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Values at the Edge of TPACK: A PRISMA-Guided Bibliometric Analysis of Values Education in Technology-Integrated Language Teaching Research, 2011–2026

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Abstract

Language teachers are expected to integrate digital and artificial intelligence (AI) tools while also cultivating ethical, cultural and civic values, yet the Technological Pedagogical Content Knowledge (TPACK) framework that guides their preparation says little about values. It is unclear whether research on TPACK in language education has begun to address this dimension. This study mapped the field and examined where values appear in it. Following PRISMA 2020, 378 Scopus records were screened, and 282 English-language documents published from 2011 to 2026 were analysed with descriptive bibliometric indicators, keyword co-occurrence clustering and dictionary-based coding of six values dimensions. Output grew sharply: 183 documents (64.9%) appeared in 2023–2026. Indonesia (47 documents) and China (39) were the most productive countries, and Hong Kong-affiliated work drew the most citations (1,009). Four thematic clusters emerged: teacher professional development and computer-assisted language learning; AI and generative AI in English language teaching; pre-service teacher education and technology integration; and digital pedagogy and competence. The share of documents that engaged any values dimension rose from 8.6% (2011–2018) to 17.2% (2019–2022) and 37.7% (2023–2026). Culture and identity (13.1%), inclusion and equity (9.9%) and ethics (9.2%) led, while character and moral values (2.8%) and social-emotional learning (1.1%) were rare. Every document coded for ethics also addressed AI. Values therefore enter TPACK language research mainly as AI ethics rather than as a planned teaching goal. The study proposes a values-oriented extension of TPACK for language teacher education.

1 Introduction

1

Language teachers today are asked to meet two demands at once. They must integrate digital and artificial intelligence (AI) tools into their teaching, and they must help learners form ethical, cultural and civic values [6, 19, 40]. In practice, these demands are seldom joined. A review in this journal found that humanistic and moral goals in English language classrooms are held back by rigid curricula, exam-oriented systems and limited teacher training [2]. Another recent review of 20 studies on generative AI in teacher professional development found that fewer than one third used the Technological Pedagogical Content Knowledge (TPACK) framework and that their ethical frameworks were inconsistent [35]. The concrete problem is therefore that language teachers are being prepared to teach with technology, and now with AI, without a clear model of the values that this technology carries or could cultivate.

TPACK is the framework most teacher education programmes use for this preparation [17, 29]. It extends Shulman's notion of pedagogical content knowledge [36] by describing how knowledge of technology, pedagogy and content interact. Research on TPACK in language education has grown steadily. Studies have developed TPACK instruments for EFL teachers [4, 5], shown that TPACK predicts the adoption of mobile-assisted language learning [15], and examined how TPACK interacts with teacher beliefs and school culture [21]. In *Discover Education*, recent work has linked teachers' TPACK with technology acceptance constructs [27] and identified the factors that shape TPACK implementation in

teacher education institutions [11]. With the arrival of generative AI, scholars have revisited TPACK [30], proposed an Intelligent-TPACK with an explicit ethics domain [7] and examined AI integration in TESOL teacher education [18]. Reviews of AI in education also call for ethical governance and responsible adoption [1, 14].

A second body of research comes from values education. It holds that values are formed through everyday teaching rather than in separate lessons [13, 24]. In language education, intercultural competence and cultural awareness are core learning goals [6, 19]. A recent bibliometric review in this journal mapped 589 Scopus-indexed articles on character education and found that the field centres on character and civic education, with digital literacy appearing among newer, practice-oriented innovations [42].

These two bodies of research rarely meet. Reviews of TPACK in language teaching have focused on measuring teachers' knowledge and technology adoption, not on values [26, 38, 43]. Conversely, bibliometric work on character education has not examined teachers' technological knowledge [42]. To date, no study has mapped the whole body of Scopus-indexed TPACK research in language education with bibliometric tools, and none has examined whether and how values are represented in it. This gap matters for values education. If the knowledge framework that guides technology-rich language teaching does not name values, teacher education programmes are unlikely to prepare teachers to cultivate them deliberately.

This study offers three contributions that are new to the literature. First, it provides the first bibliometric map of TPACK research in language education covering 2011 to 2026, including the period of generative AI. Second, it combines bibliometric analysis with the coding of six values dimensions drawn from values education, bringing together two fields that have developed separately. Third, it tests empirically whether values enter TPACK research through AI, and it uses the result to propose a values-oriented extension of TPACK for language teacher education.

The aim of this study is to map Scopus-indexed research on TPACK in language education from 2011 to 2026 and to examine to what extent, and through which dimensions, this research engages with values. The study addresses four research questions (RQs):

- RQ1: How has the volume of TPACK research in language education developed over time, and which sources and countries contribute most to it?
- RQ2: Which documents are the most influential, and which thematic clusters structure the field?
- RQ3: To what extent, and through which dimensions (ethics, culture, character, inclusion, social-emotional learning and civic orientation), do these studies engage with values?
- RQ4: How is engagement with values related to the recent rise of AI in this research?

By answering these questions, the study responds to the Collection's call to re-examine how values are taught and experienced in digital, globalised and AI-driven learning environments, with a focus on the

role of teachers and their professional knowledge.

2 Conceptual background

2
2.1

2.1 TPACK and language teacher knowledge

TPACK describes the knowledge teachers need to teach a subject with technology. It combines three core domains (technological, pedagogical and content knowledge) and their intersections [17, 29]. The framework also places this knowledge within a context, which includes learners, schools and cultures [17]. In language education, content knowledge covers linguistic systems, language skills and the cultural meanings that languages carry. Studies in this area have developed TPACK instruments for English as a foreign language (EFL) teachers, examined how TPACK predicts the adoption of mobile and computer-assisted language learning (CALL), and designed professional development programmes [38]. Across these strands, TPACK has mostly been treated as a cognitive and technical capacity.
2.2

2.2 Values education in language teaching

Values education refers to the explicit and implicit ways in which schools help learners form beliefs about what is good, right and worth pursuing [13]. Character education traditions emphasise virtues such as honesty, respect and responsibility [24]. Language teaching connects with values in at least three ways. First, language and culture cannot be separated, so learning a language involves meeting other values and reflecting on one's own [6, 19]. Second, the materials, texts and examples teachers choose carry moral and cultural messages. Third, the way learners use tools to read, write and communicate raises questions of honesty, respect and responsibility. A teacher's knowledge of how technology, pedagogy and content interact therefore also shapes which values learners meet and practise.
2.3

2.3 Artificial intelligence and the ethical turn in TPACK

Generative AI has made the value side of technology integration more visible. International guidance calls on teachers to address academic integrity, data privacy, bias and human agency when they use AI [40]. Scholars of AI in education argue that ethics must be part of how AI is designed and used in classrooms [14]. Within TPACK research, Mishra and colleagues argued that generative AI changes the context and the content of teaching itself [30], and Celik proposed Intelligent-TPACK with an explicit

ethics domain [7]. These proposals suggest that values may be entering TPACK through AI. Whether this is happening in language education, and whether it extends beyond ethics to culture, character and civic values, is an empirical question that this study addresses.

3 Methods

3
3.1

3.1 Research design

This study combined a bibliometric analysis [10, 44] with a systematic mapping of values content. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement [32] guided the identification, screening and inclusion of records. A bibliometric design was chosen over a meta-analysis because the research questions concern the structure and thematic orientation of the field rather than a pooled effect size, and because the included studies use diverse designs and outcomes that cannot be combined statistically. All analyses used descriptive statistics (counts, percentages, medians and simple growth comparisons). The study analysed published metadata only and involved no human participants.
3.2

3.2 Data source and search strategy

Scopus was selected because it offers wide coverage of peer-reviewed education and linguistics journals and exports complete metadata, including abstracts, author keywords, affiliations, references and citation counts. The search used the keywords “TPACK”, “learning” and “language” in the Article title, Abstract and Keywords field: TITLE-ABS-KEY (TPACK AND learning AND language). No further filters were applied at the search stage. The results were exported on 19 October 2026 in CSV format and returned 378 records published between 2011 and 2027.
3.3

3.3 Eligibility criteria and screening

Records were included if they (a) were journal articles, review articles, conference papers or book chapters; (b) were written in English; (c) were published between 2011 and 2026; and (d) applied TPACK to the teaching or learning of a language, including English as a foreign or second language, other foreign languages, first-language literacy and language teacher education. Records were excluded if they were duplicates, errata, corrections or retraction notices, conference proceedings front matter, whole books, or studies that used TPACK in other subjects such as mathematics, science or computer

programming. Records that mentioned “language” only in the sense of programming languages or large language models were not counted as language education.

Screening proceeded in three stages (Fig. 1). First, 7 duplicate records (identified by normalised titles; the most-cited version was kept) and 35 errata or retraction notices were removed, leaving 336 records. Second, 19 records were excluded by document type, language or publication year. Third, the titles, abstracts and keywords of the remaining 317 records were checked against criterion (d), and 35 records that applied TPACK outside language education were excluded. The final dataset contained 282 documents. Screening rules were applied with a scripted procedure, and the borderline cases were checked manually by the authors [*authors: confirm second-reviewer check*].

3.4

3.4 Bibliometric indicators

Performance analysis described annual output, document types, sources, authors, countries and citations [10]. Country productivity was counted at the document level: a document was credited once to each country in its authors’ affiliations. Citation counts were those reported by Scopus on the export date. Science mapping used author keyword co-occurrence [44]. Keyword variants were harmonised (for example, “TPCK” and “technological pedagogical content knowledge” were merged into “TPACK”; “AI” into “artificial intelligence”). The search term TPACK was then removed, and a co-occurrence network was built from the 30 most frequent keywords. Clusters were identified with the greedy modularity algorithm [9], and the network was drawn with the Kamada–Kawai layout [16]. Analyses were run in Python (pandas 3.0, NetworkX 3.6, Matplotlib 3.11).

3.5

3.5 Coding of values dimensions

To answer RQ3 and RQ4, each document’s title, abstract and author keywords were coded against six values dimensions drawn from the Collection’s scope and from values education literature [6, 13, 14, 19, 24, 40]. A dictionary of indicative terms was developed for each dimension (Table 1). Generic uses of terms that do not express values (such as “school culture” in an organisational sense, “characteristics” and “inclusion of” meaning “adding”) were removed before coding. A document could be coded for more than one dimension. Documents were also coded as AI-related if they referred to artificial intelligence, generative AI, ChatGPT, large language models or chatbots. Results are reported as the number and percentage of documents per dimension, overall and for three periods: 2011–2018, 2019–2022 and 2023–2026.

Table 1
Values dimensions and indicative coding terms

Values dimension	Indicative terms (title, abstract, author keywords)
Ethics, integrity and responsible technology use	ethic*, integrity, plagiarism, academic honesty, responsible use/AI, privacy, bias, fairness, digital citizenship
Culture, intercultural and identity	cultur*, intercultural, multicultural, local wisdom, heritage, identity, indigenous
Character, moral and religious values	character education/building/strengths, moral*, virtue, religio*, Islamic, spiritual, values education, value-based
Inclusion, equity and social justice	inclusi*, equity, equitable, disability, accessibility, diversity, social justice, marginalised, digital divide
Social-emotional learning and well-being	social-emotional, SEL, empathy, well-being, emotional intelligence, compassion, caring, resilience
Civic, global and sustainability orientation	citizenship, civic, democra*, sustainab*, SDG, global competence

4 Results

4

4.1

4.1 Overview of the dataset

The 282 documents were published in 186 sources by 700 distinct authors (Table 2). Journal articles made up 76.2% of the dataset. The documents had been cited 4,229 times in total, but citations were uneven: the median was 3 and 77 documents (27.3%) had not yet been cited. Most documents (59.6%) were open access.

Table 2
Main characteristics of the dataset (n = 282)

Indicator	Value
Time span	2011–2026 (2026 up to 19 October)
Documents	282
Articles / conference papers / book chapters / reviews	215 / 30 / 24 / 13
Sources (journals, proceedings, books)	186
Distinct authors	700
Authors per document (mean)	2.69
Single-authored documents	57 (20.2%)
Documents with authors from more than one country	57 (20.2%)
Countries represented	59
Total citations / mean / median per document	4,229 / 15.0 / 3
Uncited documents	77 (27.3%)
Open access documents	168 (59.6%)
Documents with author keywords / distinct keywords	254 / 815

4.2

4.2 Growth of the field (RQ1)

Output was low and uneven until 2017 and grew steadily from 2018 (Fig. 2). The field produced 35 documents in 2011–2018, 64 in 2019–2022 and 183 in 2023–2026. In other words, almost two thirds (64.9%) of all documents appeared in the last four years. The peak year was 2025 with 71 documents, and 47 documents had appeared in 2026 by the export date. AI-related documents first appeared in 2023 (2 documents) and rose to 8 in 2024, 28 in 2025 and 27 in 2026. In 2026, AI-related work already formed more than half of the year's output (27 of 47).

4.3

4.3 Sources and countries (RQ1)

The field is dispersed: the ten most productive sources together published only 56 documents (19.9%). *Education and Information Technologies* and *Computer Assisted Language Learning* were the most productive and most cited sources (Table 3). *Computer Assisted Language Learning* had the highest citation impact per document (79.3).

Table 3
Ten most productive sources

Source	Documents	Citations	Citations per document
Education and Information Technologies	11	678	61.6
Computer Assisted Language Learning	9	714	79.3
ReCALL	5	122	24.4
Indonesian Journal of Applied Linguistics	5	77	15.4
Sustainability (Switzerland)	5	153	30.6
International Journal of Learning, Teaching and Educational Research	5	20	4.0
Interactive Learning Environments	4	160	40.0
Educational Technology and Society	4	113	28.3
Cogent Education	4	79	19.8
Frontiers in Education	4	26	6.5

Authors came from 59 countries, with a strong concentration in Asia (Fig. 3). Indonesia was the most productive country (47 documents), followed by China (39), the United States (25), Malaysia (24) and Hong Kong (22). Productivity and influence did not match. Hong Kong-affiliated documents received the most citations (1,009; 45.9 per document), followed by Taiwan (693; 36.5 per document) and China (640; 16.4 per document). Indonesian documents received 562 citations (12.0 per document).

4.4

4.4 Most influential documents (RQ2)

Table 4 lists the ten most cited documents. The most cited, with 274 citations, modelled English teachers' behavioural intention to use AI in middle schools [3]. The rest form two groups. The older group (2016–2022) developed TPACK models and instruments for EFL teachers [4, 15], reviewed the field [38] and described teachers' online teaching during the COVID-19 pandemic [25]. The newer group (2024–2025) concerns AI: chatbots and ChatGPT for language learning and writing [23, 39] and generative AI in informal English learning [12]. A validated EFL TPACK questionnaire [5] and a study of how TPACK, beliefs and school culture shape technology adoption [21] complete the list.

Table 4
Ten most cited documents

Rank	Document	Source	Citations
1	An et al. (2023) [3]	Education and Information Technologies	274
2	Tseng et al. (2022) [38]	Computer Assisted Language Learning	204
3	Hsu (2016) [15]	Computer Assisted Language Learning	133
4	Baser et al. (2016) [4]	Computer Assisted Language Learning	125
5	Lie et al. (2020) [25]	Journal of Information Technology Education: Research	118
6	Li et al. (2025) [23]	Interactive Learning Environments	111
7	Tseng and Lin (2024) [39]	Electronic Journal of e-Learning	105
8	Guan et al. (2025) [12]	ReCALL	100
9	Bostancıoğlu and Handley (2018) [5]	Computer Assisted Language Learning	90
10	Lai et al. (2022) [21]	British Journal of Educational Technology	86

4.5

4.5 Research contexts and designs

Most documents concerned English: 185 (65.6%) referred to EFL, ESL or English language teaching, while 66 (23.4%) referred to other languages such as Arabic, Chinese, Indonesian or Spanish. Higher education was the most common setting (116 documents, 41.1%), followed by in-service teachers and professional development (79, 28.0%), pre-service teachers (77, 27.3%) and K-12 schools (40, 14.2%). Qualitative or case study designs (147, 52.1%) and surveys (104, 36.9%) dominated. Experimental or quasi-experimental designs were rare (18, 6.4%). These categories overlap because one document may report several settings or methods.

4.6

4.6 Thematic structure (RQ2)

The network of the 30 most frequent author keywords (excluding TPACK) had 100 links and formed four clusters (Fig. 4; Table 5). Cluster 2, centred on artificial intelligence and generative AI, is the newest: “artificial intelligence”, “generative AI”, “ChatGPT” and “AI literacy” did not appear as author keywords before 2023. Over time, the most frequent keywords shifted from “teacher education”, “technology integration” and “EFL” in 2011–2018 to “artificial intelligence”, “generative AI” and “pre-service teachers” in 2023–2026. No values-related keyword reached the top 30. About 20 values-related author keywords

were found (for example, “academic integrity”, “equity”, “intercultural competence”, “culturally responsive teaching”, “AI ethics” and “Islamic schools”), but none was used by more than two documents.

Table 5
Thematic clusters of author keywords

Cluster	Interpretive label	Main keywords
1	Teacher professional development and CALL	professional development, CALL, EFL teachers, teacher training, lesson planning, e-learning, digital literacy, ICT
2	AI and generative AI in English language teaching	artificial intelligence, generative AI, English language teaching, educational technology, ChatGPT, systematic review, blended learning, AI literacy
3	Pre-service teacher education and technology integration	pre-service teachers, technology integration, teacher education, EFL, higher education, SAMR, EFL pre-service teachers
4	Digital pedagogy and competence	technology, language learning, pedagogy, language teaching, digital competence, digital technology, pre-service English teachers

4.7

4.7 Values dimensions in TPACK language research (RQ3)

Of the 282 documents, 83 (29.4%) engaged at least one values dimension in their title, abstract or keywords. Culture, intercultural learning and identity was the most frequent dimension (37 documents, 13.1%), followed by inclusion and equity (28, 9.9%), ethics and responsible technology use (26, 9.2%) and civic, global and sustainability orientation (18, 6.4%). Character, moral and religious values (8, 2.8%) and social-emotional learning and well-being (3, 1.1%) were rare.

Engagement with values grew over time (Fig. 5). The share of documents with any values dimension rose from 8.6% (3 of 35) in 2011–2018 to 17.2% (11 of 64) in 2019–2022 and 37.7% (69 of 183) in 2023–2026. Ethics was absent before 2023 and reached 14.2% of documents in 2023–2026. Culture and identity rose from 5.7% to 16.4%, and inclusion and equity from 2.9% to 13.7%. By contrast, character and moral values stayed near 3% and social-emotional learning stayed below 2% in every period.

The documents that engaged values were diverse. Culture appeared in studies that integrated local cultural values into English materials and in a design that combined culturally responsive teaching with TPACK for Indonesian language learning in multicultural schools [31]. Character and religious values appeared mainly in studies set in Indonesian Islamic schools and in foreign-language teacher education in Indonesia [20, 28]. Social-emotional aspects appeared in a proposal to add affective knowledge to TPACK [37] and in a study of resilient English teachers in resource-constrained schools [34]. Some civic and sustainability codes referred to the sustainability of teacher development rather than to sustainability as a value for learners [8].

4.8

4.8 Values and artificial intelligence (RQ4)

The rise of values in the field is closely tied to AI. Of the 65 AI-related documents, 37 (56.9%) engaged at least one values dimension, compared with 46 of the 217 other documents (21.2%). Ethics was found only in AI-related work: all 26 documents coded for ethics also addressed AI, and 40.0% of AI-related documents raised ethical issues. These documents discussed academic integrity, bias, privacy and the need for a critical lens on AI in teacher education [18, 22, 33, 41]. Values also grew in recent work that did not address AI, but more slowly: 32 of 118 non-AI documents in 2023–2026 (27.1%) engaged a values dimension, mainly culture and inclusion.

5 Discussion

5
5.1

5.1 A fast-growing but values-thin field

TPACK research in language education has moved from a small niche to a fast-growing field. Almost two thirds of its output appeared in 2023–2026, and the growth was driven largely by AI. This pattern echoes earlier observations that the field focused on teachers' knowledge and technology adoption [38], and it shows that generative AI has become the new focus of this work [30]. The field is also geographically concentrated. Indonesia and China produce the most documents, while Hong Kong and Taiwan produce the most-cited work. This gap between productivity and influence suggests that much research from Southeast Asia, where values and religious education are central goals of national curricula, is not yet shaping the field's core conversations.

The main finding for values education is that values remain at the edge of TPACK language research. Fewer than one in three documents engaged any values dimension, and no values keyword reached the core keyword network. The four thematic clusters describe teacher knowledge as professional development, technology integration, digital competence and AI use. None of them names values as a goal of teaching. This mirrors the original TPACK framework, in which values are at most implied through "context" [17, 29], and it contrasts with values education research that treats values as part of everyday pedagogy [13, 24].
5.2

5.2 Values enter through AI ethics

The growth of values-related work after 2022 has a clear entry point. Ethics appeared only in AI-related documents, and AI-related documents were more than twice as likely to engage values as other documents (56.9% vs 21.2%). This supports the argument that generative AI has made the ethical side of technology use visible to teachers and researchers [7, 14, 30, 40]. It also reveals a narrow understanding of values. In most of these documents, ethics means academic integrity, bias and privacy, that is, the risks of a tool. Values are framed as something to protect learners from, not as something learners develop through language learning. A few studies went further and asked teachers to adopt a critical lens towards AI in TESOL teacher education [18] or adapted an AI ethics curriculum for literacy teachers [41]. These studies show how ethical reasoning can become part of teacher knowledge rather than a checklist of risks.
5.3

5.3 Underdeveloped dimensions: character and social-emotional learning

Culture and inclusion were the most frequent values dimensions, which fits the long tradition of intercultural language teaching [6, 19]. Still, the cultural focus often concerned content representation, such as including local culture in materials [31], rather than how learners form values through intercultural encounters. Character, moral and religious values and social-emotional learning were almost absent. The few studies that did address them came from Indonesian Islamic schools and from proposals to add affective knowledge to TPACK [20, 28, 37]. This gap is significant for the Collection's themes of character education, civic education and social-emotional learning. Language classrooms offer daily opportunities to practise honesty in writing, respect in dialogue and empathy through stories, yet TPACK research has not studied how technology can support or weaken these practices.
5.4

5.4 Implications for teacher education and research

Three implications follow. First, TPACK in language teacher education could be extended with an explicit values layer. Building on Intelligent-TPACK's ethics domain [7], such a layer would ask teachers not only "Which tool fits this content and pedagogy?" but also "Which values does this use of technology cultivate or put at risk?" This values layer would span the six dimensions examined here, not only ethics. Second, professional development programmes, which form a central cluster of the field, can include values-based lesson design: for example, using AI writing tools to teach source acknowledgement as honesty, or using telecollaboration to build intercultural empathy. Third, research needs designs that test whether values outcomes change. The field relies mostly on surveys and qualitative case studies, and very few experimental studies were found. Future studies could measure learners' values, such as academic honesty or intercultural sensitivity, alongside teachers' TPACK.
5.5

5.5 Limitations

This study has several limitations. First, it used one database, Scopus, and one search string. Relevant work indexed only in Web of Science, ERIC or national databases, or written in languages other than English, may have been missed. Second, the values coding relied on dictionary terms in titles, abstracts and keywords. Documents may address values in their full text without naming them in these fields, so the percentages are likely to be lower-bound estimates. Some terms were also ambiguous: for example, “sustainable” sometimes described teacher development rather than sustainability values. Third, eligibility screening was applied with a scripted rule, which ensures consistency but may misclassify a few borderline records. Fourth, citation counts favour older documents, and the 2026 data cover only part of the year. Finally, as a bibliometric study, this analysis describes patterns in the literature; it does not estimate the effect of TPACK-based interventions on values outcomes. A meta-analysis of experimental studies would be needed for that purpose once enough such studies exist.

6 Conclusion

6

This study mapped 282 Scopus-indexed documents on TPACK in language education published from 2011 to 2026. The field grew rapidly after 2022, mainly through research on AI, and remains concentrated in Asia and in English language teaching. Its thematic core is teacher professional development, technology integration, digital competence and AI use. Values are present but peripheral: the share of documents engaging values rose from 8.6% to 37.7%, yet this rise came mostly through AI ethics, culture and inclusion. Character, moral values and social-emotional learning were almost absent. For values education, the findings show that teacher knowledge frameworks for technology-rich language teaching do not yet treat values as a planned outcome. Adding an explicit values layer to TPACK, and studying its effects on learners, would help language teachers cultivate ethical, cultural and civic values in digital and AI-driven classrooms.

Declarations

Ethics approval and consent to participate

Not applicable. The study analysed published bibliographic metadata and involved no human participants.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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Author Contribution

S.H. conceptualized the study, designed the methodology, carried out the literature search and data screening, curated the data, performed the bibliometric and values-coding analyses, prepared Figures 1–5 and Tables 1–5, wrote the original draft, revised the manuscript and managed the project. K.S., A.R. and N.E.W. supervised the study, validated the screening procedure and the analytical results, and critically reviewed and edited the manuscript. All authors read and approved the final manuscript.

Data availability

The dataset was retrieved from Scopus (Elsevier) on 19 October 2026. Because Scopus licence terms restrict redistribution of full records, the list of the 282 included documents and their values codes is provided as Online Resource 1. The full export can be reproduced with the search strategy reported in Section 3.2. The Python scripts used for screening, analysis and figures are available from the corresponding author, Syihaabul Hudaa (syihaabul.hudaa@student.uns.ac.id), on reasonable request.

Use of generative AI

The writer uses DeepL Pro and Claude to translate documents. Besides that, Grammarly is used at the end for spell-checking.

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Figures

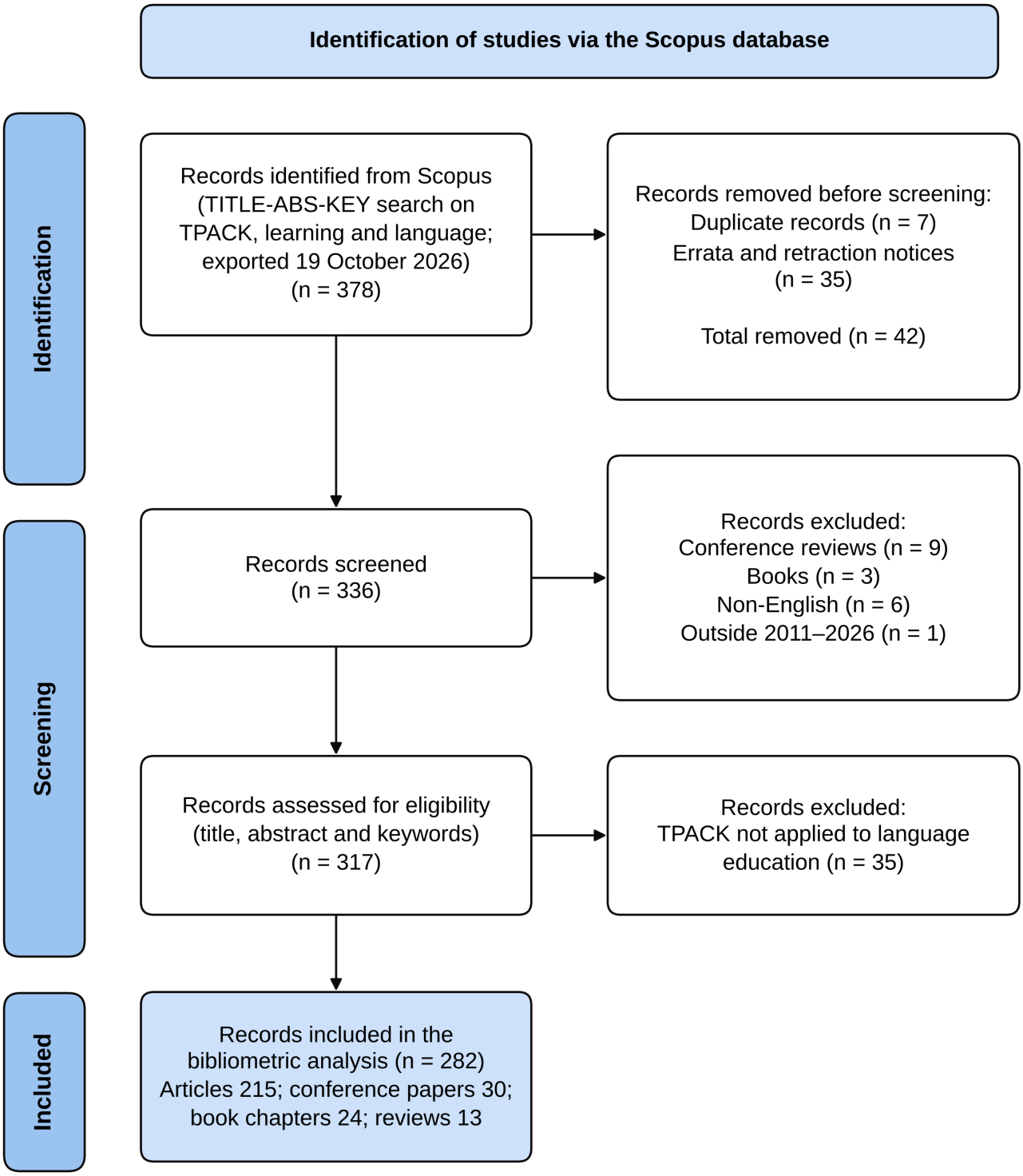


Figure 1

PRISMA 2020 flow diagram of record identification, screening and inclusion

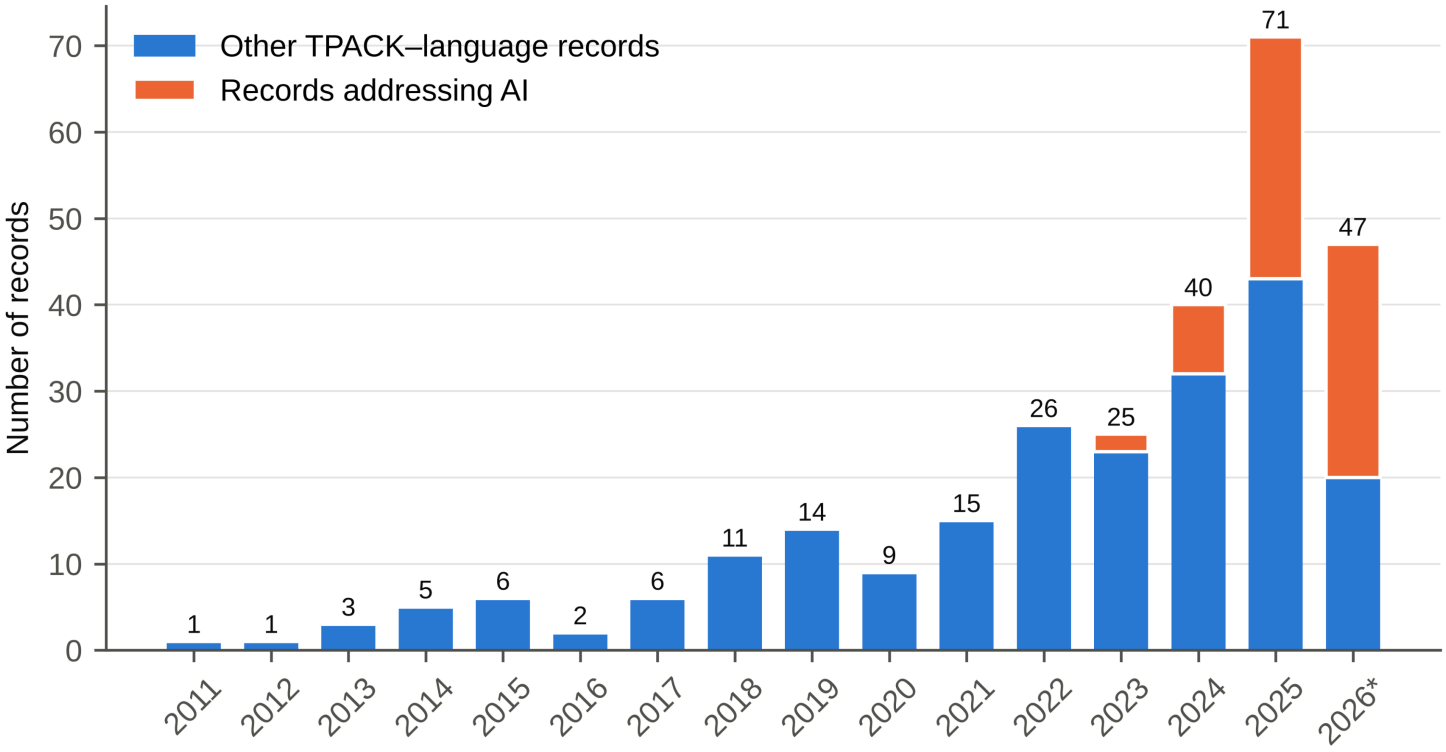


Figure 2

Annual number of TPACK–language education documents, 2011–2026, separating documents that address artificial intelligence (AI). *2026 covers 1 January to 19 October

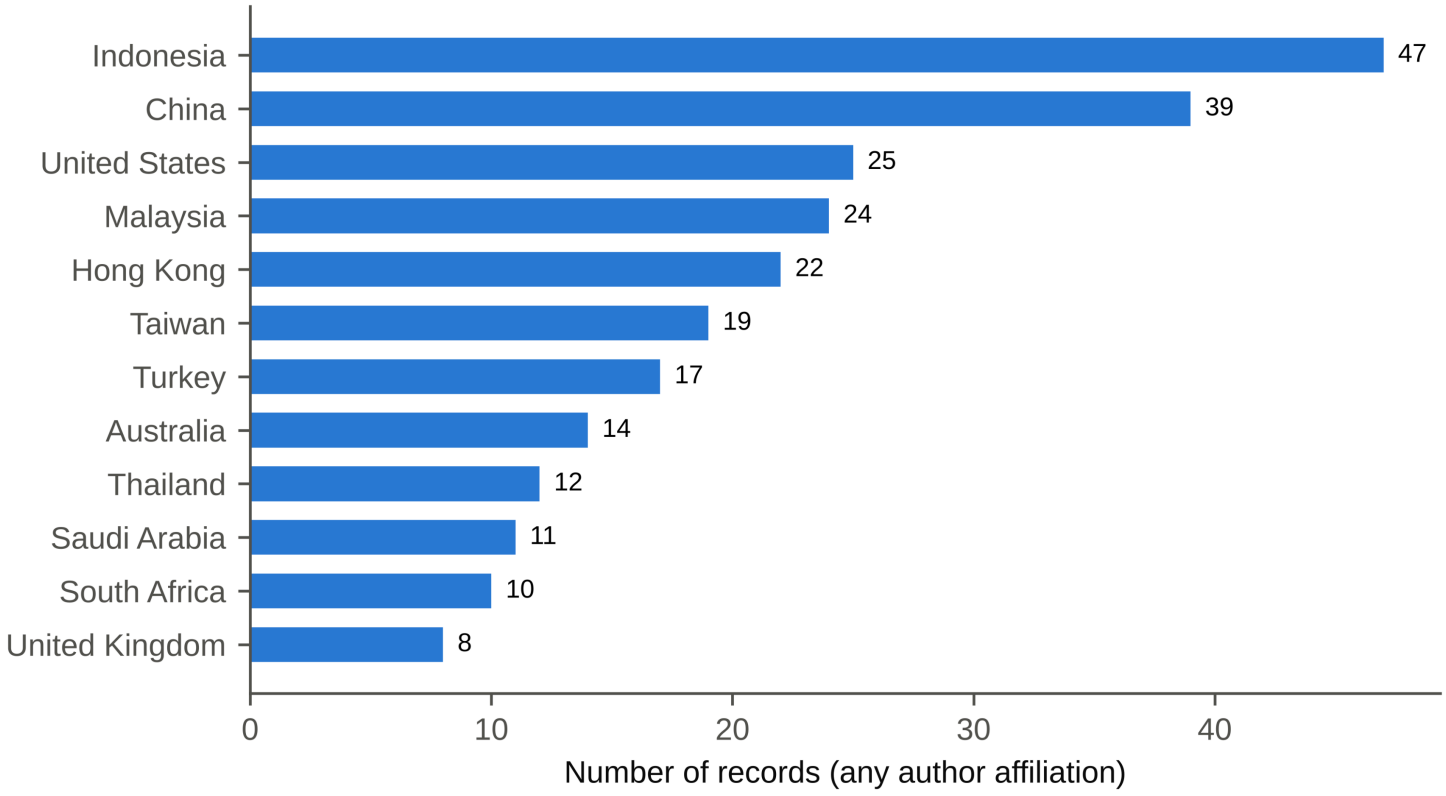


Figure 3

Twelve most productive countries by number of documents. A document is counted once for each country in its authors' affiliations

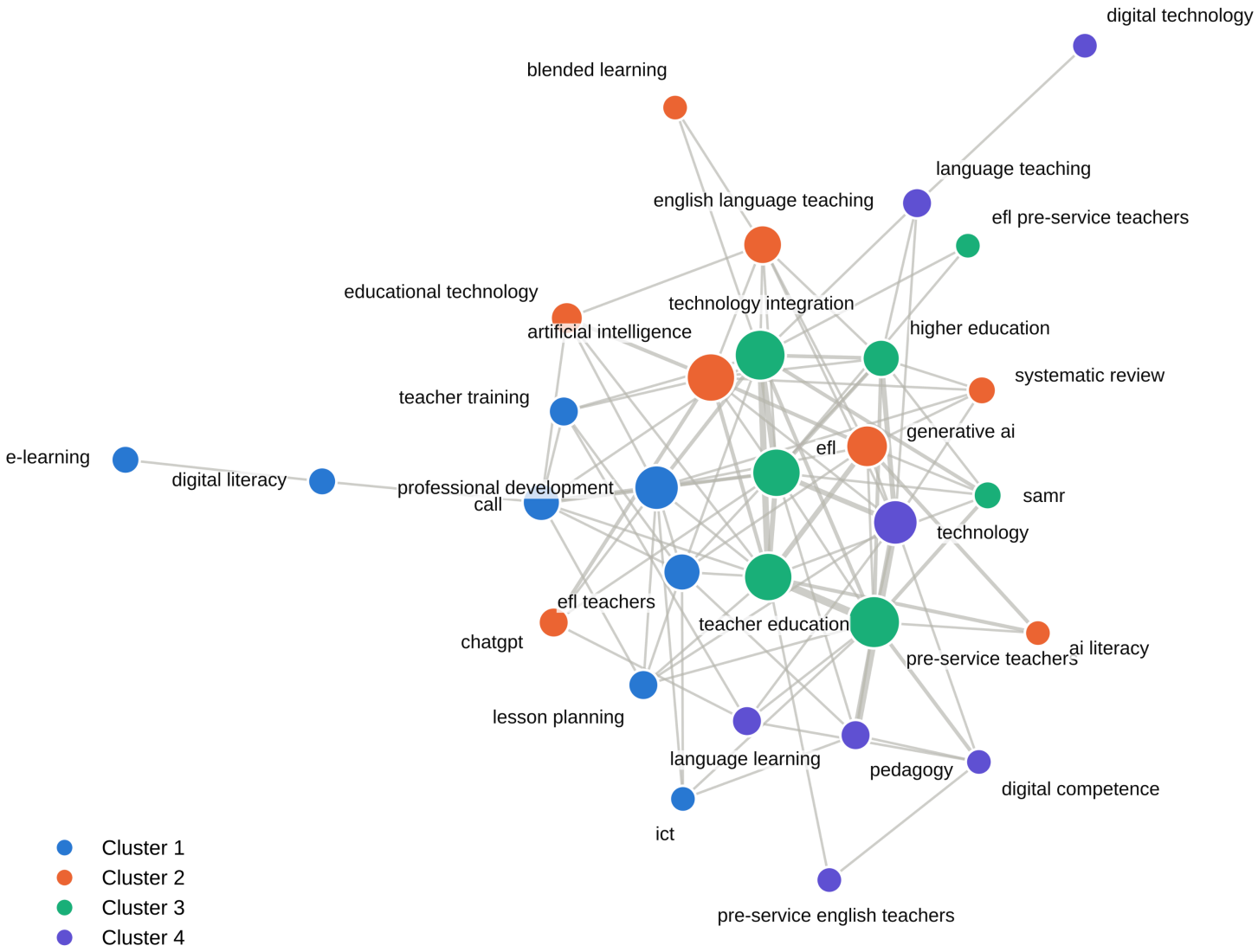


Figure 4

Co-occurrence network of the 30 most frequent author keywords (TPACK excluded). Node size shows keyword frequency, line width shows co-occurrence strength and colour shows the cluster

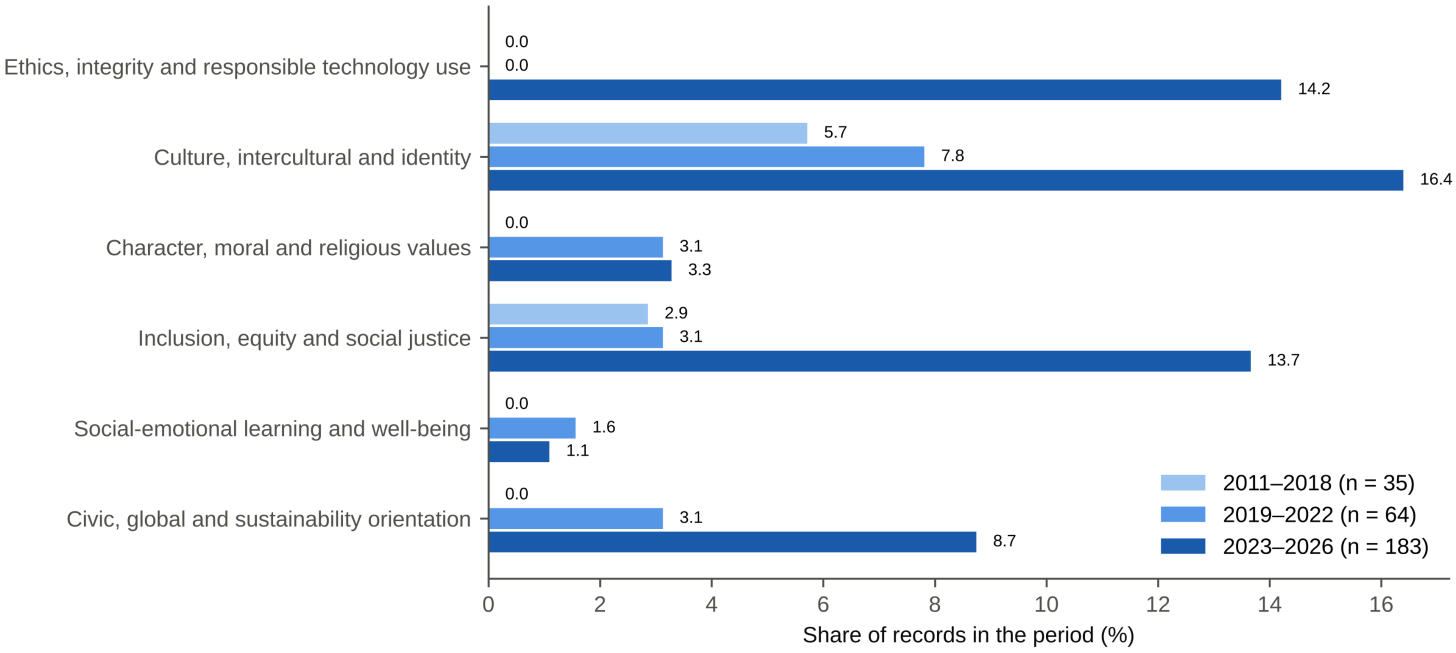


Figure 5

Share of documents engaging each values dimension, by period. A document may be coded for more than one dimension