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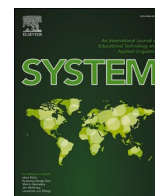
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## Review

## A scoping review of studies in informal second language learning: Trends in research published between 2000 and 2020

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## ABSTRACT

In recent years, research interest in second language use and acquisition beyond the classroom has grown considerably. However, terminological confusion and definitional differences have made it difficult to compare findings and discover trends across studies, and more broadly synthesise new insights and developments. Therefore, this scoping review is intended to provide an overview of when, where, why, and how research on informal language learning (ISLL) research has evolved between 2000 and 2020. We select, describe, and synthesise 206 publications in order to summarise key issues in the theoretical and empirical ISLL literature during this time. We explore the variables, learner populations, and languages that have been studied; research designs, methodological and analytical approaches; and the theoretical frameworks and terminology which have been employed to describe ISLL and situate it within the broader field of second language acquisition (SLA). We synthesise findings related to students' engagement in ISLL and its relationship to developing language proficiency as well as to variables such as learner characteristics, motivation and affective factors. We discuss suggested applications of these findings for pedagogy and broader SLA research, and conclude by reflecting on current issues in the existing ISLL literature while also considering areas for potential future development.

### 1. Introduction

Second language acquisition researchers have long been interested in second language (L2) use and acquisition outside of formal contexts. This includes studies of incidental vocabulary acquisition (e.g., reviews in Sok, 2014; Webb et al., 2023), autonomous or self-directed language learning (Benson, 2011b; Godwin-Jones, 2011; Lai, 2017), self-access centres for language students (Davis,

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2013; Tassinari & Martos Ramos, 2021), study abroad (Borràs & Llanes, 2021; Isabelli-García et al., 2018; Llanes, 2011), and migrant L2 learning (Kukulka-Hulme, 2019; Morrice et al., 2021; Perry & Moses, 2019). As digital technologies continue to advance, affordances for independent language acquisition have also become an important topic in computer- and mobile-assisted language learning (CALL/MALL; Chong & Reinders, 2021; Chwo et al., 2018; Peng et al., 2021).

Despite not being a new research topic, a particular growth in interest in L2 learning beyond formal education has been observed in recent decades (Dressman, 2019; Godwin-Jones, 2019; Kusyk et al., 2023). Various terms have been introduced in this context, with some referring to general L2 learning (e.g., fully autonomous self-instructed learners [FASIL], Cole, 2015; incidental foreign language acquisition, Kuppens, 2010; informal second language learning [ISLL], Arndt, 2019; language learning beyond the classroom [LBC], Benson & Reinders, 2011; language learning in the wild, Wagner, 2015; out-of-class language learning with technology [LLT], Lai & Gu, 2011) and some focusing only on English as a second/foreign language, due to its special status in popular culture and as a global lingua franca (e.g., extramural English [EE], Sylvén, 2005; informal digital learning of English [IDLE], Lee & Dressman, 2018; online informal learning of English [OILE], Toffoli & Sockett, 2010; unintentional learning of English, Forsman, 2004).

Apart from target languages, there are other important differences in the definitions of these terms. For example, some focus only on technology-mediated activities (e.g., IDLE, OILE, LLT) while others include real-world interactions such as face-to-face conversations (e.g., EE, ISLL). Some (e.g., ISLL and OILE), explicitly exclude non-formal activities (see Schugurensky, 2007) such as the use of language learning apps like Babbel or Duolingo, which differ from classroom pedagogy but still involve structured learning tasks. Definitions also differ in the extent to which they include assigned or teacher-/other-directed activities (e.g., IDLE, LBC, LLT), or expect informal practices to be fully learner-directed (e.g., FASIL, ISLL, OILE). Finally, informal language learning is defined in some cases as an unintentional or even unconscious by-product of activities in which learning is not the primary goal (e.g., OILE, unintentional learning of English, language learning in the wild), while other concepts (e.g., LBC or LLT) presume some intentionality on the part of the learners (see also Kusyk, 2023).

In this paper, we have chosen to use the term *informal second language learning* (ISLL)<sup>1</sup> for two reasons: First, the word *informal* emphasises what we perceive to be key aspects of this type of learning (see Section 2), namely that it takes place not just beyond the classroom, but also without the use of materials designed explicitly for language learning. Second, it functions as an umbrella term that includes language acquisition and usage in both on- and offline contexts, as well as a variety of potential target languages (not limited to English).

The vast number of terms used to describe L2 usage and acquisition in informal spaces, and the differences in how they are delineated and defined, make it difficult to identify and compare findings across studies and more broadly synthesise new insights and developments. Similarly, in the wider social science literature, the term *jingle-jangle fallacy* (coined by Kelley, 1927; see also Marsh et al., 2019; Pekrun, 2023; Reschly & Christenson, 2012) is used to describe issues that arise when the same terms refer to different concepts (jingle fallacy) and when different terms exist for the same construct (jangle fallacy). To give a concrete example, a researcher seeking to familiarise themselves with the literature on *informal language learning* may find studies that focus not on L2 acquisition in informal contexts (i.e., beyond the classroom) but on informal language (i.e., colloquial registers) in formal teaching and learning (jingle fallacy). Conversely, they may overlook studies which investigate L2 use and acquisition in informal contexts but use a term with which the researcher is unfamiliar (jangle fallacy).

With this review, we aim to address the jingle-jangle problem by identifying, describing, and synthesising research on ISLL published between 2000 and 2020. It can be classified as a scoping review, “a form of knowledge synthesis [...] aimed at mapping key concepts, types of evidence, and gaps in research related to a defined area or field by systematically searching, selecting, and synthesising existing knowledge” (Colquhoun et al., 2014, p. 1292–1294). Scoping reviews differ from both systematic literature reviews, which typically address specific research questions and formally assess the included studies’ quality, and meta-analyses, which statistically summarise the results of quantitative research studies (Arksey & O’Malley, 2005).

As interest in ISLL continues to grow, several reviews have already been published in the years since work on this study commenced (Guo & Lee, 2023; Lee, 2022a; Soyooof et al., 2023; Zhang et al., 2021; overview in Appendix A). In the following section, we briefly summarise the aims, scope, and main findings of these reviews, followed by a discussion of the central points of overlap and diversion between these works and our own.

### 1.1. Literature review

Two scoping reviews of specific domains of ISLL-related research are Zhang et al. (2021) review of Extramural Language Learning (ELL) studies, and a review of Informal Digital Learning of English (IDLE) research by Soyooof et al. (2023).

Using “extramural” and “out-of-school exposure” as their thematic keywords in two database searches, Zhang et al. (2021) identified and synthesised 33 studies published before March 2021. Eighty-eight percent of them focused on Extramural English (in

<sup>1</sup> While the definitions of *learning* and *acquisition* have been distinguished in the past, we use them interchangeably here to refer to a developmental process that is dynamic, nonlinear and may involve both conscious and unconscious language usage. Similarly, the term *second language* refers to all additional languages (L2, L3, L4, etc., as opposed to first/native language[s]) and encompasses both traditional *second language* (in which the L2 is spoken in the surrounding community) as well as *foreign language* (in which the L2 is not spoken in the surrounding community) contexts. Furthermore, we acknowledge that some instances of informal L2 usage blur the distinction between these contexts: Certain online communities (e.g., gaming, social media, forum, etc.), may well present *foreign language* learners with more immersive opportunities akin to traditional *second language* communities, depending on levels of involvement.

addition to isolated studies on German, French, Chinese, and Japanese) and found that listening to music or other audio media, or playing digital games were the most common ELL activities. The authors concluded that, altogether, these studies indicate a positive relationship between extramural activities and language development as well as affective variables such as language learning motivation, potentially mediated by the amount of engagement, interactivity, language difficulty, and gender of the learner.

Soyoof et al. (2023) used 35 IDLE-related keywords to search the Web of Science database for relevant research published between 1980 and 2019. Of the included 30 studies, the majority were published between 2017 and 2019, demonstrating how recently and rapidly interest in IDLE has grown, primarily in Europe and Asia. The dataset mostly included mixed-methods or qualitative studies that used questionnaires and interviews to collect data, primarily among adult learners of English. Using a grounded theory framework to synthesise the main research themes, Soyoof et al. found that these IDLE studies covered three primary research foci: linguistic development (70% of reviewed publications), digital literacies and agency, and affective and cultural aspects. They concluded that these studies demonstrate the “growing relevance of lingua-technocultural competence in technology-mediated contexts of learning” (p. 15), the importance of acquiring digital literacy skills to complement linguistic and communicative competences, and the emergence of “mediation (i.e., non-professional translation and interpreting) [...] as an interdisciplinary field of interest in language learning” (p.17).

In addition to these general scoping reviews, Lee (2022a) and Guo and Lee (2023) published systematic literature reviews with narrower thematic foci. Lee (2022a) aimed to describe the research tools that have been used to study language learning and teaching beyond the classroom, both in on- and offline settings. Conducting manual searches and LBC-related keyword searches in two databases, the author identified 76 empirical studies, published between 2010 and 2020. He discovered that the most frequently used research instruments were, in order: questionnaires targeting perceptions and behaviours related to LBC and its relationships with other (e.g., affective and motivational) variables, individual interviews, and observations of learners’ behaviour (more often in classrooms or experimental settings than in informal contexts), with the latter two being used primarily for triangulation alongside questionnaires. Less common tools included language logs, group interviews, reflective journals, computer tracking, stimulated recall, and learner histories. Pointing out the prevalence of cross-sectional study designs that rely on a single research instrument (usually questionnaires), Lee concluded that more multifaceted and longitudinal research is needed to explore directionality in the relationships between LBC and potential learning outcomes.

Finally, inspired by Bronfenbrenner’s ecological systems theory, Guo and Lee (2023) reviewed which factors had been identified in research as connected to IDLE behaviours and perceptions. In two database searches using IDLE-related keywords, Guo and Lee identified 103 studies published between 2010 and 2021. They observed that most variables studied in relation to IDLE have been learner characteristics such as age, gender, personality, educational background, abilities, and perceptions, as well as affective and motivational factors. A moderate amount of the reviewed studies also considered the micro-system, that is, the influence of teachers, peers, friends, and family. At the same time, the authors point to a severe lack of studies investigating IDLE in relation to broader environmental systems (e.g., cultural norms and religious beliefs) and encourage researchers to focus more on how teachers can implement and promote IDLE and on the role of peer influence on learners’ IDLE-related attitudes and behaviours. Similar to Lee (2022a), Guo and Lee also call for the use of more varied research methods beyond questionnaires, and more cross-cultural and longitudinal studies.

Both Guo and Lee’s (2023) and Lee’s (2022a) publications can be classified as systematic literature reviews which addressed specific research questions (i.e., cataloguing research instruments and variables studied in relation to IDLE). Like ourselves, Zhang et al. (2021) and Soyoof et al. (2023) were interested in more broadly mapping the research landscape in their respective areas of interest, which were more narrowly defined than in the current review. Zhang and colleagues (2021) focused on *extramural* and *out-of-class* language learning, while Soyoof et al. (2023) and Guo and Lee (2023) only included works related to IDLE which (due to its exclusive focus on technology-mediated activities in English) can be viewed as sitting under the ISLL umbrella. In the current study, we employed a broader definition of ISLL and more inclusive list of search terms (see Tables 1 and 2) with the goal of identifying, describing, and synthesising relevant research from a variety of contexts and directions within SLA.

In addition to their narrower foci, the prior scoping reviews were also more limited than this study in terms of the number of databases, search terms, and reviewed publications ( $N = 33$  in Zhang et al., 2021;  $N = 30$  in Soyoof et al., 2023 vs.  $N = 206$  in the current study). Finally, unlike the four previous publications, the current review includes theoretical and methodological works in addition to empirical studies, to allow us not only to discover methodological trends and major findings in ISLL research, but also to explore how definitions, terminology, and theoretical frameworks have evolved.

## 2. Methods

As previously noted, the primary aims of this review are to investigate the evolution of research on ISLL and to address the jingle-jangle problem. Given that scoping reviews provide a broad, comprehensive exploration of what a field has done and how (Arksey & O’Malley, 2005), we asked the following research questions.

- RQ<sub>1</sub>: How has the ISLL research landscape evolved between 2000 and 2020 with regard to demographic, theoretical, methodological, linguistic, and pedagogical variables?
- RQ<sub>2</sub>: Which trends in research designs and foci can be identified?
- RQ<sub>3</sub>: To what extent can the jingle-jangle problem be observed?

At the start of this project, our research team extensively discussed the way that informal language use and learning should be conceptualised in our review, wanting to be inclusive enough to draw connections between publications from a variety of contexts and directions within SLA. However, a scoping review by nature requires an a priori limitation of the research problem, selection of search terms, and definition of inclusion and exclusion criteria, which poses a risk of failing to identify publications which may be topically relevant but use substantially different terms (jangle problem).

In an attempt to strike a balance between these two challenges, we leveraged the diversity of perspectives in our seven-person research team to compile an extensive list of keywords (see Table 2) and formulate a comparatively broad, but well-delineated conceptualisation of informal second language acquisition and use (see Table 1) that informed our inclusion and exclusion criteria (see Table 3). Therein, we adapted Benson’s (2011a) four dimensions of language learning beyond the classroom, which we introduce side-by-side with our own conceptualisation in Table 1. Subsequently, we proceeded to conduct our scoping review according to the steps laid out in Fig. 1, which also provides the number of records reviewed and excluded in each stage.

**Table 1**  
Conceptualisation of informal language learning in the current study and dimensions of language learning beyond the classroom in Benson (2011a).

Current study	Benson (2011a)
<i>Setting (informal vs. formal):</i> Language use and acquisition taking place outside of the (virtual) classroom, not as part of an educational programme, and not in an L2 immersion context (e.g., study abroad or migration).	<i>Location:</i> “‘Out-of-class’, ‘out-of-school’, ‘after- school’, ‘extracurricular’ and ‘extramural’ learning [...] supplementary to classroom learning and teaching” (p. 9).
<i>Material (informal vs. non-formal):</i> L2 activities, resources, and media not primarily designed for language learning.	<i>Formality:</i> Distinguishing informal learning from “‘formal teaching and learning, which are generally understood to take place in educational institutions and to involve classroom teaching and officially recognized qualifications” and “non-formal education [which] often refers to [...] programmes that are taken for interest and do not involve tests or qualifications” (p. 10).
<i>Locus of control (informal/extramural vs. extracurricular):</i> Learners engage in L2 activities whenever and however they choose, i.e., they are not assigned certain tasks or directed to focus on specific language features.	<i>Pedagogy:</i> “Formal processes, such as sequencing of material, explicit explanation, and testing”, which distinguish “‘self-instruction’ and ‘naturalistic learning’ [as] two ends of a pedagogical continuum” (p. 11). <i>Locus of control:</i> “Who makes the major decisions about learning and teaching — the learner or someone else?” (p. 12).

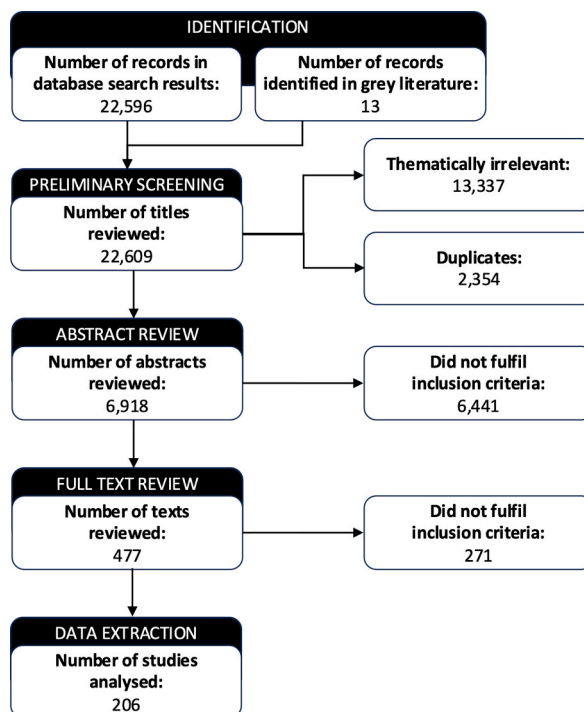


Fig. 1. Flow diagram of scoping review procedure.

In July 2020, we searched five field-relevant electronic databases: Linguistics and Language Behaviour Abstracts (LLBA), MLA International Bibliography, Education Resources Information Center database (ERIC), Scopus, and Web of Science. The keywords (Table 2) included sets of terms to describe: (1.) the processes (e.g., *acquisition* OR *develop*\* OR *usage*); (2.) object (e.g., *second language*\* OR *foreign language*\* OR *L2*); and (3.) context (e.g., *informal* OR *out-of-class* OR *extracurricular*) of ISLL. We also added a fourth set with exclusion terms, signifying areas of research outside of SLA in which terms such as *informal* are frequently used.

Table 2

Database search terms.

Keyword set	Search terms and operators
1. <i>SLA processes</i>	(learning OR acquisition OR exposure OR practice* OR activit* OR contact OR input OR use OR usage OR context OR develop* OR process* OR source*)
2. <i>Learning object</i>	AND (language OR literacy OR "second language*" OR "foreign language*" OR "target language*" OR "additional language*" OR L2 OR English OR Chinese OR Japanese OR Korean OR French OR German OR Spanish OR Italian OR Dutch)
3. <i>Learning context</i>	AND (out-of-class OR out-of-school OR extramural OR "outside class" OR intensive OR extensive OR "outside the classroom" OR "beyond the classroom" OR extracurricular OR incidental OR everyday OR FASIL* OR "digital wild*" OR naturalistic OR informal)
4. <i>Exclusion terms</i>	NOT (math* OR science* OR vocational OR engineering OR nurs* OR labour OR labor OR employment OR sport* OR clinic* OR aphasia OR theatre OR theater OR religion OR health)

The appearance of these search terms was limited to the title, abstract, and keywords. The results were further filtered by date of publication (January 2000–June 2020), document type (articles, books, book chapters, reviews, and dissertations), and subject area (Arts and Humanities, Communication; Education; Language; Linguistics; Psychology; and Social Sciences). In total, we identified 22,596 records, exported their bibliographic information and uploaded it to Rayyan, a web-based application for collaborative systematic reviewing (Ouzzani et al., 2016). Team members also manually added 13 more potentially relevant publications (so-called fugitive or grey literature consisting primarily of unpublished master's and doctoral theses) identified through manual searches and by reaching out to their wide-reaching international professional networks.

During the preliminary screening phase, each researcher reviewed an equal percentage of the titles of the 22,609 records and excluded publications on topics that were plainly irrelevant to the current review (e.g., management training, sports science). Where irrelevance could not be clearly established based on the title alone, the document was retained for the next screening phase. At this point, 13,337 thematically irrelevant publications and 2354 duplicates were excluded, leaving 6918 records for the next stage.

In order to refine our inclusion/exclusion criteria and ensure that they were applied consistently by all researchers, we began the abstract screening stage with three pilot review rounds. All team members reviewed the same abstracts (30, 50, and 70 respectively in each round) before participating in a follow-up discussion, in which the inclusion and exclusion criteria were adapted/clarified. Inter-rater agreement *before* these discussions was 87%, 81%, and 94% respectively, with inter-rater reliability as indicated by Fleiss' kappa in the range of good to very good ( $\kappa > 0.6$  and  $0.8$  respectively):  $\kappa_1 = 0.76$ ,  $\kappa_2 = 0.63$ ;  $\kappa_3 = 0.85$ .

Next, we reviewed the remaining abstracts, applying the finalised inclusion and exclusion criteria listed in Table 3. We were unable to evaluate three publications because they were written in languages unknown to any team members (Kolesnikov, 2018 in Russian; Machado & Ewerton, 2014 in Portuguese; and Köse, 2012 in Turkish).<sup>2</sup> All other records were reviewed by two researchers each, and any disagreements were resolved through discussion. In cases of continued disagreement, a third researcher acted as tiebreaker. However, if a clear decision on any inclusion/exclusion criterion could not be reached based on the abstract alone, the publication was retained for full-text screening. While each of the 6441 records that were excluded at this point was tagged with a specific reason for exclusion, these statistics are not included here because most publications failed more than one criterion.

Table 3

Final inclusion and exclusion criteria.

	Inclusion	Exclusion
1. <i>Second Language Acquisition (SLA)</i>	Include if the paper discusses the general topic of second and/or foreign language learning, including factors related to SLA such as motivation, willingness to communicate, anxiety, etc.	Exclude if the paper focuses on other subjects (e.g., maths, social work), or non-SLA topics in applied linguistics (e.g., first language acquisition, computational linguistics).
2. <i>Informal Second Language Learning (ISLL)</i>	Include if the paper primarily discusses activities considered informal by the following criteria:	Exclude if the paper primarily discusses activities not considered informal by the following criteria:
2a. <i>Setting</i>	Activities take place <b>outside</b> : <ul style="list-style-type: none"> <li>the (virtual) classroom</li> <li>a lab or other non-naturalistic research setting</li> <li>periods of study abroad</li> <li>the context of migration and immersion</li> </ul>	Activities take place <b>inside</b> : <ul style="list-style-type: none"> <li>the (virtual) classroom</li> <li>a lab or other non-naturalistic research setting</li> <li>periods of study abroad</li> <li>the context of migration and immersion</li> </ul>
2b. <i>Material</i>	Where the activities involve engagement with resources/media, these are <b>not</b> primarily designed for language learning.	The activities involve resources/media that are primarily designed for language learning (e.g., Duolingo, online language instruction videos, vocabulary games, etc.).
2c. <i>Locus of control</i>	Learners are free to engage in the activities in a "naturalistic way," i.e., they are not assigned by others and their attention is not purposefully directed towards specific language forms.	Activities are integrated in formal learning tasks, i.e., learners are assigned specific tasks, directed to focus on specific language forms, and/or asked to share their experiences with their teacher and/or peers as a learning activity.

<sup>2</sup> The team reviewed publications in English, Dutch, German, and French.

For the full-text review, electronic copies were obtained of the remaining 477 records. As before, each text was reviewed by two researchers, applying the same inclusion/exclusion criteria. Again, disagreements were resolved through discussion and, if necessary, consultation with a third team member. In this stage, 271 documents were excluded, leaving 206 publications for the final review.

Subsequently, in the final stage, information about each publication was recorded in the data extraction sheet enclosed in Appendix B. This instrument was created through a bottom-up, collaborative synthesis of thematic observations and insights gained from the preceding full-text review stage, keeping in mind the aim to help us assess the evolution of ISLL research from numerous perspectives (terminological, theoretical, methodological, pedagogical, etc.). Categories and themes noted down by all researchers were jointly discussed in depth over a multi-week period, and the data extraction sheet was piloted with three records prior to finalisation.

During the main data extraction phase, information was collected by the research team using the web application LimeSurvey. Inter-rater reliability was not recorded at this stage because articles were read individually, rather than in dyads. However, any inconsistencies or ambiguous cases were discussed with additional raters. The recorded data included (where applicable) information about the aims of the paper, the terminology and definitions, theoretical frameworks, scope and design of the study, participants, methods for data collection and analysis, language-related and individual difference variables under investigation, learning outcomes, and suggested pedagogical applications. These data are reported in the following section.

### 3. Results

Below, we present findings on the theoretical, terminological, methodological, and pedagogical aspects of the 206 reviewed studies, while also highlighting notable longitudinal trends. Our primary aim is to better understand when (publication year), where (geographic regions, participant demographics, target languages), why (research aims), and how (research design, methodology, theoretical frameworks) ISLL research has evolved since the early 2000's.

Subsequently, we report on findings with regard to types of activities in ISLL and its relationship to different aspects of developing language proficiency and various individual difference (ID) variables. We conclude by summarising the suggested applications of these findings for pedagogy.

#### 3.1. Publication type, year, and location

The 206 texts in the final review included 163 research papers, 35 literature reviews, 15 theoretical discussions, three systematic reviews or meta studies, and two pedagogical guides.<sup>3</sup> Fig. 2 shows the number of publications released during each year spanned by our review. Altogether, our results show a growth of scientific interest in ISLL over time, with publications rising from zero studies in 2000 to 37 in 2019. While the first 10-year period saw very few ISLL papers published, momentum began to grow in 2011, following the publication of several works now regarded as seminal (e.g., [Benson & Reinders, 2011](#); [Lai & Gu, 2011](#); [Sundqvist, 2009](#); [Toffoli & Sockett, 2010](#)), and peaked between 2017–2019.<sup>4</sup>

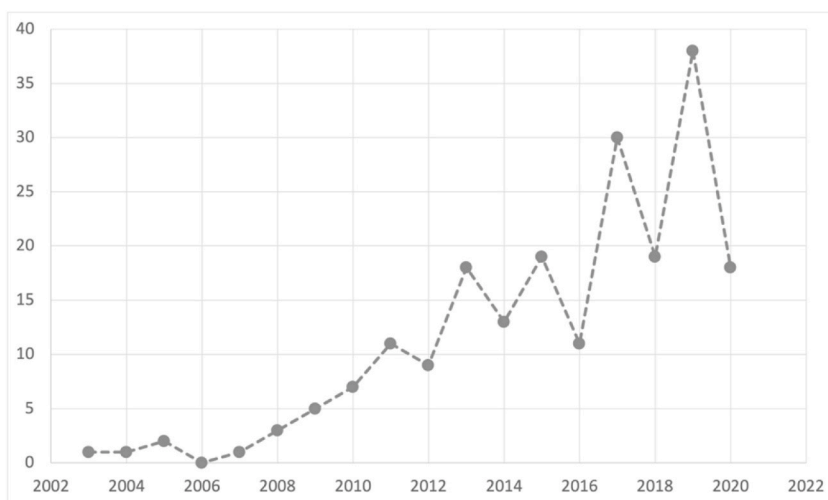


Fig. 2. Number of publications in review by year.

<sup>3</sup> The sum of the types of publications (218) is greater than 206 as some items fit more than one category. This also applies to all subsequent statistics (e.g., multiple research aims stated within the same paper, different theories referenced in the same article, various data collection methods used in the same study, etc.).

<sup>4</sup> As we limited our database searches to studies published in or before June 2020, the entire year is not accounted for. This may partially explain the drop in number of publications for 2020 shown in Fig. 2.

In terms of where the studies were conducted, Fig. 3 shows the cumulative number of publications by country between 2000 and (a) 2005; (b) 2010; (c) 2015; (d) 2020. Before 2005, only a few scattered ISLL studies had been conducted in the US, UK, and Croatia. By 2010, however, more research had begun to emerge in Europe and East Asia. In particular, we identified three dominant clusters in Sweden and Finland, Germany and France, and Mainland China and Hong Kong. Between 2010 and 2020, interest in ISLL appeared to spread to more countries, still primarily in Europe and East Asia. By 2020, Sweden, Hong Kong, and France further distinguished themselves as the regions with the highest research output, having respectively produced 12, 17, and 18 of our reviewed publications. This output overwhelmingly stemmed from a few prominent researchers and their close collaborators (i.e., Sundqvist and Sylvén in Sweden; Sockett and Toffoli in France; and Lee in Hong Kong).

### 3.2. Research aims

By categorising each publication according to the predominant research aims (Fig. 4a), we were able to identify six main aims that covered 90% of the reviewed publications: Studying L2 development and inventorying informal L2 practices were the most frequent goals (jointly covering 36% of publications), followed by descriptions of specific informal activities, investigations of L2 user

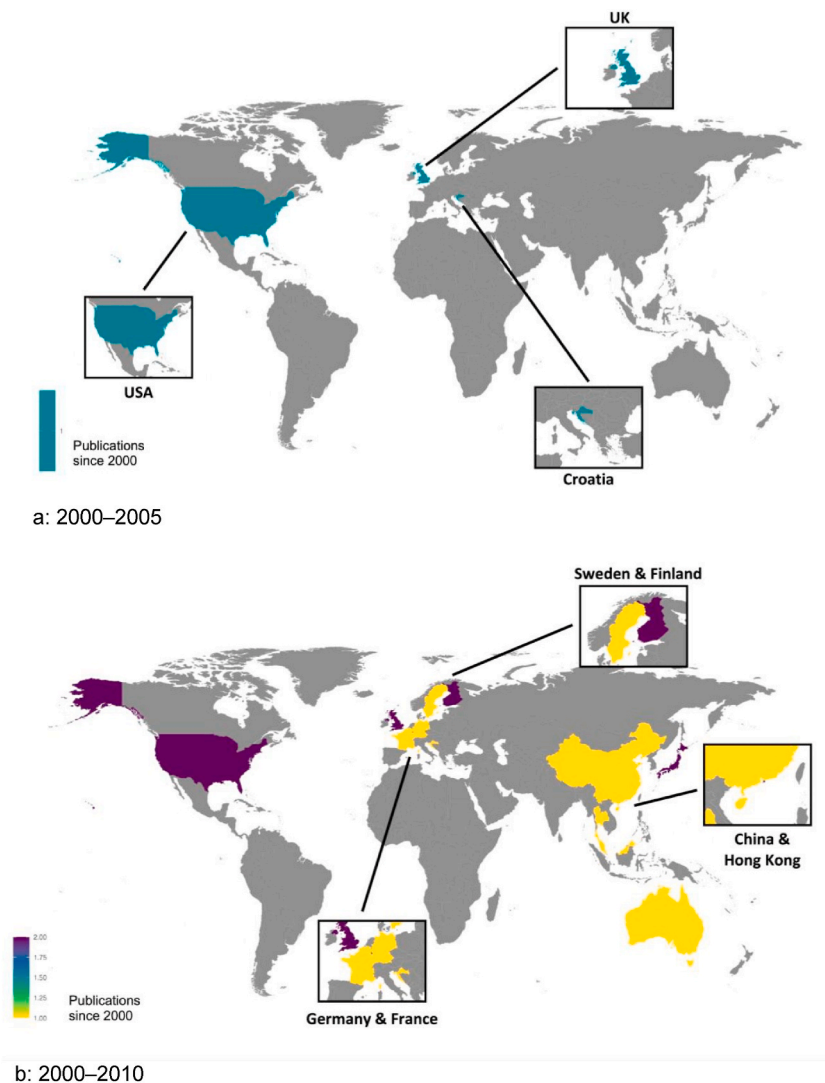


Fig. 3. Number of cumulative publications since 2000 by country.

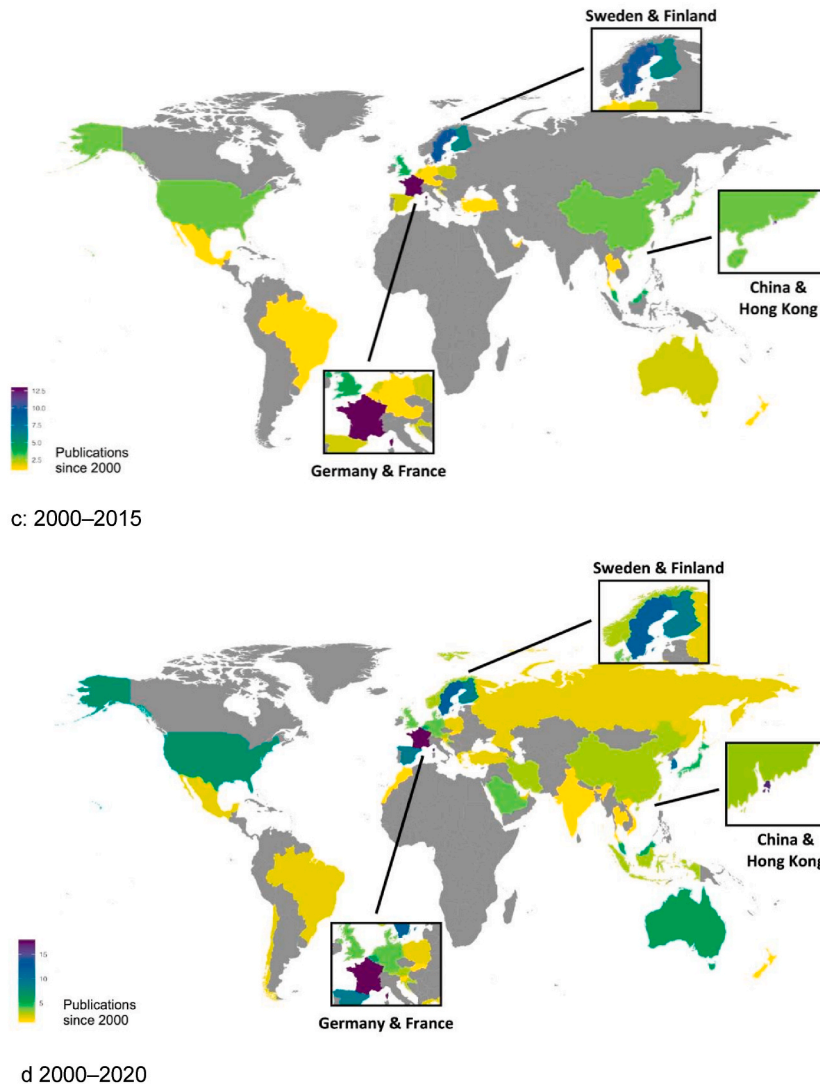
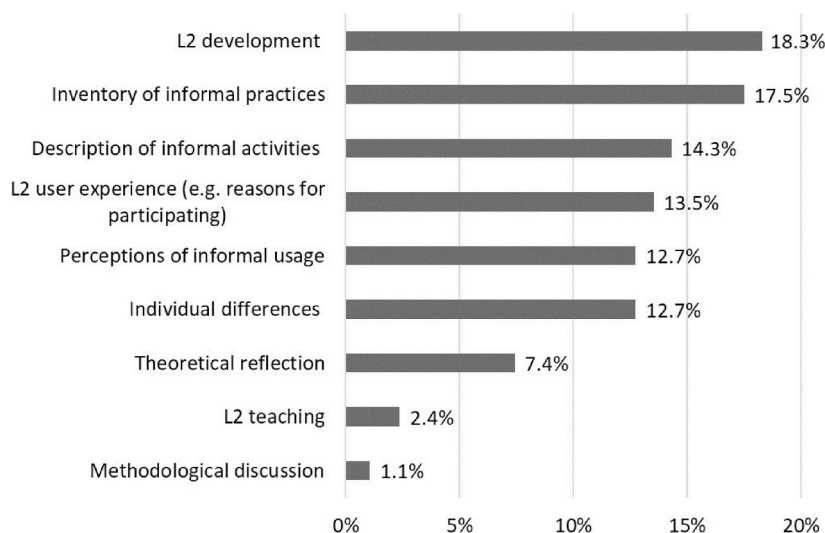


Fig. 3. (continued).

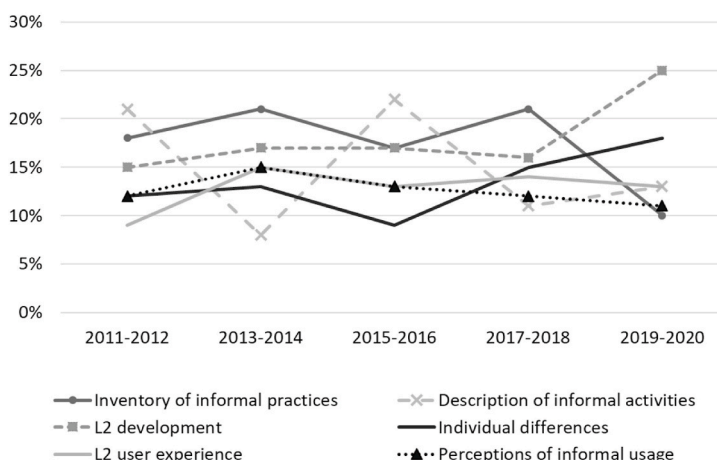
experience, perceptions of informal use, and individual differences. Very few papers primarily examined theoretical frameworks, L2 teaching or methodology (each accounted for less than 8% of the sampled papers).

Fig. 4b shows how these research aims evolved since 2011 (when the majority of reviewed papers were published, see Fig. 2). Several aims appear to exhibit a downward trend, with inventories of informal practices sharply declining after 2017–2018 while descriptions of informal activities dropped off after 2015–2016, and papers querying perceptions of informal usage have waned more steadily since 2013–2014. What is more, when cross-referencing research aims and geographic location, we observed that these three categories tended to be the main aims of papers when ISLL was first “discovered” in a new region.

By contrast, studies on L2 development and individual differences appear to be on the rise: The former sharply increased in 2017–2018 while the latter has more gradually grown since 2015–2016. Together, the decrease in studies on more general aspects of ISLL (basic descriptions of informal practices, user perceptions, inventories of popular activities in a certain learner population) and the subsequent increase in studies that investigate L2 development and various aspects of individual learner differences could indicate a certain maturation of ISLL research over time, as the scientific community begins to expand its research scope and agenda.



a: Frequency of research aims (N = 377)



b: Distribution of research aims across time

Fig. 4. Primary research aims

Note: In Fig. 4b, the three least prominent categories (*methodological discussion*, *L2 teaching* and *theoretical reflection*) were not included for readability.

### 3.3. Terminology and theoretical framing

Due to the terminological confusion arising from the jingle-jangle problem (see above), a central objective of this review was to take stock of the terms currently used to describe ISLL as conceptualised in this study (see Table 1). Fig. 5 shows the eight terms that most frequently appeared in the reviewed papers and how their usage changed between 2000 and 2020. Six terms can be traced back to specific researchers, who popularised and defined them within the context of their own studies: *Informal digital learning of English* (IDLE, Lee, 2019); *Online informal learning of English* (OILE, Toffoli & Sockett, 2010); *Extramural English* (EE, Sundqvist, 2009); *Language learning beyond the classroom* (LBC, Benson, 2011a; Reinders & Benson, 2017); *Out-of-class language learning* (OOC, Nunan & Richards, 2015; Benson, 2011b); and *Informal second language learning* (ISLL, Arndt, 2019). Research on each variety emerged from different geographic regions (e.g., EE from Sweden, OILE from France, IDLE from East Asia), and the different strands have largely developed in parallel with one another. It is therefore not surprising that the definitions of these varieties are, in some cases, quite similar and even overlapping (see Kusyk, 2023 for further discussion). By contrast, *out-of-school exposure* and *outside the classroom* do not appear to be well-defined constructs, but rather more generic descriptions of informal usage employed throughout a more diverse range of papers. Finally, many other descriptive terms were also noted, such as *language learning in the digital wilds*, *naturalistic learning*, *unintentional learning*, *informal CALL*, *self-directed learning*, etc.

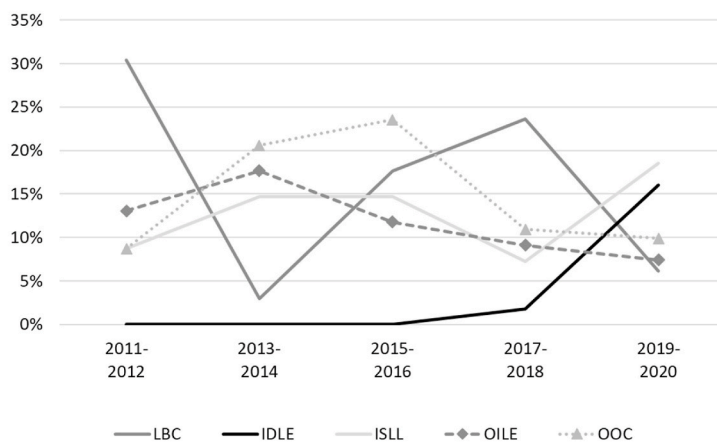
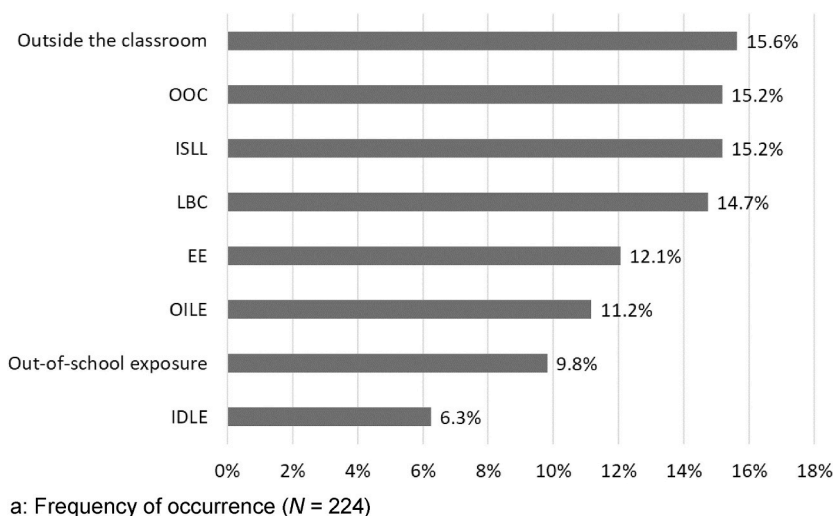


Fig. 5. Terms used to describe informal L2 usage

Note: For readability, Fig. 5b includes only five terms which showed the most variation over time. The usage of *out-of-school exposure*, *outside the classroom* and *Extramural English* has remained relatively stable across this period (between 4% and 11%, 10%–18% and 9%–13%, respectively).

Furthermore, we were able to identify certain trends in the usage of these terms over time (see Fig. 5b). As shown, terminology has converged somewhat in more recent years, although no single label currently dominates (or unites) the research community. IDLE and ISLL have been on the rise in the literature since 2017–2018 (the increase in the usage of IDLE can largely be attributed to the vast number of recent publications by Lee and colleagues). Conversely, OILE and OOC have been gradually declining since 2013–2014 and 2015–2016, respectively, while LBC has decreased more sharply since 2017–2018. As of 2019–2020, the most popular terms in the literature were ISLL (19%), IDLE (16%) and EE (12%). In addition to the use of terminology, we also explored the extent to which the variety of labels used in our dataset were accompanied by specific definitions and found that this was the case in only 38% of papers.

Fig. 6 presents the seven theoretical and learning frameworks most frequently cited in our reviewed papers. It is clear that, as in the broader field of SLA, no one framework appears to dominate the landscape of ISLL research at this time. While some focus more on the social and interactional components of language development (Sociocultural Theory, Ecological Approach), others emphasise specific L2 learning mechanisms (Input Hypothesis, Incidental learning). Notably, 33% of the reviewed publications did not cite any learning or theoretical framework at all.

Fig. 7a and b shows the fluctuations of these frameworks over time. We can observe a slight rise in recent years in papers citing Incidental learning, Sociocultural Theory, Learner Autonomy and the Input Hypothesis. Meanwhile, publications referencing Complex Dynamic Systems Theory, often appearing in research on informal learning in France (e.g., Sockett, 2013; Sockett & Kusyk, 2015; Sockett & Toffoli, 2012) seem to be declining. This might be seen as a natural consequence of the overall increase in ISLL publication output — the growth of research across the globe has balanced out some of the previous dominance of certain geographic clusters (e.g., France in the early 2010s). Finally, the absence of any learning or theoretical framework appears to be trending downward since 2017–2018, perhaps also due to a general increase in research volume.

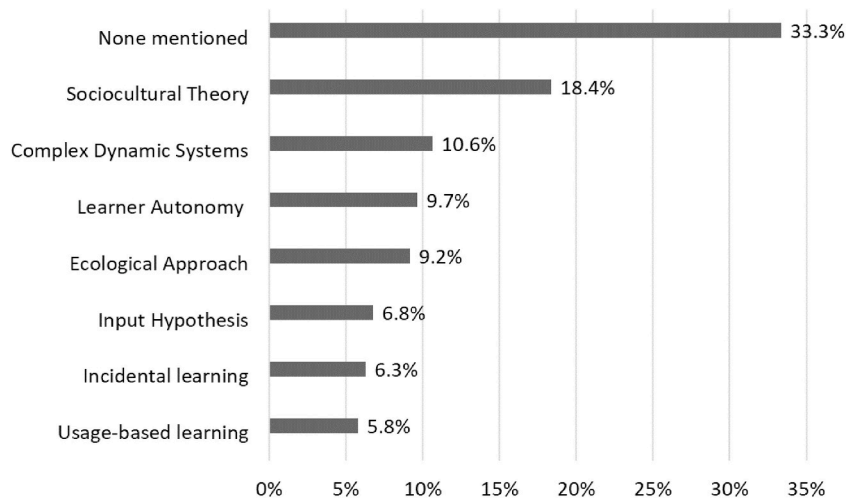
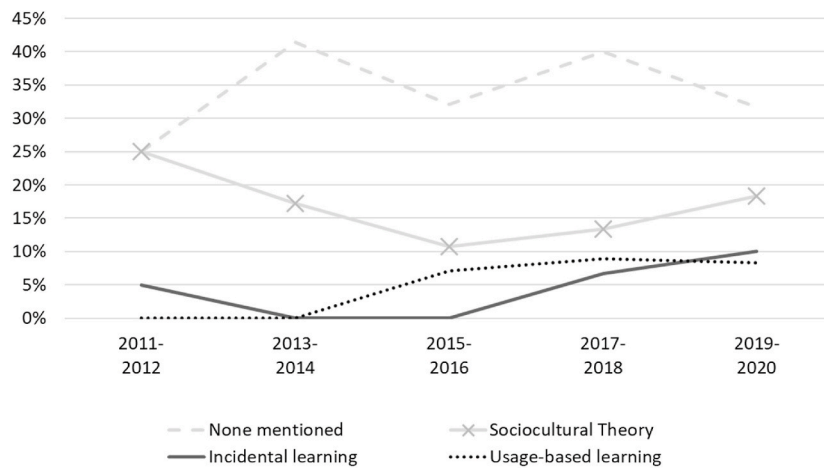
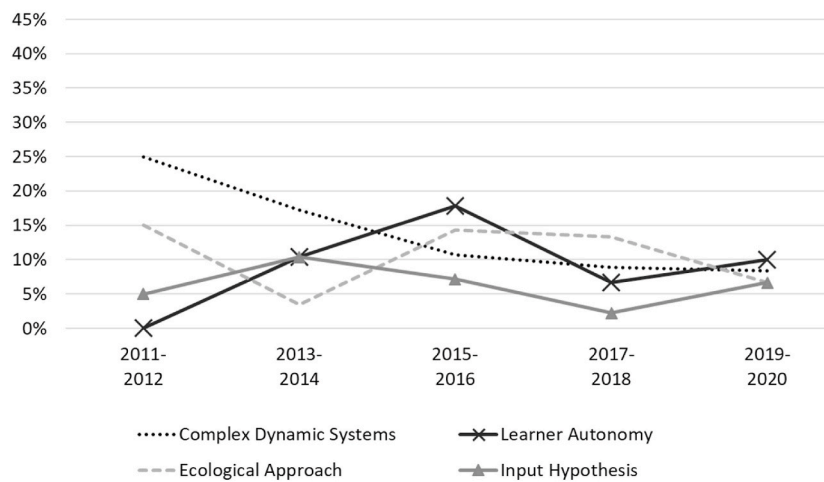


Fig. 6. Most commonly cited theoretical frameworks (N=207).



a



b

Fig. 7. Trends in theoretical and learning frameworks.

### 3.4. Design and methodology

To examine how investigations of ISLL evolved between 2000 and 2020, we coded the empirical studies in our review according to their methodological approach (i.e., quantitative, qualitative, or mixed methods), study design, and data collection methods. As shown in Fig. 8a, quantitative studies (41%) have led the way ahead of qualitative (33%) and mixed method approaches (20%), while experimental and observational studies have been rare. Additionally, studies have overwhelmingly favoured cross-sectional designs (80%), with far fewer studies carrying out longitudinal (16%) or retrodictive (4%) research. While data have been collected in a variety of ways (see Fig. 8b), the most prevalent forms of inquiry by far are questionnaires (35%) and interviews (23%).

We did not detect any major longitudinal trends in ISLL research designs and methods, with the exception of a slight decrease in qualitative approaches (39% in 2015–2016 to 28% in 2019–2020) and a slight increase in mixed method approaches (18% in 2017–2018 to 26% in 2019–2020).

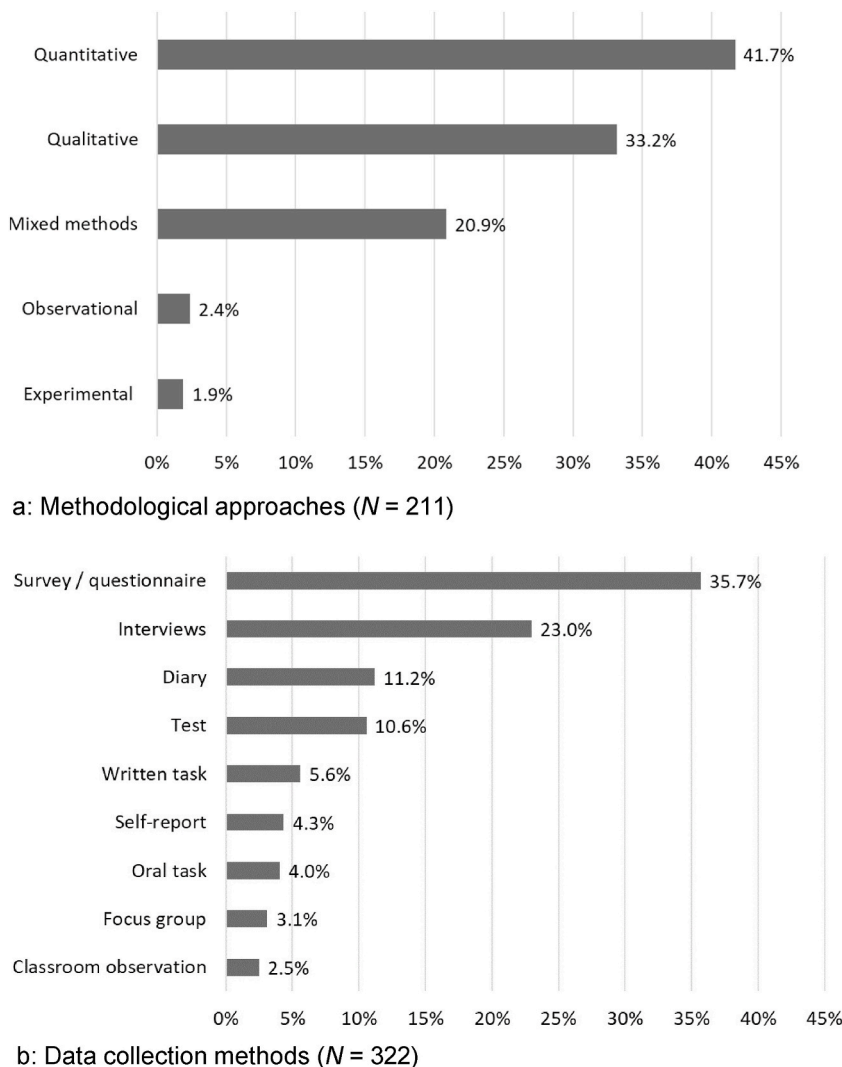


Fig. 8. Design and methodology.

#### 3.4.1. Participant demographics

Regarding the empirical studies in our review, the most frequently researched participants have been young adults (ages 18–25; see Fig. 9). The least investigated groups have been children under the age of 10, followed by adults over 26 years, and adolescents (ages 11–17). Unsurprisingly, the majority of research participants (67%) have been classroom learners, which are far easier to recruit than members of the general public. Nevertheless, informal L2 users (with no connection to the classroom) made up 32% of the participant samples, while only 1% were distance (online) learners.

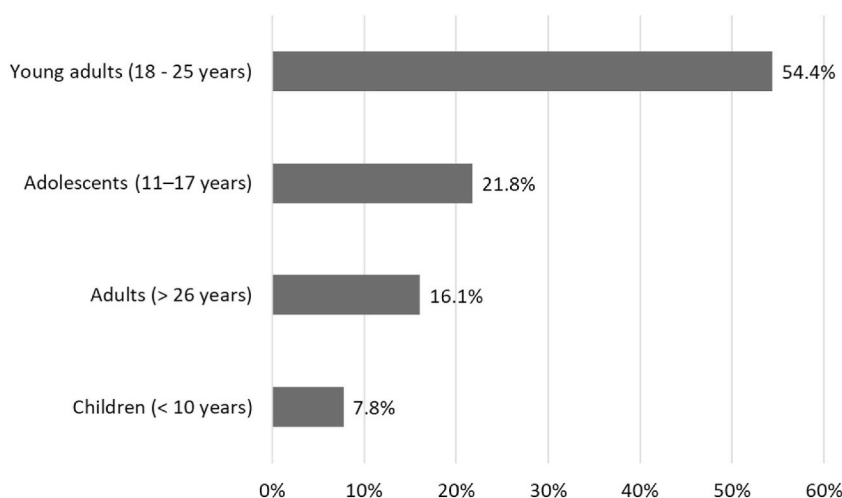


Fig. 9. Age range of ISLL study participants ( $N = 193$ ).

Regarding target languages, the majority of studies have unsurprisingly investigated L2 learners of English, followed by French, Japanese, Spanish, German, Chinese and Korean (see Fig. 10). Arabic, Icelandic, Portuguese, Russian, Serbian, Thai and Welsh were investigated in less than 1%, that is, one to two of the reviewed studies.

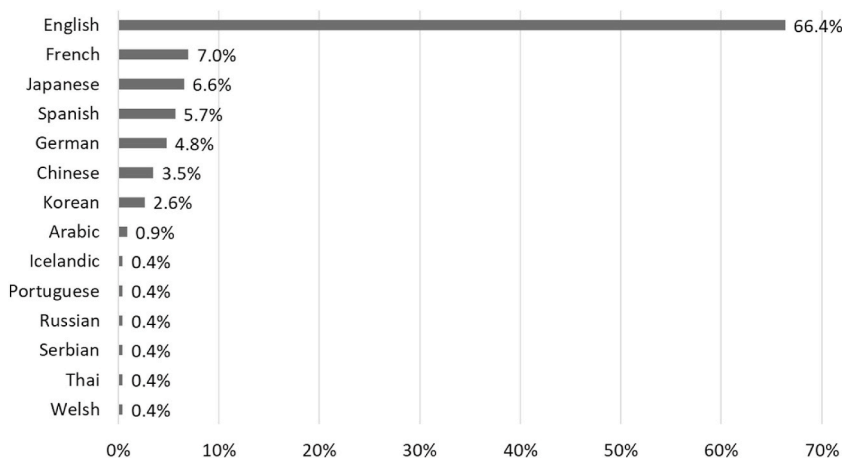
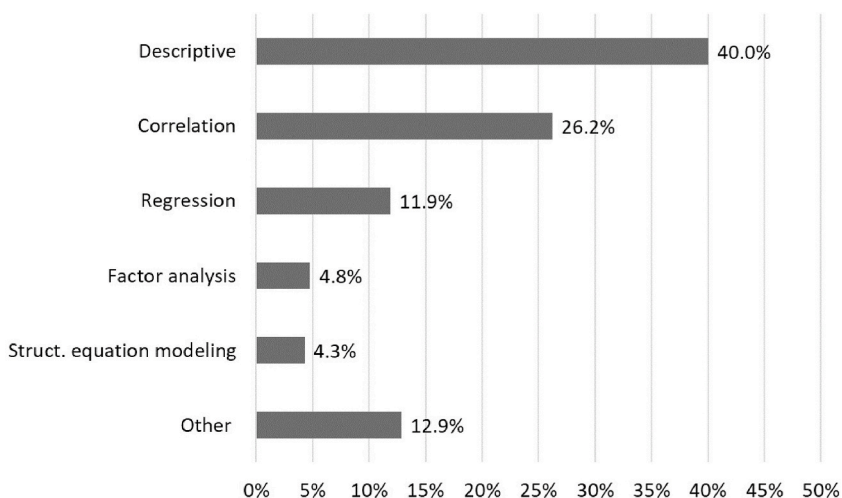


Fig. 10. Target languages investigated ( $N = 229$ ).

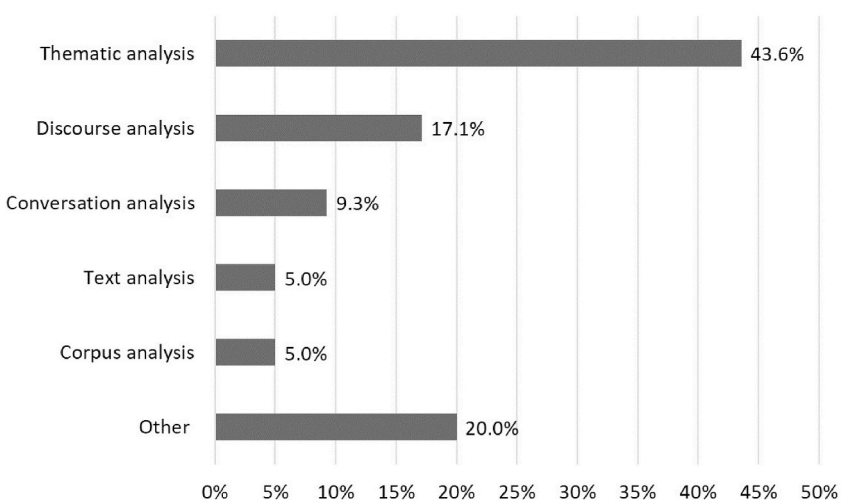
### 3.4.2. Data analysis

Fig. 11 shows how quantitative and qualitative data were analysed in the reviewed studies. Among the quantitative analyses, simpler descriptive statistics and measures of correlation have been most popular, while more advanced analytical approaches such as regression, factor analysis, and structural equation modelling were less common. “Other” quantitative analyses in our dataset included logistics models, principal component analysis, or the Mann-Whitney U tests. On the qualitative side, thematic analysis clearly dominates the landscape, followed by discourse analysis, conversation analysis and “other” forms, such as narrative inquiry, typology of activities, and nexus analysis.

As illustrated in Fig. 12a, a slight trend towards more sophisticated methods of quantitative data analysis can be observed in more recent publications. That is, the use of simpler descriptive statistics and correlations has respectively waned and plateaued in recent years, while regression modelling (and to a lesser degree, factor analysis and structural equation modelling) have slightly gained in popularity. Similarly, the broader qualitative approach of thematic analysis has declined since 2015–2016, whilst the more specific approach of conversation analysis has risen (Fig. 12b). Similar to the evolution of research aims over time (Section 3.2), this progression towards more complex forms of analysis could indicate a maturation of ISLL research as a whole.



a: Quantitative analyses (N = 210)



b: Qualitative analyses (N = 140)

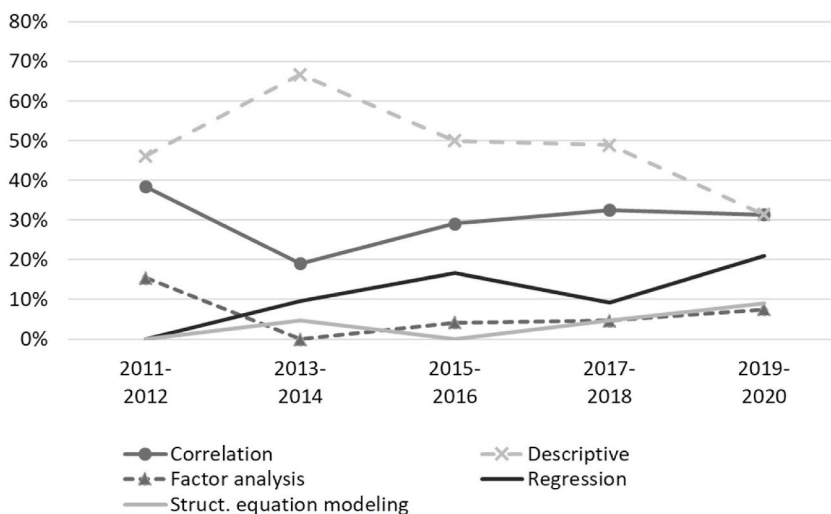
Fig. 11. Analytical approaches.

### 3.5. Findings and implications

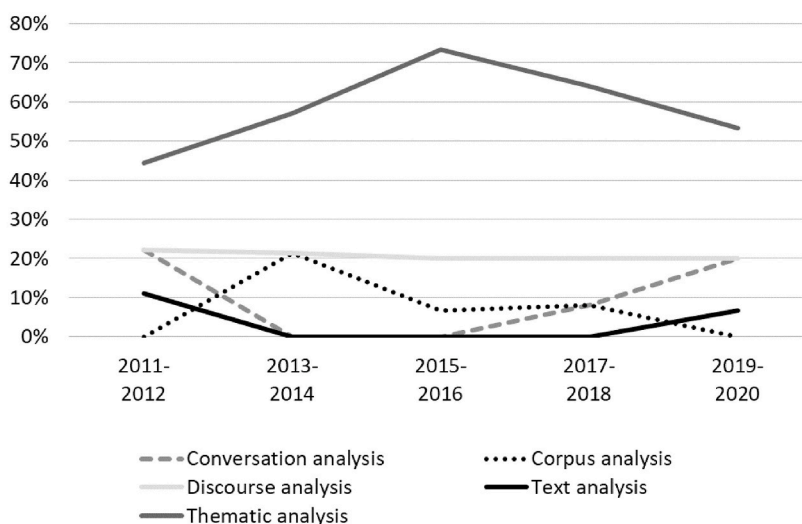
Having described various demographic, methodological and theoretical elements of ISLL research published between 2000 and 2020, we now turn to the findings and implications of these studies. Some results presented above have pointed towards a theme of maturation of ISLL research, that is, a gradual shift in focus from simpler descriptions of informal activities towards more complex explorations of the conditions and outcomes of ISLL. Along the same lines, we begin here by synthesising research that describes what L2 users do in the informal sphere, followed by findings regarding developmental aspects of general L2 proficiency, specific language skills and linguistic features, and finally investigations of individual learner differences. We conclude by summarising the major implications of this research with regard to the role of the teacher within ISLL, as well as potential classroom applications.

#### 3.5.1. Informal activities

The activities during which learners are exposed to or use their L2(s) have been one of the main areas of interest within ISLL research from the beginning. As observed above, this is usually the first strand of research to emerge when ISLL becomes a new topic of interest in different parts of the world. L2 usage has been studied with regard to a wide range of activities (see Fig. 13a), most of which involve some form of (online) media usage (recall that certain varieties of ISLL, such as IDLE and OILE, only include activities that take place in the digital sphere).



a: Quantitative analysis



b: Qualitative analysis

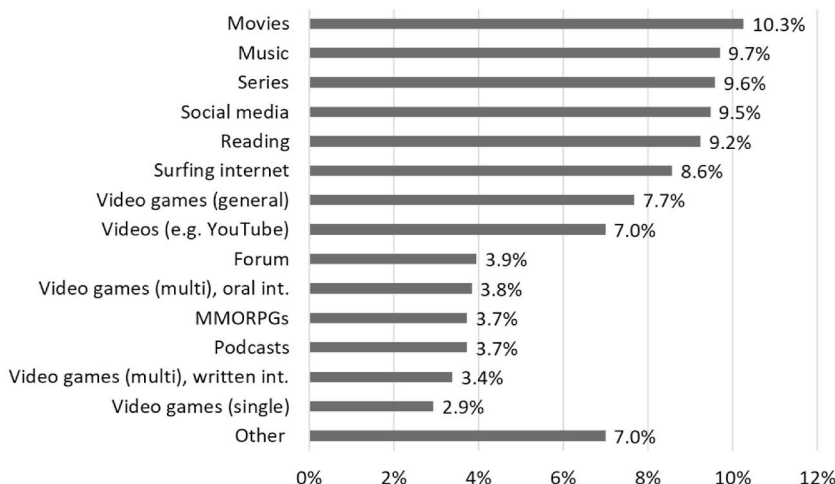
Fig. 12. Trends in data analysis.

Receptive activities such as watching movies and series, listening to music, and reading are among the most commonly studied and are usually also identified as the activities in which learners engage most frequently (e.g., Arndt, 2019; Kusyk, 2017; Sundqvist, 2009; Toffoli & Sockett, 2010). Meanwhile interactive and productive activities, such as (single- or multiplayer) video game play or participation in Massive Multiplayer Online Role-Playing Games (MMORPGs), have been less frequently featured in the publications in our review. “Other” activities include watching anime, reading manga, vlogging, chatting on Whatsapp, reading and writing fan fiction, and in-person interactions.

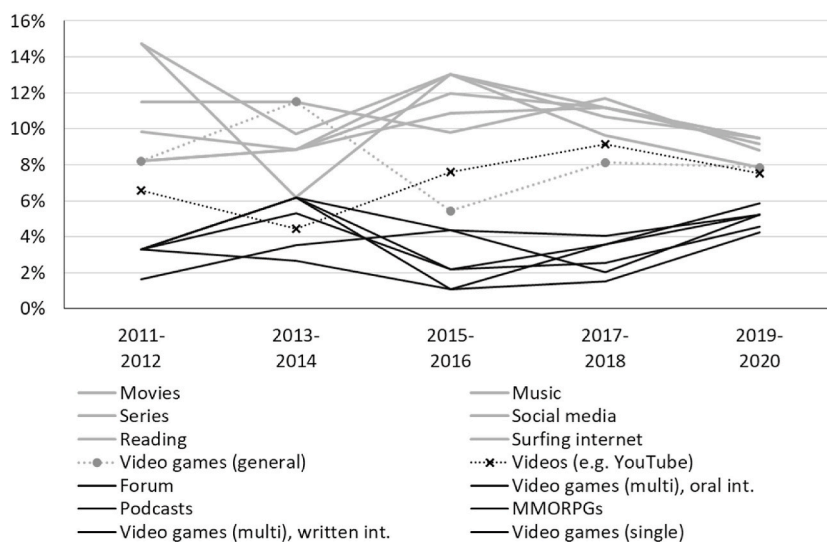
In addition to largely focusing on media consumption and online engagement, rather than in-person interactions, certain longitudinal trends can be observed in the investigation of informal activities. Fig. 13b shows that the gap between the most and least frequently studied activities (grey vs. black lines) has narrowed in recent years (i.e., the range has decreased from 2% to 15% in 2011–2012 to 4%–9% in 2019–2020). That is, we see a growing trend towards studies that simultaneously investigate a wider range of activities, rather than focusing on a small number of dominant activities. In particular, studies that focus on watching online videos and playing video games have fluctuated considerably over the course of the review (dashed lines in Fig. 13b).

### 3.5.2. Links with L2 development

By definition, language development is at the very heart of ISLL, and a considerable number of studies have examined the possibility of learning through participation in informal activities. Of the 107 studies in our review that explored the link between informal



a: Types of activities (N = 887)



b: Longitudinal trends

Fig. 13. Informal L2 activities under investigation.

L2 usage and linguistic development, 74% did find an association, while 22% reported mixed or inconclusive results, and only 4% found no link. As Fig. 14 illustrates, the number of studies in support of a connection between informal usage and development has risen since 2013–2014, while inconclusive or mixed findings have declined. It should be noted that the vast majority of studies that focus on the relationships between informal L2 usage and other variables have relied on correlation- or regression-based methods (see Fig. 11a), which cannot indicate causality. This means that it remains unclear to what extent these findings indicate that participation in informal activities promotes language development, or that more proficient learners are more likely to take part in informal L2 activities.

### 3.5.3. Language skills and variables

Many L2 skills and features have been studied over the 20 years spanned in our review (see Fig. 15). The four central skills of writing, speaking, listening and reading have appeared most often in ISLL publications (67% of total studies), while both oral and written interactions have been less commonly studied (18%). “Other” skills under investigation have included digital literacy, oral translation, or cross-cultural strategic skills.

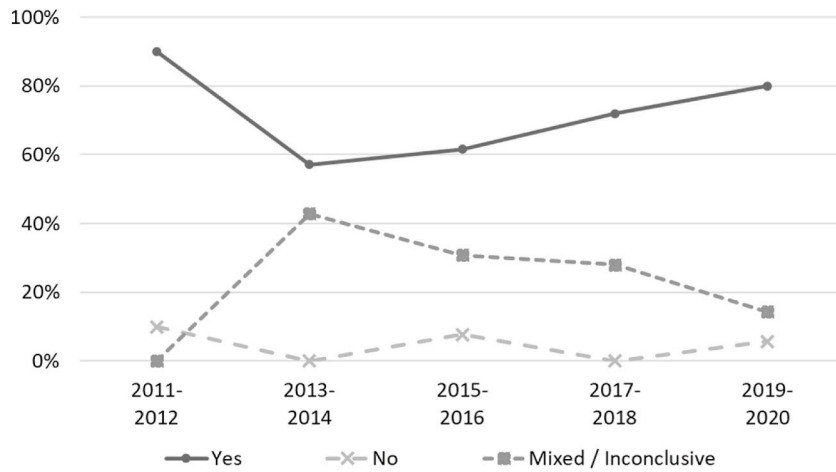
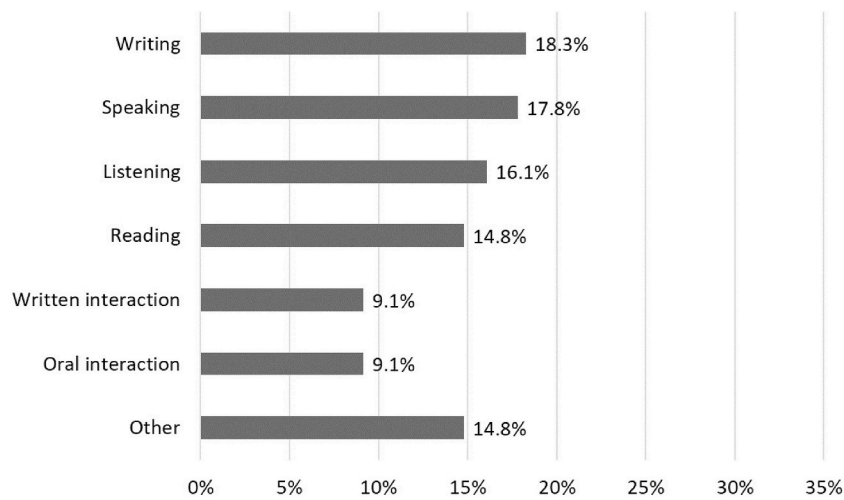
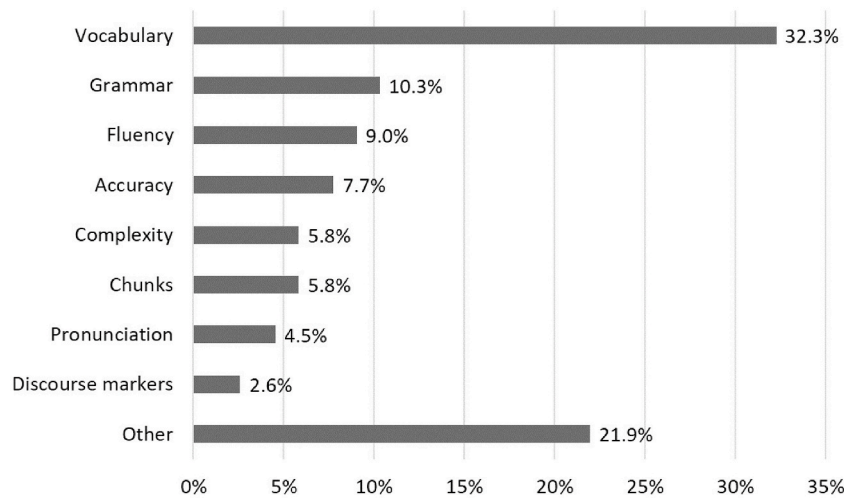


Fig. 14. Links between informal usage and L2 development over time (N = 107).



a: Language skills (N = 230)



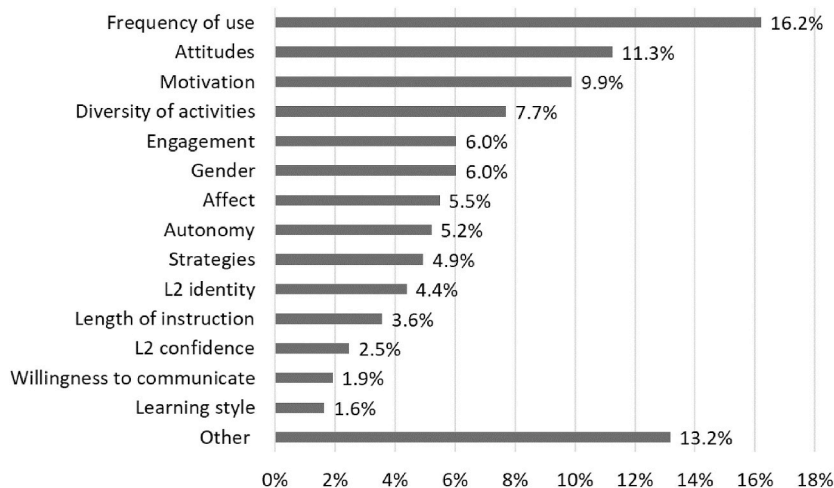
b: Linguistic features (N = 155)

Fig. 15. Linguistic variables in empirical studies.

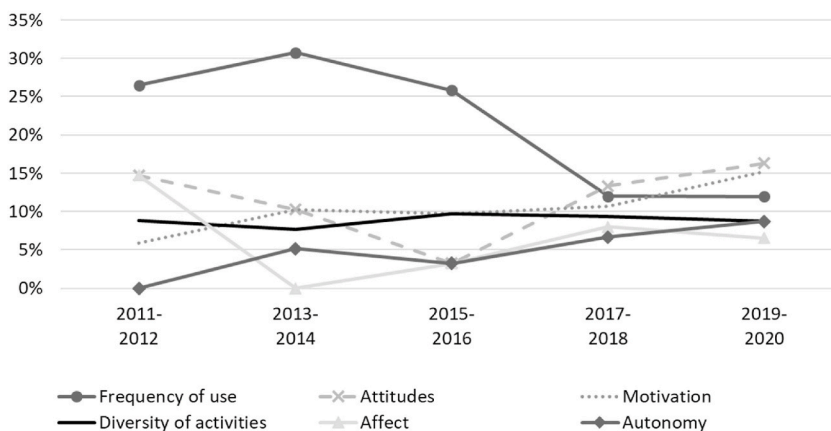
In contrast to the more even distribution of language skills, examinations of specific linguistic features have largely favoured vocabulary (32%) and grammar (10%), followed by fluency, accuracy, complexity, chunks, pronunciation, and discourse markers. “Other” investigated features include, for example, phrasal verbs and pragmatic implicature.

3.5.4. Individual difference variables

Beyond linguistic skills and features, a wide range of individual difference (ID) variables have been investigated in relation to ISLL, as researchers aim to understand which learners are more likely to partake in, and benefit from, informal L2 activities. Frequency of informal language use has been investigated most often, followed by attitudes towards language learning, language learning motivation, and the diversity of informal activities in which L2 users participate (Fig. 16a). Conversely, confidence related to L2 usage, willingness to communicate, and learning styles have been researched in only a handful of studies. The category of “other” ID variables includes, for example, levels of interest, age, beliefs about formal and informal learning, and grit.



a: ID variables (N = 364)



b: Longitudinal trends

Fig. 16. Individual difference (ID) variables.

As shown in Fig. 16b, investigations featuring frequency of use as the predominant ID variable have declined over time, with studies of attitudes and motivation making up a larger proportion of publications after 2015–2016. As we have hypothesised throughout other parts of this review, one possible reason for this could be a process of maturation within ISLL research: Early papers tended to focus on describing L2 users’ informal habits, including the activities in which they partake (diversity of activities) and how often (frequency of use). However, as the number of publications has grown over time, so too has the range of variables under investigation, and in more recent years we can observe a more evenly distributed focus on different ID variables, reflecting novel contributions from researchers from diverse backgrounds. The sharp increase in publications on individual differences in ISLL from 2015–2016 (n = 31) to 2017–2018 (n = 75) would lend support to this speculation.

### 3.5.5. Pedagogical applications

Though the reviewed publications primarily focused on the informal realm, many also explored the interface between ISLL and formal language learning and teaching. This interface is of growing relevance, as nowadays students' interactions with the language are likely to extend beyond the classroom. Indeed, a substantial number of studies in our review did address in some way how informal and formal learning could complement each other (though 10% did not mention any pedagogical applications). The two main suggestions emerging from these papers were that teachers should both encourage students to use their L2 beyond the classroom and show them how to engage in out-of-class L2 usage (29% and 26% respectively). The latter may act as a reminder to educators who assume that participation in informal L2 activities is always instigated autonomously by L2 users: some learners may require guidance in accessing and navigating the informal sphere. "Other" mentioned pedagogical applications or connections to the formal sphere (36%) varied from bridging activities that directly link the formal with the informal to the need for teachers to recognize informal interactions as a valid form of learning, as well as in some cases the need to raise teachers' awareness about informal L2 exposure. This broad spectrum of recommendations suggests that, across the globe, ISLL currently exists in different states and may be evolving along different trajectories.

As far as longitudinal trends are concerned, the question of pedagogical intervention has been commonly discussed in the ISLL literature in recent years (see Fig. 17). Since 2015–2016, the diversity of recommendations appears to have narrowed, with fewer miscellaneous recommendations and a rise in the two primary, teacher-related suggestions. At the same time, the amount of empirical studies not offering any suggestions for pedagogical application has decreased, indicating that addressing the interface between formal and informal learning has become a common component of ISLL publications.

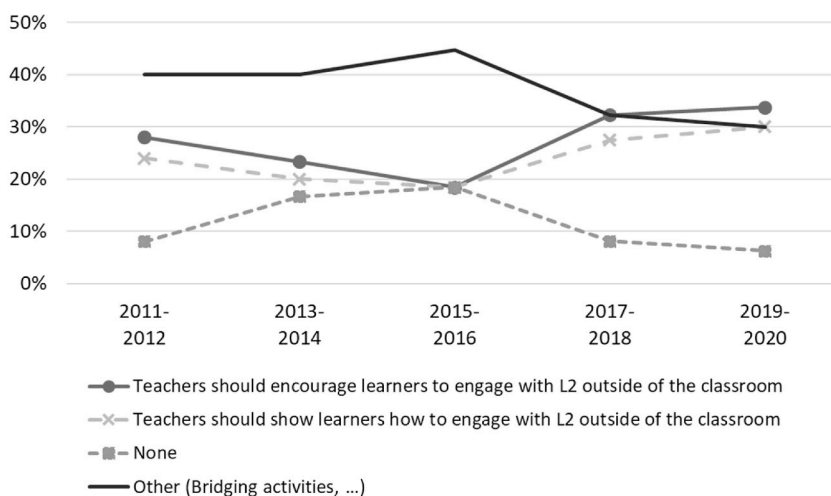


Fig. 17. Trends in pedagogical applications of ISLL ( $N = 262$ ).

### 3.6. Summary of results

To conclude these findings, we revisit our three research questions. Our first question focused on how the ISLL research landscape evolved across a broad range of variables between 2000 and 2020. Our results show a significant overall increase in published ISLL studies beginning in 2011, with certain geographic regions (Western and Northern Europe and East Asia) more heavily contributing to research output than others. While some features of these publications remained rather constant (the dominance of empirical publications, cross-sectional study designs, English as a target language, studies on young adults, etc.), other aspects showed greater fluctuation (individual difference variables, research aims, informal activities under investigation, etc.).

Our second question centred on the identification of trends in developing ISLL research across the 20-year period of our review, of which three were found: First, simpler quantitative analyses (descriptive statistics and correlations) have waned in recent years while more complex modelling approaches (e.g., regression and structural equation modelling) have become more common. Second, the primary research focus has shifted from investigating perceptions of informal usage and inventorying informal practices to examining more complex aspects of L2 development and individual differences. Third, while studies of individual differences were previously dominated by investigations into the frequency or quantity of informal language use, recent research has focused more on variables such as autonomy, motivation, and attitudes, among others.

Finally, we questioned the extent to which the jingle-jangle problem could be observed in our dataset. A strong *jingle* effect was

noted during the text screening and review phases, where it was necessary to exclude 1000s of abstracts and 100s of papers which used the term “informal” to refer to phenomena well outside of the scope of our current working definition. A significant *jangle* component was also detected, as our review identified eight different labels that were all commonly used to describe informal L2 usage, though dozens more appeared throughout the entire dataset.

## 4. Discussion

In the first part of our discussion, we will focus on identifying the research gaps which emerged from our investigation of the demographic, theoretical, methodological, linguistic, and pedagogical variables that have been the primary focus of past ISLL studies, which point toward important directions for future exploration. We will also reflect on the historical trends that were observed in our review, and what they suggest in terms of the possible future directions of ISLL research. Next, we highlight what we regard as the most important current issues in the literature and provide suggestions for best practice in future ISLL research, before concluding with a brief discussion of the limitations of our scoping review study.

### 4.1. Taking stock of past research

#### 4.1.1. Research gaps

Perhaps due to the recency of its emergence as a popular research topic, there are numerous areas of ISLL which have not yet been thoroughly investigated. Beginning with geographic representation, we have seen that three clusters currently dominate the research landscape, which have primarily conducted studies in France and Germany; Sweden and Finland; and Hong Kong and Mainland China. This mirrors [Soyoo et al.'s \(2023\)](#) observation that IDLE has been dominated by research in Europe and Asia. Together, these findings suggest a clear gap in the research with regard to cross-national/cross-cultural diversity.

Such a gap in the literature also exists for other demographic factors, including target languages and the ages of the learners that have been studied. Our review found that ISLL research has primarily focused on L2 English (66% of studies). [Zhang et al. \(2021\)](#) noted a similar hegemonic presence of English in research on extramural language learning in their review, which found an even greater percentage of studies featuring English as a target language (88%). While these observations certainly reflect the predominance of studies on learners of English in the greater field of second language acquisition (e.g., [Guo et al., 2021](#)), there is nevertheless a substantial need for ISLL research to focus on a greater diversity of target languages. Similarly, we observed demographic underrepresentation in terms of learners' ages, with the analysed studies largely focusing on young adults and adolescents, while less than 8% involved children and young learners. Expanding the knowledge base of age effects in ISLL could thus become a fruitful avenue for future research.

Concerning the nature of the informal activities under investigation, a wide range of popular pastimes has been studied, although our review has demonstrated a clear prevalence for receptive (as opposed to interactive and productive) activities. In this regard, our findings stand in contrast to [Zhang et al. \(2021\)](#), who reported playing digital games as the most commonly investigated activity in extramural language learning studies, followed by watching videos, reading, and listening to audio. While the receptive-productive gap observed in our own analysis has narrowed in recent years (perhaps an indication of the field's growth, see Section 4.1.2), it is unclear whether interactive/productive activities are less commonly featured in ISLL research because they are also less popular among learners, for methodological reasons, or other.

Finally, a key finding from our review is that a majority of the published empirical studies provided evidence in favour of a positive link between informal activity usage and L2 development. Similarly, the studies reviewed by [Zhang et al. \(2021\)](#) also largely found positive relationships between informal activities and L2 development, strengthening the support for this association. As previously noted, however, a substantial number of studies in our review relied on statistical measures that cannot indicate causality, meaning that we cannot further extrapolate on the directionality of this relationship. Thus, there is a pressing need for future studies that address questions of causality using appropriate research methods. While by no means a novel suggestion, we reiterate the importance of transitioning away from cross-sectional designs (currently comprising 80% of our reviewed ISLL empirical papers) towards longitudinal data collection, which allows for clearer observations of the directionality of relationships between ISLL and individual, collective, and contextual variables ([Lee, 2022a](#)).

Alternatively, researchers may wish to incorporate more experimental designs, which were featured in only 2% of the empirical studies in our review. We acknowledge that one possible cause of this underrepresentation of experimental research could be that certain realisations of experimental designs stand in opposition to our definition of ISLL (see [Table 3](#), Criterion 2a, “Setting”), as L2 usage within a laboratory environment does not reflect the inherently unstructured, self-directed nature of informal language learning. This does not preclude the usage of control groups, nor does it diminish the utility of laboratory designs that explore certain aspects of L2 learning that may occur during informal usage (e.g., using eye-tracking information or measuring specific implicit mechanisms). However, it does pose an additional challenge for ISLL researchers looking to investigate informal L2 development through experimental research design, whom we encourage to carefully reflect on the relationship between informal L2 usage under controlled conditions and in “real life.”

#### 4.1.2. Signs of growth

In the previous section, we identified several underrepresented areas in which ISLL researchers should expand their focus in future studies. However, in our scoping review we did not only consider which aspects of ISLL have been most studied overall, but also how research foci have changed across the 20-year review period. In this way, we have been able to identify several trends that can be interpreted as signs of “maturation” of the ISLL research literature. That is, studies appear to be progressing from simpler forms of inquiry and analysis towards greater nuance, complexity, and diversity.

For one, this is expressed in the increasingly complex quantitative analytical approaches to data analysis, moving away from primarily descriptive and correlational methods towards more advanced modelling in recent years. At the same time, we have observed a broadening in the range of both the qualitative and quantitative analytical methods employed in ISLL studies, which span from descriptive statistics, correlation, regression, factor analysis, and structural equation modelling to thematic analysis, discourse analysis, conversation analysis, corpus analysis, and text analysis — as well as “other” forms of research which make up 13% and 20% of quantitative and qualitative analytical approaches, respectively. In light of this variety, we concur with Lee (2022a), who suggested that a great diversity of methods is an indication of overall growth in ISLL research.

In addition to methodological developments, we have also observed a shift in the types of variables in which ISLL research has been most interested. Earlier studies focused more on describing informal habits, highlighting the frequency or quantity of informal language use (i.e., how often and for how long learners engage in different informal activities) as the most prominent distinguishing factor. We observed a turning point in 2017–2018, when the number of papers on individual differences more than doubled, and the focus shifted towards variables such as autonomy, motivation, and attitudes, among others. Our findings complement Guo and Lee’s (2023), who concluded that the majority of variables studied in relation to IDLE have centred on individual differences (as opposed to social, educational, and cultural contexts), as well as Zhang et al. (2021), who specifically highlighted the positive relationship between affective factors (e.g., motivation) and willingness to engage in informal activities.

#### 4.2. Current key issues

Moving beyond our discussion of the most important gaps and trends in past ISLL research, we also want to highlight what we regard as the most important current issues to emerge from our review, namely how the ISLL literature as a whole defines and frames the phenomena at the heart of its research.

Taking stock of terminology and definitions was a central objective of the current review, since we had previously observed a *jingle-jangle* problem in the ISLL literature, which made it difficult to identify and compare findings across studies and more broadly synthesise new insights and developments. Indeed, our review confirmed the presence of a strong *jingle* (i.e., use of the same term to describe different phenomena), exemplified by the need to discard 1000s of abstracts and 100s of full-text papers purportedly on *informal learning* during the early stages of this review. Perhaps this is due in part to the common appearance of the term *informal* in everyday parlance, which may go some way towards explaining its incongruous usage in the scientific literature.

On the *jangle* side, dozens of different terms have been introduced in recent decades to describe the same phenomenon, although our results showed that eight labels currently dominate the terminological landscape (see Fig. 5). Among them, *outside the classroom* and *out-of-school exposure* appear to be more generic descriptions of informal usage, while EE, IDLE, ISLL, LBC, OILE, and OOC are well-defined and have been used with considerable consistency since being coined and popularised by researchers in different regions. Some of these definitions are quite similar and even overlap with each other, which itself contributes to a lack of clarity in the research literature (see also Kusyik, 2023).

The issue of nomenclature is further complicated by the fact that only 38% of papers in our review provided clear definitions, meaning that a significant number of papers did not specifically define the manner, nature or settings that characterise the type of language use in question. To be sure, informal learning is a complex phenomenon, facing challenges related to conceptualisation, methodology, pedagogy, and recognition as a legitimate form of learning (Schugurensky, 2007). In the current review, we distinguished between informal and non-formal learning (see Schugurensky, 2007) and consider them to be fundamentally distinct, involving different learning processes and potentially different levels of motivation. However, throughout the screening process we found that many texts on *informal* learning actually focused on *non-formal* learning (i.e., involving resources used outside the classroom but designed for language learning, see Section 2).

Related to the issue of defining and delimiting *informal* is the question of the nature of learning that underlies L2 exposure and use beyond the classroom. Varying levels of intention to learn and engagement with the material, as well as attentional focus directed towards meaning or linguistic form, all impact the learning process. The issue of what type of learning (e.g., explicit, implicit, incidental) accompanies informal activity usage has not yet been thoroughly explored (for further discussion see Kusyik, 2023). Though some researchers have suggested that incidental (unintentional) learning may be involved (Kusyik, 2017; Lee, 2019; Sockett, 2011; Toffoli & Sockett, 2010), the results of our review indicate that ISLL researchers currently do not operate within one common theoretical framework. Rather, the seven most frequently cited learning and theoretical frameworks include a range of cognitivist, constructionist, ecological and sociocultural approaches. This diversity appears to reflect the current theoretical applications within broader SLA research, which similarly is not dominated by one single theory of language development. Interestingly, 33% of the papers in our review mentioned no theoretical or learning framework at all, indicating more room for potential theoretical integration in

future ISLL studies. This finding is echoed in [Soyooft et al. \(2023\)](#), where 37% of publications lacked a theoretical framework. The most common framework in their review, and second most common in our own, was Complex Dynamic Systems Theory (CDST). By contrast, while we identified Sociocultural Theory as the most common framework in our review, none of the studies in [Soyooft et al. \(2023\)](#) employed this framework. We believe that, moving forward, a deeper and more explicit engagement with theories of second language acquisition in the ISLL literature may be key to furthering our understanding of how informal learning actually takes place.

Finally, a better understanding of the informal learning process would also make valuable contributions to the formal sphere, which was shown in this review to be an important recurring issue in the literature. Ninety percent of the reviewed empirical studies discussed in some way how the formal and informal spheres could complement each other, though the prevalence of classroom learners as research participants (67%) could account for some of this. We found that these discussions primarily highlighted the role of teachers, with recommendations that they both encourage informal L2 contact and show learners how to engage with the L2 outside of the classroom, alongside a variety of other suggestions (bridging activities, etc.). Similar trends were observed by [Soyooft et al. \(2023\)](#), who emphasised the importance of bridging informal and formal learning; [Guo and Lee \(2023\)](#), who stressed the need for more insight into how teachers can implement IDLE practices; and [Zhang et al. \(2021\)](#), who underscored the importance of formal instruction as a complement to informal L2 usage.

These authors also called for the development of pedagogical interventions that are adapted to meet the needs of informal L2 users. We agree that the design and evaluation of ISLL “sensitive” ([Schwarz, 2020](#)) pedagogical approaches is an important issue for research going forward. This includes addressing how formal instruction can be adapted to meet the needs of informal L2 users (e.g., in bringing with and building on knowledge acquired outside the classroom), as well as how teachers can best support encounters with the informal sphere. Based on our results, we thus see a need for comprehensively and holistically addressing the complementarity of the formal and informal spheres, as well as the bidirectionality of learning in both contexts. While some sources offer guidance for educators on how they can best exploit the formal-informal interface (e.g., [Lee, 2022b](#); [Reinders et al., 2022](#); [Sundqvist & Olin-Scheller, 2013](#)), intervention design so far has primarily fallen under the purview of individual teachers. However, as research on the in/formal interface progresses, it will become increasingly important to investigate the efficacy of pedagogical applications of ISLL on a curriculum and institutional level.

#### 4.3. Suggestions for future research

In summary, as both the number of ISLL publications and their geographic distribution continue to grow, we regard it as highly important that researchers find greater consensus on terminology and make an effort to be more consistent in providing specific definitions of their varieties of *informal second language learning*. Without clear constructs, we run the risk of furthering the existing conceptual jingle-jangle haziness in the research literature, rather than remedying it. To this end, we suggest considering the setting, material and locus-of-control of L2 activities (see our inclusion/exclusion criteria, [Table 3](#)) to help determine if a study falls within the purview of what we have defined as ISLL in this paper. Providing clear and detailed definitions could also help cut down on the dozens of terms currently in use (*informal*, *out-of-class*, *extramural*, etc.), thereby both addressing the *jingle* problem and clarifying for researchers which terms exist as defined constructs and which are open to more common interpretations. In these definitions, we urge researchers to pay particular attention to the presence/absence of intention to learn, the role of non-formal learning, and the role of the formal sphere, as these issues appear to fundamentally impact the process and types of learning at play. At the very least, distinguishing self-directed, out-of-class exposure to/usage of authentic L2 content (i.e., what we have defined as informal learning) from participation in extramural L2 activities that are carried out within a broader context of structured learning (e.g., teacher-led activities or using materials designed for language learning), could go some way towards reducing the *jingle* problem.

Additionally, as researchers continue to address current research gaps and explore novel avenues within ISLL, it is important that we equip ourselves with appropriate methods for data collection and analysis. Although our review shows a wide range of data collection methods across the ISLL literature, the majority of data (nearly 70%) were collected through questionnaires, interviews, and diaries. The prevalence of these same methods was also noted by [Soyooft et al. \(2023\)](#) and [Lee \(2022a\)](#). Echoing [Guo and Lee \(2023\)](#), we emphasise the need for multifaceted and innovative approaches that are capable of capturing the nuanced and complex nature of informal learning. Moving forward, ISLL researchers could also give greater consideration to popular theoretical frameworks such as CDST, ecological or usage-based approaches, which can help us understand the learning processes underlying ISLL and situate the topic within the greater SLA landscape. Any such theoretical advances would, of course, need to be accompanied by corresponding developments in research methodology, shifting towards approaches which are suited to exploring language acquisition processes from these perspectives, such as Retrodictive Qualitative Analysis ([Dörnyei, 2014](#)), Experience Sampling Method ([Arndt, 2023](#); [Arndt et al., 2023](#)), or the Idiodynamic Method ([Macintyre & Legatto, 2011](#)).

#### 4.4. Limitations of the study

In our approach to this scoping review, we attempted to strike a balance between (a) identifying, describing, and synthesising a comparatively broad, yet well-defined area of the literature, while (b) being inclusive enough to be able to identify relevant studies

from a variety of contexts and areas within SLA. At the same time, this approach constitutes the two main limitations of the current study: First, there is a chance of having failed to identify topically relevant publications which may use terms to describe informal learning and usage that were unknown to the members of this review team (the *jangle* problem), and thus missing from our keywords and inclusion/exclusion criteria. The coverage of our review was further limited by the selection of databases which we were able to search, as well as the languages of the publications which we were able to read (i.e., English, Dutch, German, and French). Conversely, due to our broad aims and wide scope, the database searches resulted in a large number of initial records (22,596) that needed to be reviewed in several stages in order to retain only the most relevant publications. Despite working in a large team, the time-intensiveness of this process caused a significant delay between our initial database searches in mid-2020 and the current publication of our results. Hence, this review does not cover the numerous studies which have been published in more recent years (e.g., books by Reinders et al. (2022), Toffoli et al. (2023) and Lee (2022b), as well as many journal articles). These publications illustrate that the topic of informal second language learning continues to garner increasing interest and evolve, both thematically and in terms of methodological and theoretical approaches.

## 5. Conclusion

The central aim of this scoping review was to identify, describe, and synthesise research on informal second language learning published between 2000 and 2020. In doing so, we were able to provide insight into the theoretical, methodological, and terminological nature of this research, learning-related findings, and suggested pedagogical applications; uncover relevant longitudinal trends; and identify gaps in the literature that future research should seek to address.

The recent rapid increase in research output (including many contributions published since our database searches) strongly suggests that investigations into informal language usage will continue to grow. A major contribution of this scoping review is identifying the ways in which ISLL research has evolved and matured in the last decades. The trends we have observed suggest that past studies can be grouped into three waves. While the first wave concentrated primarily on discovery and description (inventorying ISLL practices, querying students' and teachers' perceptions), the second centred more on investigating relationships between informal usage and L2 development. Meanwhile, in the current third wave studies, attention seems to have shifted towards exploring ISLL in relation to a wide range of other learner- and environment-related factors, in order to understand for whom and under what conditions ISLL appears to be "effective." To be sure, the themes of the first and second waves have not been thoroughly exhausted, and (re)explorations of certain questions may well afford novel insights, especially as the complex interplay between individual difference variables, informal L2 practices, and language development is further examined.

As parallel strands of ISLL from various parts of the world continue to develop and converge into a more connected network of literature, we emphasise the need to more clearly define the contours of this research in terms of terminology, definitions, theoretical frameworks, and research methods. We have aimed to contribute towards building such clarity here, by taking stock of the current research landscape and emerging trends, and specifically addressing issues of terminological and definitional confusion (i.e., the *jangle* problem).

Coherence in these categories (among others) is necessary to enable researchers to compare findings and discover trends across studies, and more broadly synthesise new insights and developments in this subject area. Indeed, it is essential against the background of recent discussions around the advantages and drawbacks of delineating ISLL as a formal field of research within SLA, which could prove to be a complex undertaking in itself that involves disentangling the overlap with other topics in SLA research that share close connections with ISLL, such as immigration, study abroad, CALL/MALL or incidental acquisition, as well as with other relevant subjects such as emergent technologies or digital literacies. Moreover, by referring to itself as a separate subfield, ISLL could risk isolating itself from broader SLA research traditions and issues, and consequently contribute to further fragmentation within the field. In any case, as ISLL related research continues to evolve, converging towards a more connected and cohesive body of literature would be beneficial for researchers and educators alike.

## CRedit authorship contribution statement

**Meryl Kusyk:** Writing – review & editing, Writing – original draft, Visualization, Validation, Project administration, Investigation, Formal analysis, Data curation, Conceptualization. **Henriette L. Arndt:** Writing – review & editing, Writing – original draft, Visualization, Validation, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Marlene Schwarz:** Validation, Investigation, Data curation, Conceptualization. **Kossi Seto Yibokou:** Validation, Investigation, Data curation, Conceptualization. **Mark Dressman:** Validation, Investigation, Data curation, Conceptualization. **Geoffrey Sockett:** Validation, Investigation, Data curation, Conceptualization. **Denyze Toffoli:** Validation, Investigation, Data curation, Conceptualization.

## Declarations of competing interest

None.

## Appendix A. Overview of ISLL-related systematic reviews

Citation	Thematic focus	Review scope	Findings	Recommendations and implications
Zhang, R., Zou, D., Cheng, G., Xie, H., Wang, F. L., & Au, O. T. S. (2021). Target languages, types of activities, engagement, and effectiveness of extramural language learning. <i>PLoS One</i> , 16(6), Article e0253431. <a href="https://doi.org/10.1371/journal.pone.0253431">https://doi.org/10.1371/journal.pone.0253431</a>	<b>Extramural Language Learning</b>  1) “What were the target languages in the previous studies of ELL? 2) What types of ELL activities were investigated? 3) How frequently did people engage in ELL? 4) Were ELL effective? 5) What factors may influence people’s engagement in ELL? 6) What factors may influence the effectiveness of ELL?” (p. 2/16)	<b>Search:</b> Scopus; Web of Science <b>Review:</b> 33 reports of empirical studies, published before March 9th, 2021.	<ul style="list-style-type: none"> <li>●In addition to majority L2 English (88%), studies of 4 target languages (German, French, Chinese, Japanese)</li> <li>●Studies found learner engagement in ELL to be frequent (up to 57.2 hours per week) and most commonly involved music/other audio and digital games. Reading was least common.</li> <li>●Studies indicated a positive relationship between extramural activities and language learning as well as affective variables such as motivation.</li> <li>●Potential mediators: amount of engagement, interactiveness, language difficulty, and gender of the learner</li> <li>●Most frequent tools: questionnaires, individual interviews, and observations. Less common tools include, language logs, group interviews, reflective journals, computer tracking, stimulated recall, and learner histories.</li> <li>●Prevalence of cross-sectional study designs</li> <li>●Questionnaires target perceptions and behaviours related to LBC relationships with other (e.g., affective, motivational) factors.</li> <li>●Interviews to complement questionnaire data and give in-depth view of specific phenomena</li> <li>●Observations both on- and off-line, more often in classroom or formal research settings than at home/in informal spaces. Often used for triangulation alongside other data sources.</li> <li>●Increasing number/ diversity of tools suggests growing interest in the subject</li> </ul>	<ul style="list-style-type: none"> <li>●Encourage digital gaming as a highly interactive and engaging activity</li> <li>●Emphasise formal instruction as an important complement to extramural exposure</li> <li>●Create environments for sharing positive extramural interactions</li> <li>●Try to incorporate ELL in teaching languages other than English</li> </ul>
Lee, J. S. (2022a). Evaluation of instruments for researching learners’ LBC. In H. Reinders, C. Lai, & P. Sundqvist (Eds.), <i>The Routledge handbook of language learning and teaching beyond the classroom</i> (pp. 312–326). New York, NY: Routledge	Index the research instruments that have been used in research on language learning and teaching beyond the classroom (LBC), both on- and offline.	<b>Search:</b> A&HCI; SSCI <b>Review:</b> 76 studies published between 2010 and 2020.	<ul style="list-style-type: none"> <li>●More multifaceted approaches (less cross-sectional designs) needed to explore directionality in relationships between LBC and other factors</li> <li>●Update instruments regularly to reflect changing LBC practices</li> <li>●Triangulate retrospective self-reports with other data sources (e.g., language logs)</li> </ul>	

(continued on next page)

(continued)

Citation	Thematic focus	Review scope	Findings	Recommendations and implications
Guo, X., & Lee, J. S. (2023). A systematic review of Informal Digital Learning of English: An ecological systems theory perspective. <i>System</i> , 117, 103097. <a href="https://doi.org/10.1016/j.system.2023.103097">https://doi.org/10.1016/j.system.2023.103097</a>	Based in Bronfenbrenner's ecological systems theory, identify factors which influence learners' perceptions of or behaviours related to IDLE, including both individual characteristics and variables related to the familial, educational, and cultural context.	<b>Search:</b> A&HCI; SSCI <b>Review:</b> 103 studies published between 2010–2021	<ul style="list-style-type: none"> <li>•By far most of the variables studied in relation to IDLE have been at the individual level, e.g., age, gender, personality, educational background, abilities and perceptions, and affective/motivational factors</li> <li>•A moderate amount of studies also considered the micro-system, including, teachers, peers, family, and friends</li> <li>•Severe lack of studies in relation to broader environmental systems, e.g., cultural norms and religious beliefs</li> </ul>	<ul style="list-style-type: none"> <li>•More insight needed into how teachers can implement and promote IDLE, as well as peer- influence on IDLE attitudes and behaviours</li> <li>•Need for cross-cultural and longitudinal studies</li> <li>•Use of innovative research methods (beyond standard self-report surveys) to gather richer data on IDLE in context</li> </ul>
Soyooof, A., Reynolds, B. L., Vazquez-Calvo, B., & McLay, K. (2023). Informal digital learning of English (IDLE): A scoping review of what has been done and a look towards what is to come. <i>Computer Assisted Language Learning</i> , 36(4), 608–640. <a href="https://doi.org/10.1080/09588221.2021.1936562">https://doi.org/10.1080/09588221.2021.1936562</a>	Discover the extent, range, and research focus of IDLE research, with specific eye towards the potential to support English language teaching and learning in informal contexts, as well as potential directions for future research	<b>Searched:</b> Web of Science Core Collection <b>Reviewed:</b> 30 papers published between 1980 and 2020	<ul style="list-style-type: none"> <li>•Interest in IDLE as a research topic grew particularly between 2017 and 2019 in Europe and Asia (only 1 publication before 2010)</li> <li>•Primarily mixed-methods or qualitative studies, using questionnaires and interviews to collect data mostly from adult learners of English</li> <li>•Three main research foci: linguistic development, affective and cultural development, and agency and digital literacy dimensions of CALL research</li> </ul>	<ul style="list-style-type: none"> <li>•Growing relevance of “langua-technocultural competence” and importance of acquiring digital literacy skills</li> <li>•Need to transfer or bridge the informal and formal language learning gap</li> <li>•Mediation (non-professional translation and interpreting) as an emerging inter- disciplinary field of interest</li> </ul>

## Appendix B. Categories in data extraction sheet

Note: For each close-ended question, there were also “not applicable” or “other” options, and team members had the opportunity to add notes and comments to each category.

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Reference: Bibliographic information, year, keyword list (if any)

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**Type of document:** Literature review; meta-, systematic, or scoping review; pedagogical practice; primary research; theoretical discussion; methodological discussion; other

**Aim of the paper:** Inventory of informal activities [focus on user habits]; detailed descriptions of specific activities [focus on activity]; L2 development or learning; individual differences; L2 teaching; reasons for participating in informal learning; L2 user perceptions; theoretical reflections; methodological discussions ; other

**Terminology:** Beyond the classroom; extramural English; fully-autonomous self-instructed learning; informal digital learning of English; informal second language learning; language learning in the digital wilds; naturalistic learning; online informal learning of English; out-of- class language learning; out-of-school exposure; language learning outside the classroom; unintentional learning of English + notes on “jingle” vs. “jangle”

**Definitions:** What is the definition of informal learning provided (if any)? What (if anything) is mentioned about the “intention to learn”? Are “non-formal” activities included or excluded, and why?

**Study design:** Cross-sectional; longitudinal; retrodictive

**Data collection:** Classroom observation; diary; focus group; interviews; self-report; survey or questionnaire; task (oral); task (written); test

**Quantitative data analysis:** Correlational; descriptive; factor analysis; generalised estimation; longitudinal modelling; regression; structural equation modelling

**Qualitative data analysis:** Conversation analysis; corpus analysis; discourse analysis; text analysis; thematic analysis

**Participants and setting:** Number of study participants and type of profile (classroom learners vs. distance learners in online courses vs. informal L2 users); age range; school type; course of study (specialist vs. non-specialist language learners); CEFR levels; geographic location; target language (s); first language(s)

**Language skills examined:** Listening; oral interaction; writing; reading; synchronous written interaction; asynchronous written interaction; mediation

**Language variables:** Accuracy; chunks; complexity; discourse markers; fluency; grammar; pronunciation; vocabulary

**Individual difference variables:** Attitudes; anxiety and enjoyment; autonomy; diversity of activities; engagement; frequency of use; gender; motivation; learning styles; length of instruction; L2 confidence; L2 identity; strategies; willingness to communicate

**Nature of the L2 environment/tools:** Computer; smartphone; other digital devices (e.g., tablets); traditional media (e.g., TV, paper books); in person

**Types of activities and media:** Forum; movies; music; podcasts; reading; role-playing; series; social media; surfing the web; videos (online, e.g., YouTube), video games (general mention vs. single-player or multiplayer, with or without oral or written communication)

**Findings and contributions:** e.g., report the results of statistical tests (if used) and summarise narrative findings. Did the study find links between informal language use and language development (yes; no; mixed results; unclear)? Did the study identify significant links with other variables?

**Suggested classroom applications:** e.g., teachers should encourage engagement with L2 outside the classroom; teachers should show learners how to engage with L2 outside the classroom

**Limitations:** What are the limitations of the study as addressed by the authors?

**Future research:** What are suggested future research questions of topics of relevance, if any?

**Critique:** e.g., if you have noticed anything that may have compromised the trustworthiness of the findings, which the authors have left unremarked, note it here.

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