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Online second language learning engagement: A systematic review of conceptual frameworks, research methods, and key findings

Author 1 (corresponding author): Phung Dao (University of Cambridge, UK)

Email: pd543@cam.ac.uk; ORCID: <https://orcid.org/0000-0002-8612-5589>

Author 2: Phil Hiver (Florida State University, USA)

Email: phiver@fsu.edu

Author 3: Mai Xuan Nhat Chi Nguyen, (Manchester Metropolitan University, UK)

Email: m.nguyen@mmu.ac.uk

Author 4: Jianing E (University of Cambridge, UK)

Email: je454@cam.ac.uk

Author 5: Zehui Yang (University of Cambridge, UK)

Email: zy297@cam.ac.uk

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Online second language learner engagement: A systematic review of conceptual frameworks, research methods, and key findings

Abstract

This systematic review examines existing empirical L2 studies on the approaches to conceptualizing and measuring online L2 learner engagement in technology-mediated L2 learning/teaching settings, identifying strengths and limitations of current measures and outlining potential improvements. Using the PRISMA procedure, we conducted a systematic review of empirical studies on online L2 learner engagement. The review focused on several key areas, including the characteristics of L2 research investigating online learner engagement, the ways in which the concept of online learner engagement is conceptualized, the indicators used to operationalize it, and the primary areas of focus and key findings emerging from this body of research. Our intent with this systematic review is to provide a comprehensive evaluation of existing empirical studies on online L2 learner engagement and to offer suggestions not only for future research directions in this important area but also for implications regarding online teaching and learning practices in technology-mediated L2 learning and teaching settings.

Key words: Online learner engagement, systematic review, engagement conceptualization, indicators of engagement, engagement research key findings

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Introduction

The rapid growth of online learning modalities, such as intelligent tutoring systems, educational games, platform-based classes, and MOOCs (massive open online courses), has heightened the focus on learner engagement (Henrie et al., 2015; Stockwell, 2022). In second language (L2) learning, digital technology facilitates content delivery, learner interaction, and anytime, anywhere learning but poses challenges in maintaining engagement (Dao, 2024). Online L2 environments create unique interaction dynamics among learners, instructors, and content, mediated by technology (Arnold et al., 2019; Stockwell, 2022; see also Ghaderi et al., 2023; Reinders et al., 2022; Ziegler & González-Lloret, 2022). Designing and evaluating these environments to foster meaningful learning requires robust conceptualization and measurement of engagement (Doo & Kim, 2024; Hu & Xiao, 2025; Ogunyemi et al., 2022; Wang et al., 2022).

Learner engagement has recently gained prominence across disciplines (Egbert & Panday-Shukla, 2024). However, reviews in educational psychology, Edtech, and L2 research suggest that the concept remains conceptually and methodologically diffuse (e.g., Appleton, 2008; Aoyama et al 2024; Christenson et al., 2012; Fredricks et al., 2004; Fredricks et al., 2019; Henrie et al. 2015; Hiver et al., 2024; Namkung & Kim, 2024; Sinatra et al 2015). These reviews have highlighted a lack of clarity in defining and measuring engagement, hindering progress and consensus in research and practice. Also, research has stressed the need for construct validity and psychometrically sound measures to ensure comparability across studies (Appleton et al., 2008; Zhou et al., 2020), a challenge intensified in tech-mediated learning, where clear engagement models are vital (Jimerson et al., 2003).

Beyond previous reviews, there are a number of unique insights that a systematic review of online L2 learner engagement research would contribute to the field. The present systematic review differs from and adds to prior systematic reviews (e.g., Henrie et al. 2015; Hiver et al., 2024), and synthetic work (e.g., Dao, 2024) in important ways. Firstly, across the

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domains of technology-mediated learning, the study of learner engagement remains fragmented. While engagement holds promise for tech-mediated learning, its potential is hindered by conflicting definitions and methods (Henrie et al., 2015). Consequently, there is a need to integrate theoretical frameworks from language learning, educational psychology, and technology-assisted learning to provide a cohesive understanding of engagement in virtual learning contexts. In his book-length narrative review, Dao (2024) highlighted similar challenges in online L2 learning, stressing the need for clear definitions and reliable online L2 learner engagement measures. As online learning environments and their affordances rapidly evolve from basic LMS to immersive environments (i.e., with AI tutors and agents, using virtual reality, etc.) the notion of what constitutes engagement must be critically examined.

Secondly, despite many recent reviews of digital learning environments (Doo & Kim, 2024; Hu & Xiao, 2025; Ogunyemi et al., 2022; Wang et al., 2022) and, separately, on learner engagement (Hiver et al., 2024; Namkung & Kim, 2024), none focus specifically on online L2 contexts. This leaves gaps in understanding its conceptualization, research designs and measurements, and key links to learning outcomes. The rapid expansion of online learning and new types of virtual learning environments built on novel technological infrastructure has generated numerous new studies that need synthesis. Existing research shows inconsistent findings regarding effective engagement strategies across different demographics, subject areas, and course formats. Such studies have introduced new engagement dynamics that require systematic comparison with other instructional approaches.

Thirdly, regarding the methodology, as Dao (2024) noted, the field is in a period of innovation and exploration of rigorous mixed and multi-method research designs. Research on online L2 engagement employs diverse measurement approaches and practices (e.g., eye-tracking, self-report, multimodal learning analytics, behavioral markers) that need critical

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comparison. As one of the first and most significant reviews of research on the topic of online

L2 learner engagement, Dao (2024) identified key issues in this area, particularly the variation in how the construct is conceptualized, operationalized, and measured across studies. While this book-length review offers initial insights into multiple conceptual, theoretical, and methodological aspects of online L2 learner engagement research, the narrative review approach used to examine these complex issues has limitations in systematizing research. In particular, it may be susceptible to researcher bias and the framing of the narrative review's focus. Thus, arguably a systematic review is best positioned to take stock of the validity and generalizability of this body of work and to reflect on the consistency of how online L2 engagement metrics are operationalized and measured.

Taken together, this systematic review addresses these gaps by analysing and synthesizing empirical studies of online L2 learner engagement. Our aims in doing so go beyond simply consolidating evidence and bringing together findings from multiple studies; we additionally examine issues that have not yet been addressed in Dao's (2024) narrative review. These include:

- assessing the consistency of findings across different online learning contexts, diverse populations (i.e. adult versus young learners; English as EFL/ESL versus other languages), and tensions and contradictions in methodologies);
- identifying gaps where evidence is lacking and highlighting opportunities for future research in this growing area;
- helping to clarify contradictions and conflicting results to determine which findings are most reliable and broadly transferable;
- tracking research innovations and documenting developments in research methods;
- documenting methodological standards and best practices in research design and measurement;

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- providing evidence to guide research and practice recommendations for online L2 learning engagement research.

Online L2 learner engagement: Conceptualization and dimensionality

Online L2 learner engagement has garnered significant attention as the intersection of language learning and technology-mediated education continues to expand (Dao et al., 2021, 2024). Defined broadly as the heightened involvement and interaction of language learners with instructors, peers, and content through digital platforms and technologies, online L2 learner engagement encompasses cognitive, behavioral, affective, social and agentic dimensions. Despite its importance, substantial variation exists in how engagement is defined and operationalized within L2 research, creating challenges for synthesizing findings and building a cohesive body of knowledge.

The construct of learner engagement has long been a subject of intense scrutiny. Numerous definitions of engagement have been proposed, often adapted from broader educational research without sufficient critique or contextual adjustment. Also, although specific dimensions are emphasized, a multidimensional understanding of engagement differs across definitions. For instance, some definitions focus on engagement as an active, goal-directed process (Lawson & Lawson, 2013; Skinner et al., 2009), while others highlight its emotional and relational aspects, such as enthusiasm and responses to the learning environment (Jarvela & Renninger, 2014). These varying perspectives underscore the complexity of conceptualizing engagement and its implications for engagement research.

In the sub-domain of L2 learning, engagement has been framed in diverse ways, often reflecting unique aspects of language acquisition. Definitions range from broad characterizations of involvement or language production (Dörnyei & Kormos, 2000) to specific interpretations, such as task engagement involving goal setting and resource

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utilization (Platt & Brooks, 2002; Bygate & Samuda, 2009). Oga-Baldwin and Nakata (2017) argue that engagement represents the operationalization of motivation, where learners channel energy and direction into concrete actions. This nuanced understanding is complemented by Mercer's (2019) focus on participation in tangible language tasks, emphasizing the practical and observable aspects of engagement. Two influential models in L2 engagement research—Svalberg's (2012, 2017) "Engagement with Language" (EWL) and Philp and Duchesne's (2016, 2017) "Task Engagement"—offer frameworks for understanding engagement's multidimensionality. Svalberg conceptualizes EWL as involving cognitive, affective, and social dimensions, where language serves as both the object and vehicle of engagement. In contrast, Philp and Duchesne focus on task-level engagement, operationalizing it across cognitive, emotional, social, and behavioral domains. These models, however, feature relatively broad guidelines for operationalization, and behavioral engagement is considered distinct rather than reframed as a manifestation of other dimensions of engagement (see Dao, 2017; Yuan & Dao, 2025). Also, the layered nature of engagement, spanning task-level to societal level, adds complexity and thus creates unclear boundaries and interrelations. These issues call for refining frameworks to ensure they are robust, context-sensitive, and empirically grounded for L2 learning.

Characteristics of L2 learner engagement

Learner engagement is fundamentally characterized by the notion of "action," serving as a defining feature that underscores the active participation of students in their educational experiences (Lawson & Lawson, 2013). This engagement is highly situated and context-dependent, varying across diverse timescales and adapting to different learning environments and scenarios (Hiver et al., 2021). Central to engagement is the presence of an object, whether it be a task, a subject matter, or an interactive activity, which provides a focal point for learners' attention and effort. Additionally, learner engagement is dynamic and malleable,

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capable of evolving in response to changes in context, motivation, and instructional strategies. Often, this engagement is overt and visible, manifesting through observable behaviors such as participation, enthusiasm, and persistence in learning activities. Despite these well-defined characteristics, there are several research issues regarding learner engagement. Not all studies adequately reflect the multifaceted and unobservable nature of engagement, often overlooking essential characteristics such as its dynamic and context-dependent aspects (Sulis, 2024). Also, the indicators used to measure engagement frequently do not seem to capture its full complexity, leading to an incomplete understanding of how learners engage. Additionally, measurement tools often lack sensitivity to detect subtle engagement variations. Together with inconsistent measures and definitions, they hinder accurate assessment and complicate cross-study comparisons. Addressing these issues is, therefore, essential for developing a more comprehensive and nuanced understanding of learner engagement.

Operationalization and analysis of learner engagement

Learner engagement (including online and face-to-face engagement) has been studied at varying levels, from the granular level of engagement within a single activity to the broader level of a learner's overall learning experience. Research has linked learner engagement to important educational outcomes, such as learners' persistence in learning (Fredricks et al., 2004; Kuh et al., 2008), satisfaction (Filak & Sheldon, 2008; Zimmerman & Kitsantas, 1997), and academic achievement (Fredricks et al., 2004; Hughes et al., 2008). However, comparing findings across studies is challenging often due to variations in engagement operationalizations. (Fredricks & McColskey, 2012; Janosz, 2012).

Moreover, in technology-mediated L2 learning experiences, learner engagement can take many forms, including anticipated, perceived and actual engagement (Bikowski & Casal, 2018). Such variation complicates efforts to operationalize engagement. Furthermore,

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previous research has examined how innovative instructional practices impact learner engagement in technology-mediated experiences (Chen, Lambert, & Guidry, 2010; Junco, Heiberger, & Loken, 2011; Liang & Sedig, 2010). Yet, ways to measure online L2 learner engagement in technology-mediated contexts remain insufficiently addressed. Existing measures of online L2 learner engagement do not seem to be adaptable to the unique challenges of distance or blended learning contexts. Observational measures used in classrooms where all students are present in one location are challenging to arrange for online courses in which students learn separately and at a distance. Additionally, technology offers scalable, non-disruptive ways to measure engagement, such as using user activity data (Aleven et al., 2006; Baker et al., 2012; D’Mello & Graesser, 2012), but their use in online L2 engagement is unclear. Therefore, systematically reviewing empirical studies on online L2 learner engagement is needed to identify outstanding issues and guide future research.

The current study

This study aims to fill gaps by systematically reviewing online L2 learner engagement research, focusing on study characteristics, engagement conceptualizations, indicators, and key findings to enhance understanding of its role in technology-mediated L2 learning. Our aim is to analyze existing studies to address challenges in conceptualizing and measuring engagement, identify improvement opportunities, and synthesize recent findings on online L2 learner engagement. By analysing the resulting studies, we aim to inform future research and suggest practical applications for fostering online L2 learner engagement in technology-mediated language learning.

Research questions

- RQ1. What are characteristics of L2 research that investigated online learner engagement?
- RQ2. How is online learner engagement framed and conceptualized in L2 research?

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RQ3. What indicators and measures of online learner engagement are operationalized and tested in L2 research?

RQ4. What are the areas of focus and key findings in online L2 learner engagement research?

Method

Creating a pool of empirical studies

This study followed PRISMA guidelines (Moher et al., 2009; Page et al., 2020) to compile journal articles on online L2 learner engagement. The process involved five phases: (a) selecting databases and ESCI/SSCI L2 journals, (b) conducting an automated search with relevant keywords, (c) screening abstracts, keywords, and titles for eligibility, (d) reviewing references to identify missed articles, and (e) evaluating selected articles against inclusion/exclusion criteria. To build the report pool, we conducted an extensive search across databases and ESCI/SSCI journals (Hiver et al., 2024; Vitta & Al-Hoorie, 2017; Zou et al., 2020) to identify empirical studies on online L2 learner engagement (see supplementary materials for databases and L2 journals). The key search term was ‘*engage**’. This key term was combined with online learning-related terms, such as. “*blended learning*,” “*computer assisted instruction*,” “*computer managed instruction*,” “*courseware*,” “*distance education*,” “*electronic learning*,” “*integrated learning systems*,” “*intelligent tutoring systems*,” “*online courses*,” “*mobile learning*,” “*virtual classrooms*,” “*web-based instruction*”.

Inclusion and exclusion criteria

Articles containing the search terms in titles, abstracts, or keywords were screened against inclusion/exclusion criteria. Only empirical studies on online L2 learner engagement were included, while reviews, opinions, and meta-analyses were excluded. While various methods exist for compiling reports for systematic review (Chong et al., 2021; Li & Wang,

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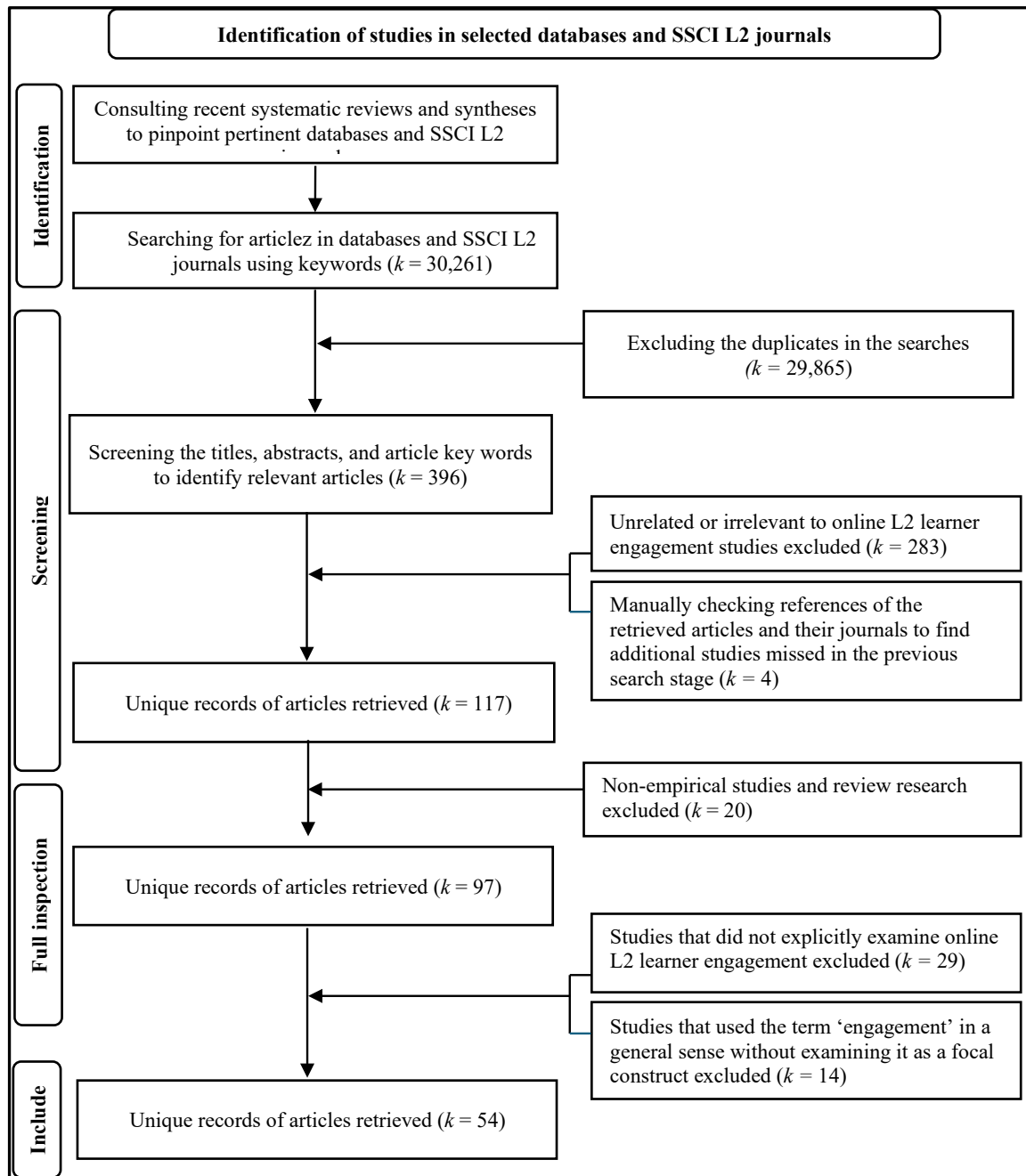
2018; Norris & Ortega, 2000; Oswald & Plonsky, 2010; Siddaway et al., 2019), we followed recent L2 syntheses when delimiting the scope of this review (Andringa & Godfroid, 2020; Nguyen et al., 2024; Hiver et al., 2021). In line with many existing reviews and recent guidance in the field (Chong, 2025; Zou et al., 2020), we used a structured search strategy to focus on studies published in SSCI/ESCI and major applied linguistics journals, and edited book chapters. This search strategy reflects a tendency in L2 systematic reviews and research syntheses to capture research published in established L2 journals (Nicklin & Plonsky, 2020; Zhang, 2020).

While we acknowledge that unpublished studies (e.g., dissertations, gray literature) may contain valuable insights, we prioritized published articles and excluded others from our report pool for several reasons: published studies typically undergo more rigorous peer-review, providing a baseline quality standard that unpublished sources may lack; published studies generally provide more comprehensive methodological details, making the findings more readily verifiable; gray literature often lacks standardized reporting formats and conventions, making systematic comparison more challenging; most unpublished studies have limited availability or restricted access, which can introduce selection bias into the review process. Consequently, our inclusion criteria focused on peer-reviewed publications to maintain methodological rigor, and to balance the need for consistent quality standards across included studies.

Figure 1 illustrates the PRISMA procedure adopted in this study.

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Figure 1. PRISMA process for identifying articles and creating the corpus of reports



Coding and analysis

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In light of the research questions, a coding scheme was developed for the reviewed studies (Table 1).

Table 1. Complete coding scheme

Category	Coding item/description
<i>Characteristics of the reviewed studies (RQ1)</i>	
Publication details	<ul style="list-style-type: none"> • Publication venue • Publication year
Participants' background details	<ul style="list-style-type: none"> • Age group • Educational level • Proficiency level • First language • Target language
Sample size	<ul style="list-style-type: none"> • The number of participants
Research design	<ul style="list-style-type: none"> • Experimental • Quasi-experimental • Exploratory • Longitudinal
Data collection tools	<ul style="list-style-type: none"> • Specific tools for capturing engagement
Technologies used in the studies	<ul style="list-style-type: none"> • Specific names of the technologies
<i>Conceptualization (RQ2)</i>	
Terms/labels (i.e., words/phrases) to describe engagement	<ul style="list-style-type: none"> • Specific words/phrases
Definition	<ul style="list-style-type: none"> • Direct quotes or paraphrased sentences provided to define engagement
<i>Indicators (RQ3)</i>	
Indicators of an overall engagement	<ul style="list-style-type: none"> • Names of measures that capture engagement as a 'whole' concept without specifying sub-dimensions
Indicators of sub-components of engagement	<ul style="list-style-type: none"> • Names of measures of sub-components of engagement in which engagement is perceived as multidimensional construct
Measures to capture indicators	<ul style="list-style-type: none"> • Names of tools used to capture individual aspects of engagement
<i>Focus and key findings (RQ4)</i>	
Areas of focus	<ul style="list-style-type: none"> • Variables being focused
Key findings	<ul style="list-style-type: none"> • Relationships of variables of interest with the construct of engagement

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In Table 1, following previous reviews (e.g., Dao et al., 2025; Hiver et al., 2024), we coded study characteristics (RQ1) across six dimensions: (a) publication details, (b) participant background (age, education, proficiency, first and target languages), (c) sample size, (d) research design, (e) data collection tools, and (f) technologies used. For conceptualization of online L2 learner engagement (RQ2), studies were coded for (a) engagement terms and (b) provided, adopted, or adapted definitions. For indicators and methods of measuring online L2 learner engagement (RQ3), studies were coded for (a) whether engagement was treated as a single concept without specifying sub-components or a multidimensional construct (e.g., cognitive, emotional, social), and (b) the indicators and measures. For areas of focus and key findings (RQ4), studies were coded for (a) study focus, (b) examined variables, and (c) relationships between these variables and engagement. For inter-coder reliability, six studies (12% of the dataset) were randomly selected and coded by two independent coders (i.e., two authors), with agreement ranging from 86% to 94%. Discrepancies were resolved through discussion. A research assistant then independently coded the remaining studies, with the authors reviewing and discussing results to resolve ambiguities.

Coding results were recorded in Excel, with descriptive analyses (frequency counts and percentages) conducted for all categories. Content analysis identified themes in definitions, conceptualizations, indicators, and key findings. Although 54 studies were reviewed, some tables and text exceed this number due to studies fitting multiple categories, such as participant subgroups with varying proficiency, education, or age.

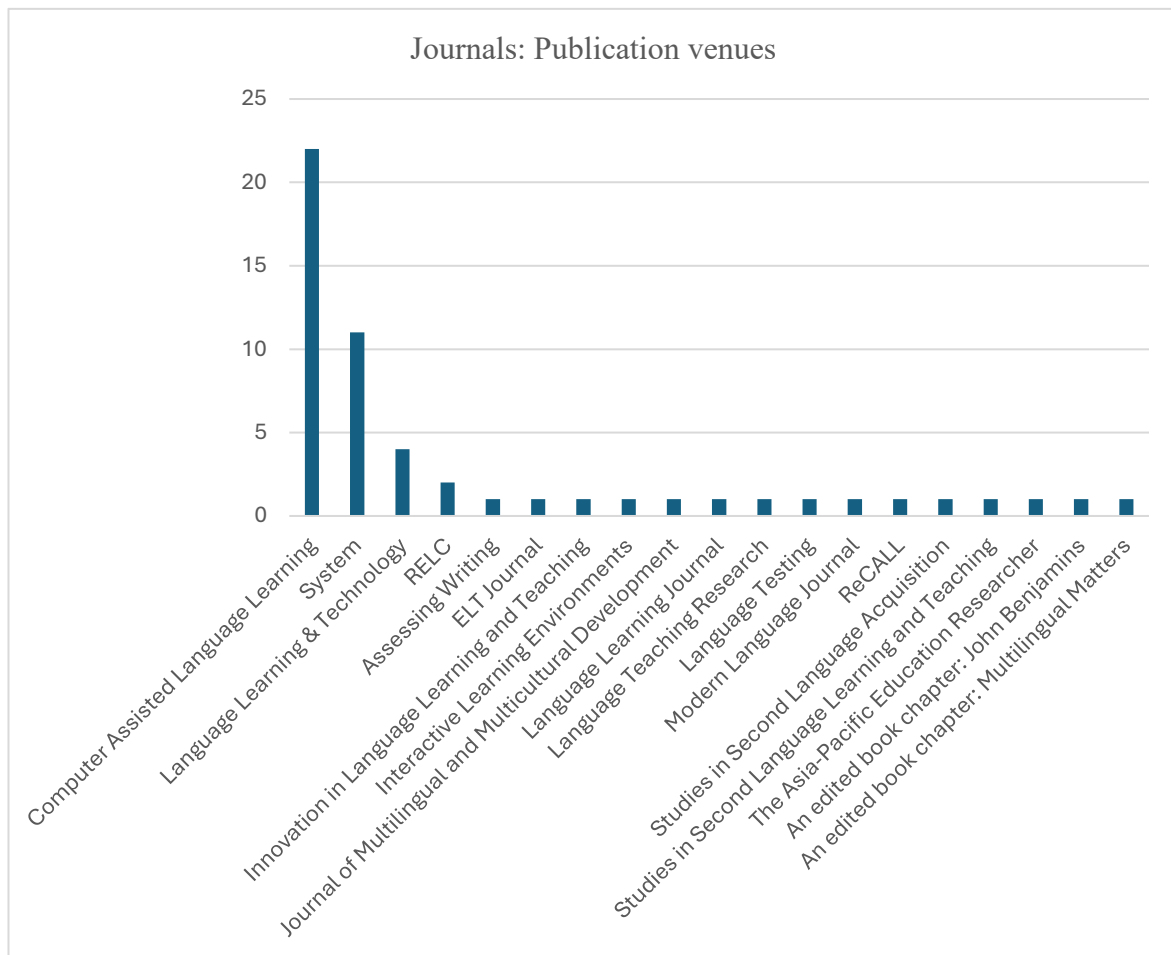
Results

RQ1. Characteristics of online L2 learner engagement studies

The analyse revealed that despite appearing various L2 journals, most studies were published in four journals: *Computer-Assisted Language Learning (CALL)*, *System*, *Language Learning & Technology*, and *RELC* (Figure 2).

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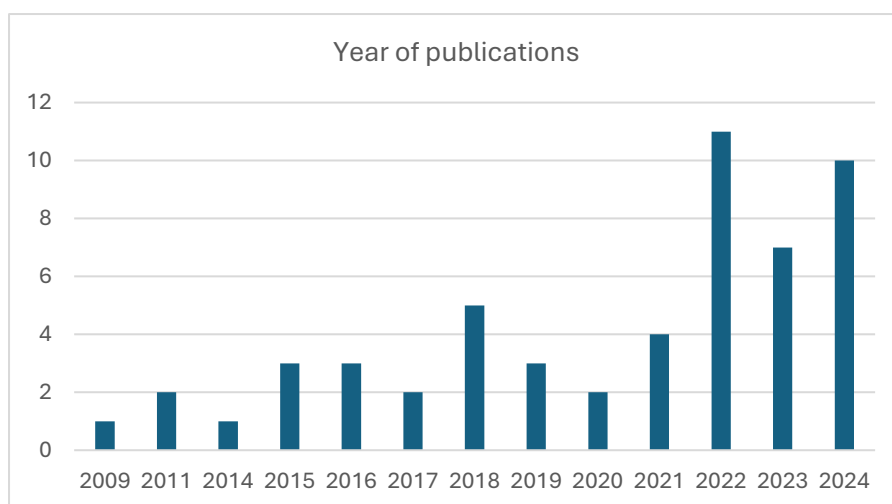
Figure 2. *Publication venues*



The results also show that research on online L2 learner engagement has appeared in peer-reviewed journals for over a decade, with its volume increasing notably, surpassing ten studies per year in recent years, such as 2022 and 2024 (Figure 3).

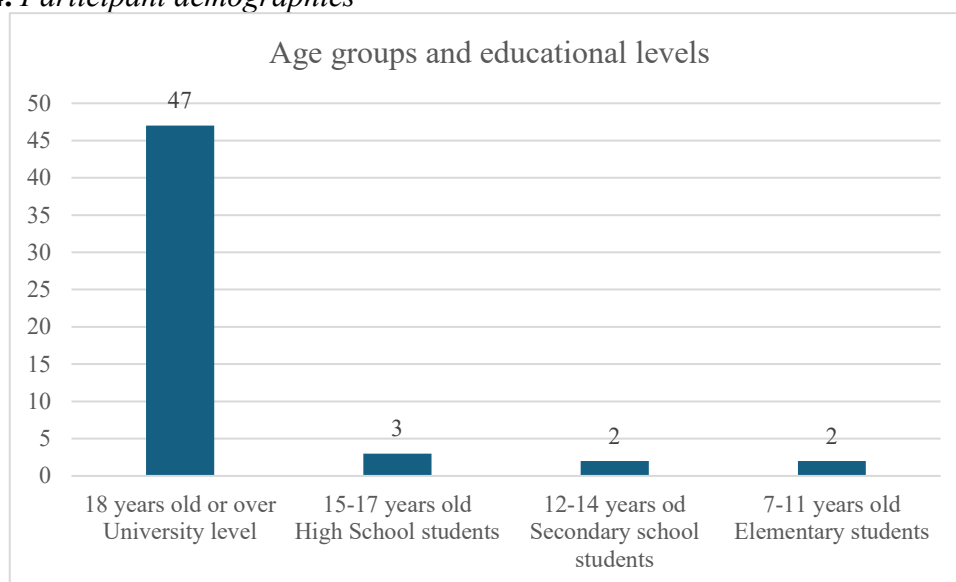
Figure 3. *Publication years*

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Regarding the demographics of the participants, Figure 4 indicates that 87% of studies focused on adult learners with university-level education, while studies on young learners in high school or elementary school were less common.

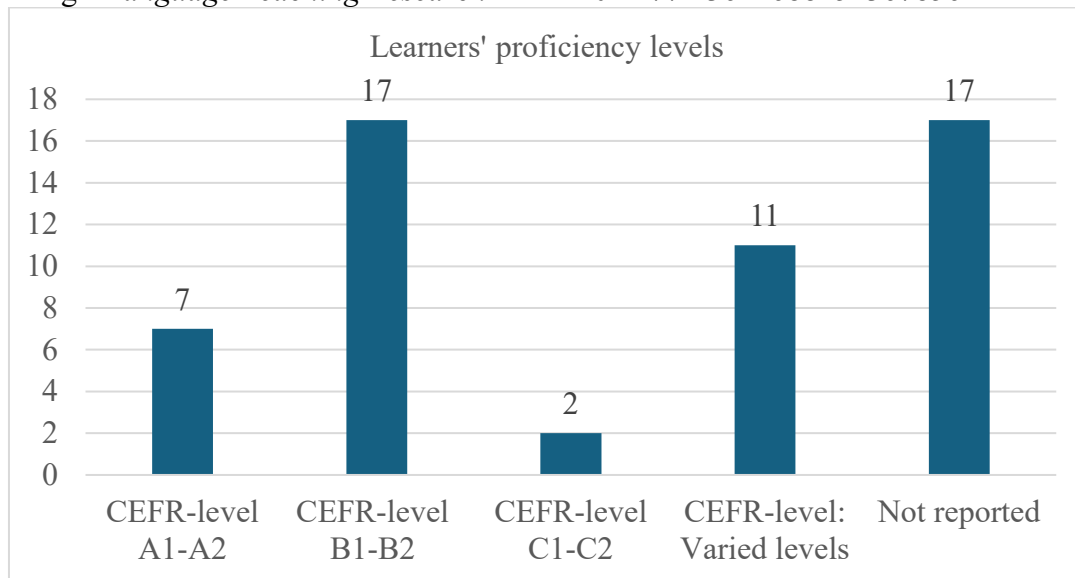
Figure 4. *Participant demographics*



As for the participants' proficiency levels, Figure 5 shows that 31.48% of studies ($k = 17$) targeted intermediate learners (equivalent to CEFR B1-B2), 20.37% ($k = 11$) focused on learners with varied proficiency, and smaller percentages examined beginners—CEFR A1-A2 ($k = 7$, 12.96%) and advanced learners—CEFR C1-C2 ($k = 2$, 3%) learners. Notably, 31.48% ($k = 17$) of studies did not report proficiency level.

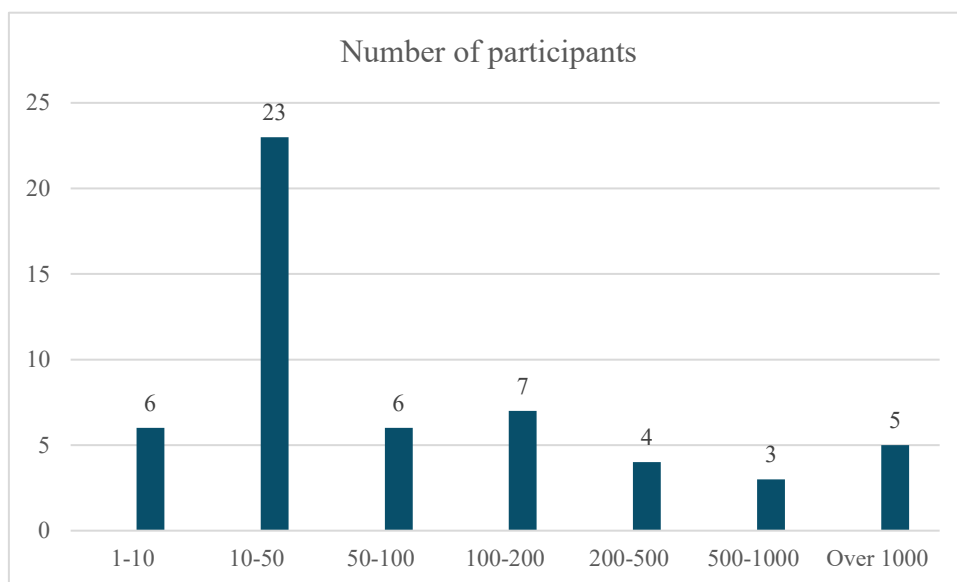
Figure 5. *Learner participants' proficiency level*

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For sample size, Figure 6 shows that 42.59% of studies ($k = 23$) had 10 to 50 participants, with other categories ranging from 3 to 6 participants in the studies each. A few studies had over 200 participants, including five using learning analytics data with more than 1,000 participants.

Figure 6. *Sample size*



For participants' first languages, Figure 7 shows most participants were L1 Mandarin speakers, with smaller numbers speaking English, Japanese, Spanish, Dutch, Korean, Arabic, and other languages.

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Figure 7. Learner participants' first language (L1)

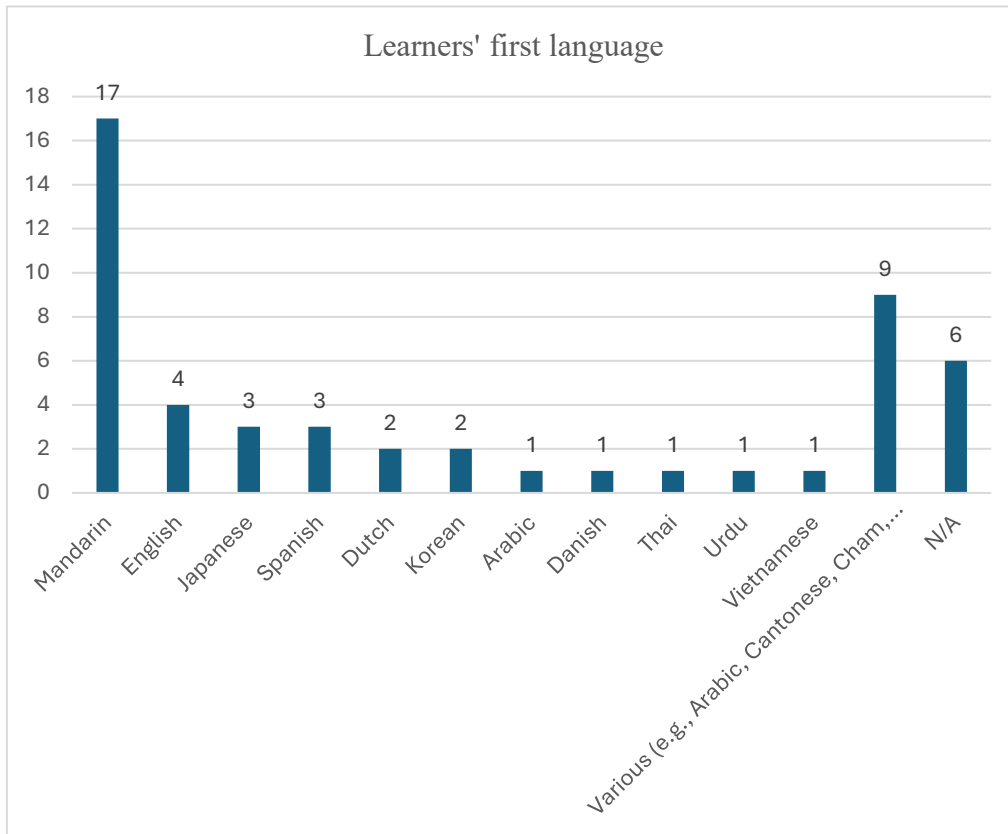
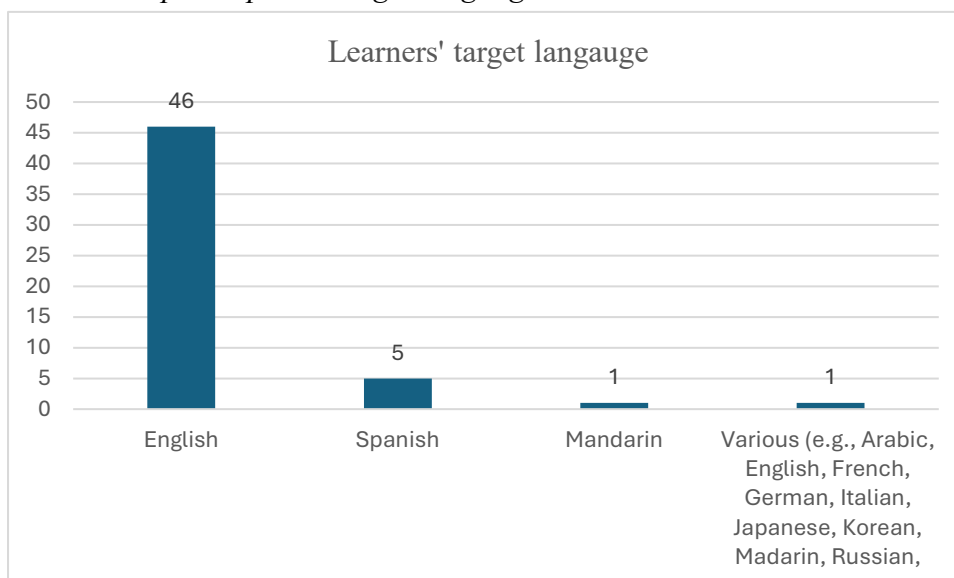


Figure 8 shows English as the target language in 85.18% ($k = 46$) of studies, followed by Spanish ($k = 5$) and Mandarin ($k = 1$). This finding reflects trends showing that L2 English is vastly over-represented in published research in language education (Andringa & Godfroid, 2020; Hiver et al., 2024). One survey study in the report pool included multiple target languages, such as Arabic, English, French, and German.

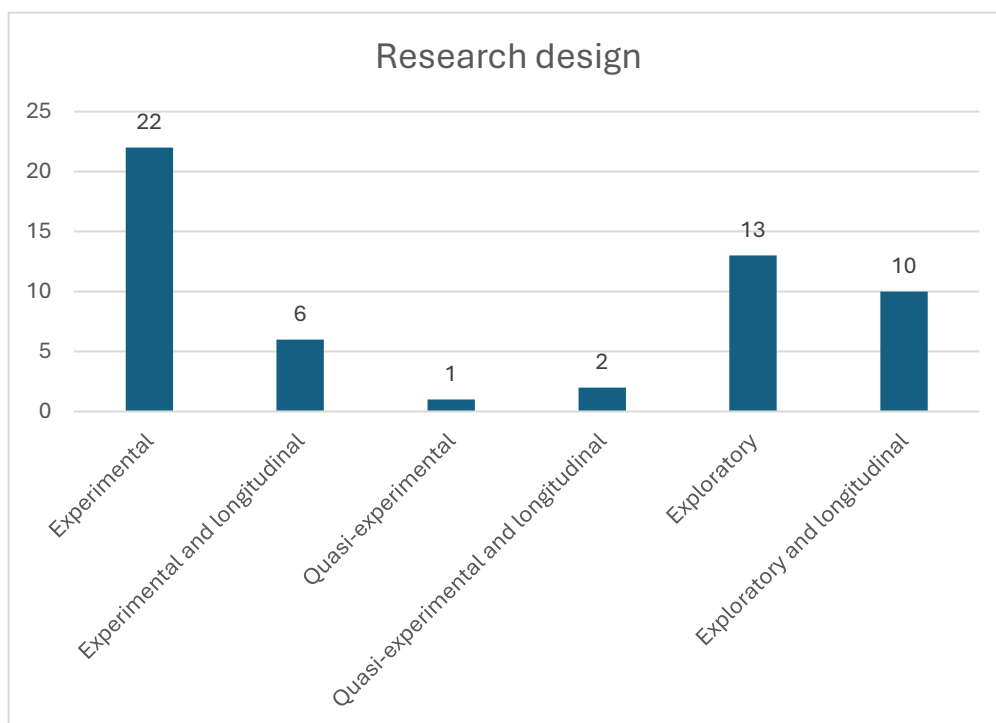
Figure 8. Learner participants' target language



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Regarding the design adopted to investigate online learner engagement, Figure 9 shows that 57.40% (k = 31) of studies used experimental or quasi-experimental designs, 42.60% (k = 23) were exploratory, and notably 33.33% (k = 18) were longitudinal.

Figure 9. *Designs of online L2 learner engagement research*



For technology use, the reviewed studies utilized various technologies, grouped into four categories: learning management systems (LMS) and platforms, videoconferencing apps, social networking sites and messaging apps (Table 2), and course-specific tools or software (Table 3).

Table 2. *Technologies used in online L2 learner engagement research*
Learning management systems (LMS) and platforms

Moodle
Blackboard
Language Massive Open Online Courses (LMOOCs)
EFL SPOC: a Massive Open Online Courses (MOOCs)
Treernity—a MOOC platform
Second Life: A 3D platform
Videoconferencing apps
Zoom

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Tencent Meeting

Voov

Google Meet

Social networking sites and messaging apps

WhatsApp

Facebook

Twitter

WeChat and Xiaodaka

LINE messaging apps

Table 3. *Specific technology tools and software*

Technologies

Google Docs: A web-based word processing tool

A digital textbook: A site that contains course materials (e.g., syllabus, rubrics), content chapters, and the course projects

A Web 2.0 digital storytelling iPad e-book: It contains stories with texts and oral narrations

A Writing Pal: An intelligent tutoring system (ITS) designed to provide students with explicit writing strategy instruction and practice.

AWE system: A website offers an online automatic grading service based on corpus and cloud computing technology.

Conjugation Nation: A drill-based mobile application designed to improve grammar

Lang-8: Social networking site: LA site that include functions in common with general-purpose social networking sites, such as user profiles, friending, messaging, and posting.

Learning through Drama: A system that includes multiple functions, e.g., *E-meeting*, *Vote Opinion*, *Student Lounge* for sharing their learning records on aspects such as tasks completed, scores, and activities.

Mango Languages: A commercially language learning app

Memrise: A flashcard app that uses spaced repetition algorithms to schedule vocabulary review in order to facilitate word retention.

Essay Critiquing System 2.0: A program trained by the Latent Semantic Analysis (LSA) technique to offer writing ideas for argumentative essays

Experience xAPI: An e-learning specification provides an interoperable data model for storing and sharing data about students' learning experience for learning and analysis.

Tradukka (Tradukka.com): A free tool that utilizes Google Translate for back-end translations

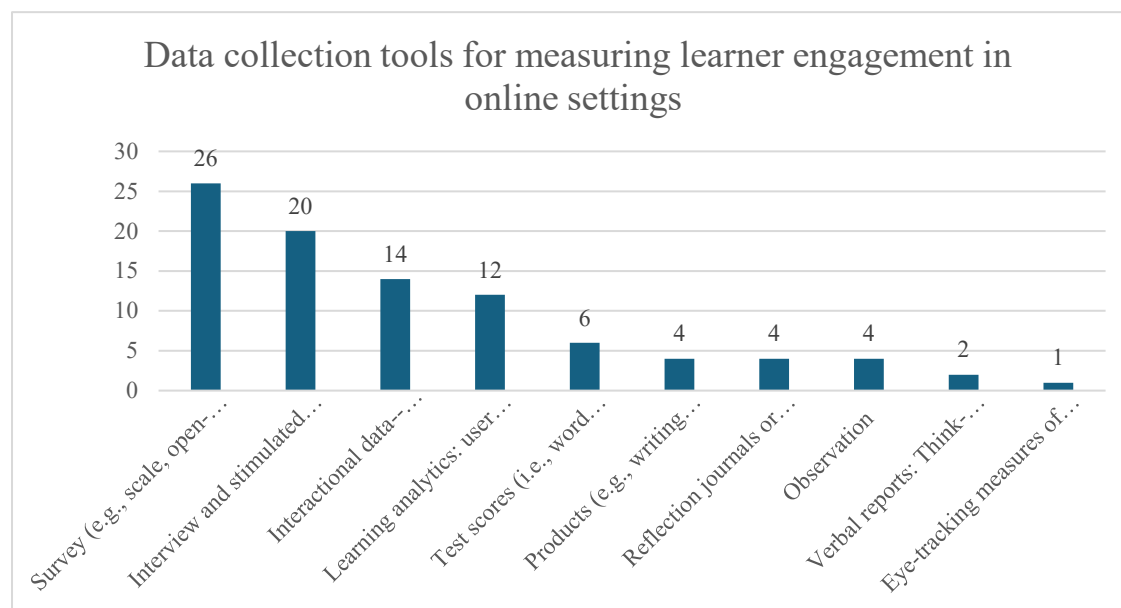
Computer: Learning activities conducted on a computer

For online learner engagement measures, Figure 10 shows that research often used multiple tools, with surveys (Likert-scale and open-ended) and interviews (individual, focus group, and stimulated recalls) being most common. Interactional data (e.g., task-based interactions) for discourse analysis, and learning analytics (e.g., user logs, posts, usage data) were also used. Less common measures included test scores, products (e.g., written assignments),

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reflection journals, observations, verbal reports (e.g., think-aloud reports), and eye-tracking data.

Figure 10. Tools for measuring learner engagement in online settings



RQ2. Conceptualizing and framing online L2 learner engagement

Labels of the ‘engagement’ construct

Before exploring definitional conceptualization, it is necessary to first gain an overview of the construct names L2 research has used for ‘online learner engagement’ (Table 4).

Table 4. Online L2 learner engagement: Construct names

Construct name	<i>k</i>
<i>Labels with a generic name/term</i>	
Engagement	10
Learner engagement	10
Learners’ engagement	5
Student engagement	6
Students’ engagement	4
<i>Labels specifying technology aspect (i.e. online aspect)</i>	
Online engagement	1
Online student engagement	1
<i>Labels specifying the language aspect (i.e., language or English learning)</i>	
Language learning engagement	1
Online English learning engagement	1
<i>Labels specifying specific focus</i>	
Task engagement	2
Online psychological engagement	1
Language-related-episode (LRE) engagement	1
Mutual engagement	1
Oculomotor engagement	1

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Virtual Learning Environment (VLE) engagement	1
Anticipated and actual engagement	1
Labels specifying the object of engagement (ELU, MALL or feedback)	1
Engagement in language use (ELU)	1
Engagement in MALL	1
Learner engagement with feedback	1
Labels specifying the dimensions of engagement	
Behavioural engagement	1
Cognitive and affective engagement	1
Cognitive engagement	1
Flow as emotional engagement	1

Table 4 shows that L2 research labelled the concept of online L2 learner engagement using various terms, classified into six categories: (a) generic terms, (b) technology-specific terms, (c) language-focused terms, (d) specialized terms (e.g., task, psychological, LRE, mutual, oculomotor, VLE, anticipated, actual engagement), (e) object-specific terms (e.g., ELU, MALL, feedback), and (f) dimension-specific terms (e.g., cognitive, affective/emotional, behavioral).

Definitions of the ‘engagement’ construct

Studies not only used varied labels for online learner engagement but also adopted diverse definitions, grouped into five categories: (a) second-language-related, (b) aspect-specific, (c) motivation-focused, (d) educational psychology/language learning science-based, and (e) paraphrased from other sources (Table 5).

Table 5. *Language-related and aspect-specific definitions of online L2 learner engagement*

<i>Definitions</i>
<i>Second language-related definitions</i>
A state of heightened attention and involvement (Philp & Duchesne, 2016, p. 51)
A cognitive, and/or affective, and/or social state and a process in which the learner is the agent, and the language is the object and may be the vehicle (means of communication) (Svalberg, 2009, p. 244).
<i>Aspect-specific definitions (i.e. metatalk, feedback, writing, flow and vocab noticing)</i>
The quality of the learners’ metatalk (Storch, 2008)
Engagement with language issues (i.e., LREs)—any part of a dialogue where language learners talk about the language they are producing, question their language use, or correct themselves or others (Swain & Lapkin, 1998)
Learner engagement with feedback’ refers to ‘how learners respond to the feedback they receive’ (Ellis, 2010, p. 342) ... including a cognitive dimension (i.e. how learners perceive and attend to the feedback), a behavioural dimension (i.e. whether and in what ways learners attend and respond to the feedback) and an affective dimension (i.e. how learners feel emotionally about the feedback)
The extent to which students commit to their learning’ (Cheng & Liu, 2022, p. 109; Zhang & Hyland, 2018, p.90)
Learners’ flow experiences are considered as a high level of emotional engagement (Fredricks et al., 2004), and... “the apex of engagement” (Oxford & Bolaños-Sánchez, 2016, p. 119). Flow is

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defined as ‘a subjective state that people report when they are completely involved in something to the point of forgetting time, fatigue, and everything else but the activity itself’ (Csikszentmihalyi, 2009, p. 394).

An umbrella term for any of a learner’s cognitive actions vis-a-vis a language element or feature, i.e., insightful engagement with the expression (Schmitt, 2008, p.291)

Table 6. *Motivational research-oriented definitions of online learner engagement*

Descriptions
Heightened attention, active participation, and meaningful involvement in a learning task (Mercer & Dörnyei, 2020).
Second language (L2) learners’ heightened participation in learning (Dörnyei and Kormos, 2000).
The degree of energy, time, and effort a person devotes to acquiring a new language (Sang & Hiver 2021)
The amount (quantity) and type (quality) of learners’ active participation and involvement in a language learning task or activity’ (Hiver et al., 2024, p. 202)
An effort to account for learners deliberate and active involvement in task performances (Hiver & Hu, 2023).

Table 7. *Definitions adopted from educational psychology and language learning sciences*

Definitions
A multifaceted construct that unites three dimensions: behavioural engagement, cognitive engagement, and emotional engagement. It is students’ subjectively perceived motivational and affective reactions to the L2 learning process, the learning materials, or the classroom’ (Fredricks et al., 2004)
An active state of learners in online learning, involving cognitive, emotional, and behavioural sub-dimensions (Fredricks et al., 2004).
The learner’s involvement, enthusiasm, and effort in learning activities (Fredricks et al., 2004).
Students’ intensity of active involvement and investment of time, energy and effort in learning activities (Wang & Eccles, 2012)
The extent of students’ involvement and active participation in learning activities [...] which will lead to their collaborative knowledge construction and deep learning (Cole & Chan, 1994, p. 259)
Students’ active engagement in L2 classes by thinking about the content of the relevant subject and talking and interacting with others’ (Dixon, 2015).
A multidimensional construct, comprised of a combination of psychological and behavioural components (Finn and Zimmer 2012) which encompass affective (emotional responses and willingness), cognitive (mental investment in terms of experiencing a sense of challenge, paying attention, focusing, and metacognitive control of learning), and behavioural (active participation) dimensions’ (Hiver et al. 2021).
The intensity and quality of students’ involvement in initiating and carrying out learning activities ‘(Gonida et al., 2009)
Active participation in the learning process, which consists of activities and perceptions that learners are involved in in the form of attention, interest, curiosity, and motivation (Trevino & Webster, 1992).
Effort and involvement in productive learning activities (Kuh, 2009, p. 6)
The time and energy paid by the students in the process of online learning (Ma et al., 2015).
The extent of a student’s active involvement in a learning activity (Reeve, 2012, p. 150).
The amount of physical and psychological energy that the student devotes to the academic experience’ (Astin, 1984)
Ongoing effort that learners put to the learning process for the achievement of learning goals (Coates, 2006).

Table 8. *Online learner engagement: Paraphrased definitions from different sources*

Definitions

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One type of manifestation of motivation, expressed in a particular moment through active involvement in the learning process

Engagement as a behavioural manifestation of motivation (i.e., behavioural engagement) ...examined mainly through L2 learners' actual use of apps as recorded by app user logs.

Online task engagement' to refer to learners' participation in online learning tasks of a focal LMOOC, which was measured by learners' online tracking data

The term "usage" used interchangeably with the behavioural component of MALL engagement.

The overall pattern in which the learners engaged with the IOL courses, regardless of whether they completed a course or left earlier.

Learners' deliberate and active involvement in task performances.

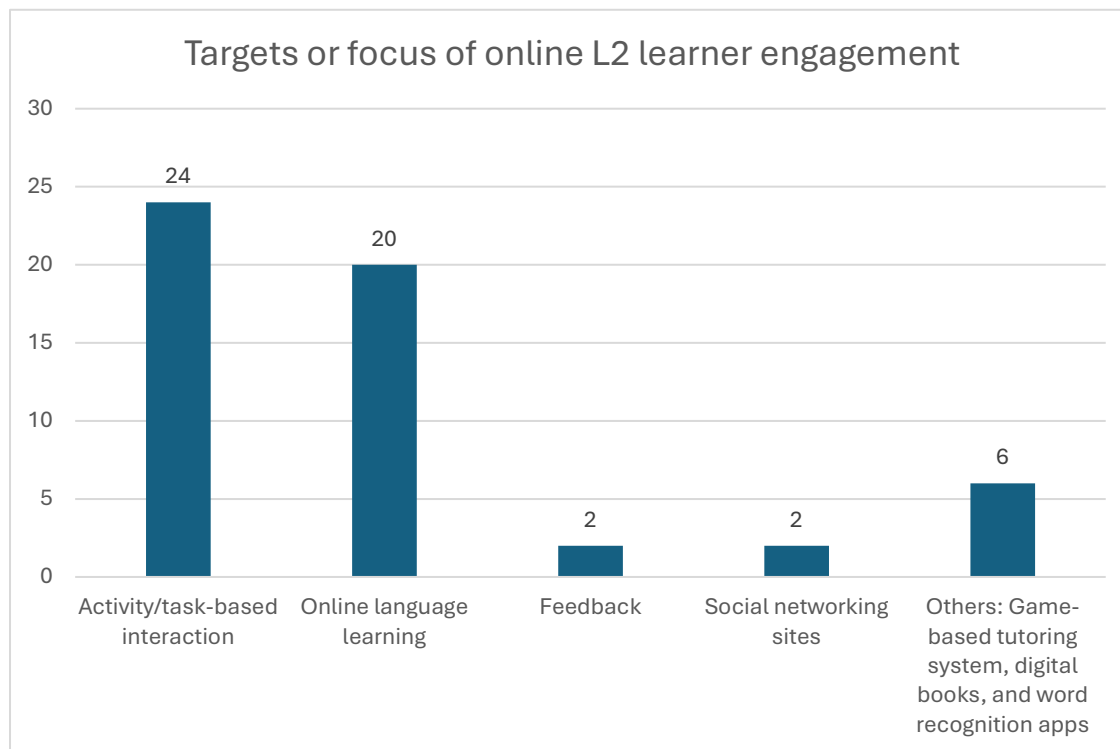
Tables 5, 6, 7 and 8 revealed variations in how researchers conceptualize 'engagement', despite focusing on the same construct. Notably, very few studies explicitly stated the 'online' aspect in their definitions, often treating online engagement as synonymous with general engagement, regardless of the learning context (face-to-face or online).

Targets or focus of online L2 learner engagement

Regarding the targets or focus of online learner engagement, the results identified four broad categories: (a) engagement in activity/task-based interaction, (b) engagement in general online language learning, (c) engagement with feedback, and (d) engagement in social networking sites and with others (e.g., digital books, word recognition apps, and game-based tutoring systems). Figure 11 shows the distribution of these focus areas.

Figure 11. Targets or focus of online L2 learner engagement

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RQ3. Indicators and methods used to capture online learner engagement

Regarding engagement indicators, the results revealed two distinct patterns. In the first pattern, engagement was treated as a unitary whole, without being separated into subtypes or dimensions; therefore, single distinct indicators were used to represent it as a whole rather than a componential construct (Table 9).

Table 9. Indicators of ‘overall’ engagement

Indicators of overall engagement	Measures and analysis
LRE (i.e., frequency and nature)	Discourse analysis
Number of editing interventions	Discourse analysis
Number of words accurately recognised, number of times learners elect to listen to, number of times of revisions	Discourse analysis
Understanding meaning and formal properties of language	Vocab recall test scores
Fixation rate (i.e., number of fixations), dwell rate (i.e., gaze rate—number of entries), total dwell time (i.e., percentage of time spent looking)	Eye-tracking
Average time spent on the virtual learning environment	Learning analytics
Actions: Watching Netflix series, subscribed to English-language written lifehacks via Instagram for good advice or daily quotes, followed people on Snapchat, and watched various American vloggers, investing in the English language outside school, wanting to becoming part of a wider community of practice	Qualitative data
Discourse moves: Disclaim, proclaim, deny, counter, concur, pronounce, endorse, justify, entertain, attribute, acknowledge, distance	Discourse analysis
Confirming the reading the researchers’ tweets, offering examples and commenting tweets or posted questions, and not replying to a tweet.	Point-giving scheme
Drop-outs, and retention rates.	Learning analytics
Number of sessions, duration of sessions, timeliness of sessions, comparison of sessions with course schedule, performance summaries per exercise, average scaled score per exercise, evolution of scores per exercise, exercise and theory page duration, number or takes and retakes of exercises and theory	Learning analytics

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 pages, navigation, use of audio files, use of the recording feature, number of lookups in the dictionary.

For the second pattern of indicators of engagement, the results showed the tendency of treating sub-types or dimensions of engagement separately and thus used distinct indicators for each sub-type or dimension (Tables 10, 11, 12, and 13).

Table 10. *Cognitive engagement indicators*

Indicators of cognitive engagement	Measures and analysis
Concentrating in the class	Blogs, reflective writing, interview
Mental effort	Survey
Level of critical thinking, and learning progress	Learning analytics, discourse analysis, survey
Noticing of language, interaction features, attention on the language as an object or as a medium, critical and analytic reflection, reasoning induction or memory, imitation-based reflection, hypothesis formation	Discourse analysis
Composing text, making meaning, and revising, reflecting, synthesizing, planning, managing resources, querying requirements, querying expectations	Discourse analysis
Questioning how to use a word, pausing, reading or multiple readings, making evaluative comments, and thinking of solutions to solve a problem.	Verbal reports and stimulated recalls.
LREs, semantically engaged talk, and attention.	Interactional data, interview, survey
Efforts to understand explanations, and self-regulation processes and metacognitive behaviours	Surveys and observations (e.g., screenshots of the apps messages)
LREs, modified output, self-correction	Discourse analysis and survey
Positioning of the platform	Interview and blog posts
Understanding the feedback information, monitoring the revision process, and self-regulation	Interview, observation, reflections
Control, attention and curiosity	Survey
Effort and involvement	Survey
Mental focus	Idiodynamic method

Table 11. *Behavioural engagement indicators*

Indicators of behavioural engagement	Measures and analysis
Active participation when performing the tasks	Blogs, reflective writing, interview
Participating actively	Survey
Login and logout times, system queries, overall usage of the communication platform.	Learning analytics
Active participation, high attendance levels or homework completion.	Discourse analysis, survey
Hand motions used to support language use, instances of scrolling up to view previously used forms, number of turns	Surveys and observations (e.g., screenshots of the app and messages)
Blog posts, the way learners respond, feedback. nature	Discourse analysis and survey
Number of submissions, revision time	Interview and blog posts
Number of task completions	Qualitative data
Participation, time, and effort.	Point-giving scheme
Focused, distracted, active, passive	Survey

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Table 12. *Emotional/affective engagement indicators*

Indicators of emotional/affective engagement	Measures and analysis
Anxiety, boredom, frustration, enjoyment	Survey
Enjoyment and boredom	Survey
Feeling positive	Survey
Adjectives describing their experience	Discourse analysis, survey
Feelings and attitudes toward their experiences	Interview and blog posts
Interest	Idiodynamic method
Affective reactions, and motivational changes	Qualitative data
Positive feelings (e.g., enjoyment and interest) and negative feelings (e.g., anxiety and/or feelings of disconnectedness with peers)	Interactional data, interview, and survey
Intrinsic interest	Survey
Negative and positive attitude, interest of the subject matter, apathy	Survey
Emotions expressed during the discussions	Learning analytics, survey, discourse analysis
Interest, boredom, apathy or frustration.	Surveys and observations (e.g., screenshots of apps messages)
Willingness to engage, eagerness or withdrawal, learner's purposefulness, focused on task or bored and autonomy: dependent or independent behaviour	Discourse analysis

Table 13. *Social engagement indicators*

Indicators of social engagement	Measures and analysis
How interactive with partner to learn, socially supportive, negotiates and scaffolds, leader or follower, reactive or initiating types of interactions.	Discourse analysis
Talk segments in which learners encourage each other to talk, reflect, and comment on their partner's ideas, repeat each other's utterances, complete each other's utterances, use backchanneling for agreement or confirmation, self- reported collaboration, mutual help.	Interactional data, interview, and survey
<i>Social-affect engagement:</i> Acknowledging (e.g., sharing likes and dislikes, showing gratitude), engaging (e.g., sharing jokes, images (memes), and puns and organizing group events), supporting (e.g., asking for/giving positive reinforcements, and establishing and strengthening social ties)	Discourse analysis

Additionally, although each dimension of online learner engagement had its own indicators, some studies combined dimensions and used shared indicators for more than one dimension, such as social-affective, cognitive-behavioral, or cognitive-affective (Table 13). In other words, while these studies acknowledged that each engagement dimension was distinct and

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had unique indicators, they also recognized overlaps, leading to indicators that capture the intertwined dimensions of online learner engagement.

RQ4. Areas of focus and key findings in online L2 learner engagement research

The analysis revealed three focal areas: (a) understanding online L2 learner engagement, its manifestations, and characteristics; (b) exploring its link to learning and language production; and (c) examining factors influencing it.

Area of focus 1. Understanding online L2 learner engagement, its manifestation and characteristics

As for the first focus, 37.04% of the studies ($k = 20$) explored the perceptions, manifestations, and characteristics of online L2 learner engagement. Regarding the understanding of the concept of online L2 learner engagement, three studies explicitly asked teachers to describe their understanding or conceptualization of the term. These studies reported that while teachers did not claim to be able to define the concept explicitly, they were able to describe how learners were cognitively, behaviorally, and emotionally engaged in online L2 classes. Additionally, these teachers specifically equated learners' alertness as a synonym for online L2 learner engagement and viewed flow as the "apex of engagement".

Regarding the manifestation of online L2 learner engagement, the exploratory and descriptive studies ($k = 20$) provided diverse accounts of what online L2 learner engagement entailed and how it was expressed in virtual L2 learning settings. Engagement was reflected in learners' participation in text chat discussions, diverse language use (e.g., denying, justifying, endorsing), turn-taking, negotiating meaning, expressing ideas, revising texts, course retention, session attendance, completed exercises, platform visits, and actions like watching videos.

For instance, the manifestation of engagement was evident in learners' level of participation in discussing language issues, diverse language use (e.g., denying, countering,

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justifying, acknowledging, expanding distance, endorsing, or concurring), and the degree of turn-taking, negotiation of meaning, expression of feelings and ideas, and revisions of texts or online discussion posts, attrition or drop-out rates in online L2 courses, time spent in online sessions, the number of sessions attended, exercises completed, course audios played, and platform visits, actions like watching videos, and the number of weekly student-initiated conversation episodes.

As for the characteristics of online L2 learner engagement, the results revealed three key features of online L2 learner engagement: its dynamic and fluctuating nature over time, diverse patterns and profiles of online learner engagement across different online settings, and the interconnection between its sub-components (emotional, cognitive, and behavioral), which influenced one another.

Area of focus 2. Online L2 learner engagement and L2 learning

The second focus of existing research on online L2 learner engagement was its link to language production and/or subsequent L2 learning. A small portion (9.26%, $k = 5$) of studies documented the link between online L2 learner engagement and language production or learning. These results indicate that online learner engagement affected and/or predicted (a) academic achievement, (b) post-test L2 learning, (c) text quality, and (d) target language production improvement.

Area of focus 3. Online L2 learner engagement and influential factors

Regarding the final focus, 74.07% of the studies ($k = 40$) investigated the relationship between L2 online learner engagement and various variables. These variables are categorized into four groups (Tables 14 and 15): tested factors (i.e., factors examined through experimental study designs), interventionist factors (i.e., factors examined through interventionist design, focusing on describing learner engagement as a result of the intervention, often without a control group), surveyed factors (i.e., factors assessed using

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Likert-scale surveys), and reported factors (i.e., factors identified in qualitative data, such as interviews, stimulated recalls, and reflective writings).

Table 14. *Factors examined in experimental studies in relation to online L2 learner engagement*

Tested factors	Level/description
Modality	Face-to-face vs. synchronous CMC Text-chat vs. video-chat Computer mediated vs. mobile-mediated communication Asynchronous vs. synchronous text-chats
Program mode	Blended learning vs. self-directed learning mode A blended gamified vs. face-to-face non-gamified programs
Anonymity	Full, partial versus non-anonymity
Video type input	Context video vs. content video
Task complexity	Complex vs. simple tasks
Pre-task planning	Pre-task planning vs. no pre-task planning
Interlocutor familiarity	Familiar versus unfamiliar interlocutors

Table 14 shows seven factors tested in experimental studies on online L2 learner engagement, all of which significantly affected engagement, with varying impacts on its dimensions (cognitive, social, emotional, and behavioral).

Table 15. *Factors examined in interventionist and descriptive studies in relation to online L2 learner engagement*

Variable/Treatment	Description
Language instruction	Language instruction through drama-based context (i.e., online situated learning environment)
Machine translation	A language learning tool
W-Pal writing strategy training	A game-based writing strategy tutoring system.
A computer word recognition application	An innovative computer protocol used to improve L2 word recognition from speech
Idiom learning procedure	The incorporation of a copy exercise as part of a procedure for learning idioms
Twitter-based intervention for pronunciation instruction	A Twitter-based instruction, involving explicit instruction and input enhancement techniques to improve pronunciation
Essay Critiquing System 2.0 (ECS2.0)	A computer-generated content feedback program
Goal setting and tracking/checking intervention	Goal-setting-and checking activities in Task-Based Language Teaching (TBLT)
Learning design	Teachers' design of online course activities and/or online modules
Second life (3D virtual world) course design	A design of Second Life 3D virtual world task-based language course
Flipped SEF-ARCS decoding model	A design model with three elements: flipped learning, SEF-Automation, and ARCS motivational model

In Table 15, a variety of interventions were conducted to explore their impact on online learner engagement. While these studies were interventionist, their overall focus was on describing how online L2 learner engagement unfolded as a result of these interventions

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Table 16. *Surveyed and reported factors in relation to online L2 learner engagement*

Survey factors	Reported factors
<p><i>Teacher factors:</i></p> <ul style="list-style-type: none"> • Teacher respect • Teacher scaffolding • Teacher support • Teacher credibility (i.e. AI vs. human) <p><i>Learner factors:</i></p> <ul style="list-style-type: none"> • Readiness • Satisfaction • Grit • Self-efficacy • Foreign language enjoyment • Language classroom anxiety • Foreign language boredom • Self-regulation • Autonomy • Academic buoyancy • Perception of peer support • Perception of social presence • Location of residency (e.g., urban versus rural) 	<p><i>Learner factors:</i></p> <ul style="list-style-type: none"> • Learners' control of the task content • Perceived task difficulty matching learner ability • Proficiency • Beliefs about learning • Sense of gaming • Perceived progress and self-evaluation • Perceptions of feedback, its nature and its timing • Perceived timing of the feedback • peer's dynamic changes in participation on the platform • Learners' attitudes towards English <p><i>Task factors:</i></p> <ul style="list-style-type: none"> • Task characteristics • Tsk familiarity • Task topic interest • Task topic familiarity • Task understanding <p><i>Language course factors</i></p> <ul style="list-style-type: none"> • Course design • Course mode • Course material resources <p><i>Technology factors</i></p> <ul style="list-style-type: none"> • Adaptability of the mobile application to learners' knowledge level • Technical issues • Perceptions of the platform affordances <p><i>Other factors</i></p> <ul style="list-style-type: none"> • Opportunities for authentic communication • Social interaction beyond the platform • Cultural differences in educational philosophy • Community belonging • Time constraint

In Table 16, Likert-scale surveys were used to gauge multiple factors and examine their links to online L2 learner engagement. These factors appeared to concern two main aspects: teacher factors and learner factors. Regarding the teacher factors, the results overall indicate teacher respect, scaffolding and support significantly predicted online L2 learner engagement. While teacher credibility (i.e., being AI or human teachers) was not observed to make direct differences, it mediated the impact of social presence on learner engagement. As for the learner factors, online L2 learner engagement was significantly correlated with and/or

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predicted by multiple factors, including learners' self-efficacy, foreign language enjoyment, grit (indirectly), self-regulation autonomy, social presence, and academic buoyancy.

Additionally, online L2 learner engagement was a significant predictor of learners' satisfaction. Finally, learners and teachers reported a wide range of factors affecting online L2 learner engagement. These factors were classified into learner factors, task factors, language course factors, technology factors, and other factors (Table 16).

Discussion

Methodological issues in online learner engagement research

This section discusses methodological issues related to participant proficiency, sample size, research context, demographics, research designs, data collection tools for online L2 engagement, and technology use in teaching and learning contexts. Overall, the results revealed key strengths in various methodological aspects. For instance, the existing research included learners with varied proficiency levels, indicating its applicability across groups rather than being limited to specific proficiency levels. Also, the sample sizes varied significantly, ranging from a few to over 200 participants, suggesting that small sample size is not a prevalent issue in this research area, unlike in earlier L2 research. However, some limitations warrant attention. For instance, 87.04% of the research focused on university learners aged 18+, leaving younger learners underrepresented—a trend also noted in L2 and educational research on technology-mediated engagement (Henrie et al., 2015). Additionally, 31.48% of participants were Chinese, and over 85.18% studied English as the target language. While aligning with trends in some topical areas of L2 research (Dao et al., 2024), this skewed population limits insights into learners with diverse first or target languages. Greater diversity in age, first language, and target language is crucial for a fuller understanding of online L2 learner engagement. Taken together, given that online language education has become more prevalent for young learners (Dao et al., 2024; Tao & Xu, 2022;

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Yuan & Dao, (2025), the over-reliance on studies of English as a second/foreign language and the narrow focus on adult learners, with little attention to young learners, limit our understanding of online learner engagement and thus highlight the need for future research to encompass a broader range of learners and languages.

The results also show that online L2 learner engagement research employed a variety of designs, including lab-based experimental, quasi-experimental, exploratory, and descriptive studies. This methodological diversity reflects a pragmatic research paradigm that tailors the designs to specific study foci, which thus allows for addressing limitations, leveraging strengths, and enabling data triangulation (Creswell 2013; Creswell & Clark 2011). Notably, while longitudinal studies are relatively limited in L2 research, 33.33% of studies on online L2 learner engagement adopted a longitudinal design. This marks a positive trend, addressing the limitations of short-term investigations and providing valuable long-term insights into engagement over time—an approach widely recommended in L2 research.

Additionally, our results revealed the use of diverse tools for measuring online learner engagement and various technologies and teaching platforms for online L2 learning and teaching. This is a welcome finding as engagement may manifest differently across platforms. These results also align with EdTech research which also employs varied tools to measure technology-mediated engagement (Henrie et al., 2015). Also, consistent with the mixed-methods and pragmatist research paradigm, the use of diverse tools to collect both qualitative and quantitative data facilitated data triangulation and thus provided a comprehensive understanding of online L2 learner engagement—a practice strongly advocated in recent L2 research. However, diverse measures of online L2 engagement can pose challenges for cross-study comparisons (Fredricks & McColskey, 2012), requiring clearer justification to address this potential issue. Using multiple tools also aligns with Sulis' (2024) integrated approach, which triangulates data sources to address the temporal dimensions of engagement. This is crucial, as no single tool can fully capture the dynamic

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nature and multifaceted components of learner engagement (Zhou et al., 2024; Eccles & Wang, 2012; Fredricks & McColskey, 2012). Additionally, aligned with educational technology research (Henrie et al., 2015), various technologies and platforms were used to deliver online L2 and foster learner engagement. These results highlight that online L2 education is rapidly evolving into an essential, rather than supplementary, alternative to face-to-face instruction (Dao, 2024; Stockwell, 2022; Ziegler & González-Lloret, 2022).

Conceptual and operationalization issues

The results revealed that the conceptualization of online L2 learner engagement varied significantly across studies, both in labelling and definition. Different studies used diverse terms (e.g., online engagement, English language learning engagement, task engagement, psychological engagement, engagement in MALL, engagement with feedback), reflecting varied focuses and interpretations of the construct. Similarly, definitions of online L2 learner engagement were adopted and/or adapted differently (Tables 5, 6, 7 and 8). While the great variety in the ways that online L2 learner engagement was labelled, defined and conceptualized was anticipated and consistent with EdTech research on technology-mediated engagement (Henrie et al., 2015), these results highlight contradictions and/or challenges for understanding the concept and comparing study findings. Without a unified framework for naming and defining online L2 learner engagement (see suggestions below), synthesizing research into a cohesive body of knowledge remains challenging. To advance the field, the results underscore the need for a more standardized and clearly defined conceptualization of online L2 learner engagement (Henrie et al., 2015). Otherwise, for instance, the results of two studies linking learner engagement to positive outcomes might yield conflicting results due to conceptual variations (Appleton et al., 2008).

While advocating for consensus on labelling and defining online L2 learner engagement, this suggestion does not preclude diverse approaches to study this multifaceted

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online L2 learner engagement. The definitional variation observed in this systematic review reflects differing theoretical frameworks (Appleton et al., 2008; Fredericks et al., 2004), leading to diverse interpretations of findings. When treated as a meta-construct, such variation in theoretical perspectives and research designs is expected and valuable. Also, some studies applied face-to-face engagement to online settings without addressing the online dimension of learning settings. Arguably, if online L2 learner engagement pertains to online learning, L2 research needs to adopt definitions that reflect this online aspect (see Dao, 2024 for a comprehensive technology-related definition of online L2 learner engagement). Otherwise, the construct risks conflation with face-to-face engagement or definitions from fields, such as educational psychology or EdTech where language learning is not focused. Additionally, our findings show that some research did not have a clear definitional statement of online L2 learner engagement. Instead, they provided a generic discussion of the engagement concept. To enable cross-study comparison, it is essential for future research to have at least a clear statement of the definition of the concept and specify its label/name, even if consensus on definitions, models, and measurements may be unlikely, “not possible or even desirable” (Christenson et al., 2012, p. 814).

Notably, the results revealed diversity in the levels at which online L2 learner engagement is manifested or the primary targets that learners direct their engagement and learning efforts toward, which were primarily categorized as: (a) engagement *in* activities, tasks, or *through* interactions, (b) engagement *in* online language learning, (c) engagement *with* feedback, (d) engagement *in* social networking sites, and (e) engagement *with* technologies (e.g., digital textbooks). While these varying levels of online L2 learner engagement align with engagement frameworks suggesting that engagement can be examined at various levels or different grain sizes, such as micro-level (e.g., individual engagement in learning activities) and macro-level (e.g., school or community engagement) (Skinner & Pitzer, 2012; Sinatra et al., 2015), the results highlight a critical research issue. That is, the

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operationalization of these engagement levels likely varies significantly based on the focal objects that capture and maintain learners' attention and involvement ('engagement + *in/with/through* + object'). Additionally, depending on the level of engagement, the learning outcomes for these types of engagement (e.g., task engagement vs. engagement with feedback vs. engagement with technologies) are different. Therefore, not specifying the level of engagement can reduce measurement accuracy, complicates interpretation of findings and hinders cross-study comparisons. Moreover, the results show that, while the labels and definitions of online L2 learner engagement focus on certain aspects, the measurement and operationalization often target different ones. These discrepancies reflected in the diverse levels or objects of engagement. Although the levels of engagement may overlap or nest within each other (e.g., task, classroom, course, school, or societal engagement), they remain distinct. Thus, definitions and operationalizations must account for these differences to ensure consistency and clarity in research (see Appleton et al., 2008; Sinatra et al., 2015).

Regarding the operationalization of online L2 learner engagement, the results indicate that the construct has been treated both as a unified concept and as a componential meta-construct. However, recent L2 research shows a growing consensus on treating engagement as a multifaceted construct with distinct sub-components rather than a unified and single-dimensional construct (Dao, 2024; Hiver et al., 2024). This approach is promising as it facilitates cross-study comparisons and provides more comprehensive and nuanced insights into various dimensions of online L2 learner engagement. Another result, which is a positive development, was the emphasis on technology-related indicators and technology-assisted methods for measuring online L2 learner engagement, distinguishing it from face-to-face engagement. While online L2 learner engagement and face-to-face engagement may overlap, they are fundamentally different, particularly in their manifestations. Also, tools used to measure face-to-face engagement in some cases can only be applied to face-to-face rather than online L2 learning contexts (Henrie et al., 2015). Just as online language instruction

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does not attempt to recreate a face-to-face classroom environment in an online delivery format but extends beyond that with the new affordances that EdTech tools provide, research on online L2 learner engagement needs to account for its technology-related aspects.

Furthermore, a key finding of this systematic review was that each dimension of online L2 learner engagement has distinct indicators. These results suggest that it is feasible to isolate and measure individual dimensions of online L2 learner engagement. However, caution is needed, particularly with certain indicators, especially behavioral ones that might reflect multiple engagement dimensions (Yuan & Dao, 2025). While it is necessary to consider online L2 learner engagement as a componential meta-construct, it is essential to acknowledge that its dimensions can overlap to some extent. Therefore, the operationalization and measurement of these dimensions require justification to avoid conflating the sub-constructs.

Key findings about online L2 learner engagement: Insights and implications for research and practice

One key finding from the analysis of the reviewed studies was that, while participants (e.g., teachers) did not define online L2 learner engagement in succinct and concrete terms, they were able to describe whether and how learners were engaged. However, their descriptions varied, which highlights different manifestations or indicators of engagement. These findings suggest some consensus among teachers on what online L2 learner engagement entails but reveal differences in how it manifests across various online settings or platforms. The variations in teachers' perceptions align with the diversity in how researchers conceptualize and operationalize online L2 learner engagement, as discussed earlier. Together, these results support the argument that engagement is interpreted and manifested differently across contexts and individuals (Sulis, 2024). While not new, this reinforces the

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need for multiple measures to capture online L2 learner engagement's multifaceted nature rather than relying on a single metric (Zhou et al., 2021).

Another key finding of this systematic review was the dynamic nature of online L2 learner engagement, marked by varying trajectories over time, diverse individual engagement patterns, and the interconnectedness of its subcomponents (e.g., cognitive, emotional, social, and agentic). These results confirm findings regarding variance in learner engagement over time, including both online engagement (Henrie et al., 2015) and face-to-face engagement (Aubrey et al., 2022; Dao & Sato, 2021; Lee et al., 2024; Sulis, 2022, 2024; Wang & Mercer, 2021). The results also highlight the importance of conceptualizing and understanding online L2 learner engagement with nuance, as it cannot be treated as a stable, single-dimensional construct with uniform patterns across different time scales. This insight has significant implications for both pedagogical practice and research.

Pedagogically, the dynamic and fluctuating nature of online L2 learner engagement suggests that teachers can possibly enhance engagement even if learners begin with low levels. However, sustaining engagement over time is crucial, as high initial engagement may not persist throughout learning activities. Additionally, the interconnectedness of engagement subcomponents highlights the need for a holistic approach in which strategies should aim to enhance all components comprehensively. A recommended holistic approach that teachers might adopt to enhance and sustain online learner engagement can follow Dao's (2024) six pedagogical guidelines: (a) raise teachers' awareness of engagement's multidimensional nature, (b) build ability to recognize key indicators in online settings, (c) become fully aware of the complex factors influencing engagement, (d) apply engagement strategies creatively, (e) build real-time evaluation skills to address up-and-down of engagement, and (f) design L2 activities with engagement as the central goal (see also Dao's engagement-based pedagogy (EBP) for more pedagogical guidelines on designing engagement-oriented L2 instruction).

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Regarding research implications, the dynamic nature and diverse individual engagement patterns of online L2 learners, along with the interplay among engagement sub-components, highlight the need for future studies to incorporate these characteristics into their designs. Currently, few studies address these unique features, which limits our understanding of online L2 learner engagement. Expanding research to focus on these aspects is, therefore, essential for a more comprehensive understanding of online L2 learner engagement.

Another significant finding in this systematic review was the established link between online learner engagement and various L2 learning outcomes which include, for example, academic achievement, subsequent L2 learning gains, text quality, and target language feature production. These findings are noteworthy, as Dao (2024) noted that the connection between engagement and L2 learning outcomes has often been tacitly assumed rather than empirically validated in L2 research. However, only few studies have directly examined this relationship, which warrants the need for further research to strengthen the evidence base. Additionally, L2 learning outcomes were operationalized in diverse ways (e.g., academic achievement, subsequent L2 learning, text quality, and production of target features). This creates challenges for cross-study comparisons. While such diversity is valuable, reaching a consensus on operational definitions of key L2 learning outcomes would facilitate comparisons and enhance our understanding of the relationship between online L2 learner engagement and learning outcomes.

A substantial number of studies have also empirically established the relationship between online L2 learner engagement and its influential factors, including facilitators and antecedents (Tables 14, 15, and 16). These factors were explored using various research designs: experimental (tested factors), interventionist and quasi-experimental (interventionist factors), and survey and descriptive (surveyed and reported factors). Our findings suggest that online L2 learner engagement is influenced by a broad range of factors, regardless of the

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research design used. These results have important pedagogical implications. Teachers can consider these factors to enhance and sustain engagement in teaching and learning activities. Additionally, leveraging these facilitators and antecedents can be a viable strategy for improving engagement, as evidence supports their positive impact on online L2 learner engagement which is linked directly to subsequent L2 learning outcomes.

From a research perspective, factors identified in descriptive studies could be re-examined through experimental designs to ensure triangulation and address potential biases from participants. Reported factors may not fully capture actual influences, as they can vary across different participants, contexts and settings of online L2 learning. Additionally, the results align with Dao's (2024) argument that much of L2 learner engagement research assumes a linear relationship between influencing factors and learner engagement. While plausible, this view is limited in its assumption of stable, one-directional effects. Dao (2024) instead proposes a three-dimensional ecological model to examine the complex relationship between influential factors and online learner engagement, focusing on three parameters: (a) nested levels, (b) dynamic interactions, and (c) temporality. This model specifically captures (a) how factors are nested across micro (individual, pedagogical, classroom), meso (institutional, organizational), and macro (policy, sociocultural) levels; (b) how they interact dynamically and bidirectionally; and (c) how they shift over time, especially in response to technological developments. Arguably, moving beyond linear assumptions, this model offers a more comprehensive framework for understanding nuances of online L2 learner engagement and suggests a promising path for future research on online L2 learner engagement.

Addressing salient conceptual and methodological issues in online L2 learner engagement

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In this section, we summarize and reiterate some salient conceptual and theoretical issues in online L2 learner engagement research and offer some suggestions to address these issues to advance this important line of inquiry. These issues are outlined in twelve points.

- First, one of the key conceptual issues identified in this systematic review—and discussed but not yet resolved in the extant literature—is the variation in the conceptualization and/or definition of online L2 learner engagement. To address this fundamental issue, we propose several suggestions aimed at promoting conceptual clarity and enabling meaningful cross-study comparisons. First, the primary level of engagement needs to be explicitly specified and stated in each empirical study.

Examples of these engagement levels or targets include: online task engagement (task level), online classroom engagement (classroom level), online learner engagement (general learning level), synchronous versus asynchronous learner engagement (online learning mode level), inside- versus outside-classroom online learner engagement (context level), formal versus informal online learner engagement (technology and context level), computer-based versus app/mobile-based learner engagement (technology-assisted form level), and online engagement *with/in/through* specific targets (e.g., *with* feedback, *in* tasks, *through* interaction). Specifying the level of online L2 learner engagement is also emphasized by Martin and Borup (2022), who argue that it is necessary to conceptualize online learner engagement in terms of interactions *with* others (e.g., peers, instructors), *with* materials (e.g., courseware, technologies), and *through* communication and experience. Once the engagement level is clearly identified, an appropriate term/label of engagement (e.g., online task engagement, online classroom engagement, mobile learner engagement, etc.) needs to be adopted accordingly. This will, in turn, determine the most suitable indicators to reflect that specific type of online learner engagement.

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- Second, once the issue related to levels of engagement is determined, the next step is to provide a clear definitional statement of online learner engagement. For instance, Dao (2024, p. 34) proposes a definition of synchronous online learner engagement (SOLE) at the task level: *Learners' intense or heightened multimodal involvement (which can be both observable and unobservable) in L2 online synchronous task-based interaction that is generated by technology-mediated L2 learning tasks or non-task activities, in which their cognitive, emotional, social, and agentic aspects of engagement can be outwardly manifested in verbal and/or non-verbal online behaviours*. This definition specifies the level of engagement (i.e., task), the learning mode (i.e., synchronous), the target (i.e., engagement in task-based interaction), and the focus (i.e., engagement for L2 learning). If empirical research examines engagement at other levels, it is recommended that a clear, updated definitional statement of engagement at that level be provided. It would be problematic if the definition of SOLE were used to describe engagement at the classroom, school, or community level. Thus, providing a clear definition of online L2 learner engagement is critically important, as it determines the indicators and measures that need to be used to capture this particular type of engagement. Without a definitional statement, there is a risk of inconsistency between the conceptualization of the construct and the operationalization and measures employed.
- Third, the key conceptual and methodological issue identified in this systematic review was the use of multiple indicators and measures for the different dimensions of the multidimensional construct of engagement. While it may not be possible to provide a definitive list of standard measures, some common indicators for each dimension of online engagement appear to have been used across studies (see Tables 8–13 in the results section). Therefore, we argue that for every empirical study on online L2 learner engagement, the indicators and measures for each dimension needs to include (a)

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- common indicators/measures used across studies and (b) indicators/measures specific to the type of engagement being examined. This approach allows for cross-study comparison—due to the use of similar measures—and provides a more nuanced understanding when specific or novel measures of engagement are proposed and applied in a given study.
- Fourth, apart from explicitly stating the indicators and measures used in an empirical study, it is critically important to provide clear definitional statements for each sub-dimension of engagement (e.g., cognitive, social, emotional, and agentic). These definitional statements need to align with the overall definition of the concept of online L2 learner engagement provided earlier. As documented in this systematic review, there were inconsistencies between the definitions of the overall construct of engagement and its components, and the measures used to capture these aspects. Thus, providing clear definitional statements with justifications for each type of engagement helps address these inconsistencies.
 - Fifth, arguably, simply borrowing definitions of engagement from other disciplines without refining them to fit the focus of L2 learning in technology-enhanced settings would be problematic—an issue that has not yet been addressed in the extant literature. We therefore suggest that given that online L2 learner engagement is technology-related, the definition and the operationalization of this construct need to account for this technological aspect. Additionally, Dao (2017, 2024) proposes that L2 learner engagement is language domain-specific; therefore, the conceptualization of this construct need also to reflect a language-focused perspective. Taken together, the definition of online L2 learner engagement needs to incorporate both language-focused and technology-related elements (see the SOLE definition provided above, which addresses this issue). Accordingly, indicators and measures of online L2 learner engagement should also reflect these two dimensions. Examples of language-focused

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- engagement measures include (a) language-related episodes (LREs)—i.e., attention to and explicit discussion of language features, (b) semantically engaged talk (SET), and Likert-scale survey that taps into language aspects (see Dao et al., 2021). Additionally, examples of technology-related indicators of engagement include multimodal SET and non-verbal signals such as emojis, virtual high fives, likes, and memes. The use of these language-focused and technology-related indicators and measures is strongly recommended for future research on online L2 learner engagement.
- Sixth, measuring online L2 learner engagement requires methodological innovations, and as documented in this systematic review, technological advances make this possible. It is strongly recommended that innovative measures of online L2 learner engagement (e.g., eye-tracking, multimodal learning analytics, behavioural markers, keystrokes, log-in number and time, mouse movement) be adopted more widely in future research. Additionally, technology offers scalable, non-disruptive ways to measure engagement, such as using user activity data (Aleven et al., 2006; Baker et al., 2012; D’Mello & Graesser, 2012), so we suggest greater use of these tools in future online L2 learner engagement studies.
 - Seventh, the individual-specific, context-dependent, and longitudinally dynamic nature of online L2 learner engagement was documented in the findings of this systematic review. To date, online L2 research has not fully addressed this salient issue. Thus, we suggest adopting an integrated approach in which multiple measures of online L2 learner engagement are designed to capture these key characteristics. Sulis (2024) provides a useful example of how an integrated approach can capture the individual-specific, context-dependent, and longitudinally dynamic nature of online L2 learner engagement through the use of multiple tools, such as the Experience Sampling Method (ESM), Video Enhanced Observation (VEO), and stimulated recall. Additionally, due to the individual-specific and context-dependent nature of online L2 learner

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engagement, Hiver et al. (2025), in their opinion piece on a research agenda for task

engagement, suggest the need to document profiles of individual and group

engagement, as well as their variations within and across learners and groups over time

and across contexts. Therefore, we also suggest that research on online L2 learner

engagement will need to uncover within-learner engagement profiles and identify

commonalities in how individual learners engage in diverse contexts and across tasks.

This means the analysis of online learner engagement needs to be conducted at both

individual and group levels across time and context.

- Eighth, as documented in this systematic review, the consensus is that online L2 learner engagement is multifaceted. Thus, we suggest that empirical research focusing on a single aspect of online learner engagement should clearly specify this focus in the title and research objectives to avoid confusion between studies that examine single aspects versus multiple aspects of online L2 learner engagement. Another point related to this issue is that, while it is common to treat each component of online L2 learner engagement as a distinct aspect to allow for a more nuanced understanding, it is also plausible to treat online L2 learner engagement as a unified construct by combining measures of all components into a single composite score—especially in quantitative engagement research where composite scores enable more appropriate statistical analyses.
- Ninth, another characteristic aspect of online L2 learner engagement is that it is both covert and overt. Engagement is often perceived primarily as actions, emphasizing the overt manifestation of behaviors. However, as documented in this systematic review, the covert aspect of online L2 learner engagement is also salient. Therefore, measures such as self-reports and physical response assessments are useful for uncovering these covert aspects of engagement, as opposed to discourse-analytical measures of engagement behaviors. From this perspective, it is possible to argue that online L2

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learner engagement can comprise both perceived engagement and actual engagement.

This distinction is important to explicitly state in empirical research, especially since recent studies show that different measures of engagement yield varying results

regarding the relationship between engagement and other variables of interest (Hiver & Dao, 2025).

- Tenth, as documented in this systematic review, simply capturing the impact of factors on online L2 learner engagement from a linear relationship perspective does not provide fine-grained insights into the complexity of this impact. As mentioned earlier, Dao's (2024) proposal of a three-dimensional ecological model to examine the complex effects of influential factors on online L2 learner engagement seems promising for unveiling the intricate nature of this relationship and, thus, potentially addressing issues associated with the perception of a uni-directional relationship between engagement and variables of interest.
- Eleventh, part of the issue with variation in the conceptualization of online L2 learner engagement stems from borrowing frameworks from multiple disciplines such as educational psychology, general learning sciences, socio-cognitive psychology, and educational technology. While diversity in theoretical lenses is important, it creates consistency issues when translating insights from these disciplines into the domain of online L2 learning and teaching. One possible way to address this is to specify and state explicitly in empirical research what informs the conceptualization and theoretical frameworks of the study. This would enable cross-study comparisons regarding whether and how the adoption of multiple theoretical lenses of online L2 learner engagement leads to potential similarities and differences, thereby allowing for a deeper and more nuanced understanding of issues related to online L2 learner engagement.

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- Twelfth, a key issue in existing research on online L2 learner engagement is the limited number of studies that link online L2 learner engagement directly to L2 learning—an issue common in L2 research. While there are a few studies that examine this link, their measures of L2 learning are diverse. Therefore, we suggest that online L2 learner engagement research needs to clearly specify what constitutes L2 learning and how it is operationalized and measured in specific empirical studies. For instance, Dao et al. (2021) use text quality as a measure of L2 learning-related evidence, whereas other studies have used tailor-made tests of language features to capture learning and development (Hiver & Dao, 2025a,b; see also Carver et al., 2021; Qahl & Lambert, 2025; Lambert et al., 2023; Lambert & Aubrey, 2025 for measures of L2 learning examined in relation to engagement). The variation in L2 learning measures is expected, but to enable more insightful comparisons, L2 learning that occurs as a result of online learner engagement in L2 research might adopt some of the measures used in previous research alongside other measures. This approach would allow for cross-study comparison while still enabling nuanced understanding. Otherwise, claims regarding the direct or indirect link between online learner engagement and L2 learning can be contradictory or conflicting due to the variation in or use of very different measures of L2 learning (i.e., the specific type of L2 learning being measured).

Conclusion

Online L2 learner engagement reflects learners' heightened and multifaceted involvement not only in activities and/or tasks but also with instructors, peers, and learning content in virtual settings or through technology. The rapid increase in online L2 learner engagement research has demonstrated that this construct not only attracts teachers' attention but also researchers' efforts to better understand this construct, which can then provide implications for learning and teaching practices. However, the results of this systematic review revealed multiple methodological and conceptual issues that need to be addressed to advance research

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and deepen understanding of this critical construct. Based on these results, some key points are suggested as guidelines for future research. Conceptually, it is necessary to (a) clearly define online learner engagement that involves technology and language foci, (b) detail its theoretical foundation and ensure consistency between its label, definition, and scope, (c) specify the level or object of engagement by providing a clear statement of definition to avoid conflation with related concepts, and (d) contextualize engagement relative to the measurement point (e.g., a specific event, lesson, time, situation, and/or context) to enhance accuracy and clarity. Methodologically, it is important to articulate how definitions inform operationalization and measurement, maintaining alignment throughout. A multi-method approach is essential to capture the multidimensional, dynamic, and context-dependent nature of engagement, with particular emphasis on incorporating technology-enhanced tools appropriate for online environments. Analyses also need to explicitly address the level of granularity to ensure clarity in interpreting findings. Arguably, when these conceptual and methodological issues are addressed, research findings will not only better unlock the full potential of online L2 learner engagement in L2 virtual learning settings but also offer valuable insights and practical implications for improving teaching practices.

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Supplementary materials

Databases for searching L2 studies to create the corpus of reports for the current study

ERIC

Education Database (ProQuest)

Education Research Complete (EBSCO)

JSTOR

Linguistics and Language Behaviour Abstracts: LLBA

MLA International Bibliography

Modern Language Association (MLA) International Bibliography

Project MUSE

PsychINFO

Scopus

The Annual Bibliography of English Language and Literature

Web of Science

Search was also performed on the following journals for double-checking

- Annual Review of Applied Linguistics
- Applied Linguistics
- Applied linguistics review
- Assessing Writing
- Australian Review of Applied Linguistics
- CALICO Journal
- Canadian Modern Language Review
- Chinese Journal of Applied Linguistics
- Computer Assisted Language Learning
- Critical inquiry in language studies
- ELT Journal
- English for Specific Purposes
- English Teaching: Practice & Critique
- English today
- Foreign Language Annals
- Innovation in Language Learning and Teaching
- International Journal of applied linguistics
- International Review of Applied Linguistics
- ITL – International Journal of Applied Linguistics
- Journal of Asia TEFL
- Journal of English for Academic Purposes
- Journal of Second Language Writing
- Language and intercultural communication
- Language Assessment Quarterly
- Language Awareness
- Language Learning
- Language Learning & Technology
- Language Learning Journal
- Language Teaching
- Language Teaching for Young Learners
- Language Teaching Research
- Language Testing
- Language testing in Asia
- Language, Culture, and Curriculum
- Modern Language Journal
- ReCall
- RELC Journal
- Second Language Research
- Studies in Second Language Acquisition
- Studies in Second language learning and teaching
- System
- TBLT Journal: Task
- TESOL in Context
- TESOL Journal
- TESOL Quarterly

Frequency of reports in the journals.

Journal	Number
Assessing Writing	1
Computer Assisted Language Learning	22
ELT Journal	1
Innovation in Language Learning and Teaching	1
Interactive Learning Environments	1
Journal of Multilingual and Multicultural Development	1
Language Learning & Technology	4
Language Learning Journal	1
Language Teaching Research	1
Language Testing	1
Modern Language Journal	1
ReCALL	1
RELC	2
Studies in Second Language Acquisition	1
Studies in Second Language Learning and Teaching	1
System	11
The Asia-Pacific Education Researcher	1
The edited book chapter	2