

Mapping AI Literacy Frameworks: A Global Document Analysis of Dimensions, Competencies, and Communication Gaps

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ABSTRACT

Artificial intelligence (AI) literacy has emerged as an essential competency in the context of rapid technological transformation, yet existing frameworks have been developed unevenly across disciplines and rarely address the specific needs of communication-related fields. This study conducts a global document analysis of 34 AI literacy frameworks published between 2015 and 2025 to examine their disciplinary orientations, theoretical foundations, contextual specificity, and competency structures. The findings show that most frameworks are concentrated in education-oriented contexts, while communication-specific frameworks remain limited. In addition, 82.4% of the identified frameworks do not specify a national or regional context, and 73.5% do not specify an explicit theoretical or model-based foundation. Through qualitative coding and framework content synthesis, the study identifies a consolidated structure consisting of six overarching dimensions, 69 sub-dimensions, and 109 competencies. The results further indicate that existing frameworks cover cognitive, technical, ethical, application-oriented, pedagogical, and affective dimensions, but communication-related competencies remain dispersed and insufficiently consolidated. Elements such as communication and collaboration, digital communication and expression, AI-generated content evaluation, information and mis/disinformation, content authenticity, disclosure of AI use, and responsible AI practices appear across selected frameworks, yet they are usually embedded within broader competency structures rather than organized as a coherent communication-sensitive AI literacy framework. By revealing these disciplinary, conceptual, and communication-related gaps, this study provides an evidence-based foundation for future development of AI literacy frameworks for communication-related fields. Future research should further develop and empirically validate communication-sensitive AI literacy frameworks with communication students, educators, and professionals.

Keywords: *AI literacy framework, communication, document analysis, dimensions, competencies.*

INTRODUCTION

AI is increasingly embedded in the production, circulation, and evaluation of information across contemporary media environments. Recent scholarship has shown that AI is no longer limited to technical or computational domains, but is becoming closely intertwined with communication practices such as news production, content creation, and information distribution (Chiu et al., 2024; Deuze & Beckett, 2022; Partha et al., 2024). As AI becomes more visible in everyday communicative settings, the ability to understand, evaluate, and use AI appropriately has attracted growing scholarly attention under the concept of AI literacy (Chiu et al., 2024; Long & Magerko, 2020).

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Existing studies have advanced the conceptualization of AI literacy and the development of competency-based frameworks (Chiu et al., 2024; Long & Magerko, 2020). However, much of this emerging literature has been developed in education-centered contexts, particularly in relation to K-12 education, general education contexts, and university students' understanding of AI (Kasinidou, 2023; Lee et al., 2024). This suggests that existing AI literacy discussions have been shaped largely by educational and instructional concerns, rather than by the specific epistemological and professional demands of communication-related disciplines.

This limitation is particularly important for communication students, who are expected to navigate environments where AI shapes not only tool use, but also content credibility, audience engagement, and professional responsibility. For communication-related fields, scholars have already noted that AI is reshaping newsroom imagination, editorial work, and the broader ecology of media practice (Deuze & Beckett, 2022). Accordingly, AI literacy in communication contexts should not be understood merely as technical familiarity or general digital competence. It also involves the ability to critically assess AI-generated content, understand the implications of algorithmic mediation, and respond to the ethical and social consequences of AI-driven communication.

The need for more communication-relevant inquiry is particularly important in the Chinese context. Communication-related disciplines in China have expanded substantially, with a large number of students enrolled in communication-related programs (Luan & He, 2019). At the same time, only limited scholarship has attempted to articulate AI-related competency frameworks specifically for news and communication-related programs (Zhang & Isayeva, 2024). This indicates that despite the growing importance of AI in communication practice, there remains a lack of consensus regarding which dimensions and competencies the field of communication should prioritize.

Against this backdrop, the present study conducts a global document analysis of AI literacy frameworks published between 2015 and 2025. This study analyzes how AI literacy frameworks have been constructed across different fields and what dimensions and competencies they emphasize. Specifically, this study aims to achieve two objectives. First, to identify the disciplinary distribution and conceptual orientations of existing AI literacy frameworks; and second, to synthesize the major dimensions and competencies represented in these frameworks. By mapping current patterns in AI literacy framework development, this study clarifies the extent to which communication-related dimensions and competencies have been incorporated into existing frameworks and identifies areas where communication-related AI literacy remains insufficient.

LITERATURE REVIEW

AI literacy has increasingly been discussed as a multidimensional capacity that enables individuals to understand, evaluate, and use AI systems in informed and responsible ways. Long and Magerko (2020) conceptualized AI literacy as a set of competencies that support users' interaction with and critical evaluation of AI systems. Ng et al. (2021) further organized AI literacy around four major aspects: knowing and understanding AI, using and applying AI, evaluating and creating AI, and considering ethical issues. More recent scholarship has extended this discussion by emphasizing confidence, self-reflection, and responsible AI engagement within AI literacy and competency development (Chiu et al., 2024). Together, these studies indicate that AI literacy should not be reduced to technical operation, but

should be understood as a broader construct involving conceptual understanding, practical use, critical evaluation, and ethical awareness.

Existing AI literacy frameworks have been developed for different groups and institutional contexts. Some studies have focused on AI literacy measurement, user competencies, learner characteristics, or school-based AI literacy development (Carolus et al., 2023; Chee et al., 2025; Kong et al., 2024; Pinski & Benlian, 2024). Institutional frameworks have also contributed to this area by outlining AI-related competencies for students, teachers, and digital learning contexts (Miao & Cukurova, 2024; Miao & Shiohira, 2024; Ruiz et al., 2024). These studies and frameworks provide important foundations for AI literacy research, but many of them are oriented toward broad educational populations, general users, or institutional learning contexts. As a result, less attention has been given to how AI literacy frameworks may need to be adapted for specific disciplinary fields.

In communication-related fields, AI has become increasingly connected to journalistic production, editorial work, content creation, information distribution, and future newsroom practices (Deuze & Beckett, 2022; Partha et al., 2024). These developments suggest that AI literacy in communication-related contexts should address not only AI concepts and tool use, but also content evaluation, information credibility, responsible disclosure, and the ethical implications of AI-mediated communication. However, existing AI literacy literature has paid limited attention to whether current frameworks sufficiently reflect these communication-related concerns. This gap provides the basis for the present study, which maps existing AI literacy frameworks and examines the extent to which communication-related dimensions and competencies have been incorporated into their structures.

METHODOLOGY

This study employed document analysis and qualitative content analysis to examine how AI literacy frameworks have been conceptualized and structured across academic, institutional, and official documents. Document analysis is appropriate for systematically examining written materials as sources of empirical evidence, particularly when the research aims to interpret how concepts, categories, and institutional assumptions are represented in documents (Bowen, 2009). In line with previous exploratory reviews of AI literacy, the present study combined database searching, inclusion and exclusion criteria, document screening, descriptive coding, and qualitative synthesis of framework content (Ng et al., 2021).

Search and Framework Document Selection Process

A systematic search was conducted to identify AI literacy framework documents published between 2015 and 2025. The search focused on both peer-reviewed academic literature and institutional or official framework documents, because AI literacy frameworks have been developed not only by scholars but also by educational organizations and professional institutions. The final search was completed on 25 August 2025. Like previous exploratory reviews of AI literacy, the search and selection process used database searching, predefined inclusion and exclusion criteria, and full-text assessment to identify eligible documents (Ng et al., 2021).

For academic literature, searches were conducted across nine major databases: Web of Science, Scopus, EBSCO, ScienceDirect, Wiley Online Library, SAGE Journals, SpringerLink, Emerald Insight, and Taylor & Francis Online. These databases were selected because they cover communication, education, social sciences, technology, and interdisciplinary research

relevant to AI literacy and competency framework development. The search was limited to English-language publications published between 2015 and 2025. In Web of Science, the search was conducted using the Topic field with the following search string:

TS = (“AI literacy framework” OR “AI competence framework” OR “AI knowledge framework” OR “AI skill framework” OR “AI system framework”)

Timespan = 2015–2025; Language = English.

Equivalent search terms were adapted for the other databases according to their search functions. The core search terms included “AI literacy framework,” “AI competence framework,” “AI knowledge framework,” “AI skill framework,” and “AI system framework.” These terms were selected because the study focused specifically on structured AI literacy or AI competence frameworks, rather than broader discussions of AI education, AI applications, or digital literacy. Because terms such as “AI system framework” may retrieve technically oriented studies, all records were subsequently screened to ensure that only literacy or competency related frameworks were retained.

The academic database search initially yielded 7,281 records. After title, abstract, and keyword screening, 39 records were retained for further examination. Full-text assessment was then conducted to determine whether the documents explicitly proposed, adapted, synthesized, or discussed an AI literacy framework, AI competence framework, dimension system, or structured set of indicators. Records that did not provide sufficient framework-related content were excluded at the full-text assessment stage. After full-text assessment, 25 peer-reviewed academic documents were included in the final dataset.

In addition to academic literature, a targeted search was conducted to identify institutional and official AI literacy framework documents. This step was necessary because several influential AI literacy and AI competency frameworks have been developed outside conventional academic publishing. Nine institutional or official documents were identified and included. These documents were issued by organizations such as the National Center for Educational Technology, Beijing Normal University, UNESCO, the European Commission and OECD, Digital Promise, Kennedy HQ, and EDUCAUSE, as well as other framework-oriented institutional sources.

The final corpus consisted of 34 AI literacy framework documents, including 25 peer-reviewed academic documents and 9 institutional or official documents. Each document was retained only if it provided sufficient framework related information for coding, such as dimensions, sub-dimensions, competencies, indicators, or structured AI literacy components. The inclusion and exclusion criteria are presented in Table 1.

Table 1: Inclusion and exclusion criteria

Criterion	Inclusion	Exclusion
Time	Published between 2015 and 2025	Outside the defined period
Language	English-language documents	Non-English documents
Topic	Focused on AI literacy, AI competence, AI knowledge, AI skills, or related frameworks	Focused only on AI tools, or AI applications
Framework	Provided a framework, model, taxonomy, dimensions, competencies, or indicators	Did not provide structured framework-related content
Access	Full text available and sufficient for coding	Unavailable or insufficient for coding

Descriptive Coding of Framework Characteristics

After the final corpus was established, each framework document was coded at the document level to map the overall landscape of existing AI literacy frameworks before proceeding to framework content synthesis. Descriptive information was summarized using frequencies and percentages, while framework content was analyzed through qualitative coding and synthesis (Ng et al., 2021). The coding captured key characteristics, including year of publication, theoretical or model basis, framework basis, research method, country or regional context, research field, participant or target group, framework title, and document grouping. These categories were used to compare the included frameworks in terms of disciplinary orientation, contextual specificity, theoretical grounding, methodological approach, source type, and target users.

Publication type and document grouping were coded to distinguish peer-reviewed academic documents from institutional or official documents. The research field was coded according to the primary disciplinary or professional orientation of each framework, such as education, communication, professional practice, or other specified fields. The participant or target group was coded according to the intended users or beneficiaries of the framework, such as educators, professionals or general groups. These categories were used to compare the disciplinary orientation and intended audience of existing AI literacy frameworks.

Country or regional context was coded to determine whether each framework was developed for a specific national or regional setting. Frameworks that did not explicitly identify a country or region were coded as “not specified.” This category was included because AI literacy frameworks may be shaped by different educational systems, cultural environments, policy contexts, and professional practices.

The theoretical or model basis category was used to assess whether each framework was explicitly grounded in a named theory, conceptual model, or established scholarly framework. A document was coded as grounded in a theory or model only when it clearly identified a theoretical, conceptual, or model-based foundation used to inform the framework structure. Documents that provided only general literature background without explicitly using a theory or model to organize the framework were coded as not theoretically grounded.

Framework basis was used to distinguish frameworks presented as original developments from those adapted from prior frameworks. The research method was coded according to the methodological approach explicitly reported in each document, including qualitative, quantitative, mixed methods, or not specified.

These descriptive coding categories provided the basis for the statistical overview reported in the Results section. They also supported later comparisons of disciplinary distribution, theoretical grounding, contextual specificity, target groups, and the extent to which communication-related concerns were represented in existing AI literacy frameworks.

Framework Content Extraction and Synthesis

After the descriptive coding of framework characteristics, the substantive content of each AI literacy framework was extracted and synthesized. This stage focused on the internal structure of the included frameworks, including dimensions, sub-dimensions, competencies, sub-competencies, components, areas, domains, indicators, and levels. The purpose was to record how each framework organized AI literacy content and to prepare the extracted materials for cross-document comparison.

Two coders were involved in the framework content extraction process. The coders read the full text of the included documents and extracted framework-related content according to the classification system used in each source document. Because different frameworks used different terms, such as “dimensions,” “competencies,” “sub-competencies,” “components,” “areas,” “domains,” “levels,” “indicators,” or “core competencies,” the original terminology was retained during the initial extraction stage. The extracted content was later reorganized for cross-document comparison.

The extracted content was organized into a hierarchical coding record. Where available, the broadest framework category was recorded as a dimension, the intermediate category as a sub-dimension, and the most specific actionable item as a competency. For example, some frameworks provided a dimension–competency–sub-competency structure, while others used structures such as domain–competence–indicator, component–practice–value, area–competency–level, or dimension–aspect–progression level. These structures were first recorded in their original form and then standardized to support synthesis across documents.

The synthesis process followed an iterative qualitative coding logic. First, the coders extracted original framework components from the included documents. Second, similar or overlapping competency expressions were compared across documents. Third, conceptually similar items were grouped into broader categories, while items with distinct meanings were kept separate. This process was informed by constant comparison and thematic analysis, which support the identification, comparison, and refinement of recurring concepts across qualitative data (Braun & Clarke, 2006; Glaser, 1965). Coding decisions were also guided by the principle that qualitative codes may be refined progressively from descriptive labels into more analytical categories (Saldaña, 2021).

The extracted content and category groupings were checked through comparison and discussion between the two coders. When discrepancies or ambiguous cases occurred, the coders revisited the original documents and reached agreement through discussion. The extraction record was retained to document how original framework components were transformed into comparable coding categories.

To support the analysis of communication gaps, extracted items were additionally reviewed for communication-related relevance. Items were considered communication-related when they involved communication and collaboration, AI-generated content evaluation, information credibility, misinformation, content authenticity, digital communication and expression, human-AI interaction, disclosure of AI use, or responsible AI practices. The results of this additional review are reported in the results section.

RESULTS

Characteristics of the Included AI Literacy Frameworks

The final corpus consisted of 34 AI literacy framework documents published between 2015 and 2025. Of these, 25 were peer-reviewed academic articles, accounting for 73.5% of the corpus, and 9 were institutional or official documents, accounting for 26.5%. This distribution shows that AI literacy framework development has taken place both within academic research and through institutional or policy-oriented initiatives.

The included frameworks covered a range of target fields, but education-related fields were the most prominent. General education accounted for the largest share of the corpus, followed by K-12 education, early childhood education, primary school education, higher

education and technology education. By contrast, communication-related fields were much less represented. Only one framework was categorized under media and communication, and one under business communication. Other fields included library and information science and psychology, while a small number of frameworks did not specify a target field.

The target groups of the frameworks were also diverse. Many frameworks were designed for students, educators, teachers, children, university students, or broader education stakeholders. Some frameworks targeted more specific groups, such as librarians, AI professionals, AI users, K-12 educators and policymakers, or business communication educators. Several frameworks did not specify a clearly defined target group. This variation indicates that AI literacy has been framed as relevant to multiple populations, although many frameworks continue to focus on educational users and learning-related contexts.

The included frameworks also varied in their stated country or regional focus. A small number of frameworks specified a national or regional context, including China, the United Kingdom, the United States, and Latin America. However, most frameworks did not specify a particular country or region. This pattern suggests that many AI literacy frameworks are presented as broadly applicable rather than explicitly situated within a specific national, regional, or institutional context.

In terms of research methods, the academic documents reported a range of methodological approaches, including qualitative methods, quantitative methods, mixed methods, and other review- or framework-based approaches. Some documents, particularly institutional or official frameworks, did not specify a formal research method. Overall, the descriptive characteristics of the corpus show that current AI literacy framework development is diverse in source type, target group, and methodological basis, but remains strongly concentrated in education-related contexts.

Table 2: Descriptive characteristics of the included AI literacy frameworks

Characteristic	Category	n	%
Publication type	Peer-reviewed articles	25	73.5
	Institutional/official documents	9	26.5
	Education-related fields	27	79.4
Target field	Communication-related fields	2	5.9
	Other specified fields	2	5.9
	Not specified	3	8.8
Target group	Education-related learners and stakeholders	25	73.5
	Professional or specialized groups	3	8.8
	General users or citizens	2	5.9
National/regional context	Not specified	4	11.8
	Specified	6	17.6
	Not specified	28	82.4
Theoretical/model basis	Theoretically/model grounded	9	26.5
	Not theoretically/model grounded	25	73.5
Framework basis	Original development	18	52.9
	Adapted from prior frameworks	16	47.1
	Mixed methods	7	20.6
Research method	Qualitative methods	13	38.2
	Quantitative methods	7	20.6
	Not specified	7	20.6

Theoretical Grounding and Contextual Specificity

As shown in Table 2, the descriptive coding further examined whether the included frameworks explicitly identified a theoretical or model basis, a framework development basis, and a national or regional context. These categories were used to assess how clearly existing AI literacy frameworks articulated their conceptual foundations, development sources, and contextual assumptions.

Only 9 of the 34 frameworks explicitly identified a theoretical, conceptual, or model-based foundation, accounting for 26.5% of the corpus. The remaining 25 frameworks, or 73.5%, did not clearly specify a named theory, model, or conceptual basis used to structure the framework. This finding should be interpreted carefully. It does not necessarily mean that these frameworks lacked scholarly background; rather, it indicates that most documents did not explicitly state how their framework structure was theoretically or conceptually derived.

In terms of framework development basis, 18 documents, representing 52.9% of the corpus, were coded as original development, while 16 documents, or 47.1%, were adapted from prior frameworks. This indicates that nearly half of the included frameworks were explicitly adapted from prior structures, while the remaining documents were presented as newly developed frameworks. This distinction is important because it shows whether AI literacy frameworks were primarily developed as new conceptual structures or constructed through adaptation from existing models.

Contextual specificity was also limited. Only 6 of the 34 frameworks, or 17.6%, specified a national or regional context, including China, the United Kingdom, the United States, and Latin America. The remaining 28 frameworks, or 82.4%, did not specify a particular country or region. Many frameworks were therefore presented as broadly applicable rather than situated within a clearly defined educational, cultural, institutional, or policy context.

Overall, these results indicate that existing AI literacy frameworks vary not only in their dimensions and competencies, but also in how explicitly they explain their conceptual and contextual foundations. The limited specification of theoretical/model basis and national or regional context provides an important background for interpreting the synthesized competency structure and communication-related gaps reported in the following sections.

Synthesized Dimensions, Sub-dimensions, and Competencies

Table 3 summarizes the six synthesized dimensions and provides representative extracted components and source examples for each dimension. Across the corpus, framework components were extracted from the original documents and reorganized into a hierarchical structure consisting of six overarching dimensions, 69 sub-dimensions, and 109 competencies. This structure was derived from the original dimensions, components, domains, areas, competencies, sub-competencies, indicators, and levels reported in the source frameworks. To improve readability, the full hierarchical coding structure was summarized in Table 3 by presenting the six overarching dimensions, their analytical focus, representative extracted components, and representative source examples.

Table 3: Synthesized dimensions of AI literacy frameworks

Dimension	Analytical focus	Representative extracted components	Representative source examples
Cognitive and Hierarchical Dimensions	Understanding, analyzing, evaluating, and creating AI-related knowledge	AI definition; AI awareness; AI understanding; evaluate and create AI; critical thinking; systems thinking	Long & Magerko (2020); Ng et al. (2021); Carolus et al. (2023); Jia et al. (2025); Luo et al. (2024)
Technical and Data Dimensions	AI technologies, data, algorithms, tools, and system-related knowledge	Data and algorithm literacy; AI mechanics; AI input and output; AI model; AI tools; AI system design	Jia et al. (2025); Chee et al. (2025); Pinski & Benlian (2024); Kennedy (2023); UNESCO competency frameworks (Miao & Cukurova, 2024; Miao & Shiohira, 2024)
Societal and Ethical Dimensions	Ethical, social, safety, responsibility, and governance-related concerns	AI ethics; responsible use; privacy; copyright; bias; misinformation; safety; accountability; societal impact	UNESCO competency frameworks (Miao & Cukurova, 2024; Miao & Shiohira, 2024); White and Scott (2024); Lao & You (2024); Chun Ru & Tang (2025); Digital Promise framework (Ruiz et al., 2024); Ma et al. (2025)
Application and Collaboration Dimensions	Practical AI use, problem solving, content creation, and human-AI collaboration	Use and apply AI; prompting techniques; AI content creation; problem solving; human-AI collaboration; communication and collaboration	Kennedy (2023); EDUCAUSE Horizon Report (Pelletier et al., 2024); Chee et al. (2025); Digital Promise framework (Ruiz et al., 2024); Chun Ru & Tang (2025)
Educational and Pedagogical Dimensions	Teaching, learning, assessment, pedagogy, and professional development with AI	AI-assisted teaching and learning; AI pedagogy; AI-enhanced assessment; learning artefacts; pedagogical approaches; teacher development	Ng et al. (2021); Celik (2023); Zou et al. (2025); UNESCO competency frameworks (Miao & Cukurova, 2024; Miao & Shiohira, 2024); Palmquist et al. (2025)
Affective and Psychological Dimensions	Awareness, attitudes, confidence, self-efficacy, readiness, and reflective dispositions	Affective competences; confidence and self-efficacy; self-reflective mindset; AI attitude; self-awareness; empathy	Kong et al. (2024); Chee et al. (2025); Palmquist et al. (2025); Luo et al. (2024); Carolus et al. (2023)

Note: The table summarizes the six overarching dimensions synthesized from the 34 AI literacy framework documents. Representative components are examples extracted from the coding record and are not exhaustive.

The first dimension, Cognitive and Hierarchical Dimensions, captures competencies related to knowing, understanding, analyzing, evaluating, and creating AI-related knowledge. Many frameworks organized AI literacy through progressive cognitive levels, such as understanding AI concepts, applying AI knowledge, evaluating AI outputs, and creating AI-related ideas or artefacts. This dimension reflects the strong presence of knowledge acquisition and higher-order thinking in existing AI literacy frameworks.

The second dimension, Technical and Data Dimensions, includes competencies related to AI technologies, data, algorithms, AI mechanics, digital literacy, AI tools, and system design. Frameworks in this dimension addressed areas such as data and algorithm literacy, AI input and output, AI model mechanisms, hardware and software, AI tool operation, and AI system design or development. These categories indicate that technical and data-related understanding is a recurring component of AI literacy framework development.

The third dimension, Societal and Ethical Dimensions, includes competencies related to ethical awareness, responsible use, safety, privacy, fairness, accountability, authenticity, copyright, sustainability, and societal impact. Across the included frameworks, ethical and societal concerns appeared in multiple forms, ranging from general AI ethics and responsible practice to more specific concerns about bias, misinformation, privacy, environmental impact, academic integrity, and social responsibility.

The fourth dimension, Application and Collaboration Dimensions, refers to competencies associated with using AI, applying AI tools, solving problems with AI, creating AI-assisted content, and collaborating with AI or through AI-supported environments. This dimension includes categories such as AI application, AI skills, AI capability, human-AI collaboration, communication and collaboration, and problem solving. It indicates that AI literacy is frequently framed not only as knowledge about AI, but also as practical engagement with AI systems and AI-supported tasks.

The fifth dimension, Educational and Pedagogical Dimensions, captures framework components related to AI teaching, learning, pedagogy, assessment, professional learning, and learner support. These categories were especially visible in education-oriented frameworks, including those concerned with AI-assisted teaching and learning, AI pedagogy, teacher development, learner empowerment, and AI-enhanced assessment. This dimension reflects the strong educational orientation of the current AI literacy framework landscape.

The sixth dimension, Affective and Psychological Dimensions, includes competencies related to awareness, attitudes, confidence, self-efficacy, readiness, self-awareness, empathy, and reflective dispositions toward AI. These categories suggest that AI literacy is not only conceptualized as knowledge, skill, or ethical reasoning, but also as involving learners' psychological readiness and affective orientation toward AI technologies.

Overall, the synthesized structure shows that AI literacy frameworks are multidimensional. They combine cognitive, technical, ethical, practical, pedagogical, and affective components. Although individual frameworks used different terminology and levels of granularity, recurring patterns appeared across the corpus. Existing frameworks commonly emphasize AI understanding, AI use, technical and data knowledge, ethical responsibility, educational application, and affective readiness. The next section examines how communication-related competencies were represented within this broader synthesized structure.

Communication Gaps in Existing AI Literacy Frameworks

Communication-related competencies were present in the reviewed AI literacy frameworks, but they appeared in limited and dispersed forms rather than as a coherent framework orientation. Across the corpus, communication-related items were mainly associated with communication and collaboration, digital communication and expression, AI-generated content evaluation, information and mis/disinformation, content authenticity, human-AI interaction, disclosure of AI use, and responsible AI practices. These items indicate that

existing frameworks have begun to address the communicative implications of AI, but they are usually embedded within broader digital, ethical, application-oriented, or educational competency structures.

The first cluster of communication-related items concerned communication and collaboration. Several frameworks explicitly included communication or collaboration as part of their competency structures. For example, the Kennedy HQ framework included “Communication & Collaboration” as one component of its AI literacy framework, covering items such as conversing with AI systems and chatbots, managing and sharing AI content, determining whether or how to acknowledge AI use, and using AI in collaboration with others (Kennedy, 2023). Similarly, Chee et al. (2025) included “Communication and collaboration,” with sub-competencies related to human-to-tool collaboration through AI technology and human-to-human communication with AI technology. The Digital Promise framework also included “Digital Communication & Expression” within its AI literacy practices (Ruiz et al., 2024). These examples show that communication-related competencies are present, but they are generally treated as one component within broader AI literacy structures rather than being systematically developed as a communication-sensitive framework direction.

The second cluster concerned AI-generated content evaluation and information-related judgment. Some frameworks and institutional documents included competencies related to reviewing AI-generated content, identifying misinformation, evaluating output reliability, and considering disclosure or citation of AI-assisted outputs. For example, the EDUCAUSE Horizon Report identified supporting AI fluency and navigating misinformation as important teaching and learning practices, highlighting the need for responsible AI use, critical engagement with AI, and attention to bias, ethics, and misinformation-related risks (Pelletier et al., 2024). Chun Ru and Tang (2025) included more detailed items related to reviewing AI-generated content for hallucinations, fake citations, reasoning errors, bias, reliability, and currency issues, as well as competencies related to disclosing AI use, citing AI-generated content, and keeping records of prompts. The Digital Promise framework also included “Information & Mis/Disinformation” as part of its AI literacy practices (Ruiz et al., 2024). These examples are relevant to communication because they involve content evaluation, information credibility, responsible use, and disclosure. However, they were usually positioned within broader categories such as using and applying AI, evaluating AI, information literacy, or ethical AI use, rather than being framed as communication-specific competencies.

The third cluster involved broader ethical and social responsibility items that may support communication-related concerns but were not usually presented as communication competencies. Several frameworks addressed responsible use, accountability, safety, privacy, fairness, authenticity, or societal impact. These categories are relevant to communication-related AI literacy because they concern information, content, and responsibility in AI use. However, in the reviewed frameworks, such items were more often organized under ethical, societal, or responsible AI dimensions than under communication-specific dimensions. Therefore, while these frameworks contain elements that can inform communication-oriented AI literacy, they do not yet provide a consolidated account of how AI literacy should operate within communication-related disciplines.

The descriptive coding results further support this interpretation. Among the 34 included framework documents, only one was categorized under media and communication and one under business communication, whereas education-related frameworks accounted for the largest share of the corpus. This distribution suggests that existing AI literacy

framework development remains shaped mainly by education-oriented and general competency perspectives. Communication-related competencies appear across selected frameworks, but they have not yet been systematically organized to support communication-related professional preparation.

Taken together, these findings show that the communication gap in existing AI literacy frameworks is not a complete absence of communication-related content. Rather, the gap lies in the fragmented and peripheral positioning of such content. Existing frameworks provide useful components for communication-oriented AI literacy, especially in relation to communication and collaboration, AI-generated content evaluation, information and mis/disinformation, content authenticity, disclosure of AI use, and responsible AI practices. However, these components remain scattered across broader framework categories and have not yet been consolidated into a coherent communication-sensitive AI literacy structure. This finding provides the basis for arguing that future AI literacy framework development should give more explicit attention to communication-related competencies and their relationships within AI-mediated information and content environments.

DISCUSSION

From General AI Literacy to Domain-Specific AI Literacy

The findings of this study extend previous AI literacy research by showing how a largely general competency discourse is reflected across existing framework documents. Earlier studies have established AI literacy as a multidimensional construct involving understanding, application, evaluation, creation, ethical awareness, knowledge, skills, and attitudes (Chiu et al., 2024; Long & Magerko, 2020; Ng et al., 2021). The present analysis confirms that these broad competency areas remain central to current AI literacy framework development.

At the same time, the results show that this general orientation is strongly shaped by education-related contexts. Most of the included frameworks were designed for students, teachers, children, educators, or broad learning populations. This pattern suggests that AI literacy has often been framed as a general learning capacity rather than as a field-specific competency structure.

For communication-related fields, this creates an important limitation. AI is increasingly connected to journalistic production, editorial work, content creation, information distribution, and future newsroom practices (Deuze & Beckett, 2022; Partha et al., 2024). Therefore, communication-related AI literacy requires more than general AI knowledge or tool use. It also needs to support judgment about content, information credibility, human-AI interaction, and responsible communication practice.

These findings point to the value of distinguishing between general AI literacy and domain-specific AI literacy. General frameworks provide a useful foundation, but domain-specific frameworks need to clarify how shared AI literacy competencies should be interpreted and prioritized within particular fields. For communication-related fields, this means connecting general AI literacy with the competencies required for communication practice and professional preparation.

Multidimensional Structure and Conceptual Clarity in AI Literacy Frameworks

The synthesized structure of the 34 frameworks reinforces earlier understandings of AI literacy as a multidimensional construct. Prior studies have shown that AI literacy involves more than operational knowledge, covering areas such as conceptual understanding,

practical use, evaluation, creation, ethical awareness, knowledge, skills, and attitudes (Chiu et al., 2024; Long & Magerko, 2020; Ng et al., 2021). The present study extends this discussion by showing how these broad competency areas are distributed across six synthesized dimensions: cognitive, technical, ethical, application-oriented, pedagogical, and affective.

At the same time, multidimensionality alone does not ensure conceptual clarity. Some frameworks include a wide range of competency areas, but provide limited explanation of how these areas are connected or how they should guide practice. This creates a gap between listing competencies and building a coherent framework. Although previous AI literacy research has drawn on educational models such as Bloom's taxonomy and TPACK to discuss AI literacy learning, cognitive progression, and pedagogical integration (Ng et al., 2021), the present analysis shows that many existing frameworks do not make their internal organizing logic equally explicit.

Contextual clarity is another related issue. AI literacy frameworks are often expected to support learning, assessment, or professional preparation, yet many reviewed frameworks did not clearly specify their national, regional, institutional, or disciplinary context. Institutional frameworks for students and teachers show that AI competencies can be designed for particular user groups (Miao & Cukurova, 2024; Miao & Shiohira, 2024). This suggests that framework usefulness depends not only on conceptual coverage, but also on a clear definition of intended users and application contexts.

Therefore, future AI literacy frameworks should make both their organizing logic and intended scope more explicit. A multidimensional framework can provide a broad foundation, but its practical value depends on whether its dimensions are conceptually connected and adaptable to specific disciplinary or professional needs.

Communication-Oriented AI Literacy as an Emerging Gap

The findings show that communication-related elements are present in existing AI literacy frameworks, but they are usually incorporated into broader competency structures rather than developed as a coherent communication-oriented direction. This pattern is important because AI is increasingly involved in communication practices, including journalistic production, editorial work, content creation, information distribution, and future newsroom practices (Deuze & Beckett, 2022; Partha et al., 2024). In such contexts, AI literacy cannot be limited to general AI knowledge or tool use.

Several reviewed frameworks contain elements that are relevant to communication-related fields. For example, communication and collaboration, digital communication and expression, AI-generated content evaluation, information credibility, disclosure of AI use, and responsible AI practices appear across selected frameworks. These elements are consistent with broader AI literacy discussions on human-AI collaboration, responsible use, AI-generated outputs, and digital learning practices (Chee et al., 2025; Ruiz et al., 2024). However, in the reviewed frameworks, such elements were usually positioned under wider categories such as application, collaboration, digital literacy, or ethical use, rather than being organized as a communication-specific competency structure.

This gap does not mean that communication is absent from existing AI literacy frameworks. Rather, it indicates that communication-related competencies are dispersed and have not yet been systematically connected to the forms of judgment required in communication-related fields. For example, content evaluation, information credibility, disclosure of AI use, and responsible use are already reflected in some framework

components and institutional guidance, but they remain insufficiently consolidated as a communication-sensitive structure (Chun Ru & Tang, 2025; Ruiz et al., 2024). Future AI literacy framework development should therefore consider how existing competencies can be reorganized to support content evaluation, information judgment, human-AI interaction, and responsible communication in AI-mediated environments.

Implications for Communication and Future Framework Development

The findings have implications for the future development of AI literacy frameworks, particularly in communication-related fields. Existing frameworks provide useful foundations for understanding, using, evaluating, and engaging responsibly with AI systems. However, the present study suggests that these general foundations require further contextualization when applied to fields where AI is closely involved in content production, information evaluation, and professional judgment.

This contextualization is especially important for communication-related fields. Prior communication research has shown that AI is increasingly involved in journalistic production, editorial work, and future newsroom practices (Deuze & Beckett, 2022; Partha et al., 2024). Future AI literacy frameworks should therefore retain core competencies such as AI understanding, tool use, and ethical awareness, while also clarifying how these competencies support content evaluation, information credibility, disclosure of AI use, human-AI interaction, and responsible communication practice.

Future frameworks should also define their intended users and contexts more explicitly. Existing institutional frameworks for students and teachers show that AI competencies can be designed for specific user groups and learning contexts (Miao & Cukurova, 2024; Miao & Shiohira, 2024). In a similar way, communication-oriented AI literacy frameworks should specify whether they are intended for communication students, media practitioners, public communication professionals, or broader communication-related groups. Clearer contextual positioning would help determine which competencies should be emphasized and how they should be translated into training, assessment, or professional preparation.

Finally, future framework development should be accompanied by empirical validation. The present study provides a document-based synthesis of existing AI literacy frameworks and identifies areas where communication-related competencies remain fragmented. Further research is needed to examine how these synthesized dimensions can be interpreted, refined, and validated in communication-related areas.

Overall, future AI literacy framework development should retain the strengths of existing general frameworks while developing more explicit domain-specific structures for communication-related fields. Such work would help connect general AI literacy with the specific competencies of communication students and professionals.

Limitations and Future Research

This study has several limitations that should be acknowledged. First, the analysis was limited to English-language academic and institutional documents published between 2015 and 2025. Although this scope enabled the study to capture recent AI literacy framework development across international sources, it may have excluded relevant frameworks published in other languages or in local policy, curriculum, and institutional contexts. Future research could expand the language scope and include more regional or country-specific

sources to examine how AI literacy frameworks are shaped by different educational systems, policy environments, and cultural contexts.

Second, the study focused specifically on documents that explicitly provided AI literacy or AI competency framework content. This decision was necessary because the purpose of the study was to analyze framework structures, dimensions, sub-dimensions, and competencies. However, broader studies on AI education, AI use, digital literacy, media literacy, or AI-related professional training may have been excluded if they did not present an explicit framework or competency structure. Future reviews could therefore examine how AI literacy-related competencies are discussed in adjacent research areas, even when they are not formally presented as frameworks.

Third, the synthesis was based on document analysis and qualitative coding of existing frameworks. Two coders were involved in the extraction and synthesis process, and coding decisions were discussed and checked against the original documents. However, the study did not calculate a formal inter-coder reliability coefficient. Future studies could strengthen coding reliability by applying statistical agreement measures, especially when classifying framework components across multiple hierarchical levels.

Fourth, the communication-related analysis was based on the framework content available in the included documents. The study identified communication-related elements such as communication and collaboration, AI-generated content evaluation and information credibility. However, the study did not empirically test whether these competencies are sufficient for communication-related learners, educators, or professionals. Future research should therefore validate communication-related AI literacy competencies through expert consultation, Delphi studies, interviews, surveys, or scale development.

Finally, this study provides a synthesized overview of existing AI literacy frameworks, but it does not propose or validate a final communication-oriented AI literacy framework. Its main contribution is to map the current framework landscape, synthesize recurring dimensions and competencies, and identify communication-related gaps. Future research can build on this foundation by developing and empirically validating AI literacy frameworks tailored to communication-related fields.

CONCLUSION

This study conducted a global document analysis of 34 AI literacy framework documents published between 2015 and 2025 to examine how AI literacy has been conceptualized, structured, and applied across academic, institutional, and official sources. By combining descriptive coding of framework characteristics with framework content extraction and synthesis, the study mapped the current landscape of AI literacy framework development and identified recurring dimensions, competencies, and communication-related gaps.

The findings show that existing AI literacy frameworks are predominantly education-oriented and are commonly designed for students, educators, children, or broader learning populations. The analysis also indicates that many frameworks do not explicitly specify their theoretical or model-based grounding or national or regional context. Through framework content synthesis, this study identified six overarching dimensions, 69 sub-dimensions, and 109 competencies, showing that AI literacy is a multidimensional construct involving cognitive, technical, ethical, application-oriented, pedagogical, and affective components.

The study further found that communication-related competencies are present but dispersed within the existing AI literacy framework landscape. Elements such as communication and collaboration, digital communication and expression, AI-generated content evaluation, information and mis/disinformation, content authenticity, human-AI interaction, disclosure of AI use, and responsible AI practices appear across selected frameworks. However, these elements are usually embedded within broader competency structures and have not yet been consolidated into a coherent communication-sensitive AI literacy framework.

Overall, this study contributes to AI literacy research by providing a structured synthesis of existing frameworks and by clarifying the need for more communication-sensitive AI literacy development. Rather than treating AI literacy as a universal and context-free competency set, future research should further examine how AI literacy can be adapted to specific disciplinary, cultural, and professional contexts. For communication-related fields, this means future studies should develop and empirically validate communication-sensitive AI literacy frameworks with communication students, educators, and professionals.

BIODATA

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