropriate to the interaction. They include environmental arrangement, interaction techniques, and strategies based on applied behaviour analysis principles.</td>
</tr>
<tr>
<td>Scripting: Present learners with a verbal and/or written description about a specific skill or situation that serves as a model for the learner.</td>
<td>Structured teaching: Provides the individual with structure and organization, in the classroom spatial arrangement, the schedule and tasks. Four main components: physical organisation, visual schedules, work systems, task organisation. Physical organisation refers to the layout of the area for teaching, the organisation helps students understand where specific activities are to take place. It is designed to provide students with visual information to direct their activities in a predictable manner such that they are provided clear and specific boundaries. Such organisation blocks irrelevant visual and auditory stimuli that might interfere with learning.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pedagogical resources</th>
<th>Visual supports: Concrete cues that provide information about an activity, routine, or expectation and/or support skill demonstration.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The implementation of these practices is based on the use of specific materials and different modalities and support from specific agents.</td>
<td>Video modelling: Method of instruction that uses video recording and display equipment to provide a visual model of the targeted behaviour or skill.</td>
</tr>
<tr>
<td></td>
<td>Multi-sensory</td>
</tr>
<tr>
<td>Provision of opportunities to</td>
<td>Peer-mediated instruction and intervention: Teach typically developing peers ways to interact with and help autistic learners</td>
</tr>
</tbody>
</table>
Table G.2 presents the 23 characteristics that I extracted from the 28 EBP, which illustrate the main procedures and goals of the practices of each category. I combined these strategies into eight encompassing elements (column on the right). These elements became the initial design principles of the design framework.

### Table G.2. List of characteristics extracted from the EBP per category and extracted elements

<table>
<thead>
<tr>
<th>Categories</th>
<th>Characteristics of the EBP</th>
<th>Extracted elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reinforcement and dealing with “challenging behaviours”</td>
<td>Reinforce desirable behaviours providing desirable consequences.</td>
<td>Add features that are reinforcing for the students</td>
</tr>
<tr>
<td></td>
<td>Modelling: Demonstrate a desired behaviour to promote the imitation of it</td>
<td>Model behaviour</td>
</tr>
<tr>
<td></td>
<td>Identify the function of a certain “challenging” behaviour, identify antecedent events and withdraw what causes it.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prompting: providing verbal, gestural or physical assistance to help acquire a behaviour/skill or to divert attention of the child away from interfering behaviour.</td>
<td>Use prompts or cues and fade out their use</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fade use of prompts.</td>
</tr>
<tr>
<td>Cognitive</td>
<td>Encourage students to examine their thoughts and emotions and recognize when negative thoughts and emotions are escalating.</td>
<td>Examine thoughts and emotions.</td>
</tr>
<tr>
<td></td>
<td>Have a detailed description of certain social situations, highlighting relevant social cues and offering examples of appropriate behaviour/responding.</td>
<td>Provide guidelines.</td>
</tr>
</tbody>
</table>
Provide a series of steps (rules or principles) that can be completed to achieve specific outcomes or solve a problem situation.

Analyse social problems after their occurrence (identify the problem - who was involved, when, where, and decide how to solve it), make connections with the consequences.

Provide scripts or verbatim transcripts to make requests or in response to social situations.

### Environment and schedule arrangements

- Modify the environment or activity so an interfering behaviour is not elicited
- Incorporate the student's interests to encourage specific target behaviours
- Delimit specific areas of the classroom in which clearly specified activities will take place (blocking irrelevant visual and auditory stimuli)
- Visual schedules to indicate the activities that will take place and in what sequence
- Presentation of tasks and materials that visually communicates: the steps to carry out a task, how many steps are there, when the task is finished and what to do after finishing

### Skill-based

- Break a complex behavioural skill into smaller components or steps in to teach a skill. Students are taught to perform each step until the skill is mastered.
- Ask student to give a picture to a communicative partner to request an item or to express something in particular
- Use multiple communication modalities that are supplementing natural speech

### Pedagogical resources

- Use visual supports as cues or provide information about an activity
- Provide a visual model of a target behaviour

### Provision of opportunities to practice positive social interactions

- Promote peer-mediated activities
- Incorporate play activities in which students can interact with their peers
- Plan activity that involves preparing or fabricating a specific end product in teams (providing opportunities and needs to communicate)

Modify or adjust the classroom environment.

*Included in provide guidelines.

Use/encourage different communication modalities

Provide opportunities to interact with others
Appendix H  Description of baseline observations in each classroom

I describe in this appendix the characteristics that I identified in each classroom regarding the activities promoted by the teachers, the teachers' support, the autistic students' participation and the level of help they received.

H1 Classroom A (year 1)

I conducted two observation days in Classroom A due to technical difficulties during the first day in clearly audio-recording Child A's participation in small-group activities. On the first day, I observed the first three lessons of the school day (English, phonics and maths). I extracted CSs from these lessons and I delineated 12 CEs (lesson's activities) out of which seven were related to the subject matters. Figure H.1 illustrates the CSs and CEs I identified.

![Diagram of baseline observations in Classroom A]

Figure H.1. EoC units of analysis of the first baseline observation day in Classroom A

Five of the seven learning activities involved whole-class activities in which students' verbal contributions were central. The other two involved one individual activity and one 'in-pairs' activity. The teacher prompted most of the students' participations in the whole-class activities. She indicated turns for speaking and asked them to share examples, answer questions, complete unfinished words, or
share their 'group work' with the class. This observation showed Teacher A's interest in promoting the active roles of students during the lessons. She used visual, auditory and physical materials and cues to illustrate the conversation topic and regulate students' behaviour and promoted engagement through praise provided in visual or physical form (e.g., behaviour chart). She also provided a calm environment at the start of the day and after breaks (e.g., by playing soothing music, meditation activities).

Student responses mostly involved sharing their or their team's ideas and providing answers and reasons. She occasionally prompted students to support each other or to comment on another's contribution, which reflected her intention to direct the students' attention to others' contributions. I noticed these invitations when few students volunteered to participate, students struggled to respond or if their answers were not correct (see the quotes below).

"…if you're not sure, you can whisper into your partner's … ear what you think…"

"Can anyone help Child A?"

Teacher A and the TA paid Child A particular attention. The TA constantly guided him, directed his attention to the activities, and helped regulate his behaviour. She sometimes used hand gestures or sang phrases that were associated with certain behaviours (e.g., being quiet to listen to others). Similarly, Child A sometimes communicated discomfort with actions (e.g., clapping hands). These observations showed that the use of repetitive signals could serve as helpful forms of communication for him. Physical stimulation seemed to be essential for Child A; his attention often drifted to objects, and he tended to stay close to others. The TA sometimes provided him with soft toys to help him to cope with the sensory stimulation of activities and to stay calm. He could take breaks and engage in activities that he chose after he had completed a task.

Child A could communicate verbally. However, his speech was sometimes difficult to understand. He contributed to whole-class activities by providing relevant
responses, but he needed help to complete and elaborate on them. The teacher waited for him to formulate answers (e.g., referring to his experiences outside school), elicited specific words (by pronouncing the first letters of those words) and highlighted relevant information. The TA repeated the instructions to him, and summarised and explained relevant information. Teacher A and the TA supported Child A while his classmates engaged in pair-talk and helped him interact with his teammates during small-group activities. Teacher A set up the students' teams or pairs, which helped Child A to find a partner or group. On the second observation day (history and phonics), I noticed that his engagement with peers in small-group activities was sometimes hindered by the difficulties he experienced with their requirements (e.g., he struggled to write and retain extensive information) and his sensitivity to sensory stimuli (noise).

H2  Classroom B

I identified five CSs during the observation day with Classroom B. These were the first activities and three lessons of the day. The lessons included two maths lessons and one information and communication technology (ICT) lesson. I delineated 18 CEs, of which 12 represented learning activities that were related to the subject matter. The activities that preceded the lessons required students to solve maths exercises individually. Figure H.2 illustrates the CSs and CEs I identified.
Eight CEs involved whole-class activities (three of which also included pair-talk or individual work), two were individual activities, and the other two were small-group activities. Teacher B aimed to promote students’ active participation (mainly expecting verbal contributions) in most of the lessons. He insisted that students should volunteer and be proactive. Primarily, he asked the students to share their answers and reasoning, challenged their contributions and guided their participation through questioning and highlighting relevant information. This observation reflected his interest in the promotion and facilitation of students' reasoning so that they could complete the exercises themselves. He also used audio-visual and physical resources and auditory cues (bells) to support the development of the activities, guide students’ responses and regulate students’ behaviour.

Teacher B occasionally asked students to comment or to (dis)agree with classmates' contributions (e.g., “whom do you agree with?”). Accordingly, student participation involved explicit reasoning, cumulative talk, and occasional expression
of (dis)agreement and building on previous contributions. The activities that involved the joint solution of exercises or brainstorming encouraged students to consider their peers’ contributions. Also, Teacher B frequently clarified what the class discussed, he built on students’ contributions (see quotes below) and he referred to previous lessons, experiences and resources to exemplify the conversation topics. Teacher B incorporated brief pair-talk exchanges into three whole-class discussions (they lasted from 20 seconds to five minutes). However, sometimes, their duration was not sufficient for all students to formulate their answers.

_Boy 1: “If you double 18, it’s 36, and then 57 is still visually greater.”_

_T: “Brilliant reasoning. So, if you halve this number and then you double this one, then you would expect them to come to similar answers.”_

The TA assisted Child B during most of the activities and Child B seemed to enjoy receiving her support. She helped him to stay on task as she directed his attention and guided him step-by-step, highlighting relevant details, while he carried out activities (see quotes below). She also motivated him to continue and provided praise when he completed his activities.

_TA: “What do you need to put in there?”_

_Child B: “A zero?”_

_TA: “Place value zero. So, what is your answer going to be?”_

_Child B: “202.”_

Teacher B planned maths materials for Child B to complete that were different from those completed by the rest of the class with a lower level of difficulty. Consequently, Child B mainly worked with the TA while the rest of the class worked in pairs. Teacher B supported Child B when the TA was not present. He checked in briefly with him during individual activities to monitor his progress, provide feedback and remind him to ask for support.
Child B could communicate verbally. He sometimes made high-pitched noises and moved his arms, which seemed to be his reactions to the activities and illustrated his emotional state. Child B did not volunteer any contributions to whole-class activities and relied on the TA’s support to carry out the class activities. Although he did not share the same materials with the rest of the class, he paid attention to the whiteboard and the teacher and remained quiet while the group solved problems. Child B could ask for and take breaks from class activities, accompanied by the TA, which sometimes were rewards. He also used physical support materials, such as a visual timetable and materials that illustrated the conversation topics (e.g., coloured blocks that represented fractions) that helped him keep track of relevant sequential information. During the small-group activity (in the ICT lesson) he stayed on task, paid attention to his teammates, and followed their guidance. It was helpful to him that the teacher established the team members and the goals of the activities were accessible.

H3 Classroom C (year 5)

In Classroom C, I identified four CSs, of which two corresponded to the lessons I observed and the other two to the initial activity and a break. Due to time constraints related to school-wide activities, I video recorded only two lessons (reading and maths). I distinguished 10 CEs, six of which corresponded to the lessons’ activities. Figure H.3 shows the CSs and CEs I identified in Classroom C.
Five of the six reading and maths CEAs involved whole-class discussions. The other CE was an individual activity. In two of the whole-class activities (the shortest which lasted four and one minute), Teacher C provided guidance and general feedback to conclude a task. The other three whole-class activities were discussions in which the teacher asked the students to share their ideas about the meaning of words or solutions to maths problems, to elaborate on their contributions and make their reasoning explicit. She explained the problems and terms, provided informative feedback and referred to previous experiences and knowledge to support the students' further understanding of the discussions' contents (see quote below). Additionally, she often directed the students' attention to the classroom's visual supporting resources to support the development of the activities (e.g., wall displays, handouts with information related to the lessons, smartboard).

“…you said you used re-reading. So, you went back but also you are using your wider knowledge of the play as well. We’re lucky guys that we’ve had that workshop with the Shakespeare people because we know about the play.”

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### EoC units of analysis of the baseline observation day in Classroom C

<table>
<thead>
<tr>
<th>CS1: start of the school day</th>
<th>CE1 - Whole-class activity: going through the timetable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline observations in Classroom C</td>
<td>CE2 - Whole-class activity: start reviewing the prologue of 'Romeo and Juliet'</td>
</tr>
<tr>
<td>CS2: reading lesson</td>
<td>CE3 - Transition to change the class activity</td>
</tr>
<tr>
<td>CS3: break</td>
<td>CE4 - Pair + whole-class activity: reviewing the meaning of words</td>
</tr>
<tr>
<td>CS4: math lesson</td>
<td>CE5 - Transition: tidying up and moving to the carpet</td>
</tr>
<tr>
<td></td>
<td>CE6 - Whole-class informal talk + individual drawing</td>
</tr>
<tr>
<td></td>
<td>CE7 - Individual + whole-class activity: solving math problems</td>
</tr>
<tr>
<td></td>
<td>CE8 - Whole-class activity: instructions and preparation for next activity</td>
</tr>
<tr>
<td></td>
<td>CE9 - Individual activity: solving math problems</td>
</tr>
<tr>
<td></td>
<td>CE10 - Whole-class activity: conclusion of math lesson, success criteria and feedback</td>
</tr>
</tbody>
</table>
Two of these discussions (the longest), involved intervals in which talking in pairs, individual work and whole-class conversations took place (from two to three minutes each). Students formulated answers individually or in pairs and had the opportunity to share their conclusions with the class. I suggest that this arrangement reflected Teacher C’s interest in the facilitation of students’ participation because they had thinking time to formulate answers. Consequently, they were more likely to respond to an invitation or volunteer their input to the activity.

Teacher C encouraged students to volunteer. If they did not, she selected a speaker randomly by drawing a stick with a name on it from a collection that carried the names of the whole class (lollipop-sticks strategy). The students participated mainly by sharing their solutions to problems and ideas and elaborating on their contributions. Teacher C also sought to promote listening among the students during class discussions. Frequently she reminded students to listen, explained the purpose of listening and asked students to turn to look at the speakers. She also directed students’ attention to their classmates’ contributions by elaborating on them through acknowledgement, rephrasing and clarification.

Teacher C supported Child C occasionally. Her support mainly took the form of checking in with him during small-group and individual activities. The teacher approached Child C when he noticeably seemed overwhelmed (e.g., he covered his face with his hands) and helped him to regulate his emotional response. I observed that Child C stopped participating due to overwhelming thoughts related to a school activity that the teacher had discussed at the beginning of the school day. Teacher C used physical tools to communicate with him and to help him to calm down when he found it hard to respond verbally. She used a printed five-point behaviour chart that Child C used to indicate his level of discomfort by pointing at it. She also gave him headphones and an electronic tablet that showed soothing images that he used to take a break. Once Child C had calmed down, Teacher C redirected his attention to the activity by asking a peer to guide him and by accompanying him as he started to carry it out. It seemed that talking about what worried him gave Child C closure related to that thought.
Child C was verbal and did not seem to have difficulty understanding class activities or indications. He did not volunteer to participate in the whole-class activities. However, he could respond to the teacher's invitations to share a response. He also seemed to cope with last-minute changes that were made to how the activities were organised. I was unable to hear how he spoke with a partner during pair-talk because he took a break, and I had technical difficulties recording his speech when he engaged with other classmates.\textsuperscript{162}

\textsuperscript{162} I could not visit the classroom again due to time constraints and lack of contact with teacher C (see Section 6.6.2).
Appendix I Findings from IPA of teachers’ baseline interviews

This appendix presents the themes that resulted from the in-depth analysis of the teachers' baseline interviews using IPA procedures. To exemplify how I identified these themes, I include at the end of this appendix a segment of one teacher’s interview with my notes for identifying themes and another segment from a table that compares the themes between the three interviews.

I1 Superordinate and subordinate themes

Table I.1 displays the superordinate and subordinate themes that I identified across the interviews.

Table I.1. Superordinate and subordinate themes identified in the teachers’ baseline interviews via IPA procedures

<table>
<thead>
<tr>
<th>Superordinate themes</th>
<th>Subordinate themes</th>
<th>Previous subordinate themes</th>
</tr>
</thead>
</table>
| Theme 1: Conditions in each classroom | A. Teacher’s background and experience | 1. Diverse previous professional experience  
2. Knowledge about autism  
3. Level of confidence  
4. Feeling of being prepared for supporting class  
5. Responsibility |
| | B. Characteristics of the class and school | 6. Diversity and needs in the classroom  
7. Frequency of changes  
8. Ethos in classroom and school |
| | C. Aspects that hindered or enabled teachers’ practice | 9. School’s support and consideration of teachers.  
10. Availability of resources and plans  
11. Collaboration with colleagues  
12. Physical environment |
| | D. Priorities | 13. Students’ wellbeing vs academic performance  
14. Students’ participation (proactivity and equity)  
15. Social interactions vs keeping pace up  
16. Address needs and differences  
17. Students’ autonomy |
| Theme 2: Teachers’ support for the focus students | A. Children’s characteristics | 18. Sensory hypersensitivity  
19. Communication and social interactions  
20. Impact of emotional distress  
21. Academic  
22. Positive emphasis |
| | B. Forms of support and priorities | 23. Adjustment for all vs for one  
24. Multimodal support  
25. Behaviour regulation (wellbeing, calm down and homogenise)  
26. Individual intervention  
27. Communication and social interactions (different foci)  
28. Autonomy |
Concerning Theme 1, I identified in the teachers’ responses that their experience with diversity, requirements of their classes and focus students, and the schools’ characteristics influenced their teaching priorities. Teachers A and C had previously worked with students with different needs (showing interest in inclusive teaching), and students in their classes had pressing difficulties the teachers had to address. For them, creating equal opportunities and fostering openness to diversity, the feeling of belonging, and a peaceful environment were essential goals. The school’s support (or perceived lack of it) also influenced these goals. In the case of Teacher A, she did not feel the school offered her enough training and, therefore, worked on finding solutions to fulfil her responsibility. In the case of Teacher C, her school had a particular interest in inclusion and provided her access to specialised support.

“…having a very high need class…” “…we haven't been told how to present… school life… in a way that they can access…” (Teacher A)

"I was a TA for four years…” “In this school… we have so many children with… …EHCPs… SEN register.” “…they'll lend us resources…” (Teacher C)
Teacher B’s responses reflected his sense of responsibility for preparing the students to be proactive and independent, and managing distractions. Although his class included students who required support, the close attention during the lessons seemed to be primarily provided by the TA.

“I’m trying to build that independence for Secondary School because I very much feel like I’m kind of spoon feeding them…” “I’ve been pushing quite a lot this year… active involvement.” (Teacher B)

Theme 2 comprised the themes that reflected the teachers’ priorities for supporting the focus students, which were related to their students’ characteristics, the previously mentioned goals and their experiences supporting them. Their responses highlighted the different difficulties of the three students. Children A and B required more close support (academically and on the regulation of behaviour) than Child C, which Teacher A and the TA-B provided, respectively. In the three interviews, the teachers mentioned forms of support associated with communicating information in different modalities. The latter included primarily visual prompts or supporting materials. Teachers B and C even indicated using a physical resource to help students communicate via pointing at an emotions chart when experiencing difficulties. They all highlighted the importance of facilitating the focus students’ communication. However, the purpose of the suggested support differed, focusing on individual (Teachers B and C) or social aspects (Teacher A). The quotes below illustrate these aspects.

“I want him to be able to communicate effectively with others…” “…talk to other children with a purpose and… be understood…” (Teacher A)

“…he needs to tell us that he needs some help.” “…having conversations is really important because actually, he tries to do a lot in his head…” (Teacher B)

“…if he had… a meltdown we wouldn't know…he didn't have a way to articulate it to us using words…” (Teacher C)
Teacher A focused on Child A’s communication with others. In the case of Children B and C, teachers mainly concentrated on their communication to ask for help. However, in the case of Child C, this support aimed to help him to continue engaging in an activity, while for Child B, it related to his understanding of the lessons’ content. The teachers identified alternative ways their students communicated, including pretending and repeating information or behaviours. These observations signalled their attention to the three students’ behaviour. The three teachers emphasised other relevant aspects: aiding their students when overwhelmed or anxious and fostering autonomy.

The teachers’ opinions on inclusion were consistent with their goals in Theme 1. They all recognised how demanding it was, considering the large number of resources they had to use or prepare, the time invested and the need for flexibility. Nevertheless, Teachers A and C reflected being motivated to address participation issues in their classrooms, slowing down their advancement in the curriculum if needed. Teacher B focused on the challenge of catering for all needs.

“…thinking about how to cater for the needs in your class …it's not always the forefront of your mind…” “…academically, Child B is just not able to access [some contents], and there's no kind of way in my mind… we can differentiate what we were doing.” (Teacher B)

“…we have to modify our lessons for most of the children anyway… it is something that you do for the whole class and it just you kind of hope that it like trickles up…” (Teacher C)

Regarding Theme 3, the themes reflected the teachers’ familiarity with classroom dialogue, conceptually and practically, and their vision of the discussions in their classrooms. They all had some knowledge about dialogic teaching, exemplified in their descriptions of it referring to using talk to promote learning, problem-solving and establishing roles. All shared their class’s rules for talking, focused mainly on turn-taking, listening and respecting classmates’ ideas. These rules were consistent with their shared goal of eliciting students’ participation, reflected by the examples of dialogic strategies they used (e.g., participation pen,
sticks to select a speaker randomly). The three teachers’ responses illustrated some insecurities related to integrating discussions or dialogic strategies in their day-to-day practice, referring to difficulties managing the discussions while also achieving their teaching goals (see quote below).

“…if a child is explaining …it can take a long, convoluted way and it could be less clear, so I’m very aware of… keeping the lesson pace up…”

(Teacher B)

Their aims related to promoting dialogue were also consistent with their main priorities. Teachers A and C aspired to improve the students’ communication with each other, provide participation opportunities to quieter students and clarify their communication with their classes. Teacher B focused on its potential for supporting students’ development of their reasoning.

“…teach them how to talk to each other in a more effective way.”

(Teacher A)

“…we do lots of partner talk… I need to know the process they’re going through.” (Teacher B)

I2 Example of how I identified themes in the interviews and across them

First, I present an illustrative short segment of the transcript of Teacher A’s baseline interview (Table I.2). It corresponds to the portion of the interview in which we talked about the way she and the TA helped Child A in the classroom. Second, I show a segment from a table that grouped common themes I identified between the three questionnaires (Table I.3). This segment is related to the teachers’ support priorities for the focus students.

Exploratory comments

- Standard comment – related to content of the responses
- *Comments in italics* – linguistic comments, related to the language used
- *Underlined comments* – conceptual comments, my questioning related to the responses
### Table I.2. Short segment from Teacher A's interview with exploratory notes

<table>
<thead>
<tr>
<th>Turn</th>
<th>Speaker</th>
<th>Speech</th>
<th>Exploratory notes</th>
<th>Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>204.</td>
<td>Researcher</td>
<td>So, what would be your approach for teaching children with autism? What do you find is the most effective right now, with your students?</td>
<td>Most effective to support autistic children: classroom atmosphere. Sensory stimuli (reduce noise levels) Regulate anxiety (meditation sessions). Focus on student's wellbeing, calm environment. “Let's not cry about it” – effort and focus on fixing.</td>
<td>Support for child. 1) Calming classroom atmosphere for student’s wellbeing (physical – reduce noise; relaxing activities – meditation; regulate anxiety.) 2) All benefit from the support</td>
</tr>
<tr>
<td>205.</td>
<td>TA A</td>
<td>Right now, it’s, I would say the, like, the whole atmosphere of the classroom, to reduce the noise level to the minimum and something, and what we are trying now with these meditation sessions is to give them a tool, for them to regulate their own anxiety, if they can have any, which I think it’s really, really positive, because nowadays like kids can get a lot of these things already, which is a pity, but let's not cry about it. You now, let's give them something that they can use. Um, so, if the classroom gets too noisy now some of them would start saying 'shhh', like you know. Like we don't tell them it is for Child A, because it is for everybody's sake.</td>
<td>It is for everybody's sake. Adjustments are helpful for all in the classroom.</td>
<td>Teacher experience. “Let's not cry about it”</td>
</tr>
<tr>
<td>206.</td>
<td>Teacher A</td>
<td>It's not for Child A, [it's for everybody. It's very (...)</td>
<td>Support for child. Behaviour regulation and motivation: behaviour chart. Prioriy Focus on positive reinforcement and reward (positive behaviour) Interaction between teacher and TA. Compliments teacher re. to positive reinforcement</td>
<td></td>
</tr>
<tr>
<td>207.</td>
<td>TA A</td>
<td>Right now, it’s, I would say the, like, the whole atmosphere of the classroom, to reduce the noise level to the minimum and something, and what we are trying now with these meditation sessions is to give them a tool, for them to regulate their own anxiety, if they can have any, which I think it’s really, really positive, because nowadays like kids can get a lot of these things already, which is a pity, but let's not cry about it. You now, let's give them something that they can use. Um, so, if the classroom gets too noisy now some of them would start saying 'shhh', like you know. Like we don't tell them it is for Child A, because it is for everybody's sake.</td>
<td>It is for everybody's sake. Adjustments are helpful for all in the classroom.</td>
<td>Teacher experience. “Let's not cry about it”</td>
</tr>
<tr>
<td>209.</td>
<td>TA A</td>
<td>Yeah, exactly. And then, yeah. Yeah, like calming and lots of. There’s lots of with this behaviour chart [and], they get motivated a lot on good behaviour.</td>
<td>Support for autistic students: Praise that is reinforcing/motivating related to behaviour regulation. Behaviour chart. (Constant, emphasis “lots of”) Refer back to training.</td>
<td>Support for child. Behaviour regulation and motivation: behaviour chart. Prioriy Focus on positive reinforcement and reward (positive behaviour) Interaction between teacher and TA. Compliments teacher re. to positive reinforcement</td>
</tr>
<tr>
<td>210.</td>
<td>Teacher A</td>
<td>Yeah, exactly. And then, yeah. Yeah, like calming and lots of. There’s lots of with this behaviour chart [and], they get motivated a lot on good behaviour.</td>
<td>Support for autistic students: Praise that is reinforcing/motivating related to behaviour regulation. Behaviour chart. (Constant, emphasis “lots of”) Refer back to training.</td>
<td>Support for child. Behaviour regulation and motivation: behaviour chart. Prioriy Focus on positive reinforcement and reward (positive behaviour) Interaction between teacher and TA. Compliments teacher re. to positive reinforcement</td>
</tr>
<tr>
<td>211.</td>
<td>TA A</td>
<td>Yeah, exactly. And then, yeah. Yeah, like calming and lots of. There’s lots of with this behaviour chart [and], they get motivated a lot on good behaviour.</td>
<td>Support for autistic students: Praise that is reinforcing/motivating related to behaviour regulation. Behaviour chart. (Constant, emphasis “lots of”) Refer back to training.</td>
<td>Support for child. Behaviour regulation and motivation: behaviour chart. Prioriy Focus on positive reinforcement and reward (positive behaviour) Interaction between teacher and TA. Compliments teacher re. to positive reinforcement</td>
</tr>
</tbody>
</table>
### Table I.3: Example of how I grouped similar themes between the interviews.

<table>
<thead>
<tr>
<th>Subordinate</th>
<th>Teacher A</th>
<th>Teacher B</th>
<th>Teacher C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Communication</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Effective communication. A. Learn script/model of high level language, access language (understand) and be understood. B. Form of spoken language, long sentences.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Social interactions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Autonomy/independence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Wellbeing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Behaviour regulation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Adjust teaching</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Social Interactions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Improve expression of experiencing difficulties.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Social skills and interactions.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Fade support gradually (seat in the classroom, form of communicating distress).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Provide safe environment (physical and social).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Autonomy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Autonomy/independence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Social interactions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Emotional regulation.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Adjust teaching.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Wellbeing</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Social skills and interactions.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Fading support gradually (seat in the classroom, form of communicating distress).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Provide safe environment (physical and social).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Individualised end goals.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Differentiate content for B.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Subordinate**
- **Priorities**

- **Teacher A**
  - Communication: A. Communication. Communicate difficulties, ask for help, and verbalise his process.
  - Social Interactions: A. Attention to others. B. Regulation of social behaviour (exaggeration/excessive protection).

- **Teacher B**
  - Communication: A. Learn script/model of high level language, access language (understand) and be understood. B. Form of spoken language, long sentences (form).
  - Social Interactions: A. Attention to others. B. Regulation of social behaviour (exaggeration/excessive protection).

- **Teacher C**
  - Communication: A. Communication. Communicate difficulties, ask for help, and verbalise his process.
  - Social Interactions: A. Attention to others. B. Regulation of social behaviour (exaggeration/excessive protection).
Appendix J  Findings from parents’ responses to the baseline questionnaires

This appendix includes the findings of the analysis of the focus students’ parents’ baseline questionnaires. The questionnaire included a 5-point Likert scale with 34 items and 11 open questions on different aspects of their children’s school experiences. I first introduce the scores obtained in the Likert-scale items. Second, I describe the superordinate and subordinate themes that I identified across the questionnaires. At the end of the appendix, I show an example of how I identified the themes in a questionnaire and across the three questionnaires.

J1  Likert-scale scores

I separated the Likert-scale scores into three groups. Namely, they included parents' perceptions of schools' support (items 1 to 23), the impact of their children's sensory sensitivities on their school experience (items 24 to 31), and their children's negative social experiences in school (related to bullying).

Table J.1 presents the scores for the items of the first group (schools’ support) grouped into five topics. A higher score was associated with a positive perception.

Table J.1. Scores per topic related to the parents' perspectives of the support provided for their children in school

<table>
<thead>
<tr>
<th>Topics related to parents’ perceptions of the support provided to their children*</th>
<th>Max. score</th>
<th>Child A’s parents</th>
<th>Child B’s parents</th>
<th>Child C’s parents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Resources and training in schools</td>
<td>25</td>
<td>21</td>
<td>25</td>
<td>21</td>
</tr>
<tr>
<td>2. Tailored teaching methods</td>
<td>30</td>
<td>21</td>
<td>27</td>
<td>24</td>
</tr>
<tr>
<td>3. Teamwork within the school</td>
<td>10</td>
<td>8</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>4. Building rapport with parents and students</td>
<td>30</td>
<td>16</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td>5. Building a climate of acceptance within the classroom</td>
<td>20</td>
<td>18</td>
<td>19</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>115</td>
<td>84</td>
<td>103</td>
<td>93</td>
</tr>
</tbody>
</table>

Scores per item: Strongly disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly agree (5).

(Items based on Baker, 2013; Bond et al., 2017; Dillon & Underwood, 2012; Rollins et al., 2016; Rubenstein et al., 2015; Yu, 2013).

The second group of scores is related to parents’ responses on the impact of their children’s sensory sensitivities on their school experience (positive and/or
negative). Table J.2 shows the scores provided to the items related to each of the sensory modalities.

Table J.2. Scores per sense modality related to parents’ perspectives on their children’s sensory sensitivities/positives

<table>
<thead>
<tr>
<th>Senses and their impact on school experience (based on Howe &amp; Stagg, 2016)</th>
<th>Child A’s parents</th>
<th>Child B’s parents</th>
<th>Child C’s parents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Touch</td>
<td>Negative</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Positive</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Visual</td>
<td>Negative</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Positive</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Hearing</td>
<td>Negative</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Positive</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Smell</td>
<td>Negative</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Positive</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Scores: Strongly disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly agree (5) Items 24 – 31 in the questionnaire.

Child C’s parents indicated a neutral impact, and Child B’s only highlighted a negative impact from his sensitivity to hearing. Child A’s parents pointed out the negative impact of his sensitivity to touch and the positive ones of touch, vision and hearing.

The last group of scores was related to three items on the children’s negative social experiences in school (particularly related to bullying). Table J.3 below shows the scores. Only the parents of Children B and C identified difficulties (medium and low scores for Child B and high scores for Child C).

Table J.3. Scores related to parents' report of their children's experience with bullying

<table>
<thead>
<tr>
<th>Experiences related to bullying and victimization (based on Chen &amp; Schwartz, 2012)</th>
<th>Child A’s parents</th>
<th>Child B’s parents</th>
<th>Child C’s parents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Child has experienced being teased by other students in the class.</td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>2. Child has felt left out from a group activity.</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3. Child teased other students in the class.</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

Scores: Never (1), Once or twice (2), Three or four times (3), Five times (4), More than five times (5) Items 1 and 2 were part of the victimization scale and item 3 was part of the bullying scale.
J2 Open questions

The open questions inquired about the students’ characteristics and the parents’ views on the schools’ support. Table J.4 displays the seven subordinate themes I identified across the questionnaires, and the three superordinate themes I established to group them.

Table J.4. Superordinate and subordinate themes identified via IP analysis in parents’ written responses

<table>
<thead>
<tr>
<th>Superordinate themes</th>
<th>Subordinate themes</th>
<th>Previous subordinate themes*</th>
</tr>
</thead>
</table>
| **Theme 1:** Social interactions and children's experiences in school | A. Child’s characteristics and social interactions | 1. Overly friendly  
2. Shy and requiring feeling comfortable  
3. Child’s difficulties with making mistakes |
|                      | B. Concerns related to social interactions | 1. Victims of bullying and isolation; and difficulties in emotional regulation  
2. Struggles in playtime. Social interaction and suitable behaviour.  
3. Lack of understanding of social cues.  
4. Being aware of differences with others and experiencing anxiety. |
| **Theme 2:** School characteristics and children's learning | A. Focus tasks | 1. Writing  
2. Reading  
3. Phonics  
4. Maths |
|                      | B. Enabling and hindering factors | 1. Clarity of directions and expected responses  
2. Influence of peers and social interactions.  
3. Awareness of children’s characteristics and state |
|                      | C. Adjusting teaching | 1. Active and ever-evolving adjustments.  
2. Equitable opportunities for children to learn what others are.  
3. Attention to child’s forms of communication and engaging.  
4. Level of difficulty |
|                      | D. Children’s enjoyment of school and learning | 1. Enjoy activities  
2. Needs are identified and met, and ability to cope  
3. Positive interaction with teacher/TA |
| **Theme 3:** Parents’ attitudes towards their children’s school | A. Parents’ foci | 1. Routine and ability to cope  
2. Exposure to social interactions  
3. Academic outcomes and future possibilities  
4. Focus on child’s strengths and abilities  
5. Clear directions and child’s understanding |
B. Parents’ trust in school

| 1. Positive emphasis on school’s support |
| 2. No concerns related to school’s support |
| 3. Acknowledgment of effort and empathy related to difficult issues |
| 4. Distancing, no suggesting specific strategies, or form of support |

Total 7 30

Regarding Theme 1, parents’ responses reflected students’ difficulties regulating their social behaviour and how schools’ social aspect appeared challenging for the students (even indicating bullying in the case of Child C). They expressed concerns about the impact of these on their wellbeing and participation in school if not regulated or facilitated. The following quotes reflect these concerns.

“Child A is also a very over friendly child.”

“… Child B is able to … question others, sometimes not in an appropriate way as he lacks some understanding of social cues…” “… is aware of his differences to others, does make him anxious.”

“…due to some bullying, [Child C] sometimes feel isolated and do not want to go to school.”

Theme 2 addressed different aspects of school that influenced the students’ engagement in school, representing potential barriers or enabling support. These aspects included challenging tasks, characteristics of teachers’ practices (indications, metaphorical language) and students’ characteristics (state) and relationships with peers. The following quotes reflect these aspects.

“[How Child A learns] depends on the subject and [his] mood. “… struggle with handwriting and is also easily distracted...”

“Visual learning/directions… seem to be the most pro-active way of learning for Child B at this time. He… requires verbal directions to be relayed in a way that gives him more time to process.” “...Sometimes making a sound is Child B’s instinct response until he puts his thoughts/ ideas together to then answer.”
The parents emphasised the need for constant adjustments to teaching based on their children’s changing needs, progress and behaviour, requiring close monitoring. They highlighted the variability of the students’ responses due to mismatches between the teachers’ expectations and their characteristics. Two parents referred to reading and writing difficulties, indicating the need for constant support. Additionally, parents reported a positive attitude towards school from their children by referring to the children’s enjoyment of specific subject matters, activities, or the company of the teaching assistants (see quotes below).

“Child A also enjoys one to one time with his 1:1.”
“Child C enjoys maths and is really good in maths.”

Concerning Theme 3, parents' responses reflected an overall positive attitude towards the schools' support, showing a sense of trust. They referred to teachers' strategies positively, acknowledged the schools' efforts or chose not to share any advice (see quotes below).

“… [Child C] needs more help with regulating their emotions and being victim of bullying. …the school is trying their best in resolving this…”

The priorities I identified in their questionnaires included providing structure and clear indications, exposure to social interactions, children's academic outcomes, and emotional regulation (in the case of Child C).

**J3 Example of how I identified themes in the questionnaires and across them**

I include in this subsection I segment from Child B’s questionnaire with notes for identifying themes (Table J.5) and a segment of a table in which I group the themes the questionnaires had in common (Table J.6).
<table>
<thead>
<tr>
<th>Question</th>
<th>Emergent themes</th>
<th>Responses of Child B’s parents</th>
<th>Exploratory comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Multimodality (visual directions to transmit information)</td>
<td>Visual learning/directions does seem to be the most pro-active way of learning for Child B at this time. He processes that information faster. He will normally require verbal information/directions to be relayed in a way that gives him more time to process. Maybe to have it repeated or broken down into a simpler form. Child B is good at absorbing information, especially about subjects he likes, although he may appear to be not paying attention. He finds phonics/reading difficult so relays on verbal instruction.</td>
<td>Visual learning is the most pro-active way of learning and faster processing information, including directions. Proactive – active adjustment. At this time. – changes, variability or evolution of needs or strategies. Not determined.</td>
</tr>
<tr>
<td></td>
<td>Importance of clear and brief directions, to give enough time and guidance.</td>
<td></td>
<td>Verbal information (directions) in a form that: -gives him more time to process -repeat it -broken down into simpler form  Importance of processing time.</td>
</tr>
<tr>
<td></td>
<td>Processing time (provide enough, enabling condition or child’s characteristic)</td>
<td></td>
<td>‘Directions’ Repeating the word directions, makes emphasis on the importance of communicating clearly and providing guidance.</td>
</tr>
<tr>
<td></td>
<td>Considering child’s characteristics, active adjustments</td>
<td></td>
<td>Strengths: absorbing information about subjects he likes. ‘Absorbing’ potentially emphasises how distinctive his attention and ability to learn/memorise information about it. This points out importance to integrate interests.</td>
</tr>
<tr>
<td></td>
<td>Clear strategies: repetition, break down info., time to process</td>
<td></td>
<td>‘…he may appear to be not paying attention’ – Difficulties: phonics/reading (relies on verbal instruction). This indicates that there is no problem understanding verbal communication and highlights again importance of guidance.</td>
</tr>
<tr>
<td></td>
<td>Child’s interests impact on learning (motivation?)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Difficulty: phonics/reading</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Variability in support for child evolving</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Repeating, practicing, and guiding at home (helping with difficult tasks)</td>
<td>-practicing phonics at home -reading to and reading with Child B, listening to him read</td>
<td>The use of verbs like ‘Practice’, ‘reading with and to’ indicate clear actions that are carried out at home. Help with difficult tasks for him:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Awareness of required adjustments – consider level of difficulty.</td>
<td>Monitor/ensure child’s understanding of activities and goals</td>
<td>Support with reading, phonics</td>
<td>Awareness of child’s required adjustments and level of support. The time investment of this support. Child’s understanding of activities is actively sought, potentially reiterating the importance of clear, brief and “simpler” directions.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>guidance in regular/required tasks:</td>
<td></td>
<td></td>
<td>Practice phonics.</td>
</tr>
<tr>
<td>3. Multimodality (of communication? – use sounds to communicate)</td>
<td>Verbal communication and able to communicate needs, opinions, ask questions</td>
<td>Literal understanding (characteristic)</td>
<td>Reading to, with and listening to him read.</td>
</tr>
<tr>
<td>Verbal communication and able to communicate needs, opinions, ask questions</td>
<td>Lacks understanding of social cues (characteristic)</td>
<td>Monitor/support understanding – enabling/hindering factors (metaphorical language)</td>
<td>‘Texts at a level he can complete’ … ‘…take time beforehand to break it down or re-jiggle it a bit to a way he can understand what he has to do’ -</td>
</tr>
<tr>
<td>Child B is verbal and able to communicate his needs. He will ask questions and is able to voice his opinions or question others, sometimes not in an appropriate way as he lacks some understanding of social cues.</td>
<td>He takes everything literally so using metaphors, as an example, can have an effect on his understanding.</td>
<td>Child B will use sounds to show his feelings or in place of interaction at times.</td>
<td>*Verbal and able to -communicate needs -ask questions -voice opinions -question others</td>
</tr>
<tr>
<td>Child B will use sounds to show his feelings or in place of interaction at times.</td>
<td>‘…sometimes not in an appropriate way as he lacks some understanding of social cues’</td>
<td>*Takes everything literal</td>
<td>‘…effect on his understanding’… Another mention to importance of guiding/monitoring understanding</td>
</tr>
<tr>
<td>*Use sounds to show feelings or in place of interaction at times</td>
<td>Difficulties for considering context, understanding expected social behaviours.</td>
<td>Mentioning times, when do these times take place? Would it be related to moments that go beyond the level he comprehends?</td>
<td></td>
</tr>
</tbody>
</table>
### Table J.6. Examples of common superordinate and subordinate themes identified in each parent’s questionnaire

<table>
<thead>
<tr>
<th>Themes in Child A’s parents’ responses</th>
<th>Themes in Child B’s parents’ responses</th>
<th>Themes in Child C’s parents’ responses</th>
</tr>
</thead>
</table>
| A. Focus on child’s strengths and abilities Q1, Q3 | **A. Clear directions Q1**  
1. Multimodality – visual directions Q1  
2. Verbal directions: Clear and brief, with enough time to process (strategies: repeat, break down information) - Q1  
3. Structure and breaks (timetable, brake up day) Q7 | A. Positive emphasis on child’s skills/strengths (no specific academic difficulty) Q1 |
| B. Difficulties and supporting writing (handwriting) Q1, Q2 | **B. Hindering/ enabling conditions Q4**  
4. Processing time (importance provide enough time) Q1, Q4  
5. Literal understanding (Metaphorical language) Q3  
6. Impact of child’s interests on learning (motivation) Q1  
7. Influence of peers (positive when peers are aware and responsive to the child’s needs) Q6  
8. Impact of sensory sensitivities (school as overstimulating) Q5, Q8 | B. Relationship between enjoyment and learning/ strengths/ difficulties Q1  
1. Enjoys and is really good in Maths Q1  
2. Doesn’t enjoy reading, they are still good Q1  
3. Enjoy school as doing better Q5  
4. Enjoy group activities Q6 |
| C. Recognition of enabling/hindering conditions,  
1. Variability of child’s response Q1  
2. Influence of child’s emotional state on learning (mood) Q1, Q2  
3. Motivation Q2  
4. Attention span Q1 | **C. Generalising and distancing – pronoun ‘they’, ‘their’ Q1, Q2, Q3, Q5, Q6, Q9** | C. Trust in school  
5. Positive emphasis on school’s support – appreciation, empathy, acknowledgement (‘school is trying their best), despite of child’s difficulties Q4, Q7, Q8  
6. No mention of a particular support/strategy Q4 |
| D. Strengths reading, phonics, maths Q1 | **D. Adjustments to child’s characteristics**  
9. Active and ever-evolving Q1  
10. Considered preferred modalities of receiving information (visual) Q1  
11. Consider level of difficulties Q2  
12. Attention to child’s non-verbal communication Q3  
13. Equitable opportunities to learn the same as others (adapted curriculum) Q10  
14. Monitor/ensure child’s understanding of activities and activities’ goals Q2 | D. Concerns related to social interactions  
7. Victim of bullying, isolation (persistent difficulty, not fully addressed) Q5, Q7  
8. Emotional regulation Q9 |
| E. Child’s positive attitude towards school  
5. Loves school - enjoys P.E., music, lunch, general classroom activities Q5 | **E. Difficulties: phonics/reading Q1** | E. Support with difficult tasks |
| F. Characteristics of child  
6. Short attention span  
7. Verbal communication | **F. Support with reading Q2** | F. Support with reading Q2 |
| **D. Difficulties: phonics/reading Q1** | **E. Support with difficult tasks** | **F. Support with reading Q2** |
G. Characteristics of social interactions
8. Over friendly Q3
9. Positive social interaction with TA/adult Q5
10. No identified concerns in group activities Q6

H. Trust in school
11. Positive emphasis on school support Q8
12. No concerns related to school Q7, Q8,

I. Not clear or not easy to describe useful strategies, main research goals, inclusion (including general statement ‘...A loves going to school’) Q4, Q5, Q7, Q8, Q9, Q10

F. Characteristics of child
17. Process visual information faster Q1
18. Requires more processing time Q1, Q4
19. Verbal communication (able to express needs, opinions, ask questions) Q3
20. May appear not paying attention Q1
21. Multimodality - Sounds to show feelings or interact (signal a need) Q3, Q4
22. Literal understanding Q3

G. Characteristics of social interactions
23. Lacks understanding of social cues Q3
24. Difficulties at playtime – social interaction Q6
25. Positive interaction with teacher/TA Q9

H. Enjoyment of school Q5
26. Needs met (accessible environment/ tasks and expectations) Q5
27. Cope with school and class activities Q5, Q6

I. Trust in school
28. No concerns related to the school’s support Q7, Q8

J. Parents’ focus Q9
29. Routine Q9, Exposure to social interactions Q9, Coping with school

K. Impact of student’s emotional state on school experience (anxiety related to awareness of difference) Q9

G. Characteristics of social interactions
9. Shy Q3, Q6
10. Influence of feeling safe, emotional state (feeling comfortable) on social interactions Q3

H. Difficulties
11. Getting something wrong Q6
12. Regulating emotions – able to ignore and stay calm about situation, seek help from staff Q9

I. Parents’ focus
13. Academic outcomes (grades above expected) and future possibilities Q7, Q9

J. Hindering factors
14. Negative social experiences (victim of bullying) Q5
15. Shy
16. Getting something wrong Q6

K. Impact of emotional state, emotional wellbeing (feeling safe) and social aspect (bullying, isolation) on school experiences and attitudes towards school Q5, Q10
Appendix K  Illustrative examples of the focus students’ participation and their teachers’ support

K1 Classroom A

- Example 1: Teacher A’s guided questioning

Table K.1. Example of Child A’s participation during a whole-class activity

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
<th>Code 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>23.</td>
<td>T</td>
<td>Why is resilience a good thing? Why is resilience something that we might want to be able to do? Child A.</td>
<td>IR</td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>Child A</td>
<td>I had my go</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>T</td>
<td>You had your go, I see. ((Child A turns to see the TA)). Child A, why is resilience good?</td>
<td>B, G</td>
<td></td>
</tr>
<tr>
<td>26.</td>
<td>Child A</td>
<td>Ah, the resilience is (...) I ride my bike because it was my bike(...) I am happy to bike. This is resilience because (...)(...) If you want to chat with me, I, (...)there are some(...) people over there ((points at the smartboard, which displays an icon that represents people talking in a circle)).</td>
<td>U</td>
<td>RPT, ALT</td>
</tr>
<tr>
<td>27.</td>
<td>T</td>
<td>What do you mean about your bicycle?</td>
<td>IB</td>
<td></td>
</tr>
<tr>
<td>28.</td>
<td>Child A</td>
<td>The bicycle, Girl 1's bicycle</td>
<td>B, C</td>
<td></td>
</tr>
<tr>
<td>29.</td>
<td>T</td>
<td>Oh, I see, so you think about Girl 1’s bicycle. What does she have to keep on doing on her bicycle? ((moves her hand in circles))</td>
<td>B, IB, G</td>
<td>ALT</td>
</tr>
<tr>
<td>30.</td>
<td>Child A</td>
<td>Pedal ((moves his arms as if pedalling with them))</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>31.</td>
<td>T</td>
<td>Why? [Even if she falls off.]</td>
<td>IB, G</td>
<td></td>
</tr>
<tr>
<td>32.</td>
<td>Child A</td>
<td>[Because she, she’s got a bell]</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>33.</td>
<td>T</td>
<td>What happens if she falls off?</td>
<td>IB, G</td>
<td></td>
</tr>
<tr>
<td>34.</td>
<td>Child A</td>
<td>Because she is crying</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>35.</td>
<td>T</td>
<td>She does cry but, what does she do? Does she just stop doing the bicycle or did she get back on?</td>
<td>IB, G</td>
<td></td>
</tr>
<tr>
<td>36.</td>
<td>Child A</td>
<td>Get back on</td>
<td>U</td>
<td>RPT</td>
</tr>
<tr>
<td>37.</td>
<td>T</td>
<td>Why?</td>
<td>IR</td>
<td></td>
</tr>
<tr>
<td>38.</td>
<td>Child A</td>
<td>Because you get back on, you get it right</td>
<td>B, R</td>
<td></td>
</tr>
<tr>
<td>39.</td>
<td>T</td>
<td>Yes, to make it better, to make her better at cycling. That’s really nice that you connected to what she has</td>
<td>B, G</td>
<td>ALT</td>
</tr>
</tbody>
</table>

Classroom A, whole-class discussion (Cycle 3)
Context: the class talked about the meaning of resilience. Before this example, a girl had referred to her personal experience of learning how to ride a bike.
said, I’m really pleased that you were listening to her idea about resilience ((*touches her ear*)).

Teacher A guided Child A’s responses by rephrasing her question (turn 25), pointing out details for him to focus on (turns 29, 33) and asking a closed question when Child A’s responses started to drift from the topic (turn 35). The example also illustrates how Child A responded by repeating information (turns 26 and 36). The example shows how he referred to a classmate’s previous contributions (C, turns 26 and 28) and his participation in the discussion (turn 24). These contributions were peculiar to Cycle 3, and I suggest that this observation reflected the familiarity he had gained with discussions. Turns 29 and 39 show how Teacher A rephrased Child A’s responses (B) to clarify them. Through the use of this strategy, Teacher A acknowledged his contribution, made his contribution clear to others and opened opportunities for other students to build on it.

- Example 2: Teacher A’s mediation of Child A’s interactions with peers

Table K.2. Example of Child A’s participation during a small-group activity

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
<th>Code 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>T</td>
<td>Do you think that the dirty girl and the clean girl should be treated the same? (<em>(Turns to see Child A)</em> Should we listen? Listen to Girl 1 <em>(points at her)</em>)</td>
<td>E, G</td>
<td>ALT</td>
</tr>
<tr>
<td>4</td>
<td>Girl 1</td>
<td>The same</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>T</td>
<td>Why?</td>
<td>IR</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Girl 1</td>
<td>Because then it’s not fair</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>T</td>
<td>To treat them differently. Child A said differently. What did you think that the dirty girl needed to do? (<em>(talks looking at Child A)</em>)</td>
<td>B, C, G</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Child A</td>
<td>Draw(...) the clean girl and the dirty girl.</td>
<td>B</td>
<td>BD</td>
</tr>
<tr>
<td>9</td>
<td>T</td>
<td>So, you think that the dirty girl, what do you think the dirty girl needs to do to her skin? (<em>(rubs her face as if she is washing it)</em>)</td>
<td>B, G</td>
<td>ALT</td>
</tr>
<tr>
<td>10</td>
<td>Child A</td>
<td><em>(Draws on his board, it is unclear what he does)</em></td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>T</td>
<td>Child A said that the dirty girl could become like the… (<em>(looks at Child A and points at the clean girl on his board)</em>)</td>
<td>B, G</td>
<td>ALT</td>
</tr>
<tr>
<td>12</td>
<td>Child A</td>
<td>Clean girl <em>(looking at his board)</em></td>
<td>U</td>
<td></td>
</tr>
</tbody>
</table>
Teacher A reminded Child A to listen to his partner (G, turn 1) and she revoiced his previous contributions (C and B, in turns 5, 7 and 9). The intention of the revoicing was to encourage Child A to share his previous ideas with his partner and to promote his partner’s engagement with Child A’s ideas.

**K2 Classroom B**

- **Example 1**
The TA referred to previously discussed ideas or responses to make clear the trajectory of an activity (see turn 4).

**Table K.3. Example of TA focusing on Child B in a one-to-one interaction**

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
<th>Code 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>TA</td>
<td>So, health and safety, what is wrong with it?</td>
<td>G, E</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Child B</td>
<td>Ah, the people are digging, ah, the kids are fighting each other, like…</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>TA</td>
<td>So, we said no water, didn’t we?</td>
<td>C, G</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Child B</td>
<td>There is no more, ah, there is [no more] …</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>TA</td>
<td>[Not enough water]</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Child B</td>
<td>There is wait, wait, wait, I’ve got a good idea, ah, let me say it, ah, there is not enough water</td>
<td>U</td>
<td>ADJ, RPT</td>
</tr>
</tbody>
</table>

- **Example 2**
Table K.4 presents a short excerpt from an activity in pairs from Cycle 2. It displays how a TA and a peer (who took on a tutor role) helped Child B to solve a maths exercise that involved fractions. In this example, the TA focused Child B’s attention on his partner’s explanation (turn 9) and built on it (turn 11). His partner represented the fractions in drawings of figures while explaining the exercise (turn 10). The TA also explained why they were not using certain materials (blocks that represented fractions) and when they would use them (referring to future activities). Through this explanation, the TA made clear what Child B could expect in the lesson and redirected his attention to his peer’s drawing (because he was paying attention to the blocks).
**Table K.4. Example of how the TA and a peer guided Child B in a pair activity**

**Context:** this short segment of a pair interaction between Child B and a peer (who adopted a tutor role) illustrates Child B suggesting a solution to a problem; his solution was related to the materials.

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
<th>Code 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.</td>
<td>TA</td>
<td>We haven’t got sevenths, so we can’t use this, otherwise we’d have used that. We will use these a bit later ((Child B grabs three columns)). It is not playtime now, where we are going to use these is later, ok ((takes the blocks away from Child B)). Now we’re going to watch what Boy 1 is doing.</td>
<td>R2.2, C2.2., G1.2</td>
<td>P.ENV.</td>
</tr>
<tr>
<td>10.</td>
<td>Boy 1</td>
<td>You have got one there, and then this, seven, so you shade 4, because you have 1,4,7 ((draws while talking, Child B observes. Teacher B approaches them))</td>
<td>R1.2</td>
<td>ALT</td>
</tr>
<tr>
<td>11.</td>
<td>TA</td>
<td>Shade the percent.</td>
<td>B, G</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>T</td>
<td>You can be using these as well ((touches the columns of blocks and walks away; Child B turns to see the blocks))</td>
<td>G</td>
<td>TEMP</td>
</tr>
<tr>
<td>13.</td>
<td>TA</td>
<td>The thing is that we haven’t got the sevenths. We can’t do the sevenths ((Child B tries to reach the blocks)).</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Boy 1</td>
<td>I’ll do the sevenths on the whiteboard.</td>
<td>G</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>TA</td>
<td>You could do the sevenths on the whiteboard, there are no sevenths in there so that is why I didn’t use them ((puts the blocks in their package, Child B tries to touch the blocks)), but we will change them, when we get a sheet today, because we will have a sheet.</td>
<td>C2.2</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Child B</td>
<td>Ok ((reaches for the blocks))</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>TA</td>
<td>So that is one whole, so you can have that ((holds one column of blocks close to Child B; Child B touches the other blocks)).</td>
<td>G</td>
<td>TEMP</td>
</tr>
<tr>
<td>18.</td>
<td>Child B</td>
<td>Wait ((grabs one column)) Or you do something like this? ((he holds the column with eight blocks, and takes one of them off))</td>
<td>B, G</td>
<td>TEMP, ALT</td>
</tr>
<tr>
<td>19.</td>
<td>TA</td>
<td>Yes, it’s just we haven’t got sevenths ((looking at what Boy 1 is drawing))</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>Child B</td>
<td>Look, but can we do it like this ((shows the eighths column without one of the blocks))</td>
<td>B</td>
<td>TEMP, ALT</td>
</tr>
</tbody>
</table>

In this example, Child B focused on his peer’s explanation by looking at the drawings. However, a contrasting suggestion from Teacher B (turn 12) redirected his attention to the physical materials. Despite the change in his attention focus, Child B showed he understood the exercise and was engaged with the activity because he proposed a viable way of solving the problem with the material (i.e., removing a block from the eighths column). Nevertheless, the TA did not take up his suggestion.
**K3 Classroom C**

- Example 1

Table K.5 illustrates Child C’s participation in a whole-class debate on whether students needed teachers.

*Table K.5. Example of Child C's participation in a whole-class debate*

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
<th>Code 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>64.</td>
<td>Child C</td>
<td>I partially agree because teachers can mislead you, the books can mislead... ((unclear, the teacher interrupts him))</td>
<td>CA, R</td>
<td></td>
</tr>
<tr>
<td>65.</td>
<td>T</td>
<td>Sorry, could you repeat that, please. Slower, a bit slower</td>
<td>G</td>
<td></td>
</tr>
<tr>
<td>66.</td>
<td>Child C</td>
<td>So, all three things could mislead you</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>67.</td>
<td>T</td>
<td>Ok</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>68.</td>
<td>Child C</td>
<td>So, like, teachers could get the wrong information, books can get the wrong information and specially the internet as well and then, you can be distracted.</td>
<td>B, CA</td>
<td></td>
</tr>
</tbody>
</table>

This example showed Child C’s engagement with the discussion; he provided a relevant contribution that was related to an idea shared by a classmate. He indicated his stance concerning the debate’s statement (CA) and explained it (R). His contribution reflected that he had evaluated a previously shared idea (i.e., that information on the internet is not always truthful) and highlighted another perspective (i.e., that books and teachers might also provide untruthful information).

- Example 2

In this example, Child C emphasised in different turns (4, 7, 9) that his team should think about the personality characteristics of the character in a story, in contrast to his teammates who were focused on her appearance. It illustrates how he focused the discussions on specific details.
Table K.6. Example of Child C’s participation in a small-group activity

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
<th>Code 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Girl 1</td>
<td>She looks ugly</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Boy 1</td>
<td>Ugly, because she looks like she is wearing her pyjamas.</td>
<td>B, R</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Child C</td>
<td>You have to do the hypothesis</td>
<td>G, CH</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Boy 1</td>
<td>Because her nose is big</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Girl 1</td>
<td>Then [write it]</td>
<td>G</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Child C</td>
<td>[No, how she is?]</td>
<td>CH, B</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Girl 1</td>
<td>I think she looks [ugly] because she is not wearing things that match.</td>
<td>B, R</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Child C</td>
<td>[But what would the witch be?]</td>
<td>B</td>
<td></td>
</tr>
</tbody>
</table>

- Example 3

Teacher C helped Child C to close off distracting thoughts that were irrelevant to the ongoing activity. She answered his questions or engaged in brief informal conversations to redirect his attention. Table K.7 illustrates this in turn 19. She also guided him when he was distracted or struggled to continue with an activity. The latter was noticeable because he recurred to his characteristic response, “I don’t know” (1RESP, illustrated in turn 14).

Table K.7. Example of Teacher C redirecting Child C’s attention in a small-group activity

<table>
<thead>
<tr>
<th>Turn</th>
<th>Agent</th>
<th>Speech</th>
<th>Code 1</th>
<th>Code 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.</td>
<td>T</td>
<td>Is that an open or a closed question?</td>
<td>G, IB</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Child C</td>
<td>I don’t know.</td>
<td>U</td>
<td>1RESP</td>
</tr>
<tr>
<td>15.</td>
<td>T</td>
<td>“Can two different animals make a fusion of them?” The answer would be yes or no. So, is that an open question or a closed question?</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>T</td>
<td>Yes, so [can we change it?]</td>
<td>G</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>Child C</td>
<td>[But what’s the answer?]</td>
<td>B</td>
<td>BP</td>
</tr>
<tr>
<td>19.</td>
<td>T</td>
<td>We’ll have to Google it. But that is not very open. Can you think of an open question?</td>
<td>G</td>
<td></td>
</tr>
</tbody>
</table>
Appendix L  Materials developed for and by practitioners

This appendix includes some of the resources that I elaborated for the teachers that participated in this investigation and the ones they developed as part of their participation. I developed some of the resources in collaboration with the teachers and others to introduce the teachers to the strategies and support their participation.

L1 Materials developed during the intervention study

I include in this subsection images of the resources that were present in Teacher A’s classroom that inspired some of the strategies (Figure L.1), the register of her live coding trials at the beginning of the study (Figure L.2) and the illustrated ground rules for talking that she elaborated for her class (Figure L.3). After these, I present the materials I developed based on Teacher A’s visual ground rules for talking (Figure L.4, Figure L.5 and Figure L.6). At the end of the subsection, I include the document that I elaborated for Teacher C (as mentioned in Section 6.6.2).

Figure L.1. Resources in Classroom A that inspired some of the strategies
Figure L.2. Teacher A’s live coding of class interactions between workshop sessions
<table>
<thead>
<tr>
<th>Images of some rules for talking</th>
</tr>
</thead>
<tbody>
<tr>
<td>We add ideas to our and other people’s thoughts</td>
</tr>
<tr>
<td><img src="image1" alt="Build" /></td>
</tr>
<tr>
<td>We think it’s best to share our thoughts</td>
</tr>
<tr>
<td><img src="image2" alt="Sharing Thoughts" /></td>
</tr>
<tr>
<td>We ask for and give reasons</td>
</tr>
<tr>
<td><img src="image3" alt="Question Mark" /></td>
</tr>
<tr>
<td>We prepare to talk with others</td>
</tr>
<tr>
<td><img src="image4" alt="Special Spot" /></td>
</tr>
<tr>
<td>We listen and think about each other’s ideas</td>
</tr>
<tr>
<td><img src="image5" alt="Listening and Thinking" /></td>
</tr>
<tr>
<td>We use the materials on the walls to know how to participate</td>
</tr>
<tr>
<td><img src="image6" alt="Materials on Walls" /></td>
</tr>
<tr>
<td>We take turns to talk and to listen</td>
</tr>
<tr>
<td><img src="image7" alt="My Turn, Your Turn" /></td>
</tr>
<tr>
<td>We co-operate and try to get along with each other</td>
</tr>
<tr>
<td><img src="image8" alt="Co-operation" /></td>
</tr>
<tr>
<td>The teacher helps us to focus on important ideas</td>
</tr>
<tr>
<td><img src="image9" alt="Teacher Assistance" /></td>
</tr>
<tr>
<td>We can take a break from our conversations</td>
</tr>
<tr>
<td><img src="image10" alt="Break Time" /></td>
</tr>
</tbody>
</table>

*Figure L.3. Icons of ground rules for talking in Classroom A*
### Summary of dialogic teaching strategies (from 1st part of the study)

<table>
<thead>
<tr>
<th>Rules for talking</th>
<th>Strategies and contributions (with key words)</th>
</tr>
</thead>
</table>
| We add ideas to our and other people’s thoughts | Ask others to build on or clarify own or others’ ideas  
‘Can you clarify?’, ‘Could you add an idea to what she said?’  
Build on or clarify your own or other’s ideas  
‘It is also…’; ‘Your classmate meant…’.  
IDEA: Join Lego blocks when you add information to an idea – see how you are building ideas! |
| We ask for and give reasons | Ask others to explain  
‘Why?’, ‘How?’, ‘Do you think?’  
Explain or justify (your own or another’s ideas)  
‘I think’, ‘because’, ‘If… then…’ |
| We listen and think about each other’s ideas | Challenge, question or disagree with an idea  
‘Are you sure?’, ‘I disagree’, ‘but’  
Compare and summarise ideas; say when you agree with an idea  
‘I agree’, ‘to sum up…’, ‘I changed my mind’  
Refer to ideas, knowledge and experiences previously mentioned in the classroom (and from outside school)  
‘last lesson’, ‘it reminds me of…’, ‘she said earlier that…’  
IDEA: Refer to the timetable of the day and the rules for talking in class |
| We take turns to talk and to listen | Think, invite others to think and talk about class discussions and activities  
‘have we followed the rules for talking?’, ‘what have you learned?’  
IDEA: Think about how you felt during the class discussion and if you were concerned about something. Think about the rules for talking – how can they help you? |
| The teacher helps us to focus on important ideas | Guide dialogue and activity: focus in main ideas, suggest solutions, encourage students to help each other, give time to think, give feedback  
‘concentrate on this’, ‘let’s try doing…’, ‘no hurry’, ‘have you thought about…’, ‘she can help you’  
IDEA: Students can also communicate with signs or writing/drawing. Assign roles to each member in a team. |

*Figure L.4. Illustrated summary of the strategies after Cycle 2*
We think it’s best to share our thoughts

Express or ask others to express ideas related to the activity
‘What do you think about...?’, ‘Tell me your thoughts’

Communicate with non-verbal language during group or pair discussions
Make a hand signal, show a picture or point at resources on the wall

We prepare to talk with others

Select a special spot or seating arrangement for class discussions
Sit in a circle on the carpet, use a specific chair, turn to see peers
IDEA: Hide or block distracting stimuli

Indicate that a class discussion will start or end with non-verbal communication
Make a hand signal, play a specific sound, show a picture

We use the materials on the walls to know how to participate

Show, during class discussions, how students can participate with visual prompts
Show images of some rules for talking or sentence starters on the board

Display at all times visual prompts related to how to contribute in class discussions
Have the images of the rules for talking on the wall, display examples of phrases that students can use to participate (‘I agree because...’)

We co-operate and try to get along with each other

Promote dialogue in activities that: 1) involve topics of interest for the student, 2) allow creative responses and 3) give the student opportunities to help solving the task
‘How would you like the story to end?’; ‘You like trains, could you share more information about them?’

Promote dialogue in peer mediated activities
Encourage shared projects or activities in which students guide each other

We can take a break from our conversations

Schedule relaxation time or breaks from class discussions (allow students to ask for breaks)
Have meditation or dance breaks, a student can separate from the group to calm down
IDEA: While you rest, think about the aspects of the activity that are uncomfortable for you

In general, these rules, strategies and contributions reflect what teachers can do to encourage class discussions. They also include the different ways in which students can participate in class discussions (or how children can talk to the teaching assistant when working together).

Figure L.5. Illustrated summary of the strategies after Cycle 2 (continued)
<table>
<thead>
<tr>
<th>Rules for talking</th>
<th>Some sentence stems</th>
</tr>
</thead>
</table>
| We add ideas to our and other people’s thoughts | I would like to add…  
It is also…  
*Your classmate meant…  
Can you clarify?  
Could you add an idea to what she said? |
| We ask for and give reasons | This is because…  
It is evident that… because…  
It is clear that… because…  
The reason for this is…  
I think… because…  
If… then…  
I predict that…  
Why?  
How?  
Do you think? |
| We listen and think about each other’s ideas | On the one hand… on the other hand…  
In contrast…  
Similarly, I think…  
Are you sure?  
I disagree…  
But…  
In my opinion…  
I agree because…  
I agree and I would like to add…  
I have a similar opinion to… because…  
I support that point because… |
| We take turns to talk and to listen | Have we followed the rules for talking?  
What have you learned while talking to others? |
| Teachers and classmates help us to focus on important ideas | Concentrate on this…  
Let’s try doing…,  
No hurry  
Have you thought about…?  
She can help you |
| We think it’s best to share our thoughts | Verbal:  
What do you think about…?  
Tell me your thoughts’  
Non-verbal forms of contributing:  
Make a hand signal  
Show a picture or point at resources on the wall |
| We prepare to talk with others | Sit in a circle on the carpet  
Use a specific chair  
Use specific sitting arrangement  
Hide distracting |
| We use the resources on the walls to know how to participate | Show images to a peer or teacher  
Point at rules for talking on the wall  
Point at sentence starters on the board |

*Figure L.6. Sentence stems related to the ground rules for talking from Classroom A*
• Supporting resource with sentence stems and suggestion of activities for Classroom C

Ideas for resources for classroom discussions

I included below some examples of resources that can support/guide the participation of the students during the class discussions (namely sentence stems and participant tokens) and two examples of ‘listening’ activities. I retrieved this information from the book “Transform teaching and learning through talk: The oracy imperative” (Gaunt & Stott, 2019).

1. Sentence stems

It is important to consider the type of talk you want your students to engage in.
- What do you want this conversation, discussion, debate or series of questions to sound like?
- What do you want your students to be thinking about and what kinds of things should they be saying?

You can create your own sentence stems for a specific task that you have in mind.

Examples that prompt students to either identify the speaker or idea they were directly responding to:
- I have a similar opinion to X because…
- I recognize that… However,…
- I would like to challenge the idea that… because…

Examples of sentence stems:

<table>
<thead>
<tr>
<th>To predict</th>
<th>To explain</th>
</tr>
</thead>
<tbody>
<tr>
<td>I predict that…</td>
<td>This is because…</td>
</tr>
<tr>
<td>I think this will be about…</td>
<td>It is evident that… because…</td>
</tr>
<tr>
<td>I think the effect will be…</td>
<td>It is clear that… because…</td>
</tr>
<tr>
<td>The reason for this is…</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>To compare and contrast</th>
<th>To sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>On the one hand… or the other hand…</td>
<td>First,…</td>
</tr>
<tr>
<td>Another difference is that… whereas…</td>
<td>To begin with,…</td>
</tr>
<tr>
<td>In contrast,…</td>
<td>Second,…</td>
</tr>
<tr>
<td>Similarly, I think…</td>
<td>Then,…</td>
</tr>
<tr>
<td>After…</td>
<td></td>
</tr>
<tr>
<td>Finally,…</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>To evaluate</th>
<th>To agree/disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall, I think…</td>
<td>I agree because,…</td>
</tr>
<tr>
<td>In my opinion…</td>
<td>I agree and I would like to add,…</td>
</tr>
<tr>
<td>On the one hand,… or the other hand,…</td>
<td>I have a similar opinion to… because,…</td>
</tr>
<tr>
<td>On balance, I think</td>
<td>I would like to support that point because,…</td>
</tr>
<tr>
<td></td>
<td>It might not seem like it, but X and I both agree about,… because,…</td>
</tr>
<tr>
<td></td>
<td>While… is an important consideration, it isn’t as important as,…</td>
</tr>
</tbody>
</table>

2. Talk tokens

They can be beads, coins or any other material that can represent visually the students’ contributions to a discussion. Every time a student contributes, the student spends a token (which can be placed in the centre of the table). Each student has a set number of tokens. You can use tokens of different colors that represent different types of contributions (e.g., evaluate another child’s ideas, build on the other’s idea, challenge). The students will have the responsibility of monitoring the number of times they talk and what they do.

3. Examples of “Listening Activities”

The following examples were retrieved from page 94 in Gaunt’s and Stott’s (2019) book.

1) Micro vs Macro listening

Split students into groups of four. Ask two of the students to have a discussion; this could be about anything, but it works best if the subject is something controversial or something that they are both passionate about. One of the other students is assigned the role of micro listener and the other macro listener. After the discussion both students can offer feedback to their group on what they notice. The micro listener should recall most of the points made by the speakers, whereas the macro listener should have noticed the speakers’ feelings, perspective, or agenda.

<table>
<thead>
<tr>
<th>Micro Listening</th>
<th>Macro Listening</th>
</tr>
</thead>
<tbody>
<tr>
<td>What points did the speaker raise?</td>
<td>How is the speaker feeling?</td>
</tr>
<tr>
<td>What facts, details, or dates did the speaker share?</td>
<td>What is the speaker not saying?</td>
</tr>
<tr>
<td>How did the speaker start and end what they were saying?</td>
<td>What do the speaker’s tone of voice, body language, and facial expressions convey?</td>
</tr>
</tbody>
</table>

2) Buzz word **

This game, which teaches micro listening, involves one student telling a story to their classmates, who are listening for a key word, such as bananas. Once they hear the word they have to buzz in or raise their hand; the first person to do this is the winner and gets to go next. The best players tease their audience by saying similar words or words that begin with the same sound such as, “Then I ate some b… erful p… ap… pier.” To be successful in this game, players must pay careful attention to what is being said.

Reference:
L2 Documents that resulted from the teachers' participation in the course

- List of general recommendations for supporting autistic students in school

List of general recommendations on how to support students diagnosed with autism in mainstream schools

23 – March – 2021

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Introduction to the recommendations

In this document we share the list of the general recommendations that some teachers have shared in Section 1 of the online course Dialogic teaching strategies for autistic students. These recommendations are not focused on dialogue but point out ways of supporting autistic students in mainstream classrooms. They highlight important aspects to consider when planning class activities, supporting students understanding of what their tasks are and of what can be expected in school and in the classroom. The recommendations were divided into eight different groups: provision of structure, control of sensory stimuli, provision of 1-on-1 support, adjustments of language, characteristics of activities and instructions, environment and materials, and collaboration with parents.
I. Provision of structure

- Display visual timetables and pre-empt changes in routine, preparing students for those (e.g., festivals in school).
  
  - Display the morning and then afternoon activities at appropriate. Remove symbols as you go through the day so the student can see the tasks that have been completed.
  - Talk through the timetable with the whole class (if the same timetable applies for the whole class).
  - Give students their own personal timetable that includes a ‘change card’ or an ‘oops’ element/card. This card is used to make the student aware that there will be a change in the timetable and reasons why. It indicates when something from their expected timetable isn’t going to happen or will be delayed. To get students used to this card initially use it for fun activities (e.g. ‘oops, we will have to extend playtime by 5 minutes) and then gradually introduce it for unexpected changes throughout the day (e.g. ‘oops, we are a little late for assembly’ or ‘oops, look at the time, we need to tidy up’).

- Use Now/Next boards

- Provide a 'learning menu' so students have control on the order in which they complete tasks.

- Explain prior to the session/lesson what can be expected from it, the content that will be discussed, language, product of learning, technical terms

- Link back to prior learning and anticipated learning to connect learning.

- Consistent staff if possible

- Provide a weekly overview of what child will be learning the next week- review weekly.
II. Control of sensory stimuli

- Weighted blankets

- Reduction of overloaded visual stimuli.
  
  - **Display boards:** Carefully consider displays in classroom, whether they provide too much visual stimulation, etc. If using working walls, consider that this might mean that displays are constantly evolving and changing. For example, try to make them 'subject specific' with facts about the topic that the class is learning about, not a past topic.

  - **Lighting:** Be aware of any visual /sensory impairment due to fluorescent lighting. Use natural lighting if possible

  - **Colours:** Be aware of colours that could/can cause distress for pupils (e.g., having to sit on a blue chair where in blue is a colour that the child has a hypo reaction to).

  - **Sounds/noise:** Provide ear defenders/headphones, warn students if a loud noise is going to occur. Some children use 'ear defenders' when focusing on their work so as not to get distracted by classroom noise.

- **Sensory breaks.** Provide student with visual cards that the student can use to ask for a sensory break. Have available a calm space that students can go to when they require a sensory break. It can be inside or outside the classroom. It could be a tent, or a table covered with a cloth

- Have 'sensory fiddle box/toys' available so students can use them if they are over stimulated and need calm time. Teachers can let autistic students keep something soothing with them or on their working desks to help the students focus.
III. Provision of 1-on-1 support

- Have time to listen to a child who feels that something unjust has happened and helping them to find a solution. "I have found this is a recurring theme for older children with high functioning Autism and can completely ruin their day if not handled in the right way".

- Avoid 'learned helplessness' i.e., over dependence on help, help students develop their independence.

- Praise and reward but not overly so, they need it to be appropriate to level of application given by themselves.

- Verbal co-analysis of work together with the student(s) rather than just providing a written comment.

- Revisit to monitor how the students are managing with the task, time or resources. You could do this with children in a mini-plenary but this could also be done 1-on-1 asking at the end of the lesson how they feel they have managed against the shared example and what they could do next time.

- Find ways to practice eye contact (e.g. turn it into a game, such as a 'staring contest').

IV. Language

- Avoid ambiguity, aim for clarity.

- Ground language in concrete not abstract.

- Repeatedly use concepts as a language so that students can relate new experiences to known experiences through a consistent vocabulary. For example, 'place' in geography, home is a place, classroom is a place, so when we go to xx, this is also a place.

- The conceptual terms relate to subject knowledges, so that students are also building up cognition in a way that is metacognitive and self-regulatory.
V. Characteristics of class activities and instructions

- Plan short and achievable tasks.

- Set tasks in a staged approach so they are not over faced.

- Provide a clear explanation of how students will meet expectations of task and how the task has been adapted (if applicable). Share expectations and provide a step-by-step plan or a ‘task break down’ indicating the individual steps involved. Allow time to process the information.

- Share specifics of how learning will be demonstrated for them. Provide concrete examples to follow as a prompt, model tasks prior to starting a new task or allow students to observe new style tasks. Never revisit and extend a task once finished.

- Provide time for students to process and ask questions. After giving an instruction do not expect an immediate answer. Show them you are comfortable to wait for their response, do not continue to ask more questions.

- Homework. Allow for homework to be complete at school if need be.

- Use back chaining if needed and ensure you have provided the student a next step when finished.

- Be prepared to adapt an activity quickly if it is failing to engage. Work on obtaining the same outcome but taking a different path.

- Differentiation in the planning of the lesson (tailoring instruction). This may include content, process, products and/or the learning environment.
VI. Environment and materials

- **Tool**: Use alpha smart word processor.

- Ask students to sit where they can see worked examples or provide their own work examples (e.g., sentence stems or worked maths example they can follow).

- Ask students to sit where you pass through the class the most often so you can touch base with them more frequently.

- Allow child to choose what to write in (e.g., could use a purple pencil to engage in writing task).

- Blank pages without a framework for a child are daunting, provide a starting point for a piece of work and a finish. Use a frame or lines, red/green dots start and finish place.

- Secretarial duties, such as date and learning objectives, can be completed by a member of staff or have stickers printed and ready with the relevant information.

- Have a classroom space and an 'office space for focused work' for the students, with a portable or fixed screen so that they can work without disturbances and with their own tools, pens/pencils etc. Include activities they can do when they feel overloaded.

- Provide cards to communicate or with key information related to the class activity. Some examples are included below.
  - Permission cards to leave the classroom when students feel overloaded.
  - Discrete symbol cards to indicate 'I need help' or 'I am Ok' to be placed by students on their desks when needed. Make sure that all staff is aware about them, recognize the cards and know how to act upon them.
  - Provide strategy cards for Maths/English. Students can construct their own cards when a new strategy has been shown.
  - Task breakdown cards.

VII. Transitions

Within a college setting, it is important to establish a positive transition from school to college. EHCP's will list coping strategies at school but not really consider that the child is now going to become an adult and more independence will be encouraged as well as expected for them to continue their lifelong studies.

To put a learner at ease teachers can pick up on their interests so that teachers can relate to the students and ease them into their new surroundings. These will need both academic and social adjustments to be made. Finding common interests can make class members more willing to interact and if these interests can be incorporated into the curriculum then automatically they will have a greater desire to participate and share.

VIII. Collaboration with parents

Engage parents and carers to share the position of workstation/office area and use their experience and expertise to support staff.
Summary of takeaway points elaborated by one of the participants.

Dialogic Strategies for supporting the participation of students diagnosed within the autism spectrum.

Ideas developed from Ana Trigo-Clapes, PhD candidate, University of Cambridge

Dialogic teaching is a pedagogical approach that fosters the power of productive talk to enable knowledge building, engagement and furthers thinking and curiosity. In dialogic teaching a space is opened up for the development of learning through engagement with different views in relation to concepts. It encourages exploratory talk, a form of talk in which everyone listens, people as questions, justifications are given and sought. Dialogic pedagogies often aim to promote inclusivity, opening opportunities for everyone to participate and acknowledging and capitalising on different views and perspectives within clear guidelines for productive participation. It is recognised that all learners can contribute to class dialogue, and that some learners may contribute differently. The focus of the ideas below is on enabling pupils diagnosed within the autism spectrum to participate by reducing any potential barriers. This is based on the premise that it is important for us, as teachers to be aware of potential challenges, to notice our learners’ needs and to be resourceful and informed in relation to adjustments and adaptations so as to support participation. We hope that the suggestions below might be helpful in relation to this important endeavour.

Learning relationships

- Learners trust each other so that they feel able to share ideas.
- Inclusion and equity are sought.
- Teachers facilitate rather than dominate.

Learning gains

- Learners make meaningful disciplinary content connections.
- Talk and reasoning capabilities are practised and developed.
- The dialogic space opens up opportunities to share views. The establishment of ground rules for talking can help secure consistent expectations that enable this to be a safe participatory space.

Learning Instruments

- Verbal and non-verbal devices e.g., displays, prompt cards, visual timetables
- Ground rules of talking.
- Goals are explicit – learners know what they are doing and why.
I. Displays

You may find it helpful to create classroom simple and clear displays that share what happens in dialogue, so for example.

What do speakers do?
- Listen to each other
- Share ideas
- Justify contributions
- Engage with each other’s views and ideas
- Contributions can be both verbal and visual

How do we learn?
- Knowledge is built, enriched and enhanced collectively across time; dialogic spaces enable the co-construction of different forms of knowledge to be respected.
- We use the ideas of people in the room, and ideas from others beyond the room.

Productive dialogue is likely to include
- Open questions, that do not have a single solution
- Learners building on contributions
- Different ideas are shared and respectfully challenged
- Reasons are explored and justified
- Reflection

Note: It is important to adjust the language used in these displays to the students’ language skills and educational level. For example, metaphorical language might be difficult to understand for some students.
II. Creating a classroom environment supportive of participatory dialogues

- A supportive and respectful ethos should be created, one in which different perspectives are shared and valued.

- Dialogue can be promoted in whole-class activities or during group work.

- If you are changing the classroom layout, explicitly state the purpose of the new layout.

- Think about who sits next to who and why – who can help support learners?

- Remove stimuli that may be irrelevant and / or overwhelming/ or distracting.

- Inform learners that certain objects may not be accessible during the discussion, and if appropriate explain why.

- Avoid promoting dialogue during activities that involve overwhelming stimuli for learners e.g., loud noises, bright lights.

- Plan to ask peers to adjust their behaviour during dialogue, ask them to consider:
  - sensory sensitivities (e.g., noise levels, physical distance)
  - communication preferences (e.g., maybe not looking at a learner whilst contributing)
III. Facilitating Dialogue

Preparing for dialogic opportunities

- Aim to avoid planning activities that only rely on imagination
- Embed 'small choices' or 'short decisions' in activities, so that learners have a sense of control
- If appropriate incorporate learners' special interests
- Show brief notes with key information related to the dialogue, prior to the session
- Show objects that illustrate the key concepts associated with the dialogue
- Prepare materials that inform learners about what generally happens in a dialogue, including how they can participate
- Share some sentence stems to aid contributions

Scheduling dialogic activities

- Make the schedule clear, explicit and visible
- Make explicit that activities are planned, but not guaranteed
- Try to maintain consistency in the schedule
- Discuss any changes in advance
- Link discussions with previous work or familiar topics that help to inform contributions
- Include breaks during activities that involve dialogue. During breaks learners may be encouraged to
  - Take deep breaths, engage in meditation or a relaxing activity as appropriate
  - Talk with a teacher about any uncomfortable aspects or any negative feelings
- Indicate the start and/or end of the discussion nonverbally as well as verbally

Simplify language

- Aim for concise and simple language – slowing down the pace can also help
- Consider the literal interpretation of your indications
- Avoid relying on abstract concepts (or explain them)

Include non-verbal forms of contributing

- Have an agreed non-verbal signal for the start and/or end of discussions – e.g., an image or a song or appropriate sound
- Hand signals
- Communication strategies – e.g., Makaton
• Sticky notes
• Pointing to icons
• Use of images / objects
• Flashcards
• Opportunities to write or draw contributions

State the obvious

• Name what you are doing
• Make visible information that explains what learners are doing with the why and how
• Specify expected behaviour
• Refer back to key contributions explicitly and if appropriate re-voice these

Model and describe expected behaviours

• Mention what is being modelled and why
• Describe behaviours and the forms of contributions expected
• If appropriate indicates roles in group activities

Use physical representations to make dialogic moves visible

• For example, using building blocks to show how ideas are built
• Use a flow chart for steps
• Use hula hoops for grouping ideas, hula hoops can create a visible Venn diagram for sorting ideas and responses
• Use string for linking
• Use a rope for positioning on a line

Be mindful about the amount of information and time

• Avoid asking many questions in one go – try to keep it to one or two
• Plan short instructions
• Reduce the number of tasks to be undertaken
• Verbalise what the learner is doing
• Provide time for the processing information – sometimes learners require more time than you might first think.
• Balance the agenda, including down time
Clarify constantly

- Use verbal and non-verbal support to ensure that learners know what to do, how to do it and when to do it
- Explicitly indicate when moving from one activity to another
- Revisit instructions from previous lessons – if appropriate adding more detail or making adjustments clear

Support pupil motivation

- Provide reassurance often, so that learners know if they are moving in the expected direction
- Find opportunities to let learners know what they did that made them successful

Check in with the learner(s)

Take time to check in and if appropriate provide 1:1 support. Learners may want to share thoughts beyond the time allocated to the discussion. You may also want to ‘check in’ to see what the learner has taken away from the dialogue. You may also want to describe what behaviours or forms of contribution were helpful and why it was helpful.

IV. Final thoughts

Remember that developing such a dialogic approach with learners will take time to build, and so it is important that we give both ourselves and our learners space to develop. We feel that it is worth sticking with a dialogic approach as the learning gains for all, but particularly for pupils with a diagnosis within the autism spectrum, can be very enabling. We are aware of the potential cognitive, social and emotional gains and so encourage you to be patient with yourselves and others as you invest in the significance and sustainability of such an approach.
Appendix M  

Frequencies of features identified pre-and post-intervention study

Table M.1, Table M.2 and Table M.3 present the frequency counts of the dialogic and non-speech communication strategies and contributions, and autistic students’ behaviour codes I identified per classroom and agent at the baseline and final observations. These tables are complementary to the graphs in Chapter 7.
Table M.1. Pre-and post-study frequencies of features identified in Classroom A

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Codes</th>
<th>Full Classroom A</th>
<th>Teacher A</th>
<th>Child A</th>
<th>Classmates A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
<td>Post</td>
</tr>
<tr>
<td>Dialog</td>
<td>IB</td>
<td>21</td>
<td>18</td>
<td>21 (6)</td>
<td>18 (5)</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>38</td>
<td>45</td>
<td>20 (5)</td>
<td>23 (7)</td>
</tr>
<tr>
<td></td>
<td>CH</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2 (1)</td>
</tr>
<tr>
<td></td>
<td>IR</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>4 (3)</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>4</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>CA</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>3</td>
<td>8</td>
<td>2</td>
<td>5 (1)</td>
</tr>
<tr>
<td></td>
<td>RD</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>G</td>
<td>33</td>
<td>34</td>
<td>33 (10)</td>
<td>33 (16)</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>43</td>
<td>43</td>
<td>17 (4)</td>
<td>19 (7)</td>
</tr>
<tr>
<td>Uncoded turns</td>
<td></td>
<td>78</td>
<td>60</td>
<td>30 (6)</td>
<td>24 (6)</td>
</tr>
<tr>
<td>Non-speech</td>
<td>Adjust physical environment</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>3 (1)</td>
</tr>
<tr>
<td></td>
<td>Use/refer to resources</td>
<td>14</td>
<td>18</td>
<td>12 (5)</td>
<td>12 (8)</td>
</tr>
<tr>
<td></td>
<td>Non-speech communication</td>
<td>19</td>
<td>28</td>
<td>16 (3)</td>
<td>20 (11)</td>
</tr>
<tr>
<td></td>
<td>Praise, ask for a break</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Focus students’ behaviour</td>
<td>Details and repetitions</td>
<td>3</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ask for support</td>
<td>1</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Students’ usual expressions</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>Turns</td>
<td>189</td>
<td>177</td>
<td>93 (23)</td>
<td>90 (33)</td>
</tr>
</tbody>
</table>

*Numbers in parenthesis represent the frequencies from the turns addressing Child A. I highlighted the four most frequently identified codes per agent and period (columns), in increasing order from light to dark shades of orange.
### Table M.2. Pre-and post-study frequencies of features identified in Classroom B

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Codes</th>
<th>Full Classroom B</th>
<th>Teacher B</th>
<th>TA B</th>
<th>Child B</th>
<th>Classmates B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
</tr>
<tr>
<td>IB</td>
<td></td>
<td>30</td>
<td>13</td>
<td>20</td>
<td>9 (1)</td>
<td>9 (9)</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>56</td>
<td>87</td>
<td>12</td>
<td>15 (4)</td>
<td>10 (10)</td>
</tr>
<tr>
<td>CH</td>
<td></td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>IR</td>
<td></td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>R</td>
<td></td>
<td>11</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3 (3)</td>
</tr>
<tr>
<td>CA</td>
<td></td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>15</td>
<td>15</td>
<td>8</td>
<td>6 (1)</td>
<td>4 (4)</td>
</tr>
<tr>
<td>RD</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>G</td>
<td></td>
<td>40</td>
<td>57</td>
<td>20 (2)</td>
<td>15 (4)</td>
<td>19 (19)</td>
</tr>
<tr>
<td>E</td>
<td></td>
<td>16</td>
<td>48</td>
<td>2</td>
<td>6</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Uncoded turns</td>
<td></td>
<td>93</td>
<td>158</td>
<td>16</td>
<td>28 (1)</td>
<td>25</td>
</tr>
<tr>
<td>Physical environment</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Use of resources</td>
<td></td>
<td>49</td>
<td>68</td>
<td>26 (1)</td>
<td>13 (2)</td>
<td>12 (12)</td>
</tr>
<tr>
<td>Non-speech contributions</td>
<td></td>
<td>54</td>
<td>54</td>
<td>27 (1)</td>
<td>9</td>
<td>14 (14)</td>
</tr>
<tr>
<td>Praise, ask for a break</td>
<td></td>
<td>9</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3 (3)</td>
</tr>
<tr>
<td>Details and repetitions</td>
<td></td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Support</td>
<td></td>
<td>5</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Students’ expressions</td>
<td></td>
<td>4</td>
<td>17</td>
<td>4</td>
<td>17</td>
<td>4</td>
</tr>
<tr>
<td>Turns</td>
<td></td>
<td>225</td>
<td>344</td>
<td>57 (2)</td>
<td>66 (9)</td>
<td>61 (61)</td>
</tr>
</tbody>
</table>

*Numbers in parenthesis represent the frequencies from the turns addressing Child B. I highlighted the four most frequently identified codes per agent and period (columns), in increasing order from light to dark shades of orange.*
Table M.3. Pre-and post-study frequencies of features identified in Classroom C.

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Classroom C</th>
<th>Full Classroom C</th>
<th>Teacher C</th>
<th>TA C</th>
<th>Child C</th>
<th>Classmates C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
<td>Post</td>
</tr>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
<td>Post</td>
</tr>
<tr>
<td>IB</td>
<td>11</td>
<td>8</td>
<td>11 (1)</td>
<td>5 (2)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>36</td>
<td>38</td>
<td>23 (6)</td>
<td>8 (3)</td>
<td>1</td>
<td>4 (3)</td>
</tr>
<tr>
<td>CH</td>
<td>2</td>
<td>6</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>IR</td>
<td>3</td>
<td>0</td>
<td>3 (0)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>R</td>
<td>6</td>
<td>9</td>
<td>3 (2)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>CA</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>C</td>
<td>21</td>
<td>10</td>
<td>14 (4)</td>
<td>2 (1)</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>RD</td>
<td>4</td>
<td>2</td>
<td>4 (3)</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>G</td>
<td>29</td>
<td>12</td>
<td>27 (4)</td>
<td>5 (1)</td>
<td>0</td>
<td>5 (3)</td>
</tr>
<tr>
<td>E</td>
<td>9</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1 (1)</td>
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<td>104</td>
<td>129</td>
<td>37 (6)</td>
<td>20 (3)</td>
<td>0</td>
<td>15 (9)</td>
</tr>
<tr>
<td>Physical environment</td>
<td>1</td>
<td>0</td>
<td>1 (1)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Use of resources</td>
<td>32</td>
<td>0</td>
<td>28 (8)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Non-speech contributions</td>
<td>31</td>
<td>1</td>
<td>20 (1)</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Praise, ask for a break</td>
<td>3</td>
<td>0</td>
<td>3 (3)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Focus students’ behaviour</td>
<td>Details and repetitions</td>
<td>1</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Support</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Students’ expressions</td>
<td>0</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turns</td>
<td>191</td>
<td>199</td>
<td>95 (22)</td>
<td>35 (8)</td>
<td>2</td>
<td>25 (15)</td>
</tr>
</tbody>
</table>

*Numbers in parenthesis represent the frequencies from the turns addressing Child C. I highlighted the four most frequently identified codes per agent and period (columns), in increasing order from light to dark shades of orange.*
Appendix N  Summary of responses to the feedback survey from the online course

Table N.1 shows the findings from the feedback survey related to the usefulness of the strategies and how likely were the teachers to implement them. A Likert Scale measured each aspect, and I invited teachers to select the specific strategies they would like to try in their classrooms. The options from the Likert Scale related to the usefulness of the strategies were: Not useful at all (1), Somewhat useful (2), Useful (3), and Very useful (4). Therefore, the highest overall score that this measure could get was 40. The options on the likeliness of implementing the strategies were: Definitely not likely (1), Probably not likely (2), Possibly (3), Likely (4), and Definitely (very likely) (5). The highest score on this scale was 50.

The column on the left shows the principles that I introduced to the teachers. The following two columns include the overall scores of usefulness and likeliness to be implemented for each principle. The last two columns on the right present the list of strategies and the number of teachers (out of ten) that selected each of the strategies as one they would like to try in their classrooms. I marked with the gradient of colours on the last column the most (darkest shade of orange) and second-most (lighter shade of orange) selected strategies per design principle.

Table N.1. Results from the Likert Scales and ranking related to the design principles and strategies

<table>
<thead>
<tr>
<th>Principles</th>
<th>How useful? (Max. 40)</th>
<th>How likely to implement? (Max. 50)</th>
<th>Specific principles (strategies)</th>
<th>Would implement (out of 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparing the classroom environment</td>
<td>36</td>
<td>40</td>
<td>1. Delimit a specific place or seating arrangement for class discussions.</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Useful (x4)</td>
<td></td>
<td>2. Block or remove objects or stimuli that are irrelevant for class discussions.</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Very useful (x6)</td>
<td></td>
<td>3. Consider students’ sensory sensitivities and communication preferences.</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4. Display prompts that indicate potential forms of contributing to the activity at hand (temporal supporting resources).</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5. Display prompts with key information related to the activity at hand (temporal supporting resources).</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6. Have available reference materials related to class dialogue and how to participate in class discussions (permanent supporting resources).</td>
<td>7</td>
</tr>
<tr>
<td>Planning class activities and</td>
<td>36</td>
<td>40</td>
<td>7. Plan activities in which students' participation is associated with desirable outcomes (including talking about students' topics of interest, providing praise).</td>
<td>7</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
<td>usefulness</td>
<td>frequency</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-----------</td>
<td>-----------</td>
<td></td>
</tr>
<tr>
<td><strong>forms of contributing</strong></td>
<td>open-ended activities, and providing opportunities to take a level of control.</td>
<td>Very useful (x6)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Promote dialogue in peer mediated activities (including collaborative projects, structured play activities or role play).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Determine a specific dialogic goal for the activity.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Include breaks during activities that involve dialogue.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Think of advance requirements for class activities (including basing discussions on students’ previous work or familiar topics, planning to use materials that are accessible based on students’ skills).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Use forms of communication that are different from verbal contributions and encourage students to use them too (including hand signs, pointing, writing or drawing contributions).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Incorporating visual and/or physical representation</strong></td>
<td></td>
<td>34</td>
<td>Useful (x6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>39</td>
<td>Very useful (x4)</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Show visually and/or physically how ideas are brought up together during a class discussion, building on other ideas, to create collective knowledge.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Represent an abstract problem and/or process of arriving to its solution with physical materials or visually while verbally explaining it to the class.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Being explicit</strong></td>
<td></td>
<td>37</td>
<td>Useful (x3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>40</td>
<td>Very useful (x7)</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Explicitly ask students to add information and/or comment on a specific idea that oneself has expressed in dialogue.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Explicitly indicate that an idea is being challenged or explicitly probe students’ understanding of an activity.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>Explicitly model behaviour or forms of contributing that are expected.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>Describe the behaviours and forms of contribution that can be expected during a class discussion.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>Indicate the specific roles that each student will play in a small-group activity.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>Talk openly about the different components of dialogue and reflect on their importance with the class.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Breaking down into steps or recap the sequence of key information</strong></td>
<td></td>
<td>36</td>
<td>Useful (x4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>40</td>
<td>Very useful (x6)</td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>Repeat the instructions of a class activity in a summarised way. You can also make explicit for the autistic student what are the student's specific goals and tasks when you communicate the instructions for a class activity.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>Recap the information shared previously during dialogue that helped advance the activity at hand or solve a problem (this includes information that was mentioned seconds earlier).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>Break down ‘class dialogue’ into different components and refer back to these during class discussions.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>Refer back to the timetable of a lesson (or the tasks that are part of the activity at hand) during a class discussion.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>Refer back to the sequence of key contributions shared during a discussion that helped advance the activity at hand.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Provide students with options</strong></td>
<td></td>
<td>36</td>
<td>Useful (x4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>40</td>
<td>Very useful (x6)</td>
<td></td>
</tr>
<tr>
<td>26.</td>
<td>Suggest that students contribute to dialogue using forms of communication different from to speech (e.g., write a note, make a drawing, point at materials on the wall, hand signs).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27.</td>
<td>Indicate different roles that students can assume during group work that involves dialogue.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28.</td>
<td>Provide options of answers or courses of action to choose from to solve a problem or carry out a particular activity (e.g., point out different ways of solving an addition of fractions or suggest different ways of finishing the student’s story).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mediate dialogue</strong></td>
<td></td>
<td>34</td>
<td>Very useful (x4)</td>
<td></td>
</tr>
<tr>
<td>29.</td>
<td>Re-voice a contribution shared by the student during group work; rephrasing or repeating it back to the</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
I also provided the teachers with a space to rank the principles from the most to the least useful (from 1 to 8). **Error! Reference source not found.** displays the rankings provided by the ten teachers that filled in the survey (T1 – T10). To find a trend in their ranking I calculated the median and mode of the ranks assigned to each principle. The median provided me with some information about the mid-value of the scores while the mode highlighted the most common score.
**Table N.2. Teachers’ ranking of the design principles**

<table>
<thead>
<tr>
<th>Design principles</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
<th>T8</th>
<th>T9</th>
<th>T10</th>
<th>Median</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepare the classroom environment for class discussions (including place/seating arrangement, removing distractors and controlling stimuli).</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Plan the class activities in which dialogue will take place and how students will participate to make them friendlier for autistic students.</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>7</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Incorporate visual and/or physical representations to verbal contributions.</td>
<td>3</td>
<td>2</td>
<td>7</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Be explicit during dialogue (including making explicit one’s intentions of inviting a student to participate and being explicit about expectations of students’ participation).</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Break down into steps or recap the sequence of key information.</td>
<td>5</td>
<td>8</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>7</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Provide students with options during dialogue to guide/support their participation.</td>
<td>8</td>
<td>3</td>
<td>1</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>4</td>
<td>1</td>
<td>8</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Mediate dialogue between peers during small-group activities.</td>
<td>7</td>
<td>6</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>2</td>
<td>7</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Check in with students during dialogue to provide 1-on-1 support.</td>
<td>6</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

I highlighted the two principles that were ranked the highest, in increasing order from light to dark shades of orange. I marked in grey the lowest-ranked principle.