VIETNAM JOURNAL OF EDUCATION, 2026
Volume 10, Issue 1, 84-97
https://doi.org/10.52296/vje.2025.810

REVIEW ARTICLE

Connectivism in Language Education: What Does Literature Tell Us?

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Article history
Received: 23 February, 2026
Accepted: 23 May, 2026
Published: 30 May, 2026

Keywords
Connectivism, language education, networked learning, digital learning ecologies, systematic scoping review

ABSTRACT
Connectivism has been widely mentioned in language education research to explain learning in networked and technology-rich environments. However, the literature remains difficult to interpret as a coherent evidence base, because connectivism has been used in different ways - as a learning theory, as a pedagogical orientation, or only as a descriptive lens). This article reviews what the literature reveals about connectivism in language education through a systematic scoping review with an evaluative synthesis. The analysis maps the learning ecologies where connectivism is most visible (e.g., LMOOCs, social media communities, blended online learning, and emerging AI-mediated contexts), and examines how studies operationalize "connections" (social interaction ties, resource curation, and platform/algorithmic mediation). Across studies, the most consistent reported outcomes relate to engagement, participation, learner agency, and digital literacies, while stronger evidence for measured language development is less common and often not well aligned with network indicators. Overall, the review suggests connectivism is currently more robust as a design rationale than as a tested explanatory theory in language education. The review concludes by outlining priorities for future research, focusing on clearer construct definitions, better indicator-outcome alignment, and comparative designs across ecologies.

1. INTRODUCTION

Digital technologies have reshaped where, how, and with whom language learning occurs. For many learners, language development is no longer organized mainly by a single textbook, a single teacher, or a single classroom routine. Instead, learning activities are distributed across messaging applications, social media feeds, open online courses, collaborative documents, and algorithmically curated resources (Nguyen et al., 2024; Nguyen et al., 2025). In this context, it is not only the *content* that matters, but also the learner's capacity to locate, select, connect, and reconnect resources and people over time (Guan et al., 2025). For language teachers, this also changes the practical meaning of "learning environment": it becomes less a bounded classroom space and more a networked ecology in which guidance, participation structures, and assessment choices can influence how learners navigate information and relationships.

In this context, connectivism (Siemens, 2005) has been frequently used to explain or to justify language learning in networked settings. Its appeal is quite understandable. Language learning is deeply social, and participation is often essential for developing communicative competence. When learners interact with peers, access diverse models of language use, and curate resources that match their interests and goals, learning appears to occurthrough connections rather than through linear instruction. Nevertheless, connectivism is also debated in the wider education literature (Lu et al., 2025). A recurring argument is that connectivism may sometimes function more asa descriptive vocabulary for technology-rich learning. In this sense, it names what learning looks like in digital spaces. However,

it may not always operate as a full theory with clear mechanisms. It may also not always offer testable predictions. For example, some work in open and distributed learning has raised questions about this limitation. These scholars have questioned whether connectivism, on its own, can explain learning processes well enough. They also encourage researchers to apply theory more rigorously. In other words, they recommend going beyond broad claims about "networks". Instead, researchers should show more clearly how learning actually happens, and in what specific ways, rather than just saying that "everything is connected" (Bell, 2011; Kop & Hill, 2008; Nguyen, 2025). These debates become especially important in language education, because the field has strong existing explanatory traditions (e.g., interactional perspectives, sociocultural accounts, self-regulation research). If connectivism is used loosely, it may produce attractive narratives about innovation but weak evidence about language development.

At the same time, contemporary language learning contexts increasingly resemble the conditions that connectivism tries to capture. For instance, research on language MOOCs has used connectivist principles to examine how learning design and participation structures may shape engagement, retention, and learners' experience in open digital environments (De Caro-Barek, 2022). In addition, large-scale discussions of LMOOC design highlight that language learning has specific demands (e.g., interaction, feedback, sustained practice) that are not automatically supported by platform architectures, and therefore the theoretical framing and pedagogical design cannot be assumed to "work" just because a course is online (Chong et al., 2022). More recently, language learning ecologies have been further complicated by AI tools. Recent syntheses framed by connectivism suggests that learners' pathways now involve not only human networks and open resources, but also AI-mediated guidance and content generation, which may intensify the need for navigation, evaluation, and decision-making skills (Nguyen & Nguyen, 2025; Nguyen, 2024; Ruyang et al., 2025).

Despite these developments, the connectivism-language education literature remains difficult to interpret as a coherent evidence base. Many studies cite connectivism to justify the use of social media or online platforms, yet they do not always specify what counts as a "connection" (social tie, resource link, participation trace, or algorithmic mediation), nor do they consistently link network indicators to language outcomes. For example, some research on social media use in EFL higher education has tried to interpret learners' experiences by using constructivist and connectivist frameworks (Apoko & Waluyo, 2025). In these studies, learners often report that social media offers several benefits. They may feel more engaged, and they may have more chances to practise language skills. However, these kinds of claims still need to be examined more carefully. In particular, researchers should look more closely at the mechanisms, meaning how the benefits actually happen. They should also examine the measurement, meaning how the benefits are really shown and evidenced in data. It is not enough to rely mostly on general perceptions or impressions, because these may sound positive but still be hard to verify (Apoko & Waluyo, 2025). Therefore, a review is needed that does not merely list studies, but clarifies *what the literature can legitimately demonstrate*, and where claims run ahead of evidence.

Accordingly, this review addresses the following research questions:

RQ1: How is connectivism defined and positioned in language education scholarship (learning theory, pedagogical orientation, or descriptive lens)?

RQ2: How is connectivist learning operationalized in language contexts (i.e., what constructs and indicators represent "connections")?

RQ3: In which learning ecologies and instructional designs is connectivism most frequently applied (e.g., LMOOCs, social media, hybrid environments, AI-mediated learning)?

RQ4: What outcomes are reported, and what mechanisms are proposed to link networked activity to language development and related capacities?

RQ5: What methodological strengths and limitations recur, and how do findings align with, qualify, or challenge connectivist claims?

2. CONCEPTUAL BACKGROUND

As outlined in the Introduction, language learning is now often distributed across platforms and communities, so the ability to navigate connections becomes an important part of learning. This section clarifies how connectivism is typically understood in education research before considering its implications for language education. It also identifies the research gaps that motivate the review questions at the end of the Introduction.

Connectivism and the "network" idea in learning

Connectivism is commonly discussed as a "digital age" learning perspective that highlights learning through connections - among people, information sources, and technological tools. In many papers, the key assumption is that knowledge is not only located within individuals, but also distributed in networks and artefacts, and learners develop competence partly by building and maintaining these networks. However, connectivism has also been criticized for being too broad or too descriptive. Bell (2011) argues that connectivism on its own may not be enough to guide theory-based research and innovation. This is particularly problematic when it does not clearly specify mechanisms. If the mechanisms are not specified, then it becomes difficult to test them empirically with data.

For language education, this tension matters. Language learning already has strong existing explanations, such as interaction, mediation, practice, and self-regulation. So, connectivism needs to show more clearly what it adds on top of these explanations, rather than only using new terms for ideas that are already well explained… If connectivism is used only as a label for "online learning", then it does not help us understand *why* some networked environments support language development while others do not (Plueger, 2024). This is why a review cannot treat connectivism as a single stable object. It is better to treat it as a set of uses with different evidential requirements.

Three uses of connectivism in language education research

When connectivism appears in language education literature, it is usually used in at least three ways: (1) theory claim, (2) pedagogical orientation, and (3) descriptive rhetoric.

(1) *Connectivism as a theoretical claim*: Here connectivism is presented as an explanation of learning, not only as a teaching idea. If a paper uses connectivism at this level, it should show evidence of *network processes* and link them to learning (Gao et al., 2025). For example, it should specify what kind of connection matters (peer interaction ties? resource curation? algorithmic recommendation exposure?) and how such connections relate to language outcomes (Li et al., 2025). Without this, the claim is more an aspiration than a tested explanation.

(2) *Connectivism as a pedagogical orientation*: In this use, connectivism mainly guides design: openness, learner autonomy, peer contribution, and resource curation across spaces. For language teaching, this often appears in designs such as open online courses and cross-institutional collaborations, where learners connect to peers and artefacts beyond the local classroom. For instance, connectivism has been mobilized to justify networked writing pedagogy that supports international collaboration and intercultural learning (Tham et al., 2021). In such work, connectivism is valuable even if it does not "prove" a learning theory, because it gives a design rationale for participation structures.

(3) *Connectivism as descriptive rhetoric*: Here connectivism becomes a vocabulary to signal modernity ("learning is networked now"), but the study does not operationalize network processes in a clear way. This is not rare in technology-related language research. When connectivism is used like this, the literature can look large, but the evidence base for connectivist mechanisms remains thin (Lu et al., 2025). This is one reason why "what the literature tells us" is not the same as "how often the literature mentions connectivism".

What counts as a "network" in language learning contexts

A further conceptual problem is that "network" can refer to different objects. In language learning research, three main referents can be identified: (1) Social networks: interactional ties among learners, teachers, and wider communities (e.g., peer feedback, group work, community participation); (2) Resource networks: connections among texts, tools, exemplars, and repositories (e.g., curation practices, learning pathways across sources); and (3) Platform/algorithmic networks: connections shaped by platform architectures and recommendation systems (what learners see, click, and engage with) (Haque et al., 2024).

These referents matter because they ask for different kinds of evidence. Trace data can show what learners did, such as clicks, time, or posts. But activity is not automatically learning. Surveys can show perceived connectedness or feelings of being connected. However, these perceptions may not match the real network structures or interaction patterns in practice (Gao et al., 2025). Qualitative data can show meaning-making and identity development in rich detail. Yet it may still not clearly show whether language proficiency actually improved. For this reason, connectivism studies in language education need careful alignment between (i) what "connection" means, (ii) how it is measured, and (iii) what outcomes are claimed.

To make the synthesis more discriminating, this review uses the distinctions in Table 1 to code and interpret studies. The purpose is not to "police" authors, but to make claims and evidence comparable.

Table 1. Connectivism uses, network referents, and evidentiary implications in language education research

Connectivism use in a study	Typical network referent(s)	Common indicators used	What can be concluded (carefully)	Frequent threats to validity
Theory claim	Social/ resource/ algorithmic	Network analysis, trace data, interaction evidence, plus language measures	Potential mechanisms linking network processes to learning	"Network" undefined; outcomes not aligned; confounds not handled
Pedagogical orientation	Social + resource	Design descriptions, participation tasks, reflective accounts	Design principles and plausible learning opportunities	No mechanism test; reliance on satisfaction or engagement only
Descriptive rhetoric	Vague "online network"	General surveys, platform use reports	Context description, not theory support	Technology use equated with connectivist learning

Table 1 explains why this review emphasizes operationalization. If connectivism is a theory claim, then it needs stronger evidence; if it is a pedagogy, then design and participation logic are central; if it is descriptive rhetoric, then literature may still be useful for mapping trends, but it should not be read as theory confirmation.

Connections to current language-education ecologies

Some language-learning domains naturally invite connectivist framing, but they also highlight its limitations. For example, language MOOCs have been widely discussed as networked and open environments. Yet careful work shows that design features and participation architectures vary, and therefore "LMOOC = connectivist learning" is cannot be assumed(Hsu, 2022). In parallel, open networked writing pedagogies show how connectivist ideas can be enacted through structured collaboration, but the main outcomes may be intercultural learning, digital literacies, and rhetorical awareness, rather than direct proficiency gains (Tham et al., 2021). More recently, AI-mediated language learning has been framed as an ecology where learners must evaluate and integrate machine-generated support alongside human networks, which again increases the importance of navigation and judgement (Ruyang et al., 2025).

Research gaps

The preceding conceptual discussion highlights four gaps that justify the review questions, namely (1) Conceptual positioning gap: Many studies cite connectivism, but they do not clearly state whether it is used as theory, pedagogy, or a descriptive lens, which makes the literature difficult to synthesize systematically(Bell, 2011); (2) Operationalization gap: "Connection" and "network" are often assumed rather than measured. Studies may report platform use or engagement, but not the network processes connectivism depends on; (3) Outcome alignment gap: A substantial part of the literature reports participation, satisfaction, or perceived learning, while fewer studies link network indicators to language development outcomes with robust measurement and plausible causal logic; and (4) Ecology comparability gap: MOOCs, social media communities, and AI-mediated environments have different participation architectures, yet they are sometimes treated as the same "networked learning" category, which can lead to over-general conclusions (Hsu, 2022; Ruyang et al., 2025).

These gaps directly inform RQ1-RQ5 stated in the Introduction and explain why this review must be both systematic and evaluative, rather than merely descriptive.

3. MATERIALS AND METHODS

As discussed in the Introduction and Conceptual Background, the connectivism-language education literature has conceptual positioning and operationalization problems (e.g., theory vs pedagogy vs rhetoric; "network" assumed

rather than measured). For this reason, this review adopted a systematic scoping review with an evaluative synthesis. A scoping design is suitable when studies are diverse in methods and outcomes, while maintaining systematic transparency in how evidence is located and synthesized (Peters et al., 2020). At the same time, because the key gaps are about claims running ahead of evidence, not all included studies were treated as equally informative; instead, a simple evidence-weighting approach was used when interpreting findings, consistent with methodological discussion that scoping reviews can benefit from clearer analytic steps and quality-sensitive interpretation (Levac et al., 2010).

Review framework and reporting

The review process was planned to align with the PRISMA extension for scoping reviews (PRISMA-ScR) for reporting transparency (Tricco et al., 2018). Although PRISMA-ScR is a reporting guideline (rather than a methodological framework in itself), it provides a clear structure for documenting search, screening, and charting decisions. For general reporting consistency, PRISMA 2020 was also consulted where appropriate(Page et al., 2021).

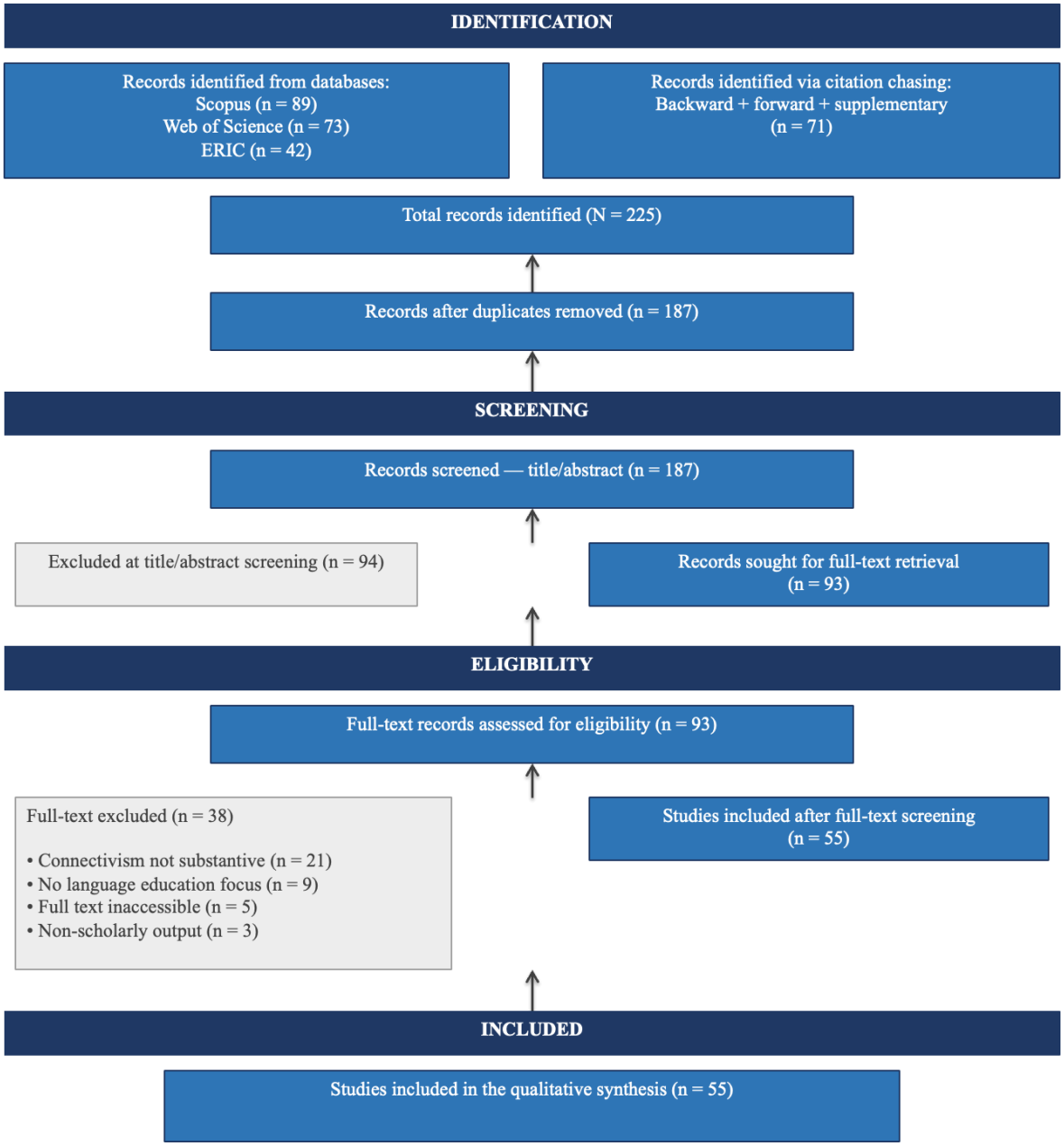

Figure 1. PRISMA-ScR flow diagram of study identification, screening, and selection

Information sources

To cover the interdisciplinary nature of this topic (CALL, applied linguistics, educational technology, open/networked learning), the author searched: (1) Scopus and Web of Science Core Collection (broad index coverage and citation tracking), (2) ERIC (education-focused indexing), and (3) Google Scholar (used only for *supplementary* retrieval and citation chasing because reproducibility is limited).

In addition, backward and forward citation chasing from key connectivism-oriented papers and from high-relevance language education studies found in the database search was conducted.

Search strategy

The search strategy combined (a) the focal theory term and (b) language education descriptors. The core string was adapted to each database syntax and searched in Title/Abstract/Keywords when possible: "connectivis* AND (language learn* OR language teach* OR "second language" OR "foreign language" OR EFL OR ESL OR TESOL OR CALL)". To reduce the risk of missing studies that apply connectivism mainly within specific ecologies, I used a supplementary expansion block: "(MOOC* OR cMOOC* OR "networked learning" OR "social media" OR "online community" OR "open online" OR "digital informal learning" OR AI OR "artificial intelligence")". Limits: English-language publications; peer-reviewed outputs prioritized. The exact search dates, database-specific strings, and retrieval counts were documented for transparency.

Eligibility criteria

Studies were included when they met all conditions below:

(1) *Substantive connectivism use*: connectivism was central to the study's framing (research questions, design rationale, analytic interpretation), not merely a brief mention.

(2) *Language education focus:* learning/teaching of languages in formal, non-formal, or informal contexts.

(3) *Scholarly contribution type*: empirical studies (qualitative/quantitative/mixed/design based/analytics) and conceptual papers that meaningfully define, extend, or critique connectivism in language education.

(4) *Accessible full text for coding*.

Exclusion criteria were: technology-focused language studies that did not meaningfully theorize connectivism; purely technical tool descriptions without learning analysis; non-scholarly outputs (blogs, news items).

Screening and selection

Screening proceeded in two stages:

Stage 1: title/abstract screening to remove clearly irrelevant items.

Stage 2: full-text screening to confirm that connectivism shaped the study beyond rhetorical signalling.

Applying this process, the search yielded 225 total records across all sources (Scopus: n = 89; Web of Science: n = 73; ERIC: n = 42; citation chasing: n = 21). After removing 38 duplicates, 187 records proceeded to title and abstract screening. Stage 1 screening excluded 94 records that did not meet the substantive connectivism criterion or language education focus. The remaining 93 records underwent full-text review (Stage 2). Of these, 38 were excluded for the following reasons: connectivism not substantive (n = 21), no clear language education focus (n = 9), full text inaccessible after institutional and interlibrary loan requests (n = 5), or non-scholarly output type (n = 3). This resulted in a final corpus of 55 studies included in the synthesis.

If connectivism's role was ambiguous, I applied a conservative rule: the paper was included only when the full text showed that connectivism informed the design, analysis, or interpretation in a traceable way (this is important given the "descriptive rhetoric" gap identified earlier).

Data charting and coding scheme

A structured data-charting form was developed and refined during pilot coding. The aim was to preserve both *mapping breadth* and *mechanism sensitivity*, directly responding to the operationalization and outcome-alignment gaps discussed in the Conceptual Background.

Before presenting the synthesis results, Table 2 shows the core coding dimensions used to ensure that "connectivism" is not treated as a single undifferentiated label.

Table 2. Data extraction and analytic codes for the evidence map

Dimension	Example codes / descriptors	Link to gaps
Bibliographic/context	year; region; sector; participants; target language	clarifies where evidence exists
Learning ecology	LMOOC/cMOOC; social media; LMS-hybrid; AI-mediated	addresses ecology comparability gap
Connectivism positioning	theory claim; pedagogical orientation; descriptive lens	addresses conceptual positioning gap
Network referent	social ties; resource curation; algorithmic mediation	addresses operationalization gap
Indicators and data	self-report; trace/logs; SNA; discourse/interaction analysis	tests "network" measurability
Outcomes	engagement; agency; literacies; language measures	addresses outcome alignment gap
Method quality signals	instrument validity; reliability; triangulation; analytic transparency	supports evaluative synthesis

This coding scheme functions like a bridge between the Conceptual Background and the Results section. For instance, if a study claims connectivism as theory but uses only general satisfaction surveys, it will be mapped as evidence for trends in discourse, but interpreted cautiously regarding mechanisms or language outcomes.

Evidence-weighting and synthesis

Because scoping reviews typically prioritize mapping rather than excluding on quality, I did not remove studies solely due to methodological weaknesses. However, following methodological calls for clearer analytic steps in scoping work (Levac et al., 2010), I applied an evidence-weighting heuristic during synthesis. Each study was judged (informally but systematically) on: (i) construct clarity (explicit definition and alignment of "network"), (ii) transparency (sampling, procedures, analysis), and (iii) outcome credibility (appropriate measurement and inference).

Findings were then synthesized in three layers: (1) Descriptive mapping (who/where/what ecologies); (2) Thematic synthesis of conceptualization and operationalization patterns; and (3) Outcome-mechanism synthesis, where claims were interpreted in relation to the strength of indicators and the degree of alignment between network processes and language-related outcomes.

This approach is designed to answer the review questions stated in the Introduction while directly confronting the gaps identified in the Conceptual Background: not only *how often* connectivism is mentioned, but *what kinds of evidence* support connectivist interpretations in language education.

4. RESULTS AND DISCUSSIONS

This Results and Discussion section follows directly from the Conceptual Background and Methods. In particular, because the earlier section identified gaps about conceptual positioning (theory vs pedagogy vs rhetoric), operationalization (what "network" means), and outcome alignment (participation vs language development), the author organizes the synthesis around these same points. This section reports the *patterns* that recur across studies, then interprets what these patterns mean for what the literature can (and cannot) tell us.

To ensure clarity and transparency, Table 3 maps each research question to the subsection where it is directly addressed.

Table 3. Mapping of research questions to Results and Discussion subsections

Research Question	Addressed in Subsection
RQ1: How is connectivism defined and positioned?	How connectivism is positioned: theory, pedagogy, or descriptive lens
RQ2: How is connectivist learning operationalized?	Operationalization: what counts as 'connections' in practice
RQ3: In which learning ecologies is connectivism applied?	Included evidence and overall landscape of studies
RQ4: What outcomes and mechanisms are reported?	Outcomes: what is most consistently reported
RQ5: What methodological strengths and weaknesses recur?	Evidence quality: recurring strengths and recurring weaknesses

Overview of included evidence and overall landscape of studies

Across the mapped corpus, connectivism is most visible in language education research when the learning environment is open, networked, and platform-mediated, such as LMOOCs, social media communities, and blended online learning designs. Studies are also increasingly linking connectivism with AI-mediated language learning. This is not necessarily because AI itself is "connectivist" as a theory. Instead, it is more because AI tools can become new "nodes" in the network. Learners may consult these tools, rely on them, and then integrate them into their learning networks together with teachers, peers, and online resources (Ruyang et al., 2025).

In terms of methods, the literature is still quite mixed. Many studies mainly use surveys and interviews to explore perceptions and patterns of participation. By contrast, a smaller group of studies uses learning analytics, trace data, or network-analytic approaches to examine observable learner activity and how connections are structured. This is important because connectivism is a theory that depends strongly on *connections as processes*, so evidence based only on general perceptions can be informative for experience and attitudes, but often weak for mechanism claims (Bell, 2011; Kop & Hill, 2008).

How connectivism is positioned: theory, pedagogy, or descriptive lens

A consistent result is that connectivism is not used in one stable way. Instead, the three uses described in Table 1 of the Conceptual Background recur clearly in the empirical literature:

First, many papers use connectivism as a pedagogical orientation. In this group, connectivism is mainly a design logic: learners are expected to curate resources, participate in peer interaction, and sustain engagement across learning spaces. A good example is networked writing pedagogy that emphasizes international collaboration and intercultural learning; the strength here is design clarity and pedagogical plausibility rather than theory testing (Tham et al., 2021).

Second, a smaller group of studies uses connectivism more as a theory claim. This means they imply that network processes are not only background context, but are part of the explanation for learning outcomes. This is where the literature becomes more challenging. The reason is that theory claims need stronger operationalization, so researchers must define and measure the network processes more clearly, not just assume them. When some studies can show clearer mechanisms, connectivism looks more convincing. For example, in an LMOOC context, a study may show that interaction intensity is associated with learners' persistence and also their affective experience. In this case, connectivism becomes less like a rhetorical label that sounds attractive. It becomes more like a testable interpretation of learning conditions, because we can see *how* certain conditions relate to specific learner outcomes (Rahimi & Daneshvar Ghorbani, 2025).

Third, many studies use connectivism as a descriptive lens that signals "learning is networked now", but without clear construct definitions and without indicators that match the theory. This is not inherently problematic but it limits what can be concluded. In these studies, connectivism explains the setting more than the learning mechanism, which supports the conceptual positioning gap identified earlier (Bell, 2011).

Table 4. Synthesized patterns in the connectivism-language education literature

Synthesis focus (linked to gaps)	Typical pattern in studies	What the literature tells us (careful claim)	What remains under-tested
Conceptual positioning	Connectivism more often used as design rationale than as tested learning theory	Connectivism helps justify networked designs and autonomy/curation tasks	Clear tests of connectivist mechanisms (beyond general engagement)
Operationalization of "network"	"Network" frequently equated with platform use or online participation	Networked environments are commonly associated with engagement and perceived usefulness	Valid indicators of network processes (ties, curation pathways, algorithmic mediation)
Outcomes	Outcomes often focus on engagement, agency, literacies; fewer studies measure language gains robustly	Networked learning designs plausibly support participation and strategic competence	Reliable, outcome-aligned language measures linked to network indicators
Ecology comparability	Different ecologies (LMOOC/social media/AI) often treated as similar "networked learning"	General claims travel easily across contexts	Comparative studies that separate ecology effects from connectivist mechanisms

Table 4 indicates that the literature is richer for design and participation narratives than for mechanism confirmation. This matches the research gaps in the Conceptual Background and explains why RQ2 and RQ5 are central for interpretation.

Operationalization: what counts as "connections" in practice

When studies attempt to operationalize "connections", they tend to do so through three main indicator families, aligned with the earlier conceptual distinctions.

(1) *Social interaction indicators*: Some studies treat peer interaction (posting, replying, commenting, collaborative tasks) as evidence of networked learning. This is common in LMOOC and online community work. A key insight here is that learners do not all participate in the same way. Their interaction patterns can be quite uneven. Also, the roles they take in a network can be different, such as active contributors, quiet followers, or occasional participants. Research that uses learning analytics and networked attention perspectives in connectivist contexts suggests that we can identify participation types, and we can also see how interaction patterns shift over time. This is promising because it helps operationalize connectivist learning, instead of only assuming that it exists just because a network is present (Gao et al., 2025).

(2) *Resource curation and navigation indicators*: Other studies treat learners' resource practices - finding materials, sharing links, building repositories, using models and exemplars - as "connections". This is conceptually close to connectivism, but it is often measured through self-report, reflective writing, or interview accounts. These data are valuable for understanding learner agency, but they are not always sufficient to show whether curation practices produce language development outcomes.

(3) *Platform/algorithmic exposure indicators*: This is still emerging, but increasingly relevant. The rise of AI and algorithmic curation changes what learners see, practise, and value. Bibliometric and trend analyses in technology-integrated foreign language teaching explicitly note connectivism as one theoretical foundation that fits these networked and personalized conditions (Li & Li, 2025). However, empirical language studies rarely isolate algorithmic mediation as a mechanism. This is a major under-tested area.

Outcomes: what is most consistently reported

Across learning ecologies, the strongest and most consistent outcomes are in engagement, participation, agency, and digital literacy-related capacities, rather than in robustly measured language gains. This is not surprising.

Networked environments directly change opportunities to participate and to access resources, so affective and behavioural outcomes appear early and are easier to measure. For example, mixed-methods studies of social media use framed through connectivist and constructivist perspectives typically report themes such as learning engagement, collaboration, and perceived benefits for skills practice (Apoko & Waluyo, 2025).

Evidence for language development outcomes exists, but it is more uneven. It tends to appear either (a) in intervention studies with explicit connectivist programmes (often in school contexts), or (b) in courses where language practice is structured and assessment is integrated into the networked design. The problem is that many studies do not align network indicators with language measures, so it is difficult to interpret language gains as connectivist effects rather than as general effects of increased practice, motivation, or time-on-task. This is the outcome alignment gap in concrete form.

Evidence quality: recurring strengths and recurring weaknesses

The evaluative synthesis identified three recurring strengths:

• *Contextual richness*: Many qualitative and mixed-methods studies describe the learning ecology in a lot of detail. This helps us interpret what "networked learning" really looks like in real language learning settings, not only in abstract theory.

• *Design specificity in LMOOC work*: Critical reviews of LMOOC design features often highlight that language learning needs interaction opportunities and also feedback structures. Because of this, connectivism should not be assumed only from the platform or the technology itself (Hsu, 2022).

• *Growing analytics sophistication*: Some recent work has started to model participation diversity and how interaction evolves over time in networked learning contexts. This is a useful step for making the connectivist claims more concrete (Gao et al., 2025).

At the same time, three weaknesses seem persistent:

• *Construct vagueness*: Terms like "network" and "connection" are not always clearly defined. So, studies can become hard to compare with each other, and the theory side becomes a bit thin.

• *Over-reliance on self-report*: Many studies depend heavily on perceived learning and satisfaction. This is still informative, but it is limited when researchers want to claim mechanisms.

• *Confounding and causal overreach*: Even when language outcomes are reported, many designs cannot clearly separate network effects from other factors. These can include prior proficiency, teacher scaffolding, learner motivation, and unequal access to networks.

Discussion: what literature tells us, and what it does not

Taken together, the findings suggest four cautious but useful conclusions,.

First, connectivism is more established as a pedagogical orientation than as an empirically validated learning theory in language education. Many studies use connectivist language to support openness, autonomy, and peer contribution designs, and they provide convincing accounts of participation opportunities (Tham et al., 2021). However, fewer studies test the theory-level claim that network processes explain learning outcomes.

Second, the strongest evidence is for participation-related outcomes and learning capacities that sit "around" language development. These include engagement, persistence, agency, and digital literacies. This does not mean language development is absent; rather, it means language outcomes are less consistently measured and less tightly linked to network indicators. In that sense, connectivism in language education currently functions well as a framework for understanding *learning conditions* and *learner navigation*, but less well as a direct predictor of linguistic gains.

Third, learning ecology matters more than is sometimes acknowledged. LMOOCs, social media communities, and AI-mediated environments have different participation architectures. Research on LMOOC design features shows that interaction and feedback are not automatic; they must be designed, scaffolded, and sustained (Hsu, 2022). Similarly, in AI-powered language learning, using a connectivist framing implies that learners need to develop strong evaluative judgement. They also need skills for navigating networks, such as choosing sources, checking quality, and deciding what to trust. However, the empirical research is still catching up with these kinds of claims. In many cases, the argument sounds reasonable, but the evidence base is not yet strong enough to fully support it (Ruyang et al., 2025).

Fourth, the field now appears ready for a more disciplined research agenda. This agenda should directly address the gaps identified earlier. Based on this synthesis, four methodological priorities emerge:

(1) *Minimum operational definitions*: Studies should clarify what "network" means in their work. For example, does it refer to social ties, resource curation, or algorithmic mediation? Then they should choose indicators that fit this definition.

(2) *Alignment between indicators and outcomes*: If connectivism is treated as a theory claim, then network indicators should be linked to language measures. They should not be linked only to engagement or participation.

(3) *Comparative ecology designs*: Researchers should compare different learning ecologies. For instance, they can compare LMOOCs with closed LMS contexts, or human-only networks with AI-augmented networks. This helps separate "being online" from actual connectivist mechanisms.

(4) *Evidence-weighting transparency*: Reviews and also primary studies should report construct clarity and measurement quality more explicitly. This can reduce rhetorical inflation, where big claims are made without enough precision in concepts and evidence (Bell, 2011; Kop & Hill, 2008)

Overall, literature supports connectivism as a valuable language for describing and designing networked language learning, but it also shows that connectivism can become too easy to claim and too difficult to test. The next step, therefore, is not to abandon connectivism, but to make it more empirically accountable in language education research.

5. CONCLUSION

This review started from a simple motivation stated in the Introduction: connectivism is often used to explain or legitimize networked language learning, but the literature does not always show clearly what "connections" are, how they are measured, and how they relate to language outcomes. Building on the Conceptual Background and the scoping-review methods, the Results & Discussion suggests that connectivism has become most stable in language education as a pedagogical orientation rather than as an empirically validated learning theory. In many studies, connectivist ideas support reasonable design principles - openness, learner autonomy, peer contribution, and resource curation across platforms - and these designs are frequently associated with outcomes such as engagement, participation, agency, and digital literacy development (Apoko & Waluyo, 2025; Tham et al., 2021). However, fewer studies provide strong evidence that specific network processes explain measured language development, because operational definitions are often vague and outcome measures are not consistently aligned with the proposed connectivist mechanisms.

A key conclusion is therefore not that connectivism is "right" or "wrong", but that it is often too easy to claim and still difficult to test in language education research. When connectivism is used as a theory claim, studies need to specify which network referent is central (social ties, resource curation, or platform/algorithmic mediation) and then select indicators that match that referent. In particular, LMOOC research reminds us that networked participation and feedback are not automatic features of being online; they depend on design architectures and sustained scaffolding (Chong et al., 2022). Meanwhile, emerging AI-mediated language learning creates new "nodes" and new risks for learners' judgement and evaluation, which makes connectivist framing increasingly relevant, but also increases the need for stronger construct-valid evidence (Ruyang et al., 2025).

For future work, this review highlights four practical priorities. First, researchers should state clearly whether connectivism is used as theory, pedagogy, or descriptive lens, so synthesis becomes possible across studies. Second, "network" should be operationalized with minimum transparency, rather than assumed from platform use. Third, outcome alignment must improve: if language development claims are made, they should be linked to network indicators and measured with credible language assessments, not only self-report. Finally, comparative designs across learning ecologies (e.g., LMOOCs vs closed LMS, human-only vs AI-augmented networks) are needed to separate general online effects from connectivist mechanisms.

In summary, the literature tells us that connectivism is a helpful vocabulary and design orientation for contemporary language education, but it also tells us that the field must move toward more disciplined operationalization and stronger evidence if connectivism is to function convincingly as an explanatory account of language learning.

Practical implications for language teachers, curriculum designers, and policymakers

Beyond the theoretical and methodological contributions discussed above, this review yields several actionable implications for practice. Rather than treating connectivism as an abstract framework, practitioners can use its principles to make concrete decisions about design, facilitation, and assessment.

For language teachers, the most immediate implication is that fostering network navigation skills should become an explicit pedagogical goal, not merely a hoped-for byproduct. This means teaching learners how to: Evaluate the credibility of online resources and AI-generated content before integrating them into learning networks; Sustain meaningful peer connections beyond graded assignments (e.g., through voluntary discussion threads, shared resource repositories); Curate personal learning environments that balance human interaction, structured content, and AI support.

Practical strategies include dedicating 10-15 minutes of class time weekly to "network check-ins," where students share one useful resource they discovered and explain why they trust it, or using collaborative bookmarking tools (e.g., Padlet, Wakelet) to build class-wide resource banks with structured reflection prompts.

For curriculum designers, connectivism suggests rethinking the boundary between "course content" and "learner-generated content". In practice, this means: Designing tasks that require learners to find, compare, and synthesize information from multiple sources outside the provided materials; Building in structured opportunities for cross-cohort and cross-institutional interaction (e.g., shared discussion forums, peer review exchanges with partner classes); Integrating AI literacy as a formal learning outcome, with explicit criteria for evaluating machine-generated language models.

Table 5 provides a summary of design strategies mapped to specific learning ecologies:

Table 5. Practical design strategies by learning ecology

Learning Ecology	Connectivist Design Strategy	Example Implementation
LMOOC	Foster sustained interaction through structured prompts and small-group facilitation	Weekly "connection challenges" requiring replies to 3+ peers; instructor modelling of network commentary
Social media community	Scaffold resource curation with reflection; avoid assuming participation equals learning	Students post 1 resource + 2-sentence rationale; class votes on most useful weekly resource
Blended online learning	Integrate self-tracking of learning pathways across platforms	Digital learning log where students map where they found key information (peer, tool, resource)
AI-mediated learning	Teach evaluation protocols for AI output; position AI as node, not authority	"Verify with two sources" rule for AI-generated language; compare AI suggestions with peer/human examples

For institutional and policy audiences, the review suggests that investments in digital infrastructure alone are insufficient without corresponding investments in learner and teacher network literacy. Policymakers should consider: Embedding digital network literacy (evaluation, curation, ethical participation) into language curricula as assessable competencies; Providing professional development that moves beyond "tool training" toward pedagogical frameworks for orchestrating networked learning; Developing guidelines for appropriate AI integration that preserve learner agency and critical judgement.

A cautionary note is warranted: not every networked activity is connectivist learning. Practitioners should resist the temptation to label any technology-mediated activity as "connectivist" simply because it occurs online. Instead, they should ask: What specific connections are being fostered? How are these connections measured? And what evidence links them to language development?

Conflict of Interest: No potential conflict of interest relevant to this article was reported.

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