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Integrating local wisdom into digital teaching materials for next-generation competencies in future education: A systematic literature review

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Abstract The rapid development of digital technology and the demands of future education emphasize the importance of teaching materials that not only utilize technology but also preserve local wisdom. This study aims to systematically review the integration of local wisdom into digital teaching materials and its impact on the development of next-generation competencies. This systematic literature review was conducted by following the PRISMA framework. The inclusion criteria in this study were set as follows: (1) articles published between 2019–2025 to ensure that the data used remain up-to-date; (2) articles written in English to ensure broader accessibility; (3) articles must be original research, not literature reviews, so that the findings analyzed are based on empirical data; (4) research topics must align with the focus on integrating local wisdom into digital teaching materials and the development of 21st-century skills; (5) articles must be published in journals with at least medium-level indexation (such as EBSCO) up to high-level indexation (Scopus or Web of Science), ensuring academic quality; and (6) the reported research must involve a sample or subject of at least 10 participants to ensure more representative results. The findings revealed: (1) research trends related to the integration of local wisdom into digital teaching materials and its impact on next-generation competencies; (2) strategies used in integrating local wisdom into innovative forms of digital teaching materials; (3) the impact of such integration on the development of next-generation competencies and its relevance in the context of future education; and (4) challenges and obstacles encountered during the implementation process. In conclusion, integrating local wisdom into digital teaching materials effectively supports the development of next-generation competencies while simultaneously preserving cultural identity. This study provides practical guidance and an evidence map for educators, policymakers, and researchers in designing culturally sustainable technology-based learning resources.

Keywords: cultural-based learning, digital pedagogy, teaching material, educational innovation, sustainable learning

1. Introduction

The global context of next-generation competencies is characterized by rapid changes in digital technology and the emergence of the Industrial Revolution 4.0, which is transforming into society 5.0 (Yusuf & Fajari, 2025). This development has brought about fundamental changes in the way humans work, communicate, and learn. Technologies such as artificial intelligence, big data, the Internet of Things, and automation require the education sector to adapt curricula, methods, and learning objectives to remain relevant to contemporary needs (Chamdani et al., 2022; Fajari et al., 2020a). Education is no longer merely about transferring knowledge but also emphasizes adaptability, digital literacy, and the ability to face complexity and uncertainty in the future (Fajari & Meilisa, 2022).

In addressing these challenges, learners must be equipped with 21st century skills, which were initially formulated as the 4Cs (Critical Thinking, Creativity, Communication, Collaboration) and have since evolved into 6Cs and even 8Cs with the addition of Citizenship, Character, Cultural awareness, and Compassion (Fajari et al., 2020b, 2023; Sarwanto et al., 2021). These competencies are crucial to ensure that graduates can compete globally while maintaining a local identity. Education that focuses solely on cognitive aspects is no longer sufficient, as social, emotional, ethical, and adaptive skills are also key factors (Kim et al., 2019; Sakti et al., 2024).

The importance of future education arises from the need for learning that is more flexible, contextual, and technology-based while still rooted in human values (Yusuf & Fajari, 2025). This concept requires the integration of digital innovation with a humanistic approach so that education not only produces skilled workers but also critical, caring individuals with social awareness (Highfield et al., 2020; Reinsfield, 2018). The future education system is not only oriented toward technical competence but also aims to shape holistic human beings who can harness technology for collective well-being and the sustainability of life (Gregersen-Hermans, 2021; Su & Zhong, 2022).

Future education demands a learning approach that not only relies on digital technology but also draws upon local values that shape students' identity (Reinsfield, 2018). The integration of local wisdom with digital approaches becomes a strategic pathway to deliver education that is flexible, contextual, and globally relevant while simultaneously preserving cultural roots (Al Farisi et al., 2024; Sakti et al., 2024). Local wisdom holds profound meaning as a marker of identity, cultural values, and national character (Yani et al., 2025). Local wisdom reflects the collective experiences of communities passed down across generations, containing norms, ethics, and ways of life that are harmonious with social and natural environments (Lubis et al., 2024). Local wisdom can be actualized as a contextual learning resource closely related to students' lives, so that learning does not feel foreign but instead builds connections between knowledge and everyday reality (Ardiansyah et al., 2024; Wijayanti et al., 2025).

Local wisdom also has great potential to strengthen students' character in the era of globalization and digitalization. Amid the influx of global culture that often erodes local identity, preserving local wisdom through education becomes essential (Lestari et al., 2021; Pangalila et al., 2024). Values such as cooperation (gotong royong), deliberation, responsibility, and environmental care can serve as moral foundations in facing the challenges of a highly competitive and individualistic modern world (Al Farisi et al., 2024). These values can be effectively internalized through the development of teaching materials that embed local cultural contexts, making learning more meaningful, contextual, and relatable to students' lives (Hudhana et al., 2025; Lubis et al., 2024).

Digital teaching materials refer to all forms of learning content packaged and delivered in digital format, accessible through electronic devices such as computers, tablets, or smartphones (Ardiansyah et al., 2024; Pangalila et al., 2024). Their advantages lie in flexibility, interactivity, and the ability to display text, images, audio, video, and interactive simulations, making learning more engaging and adaptive to technological advancements (Mar'atussolichah et al., 2024). Through the development of digital teaching materials that incorporate local cultural elements, students not only learn to master technology but also internalize the nation's noble values. This makes education more meaningful, adaptive to global changes, and contributive to strengthening the identity of the younger generation (Sari et al., 2024; Winarni et al., 2021).

Digital teaching materials serve not only as sources of information but also as media that support students' learning styles, which are increasingly attuned to technology (Toharudin et al., 2021). Strategies for integrating local wisdom into digital teaching materials can be realized through the development of various technology-based media, such as interactive e-books containing folktales, learning multimedia showcasing local traditions, and the use of AR/VR to deliver immersive experiences of regional cultures (Lestari et al., 2021; Sakti et al., 2024). However, it is important to emphasize that innovation in digital teaching materials should not be limited to the use of advanced technologies (Wijayanti et al., 2025). The content's substance must also incorporate cultural values and local wisdom to ensure that the learning process remains contextual to students' social realities (Lubis et al., 2024). This approach allows students to engage in deeper learning, not only understanding academic concepts but also internalizing cultural values (Hudhana et al., 2025; Mar'atussolichah et al., 2024).

To date, there has been very limited systematic review research explicitly linking all three components—local wisdom, digital teaching materials, and the development of next-generation competencies. Existing literature is generally fragmented, with some studies focusing only on the digitalization of teaching materials without cultural foundations, while others highlight the preservation of local wisdom without examining its impact on next-generation competencies. This condition reveals a significant research gap that requires more comprehensive and integrative study. This study offers a new perspective by integrating three domains—local wisdom, digital teaching materials, and next-generation competencies —within the framework of future education. It presents an evidence map across contexts, synthesizes patterns of integration strategies, and formulates an integrative logic model (context–input–process–output–impact) that can be directly applied by researchers and practitioners. Conducting this SLR is crucial to provide targeted evidence on trends, effective integration strategies, impacts on next-generation competencies in future education, and implementation challenges (infrastructure, teacher competence, content licensing, and co-design with communities).

Based on the above background, the objectives of this study are: (1) to identify and analyze research trends related to the integration of local wisdom into digital teaching materials during the 2019–2025 period, (2) to examine various strategies employed in integrating local wisdom into innovative forms of digital teaching materials, (3) to explore the impact of such integration on the development of next-generation competencies and its relevance to the context of future education, and (4) to uncover the challenges and obstacles that arise in the implementation process in order to provide practical recommendations for researchers and education practitioners.

2. Materials and Methods

2.1. Research design

Systematic Literature Review (SLR) is a research method used to identify, evaluate, and interpret all relevant studies available related to a specific topic, phenomenon, or research question. SLR is conducted in a systematic, transparent, and replicable manner, making it different from a narrative literature review which tends to be subjective. Through SLR, researchers

can discover research patterns, identify research gaps, and present comprehensive scientific evidence to support both theoretical and practical development.

2.2. Research procedure

The research procedure in this study was carried out using a Systematic Literature Review (SLR) approach following the PRISMA guidelines. The PRISMA stages consist of four main steps: identification, screening, eligibility, and inclusion. In the identification stage, articles were identified through searches in various reputable databases. Next, screening was conducted based on titles, abstracts, and keywords that met the inclusion and exclusion criteria. Articles that passed were then evaluated at the eligibility stage by reading the full text to ensure their relevance to the research topic. The final articles that met the criteria were included in the inclusion stage for further in-depth analysis, and the overall selection process was visualized through the PRISMA Flow Diagram in Figure 1.

To ensure broad and representative literature coverage, article searches were conducted in several reputable international databases, namely Scopus, Web of Science (WoS), ERIC, ScienceDirect, as well as Google Scholar as a complement for grey literature or publications not indexed in the main databases. The selection of these databases was based on the consideration that many reputable educational journals are published through these platforms. Furthermore, the search strategy used a combination of keywords with Boolean operators (AND, OR) to either broaden or narrow the search results. An example of the search string used is: (“local wisdom” OR “indigenous knowledge”) AND (“digital teaching material” OR “digital learning resource”) AND (“next-generation competencies” OR “future education”).

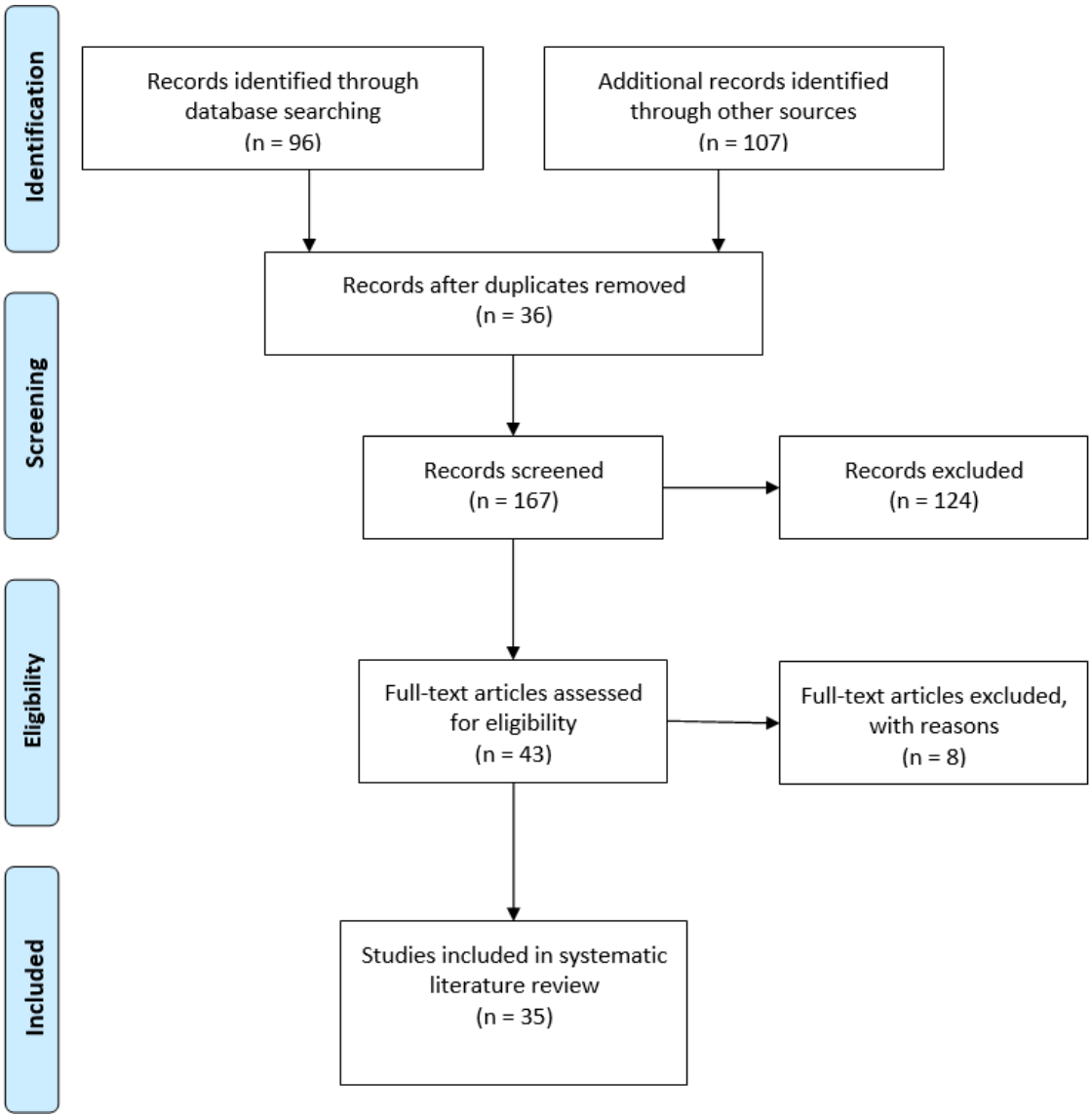

Figure 1 PRISMA flow diagram.

2.3. Inclusion and exclusion criteria

In Systematic Literature Review (SLR) research, inclusion and exclusion criteria are very important to ensure that the articles analyzed are truly in line with the research focus. Inclusion criteria are requirements or boundaries that must be met for an article to be included in the analysis, such as publication year, language, type of publication, and research topic. Conversely, exclusion criteria are specific reasons or considerations that disqualify an article from being included, even if it was initially found during the search process.

The inclusion criteria in this study were set as follows: (1) articles published between 2019–2025 to ensure that the data used remain up-to-date; (2) articles written in English to ensure broader accessibility; (3) articles must be original research, not literature reviews, so that the findings analyzed are based on empirical data; (4) research topics must align with the focus on integrating local wisdom into digital teaching materials and the development of 21st century skills; (5) articles must be published in journals with at least medium-level indexation (such as EBSCO) up to high-level indexation (Scopus or Web of Science), ensuring academic quality; and (6) the reported research must involve a sample or subject of at least 10 participants to ensure more representative results. The exclusion criteria used were: (1) articles in the form of opinions, editorials, or reports without research data, as they do not support empirical analysis; (2) articles written in languages other than English, which may cause difficulties in analysis; and (3) articles that do not discuss topics aligned with the research focus, thus irrelevant to be included in the discussion.

2.4. Research analysis data

The data analysis in this study employed qualitative thematic analysis. This approach was chosen because it can identify, organize, and interpret the main themes from the collection of articles obtained in the SLR. The process began with thoroughly reading all articles to understand the context, followed by initial coding of important information according to the research focus. Next, the codes were grouped into thematic categories representing core issues. Thematic analysis in this SLR emphasizes identifying recurring patterns across various studies, thereby producing a more structured and comprehensive synthesis of knowledge.

The thematic analysis procedure in this study was adjusted to the research questions. First, data were analysed to identify research trends related to the integration of local wisdom into digital teaching materials. Second, data were grouped to reveal strategies for integrating local wisdom, both in terms of content and methods of teaching material development. Third, findings were identified regarding the impact of local wisdom integration on strengthening next-generation competencies or its contributions to future education. Fourth, other themes explored included challenges and barriers to implementation, covering limitations in resources, policies, as well as teacher and student readiness. The results of this thematic analysis provide a comprehensive overview that not only describes the state of research but also connects it to the direction of education development based on local wisdom in the global era. Table 1 provides an overview of the reviewed articles included in this study.

3. Results

Based on the analysis of 35 selected articles, information was collected on several important aspects, including the number of samples by educational level, research methods used, journal indexation of the reviewed articles, data collection techniques, related variables, as well as the types of local wisdom and digital teaching materials studied. The following paragraphs provide a detailed overview of these trends, highlighting patterns, common practices, and emerging focuses in this field.

The distribution of digital teaching materials based on local wisdom in Indonesia is spread across various provinces, reflecting the cultural diversity and rich local potential of each region. From the analysis of 35 articles, it was found that the province with the highest number of studies was Central Java (5 articles), followed by West Java (4 articles), and regions representing national or general contexts (4 articles). Other provinces were also noted to have related studies, including Bali (2), Jambi (2), North Sulawesi (2), South Sulawesi (3), and West Nusa Tenggara (3). Provinces such as Aceh, Bengkulu, East Java, Jakarta, Maluku, North Sumatra, Papua, South Kalimantan, West Sulawesi, and Yogyakarta each had one article. Figure 2 presents the distribution of reviewed articles across Indonesian provinces.

Furthermore, the distribution of research based on the number of subjects per educational level shows that the majority of studies were conducted at the elementary school level, with a total of 1,286 participants, followed by senior high schools with 1,190 participants, and junior high schools with 640 participants. Higher education accounted for 289 participants, while the kindergarten level involved 74 participants. In total, the number of research subjects reached 3,479 participants. These data illustrate that the integration of local wisdom into digital teaching materials has been widely tested at primary and secondary levels, which are crucial stages in shaping 21st-century skills and cultural understanding from an early age. Figure 3 shows the distribution of articles based on research subjects.

Table 1 Recapitulation of reviewed articles.

No.	Name	Sample	Level	Method	Index	Type of Teaching Material
1	(Hudhana et al., 2025)	199	Elementary School	Quantitative Survey	Scopus Q1	Comics
2	(Saminan et al., 2024)	70	University	Research & Development	Scopus Q1	Modules
3	(Darmawati et al., 2024)	350	Junior High School	Research & Development	Scopus Q1	Book
4	(Sakti et al., 2024)	12	Kindergarten	Qualitative Case Study	Scopus Q1	Learning tool
5	(Awaluddin et al., 2024)	60	University	Qualitative Case Study	Scopus Q2	Curriculum
6	(Al Farisi et al., 2024)	43	Senior High School	Qualitative Ethnography	Scopus Q2	Book
7	(Patras et al., 2025)	35	Elementary School	Research & Development	Scopus Q2	Modules
8	(Yani et al., 2025)	100	Elementary School	Qualitative Case Study	Scopus Q2	Interactive Multimedia
9	(Apdelmi et al., 2025)	120	Senior High School	Research & Development	Scopus Q2	Interactive Multimedia
10	(Andriyanto et al., 2025)	12	University	Qualitative Case Study	Scopus Q2	Game Applications
11	(Wijayanti et al., 2025)	90	Senior High School	Qualitative Case Study	Scopus Q2	Interactive Multimedia
12	(Damopolii et al., 2018)	69	Junior High School	Research & Development	Scopus Q3	Book
13	(Santoso et al., 2024)	60	Elementary School	Quantitative Quasi Experiment	Scopus Q3	Application Games
14	(Ramdiah et al., 2020)	134	Senior High School	Research & Development	Scopus Q3	Learning tool
15	(Sofyan et al., 2019)	62	Kindergaten	Research & Development	Scopus Q3	Modules
16	(Hikmawati et al., 2024)	77	University	Quantitative Quasi Experiment	Scopus Q3	Learning tool
17	(Syahfitri & Muntahanah, 2024)	109	Senior High School	Quantitative Quasi Experiment	Scopus Q3	Modules
18	(Ermiana et al., 2024)	15	Elementary School	Research & Development	Scopus Q3	Comics
19	(Jufrida et al., 2024)	90	Junior High School	Mixed Method	Scopus Q3	Learning tool
20	(Pangalila et al., 2024)	67	Junior High School	Research & Development	Scopus Q3	Learning tool
21	(Toharudin et al., 2021)	298	Senior High School	Mixed Method	Scopus Q3	Application Games
22	(Winarni et al., 2021)	135	Elementary School	Research & Development	Scopus Q3	Book
23	(Lestari et al., 2021)	70	Elementary School	Quantitative Quasi Experiment	Scopus Q3	Comics
24	(Ramadhana et al., 2023)	70	University	Qualitative Ethnography	Scopus Q3	Learning tool
25	(Yuliarti et al., 2023)	124	Senior High School	Quantitative Quasi Experiment	Scopus Q3	Story
26	(Saripudin et al., 2022)	60	Senior High School	Research & Development	Scopus Q3	Book
27	(Sari et al., 2024)	100	Elementary School	Research & Development	Scopus Q4	Interactive Multimedia
28	(Ardiansyah et al., 2024)	15	Junior High School	Research & Development	Scopus Q4	Book
29	(Mar'atussolichah et al., 2024)	66	Elementary School	Research & Development	Scopus Q4	Application Games
30	(Lubis et al., 2024)	60	Senior High School	Qualitative Phenomenology	WoS ESCI	Podcast
31	(Wiradnyana et al., 2024)	130	Elementary School	Quantitative Quasi Experiment	EBSCO	Book
32	(Mawaddah et al., 2024)	60	Elementary School	Quantitative Quasi Experiment	EBSCO	Learning tool
33	(Zaki et al., 2024)	116	Junior High School	Research & Development	EBSCO	Modules
34	(Usman et al., 2024)	159	Elementary School	Quantitative Survey	EBSCO	Learning tool
35	(Masie et al., 2025)	52	Senior High School	Research & Development	EBSCO	Modules

Next, the distribution of articles based on indexation shows variations in the quality and scope of publications used in this study. A total of 4 articles were published in high-reputation journals (Scopus Q1), 7 articles in Scopus Q2, 15 articles in Scopus Q3, and 3 articles in Scopus Q4. In addition, there was 1 article indexed in Web of Science ESCI and 5 articles available through EBSCO. This distribution indicates that most research on the integration of local wisdom into digital teaching materials has been published in journals with medium to high indexation, demonstrating good academic credibility and providing strong scientific evidence to support findings and trends in this field. Figure 4 presents the distribution of articles based on journal indexation.

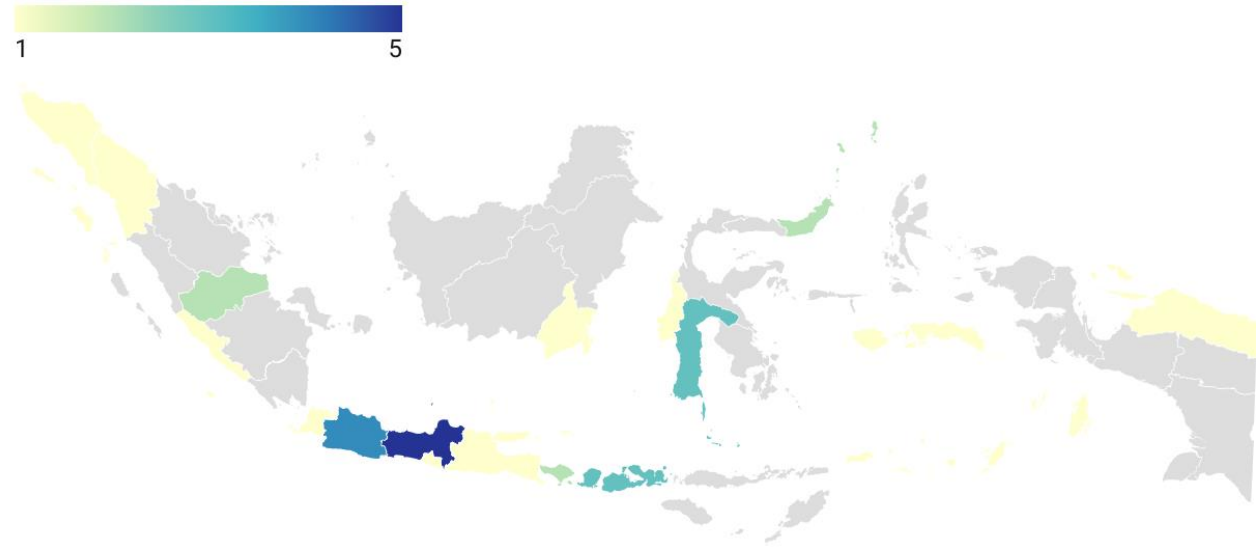

Figure 2 Distribution of articles based on provinces of local wisdom.

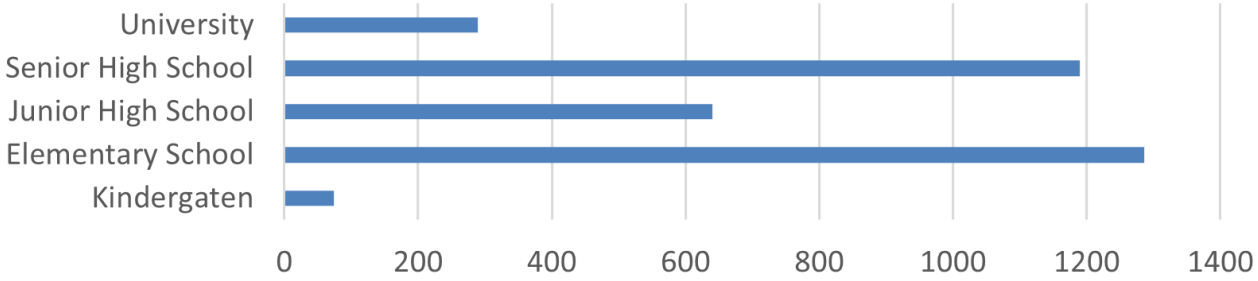

Figure 3 Distribution of articles based on research subjects.
Source: Scopus, Web of Science & EBSCO Database.

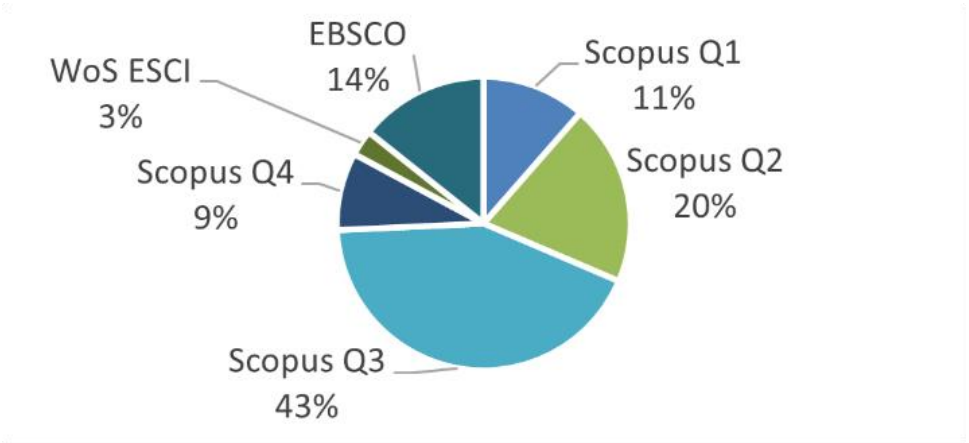

Figure 4 Distribution of articles based on journal indexation.
Source: Scopus, Web of Science & EBSCO Database.

The distribution of research methods used in studies on the integration of local wisdom into digital teaching materials shows diverse approaches according to the objectives and contexts of each study. In qualitative methods, most studies employed case studies (5 articles), followed by ethnography (2 articles) and phenomenology (1 article). For quantitative methods, quasi-experiments dominated with 7 articles, while surveys were used in 2 articles. Mixed-method approaches were applied in 2 articles, with embedded and sequential explanatory designs each used once. Meanwhile, Research and Development (R&D)-based studies accounted for a significant portion, with various models applied: the 4D Model (5 articles), the ADDIE Model (6 articles), the Borg and Gall Model (3 articles), and the Plomp & Nieveen Model (2 articles). These findings indicate that research in this field employs flexible and diverse methods, ranging from exploratory studies, controlled experiments, to product development, in order to support the integration of local wisdom into digital teaching materials. Table 2 presents the distribution of articles based on research methods used.

Table 2 Distribution of articles based on research methods used.

Method	Types	Frequency
Qualitative	Case Study	5
	Ethnography	2
	Phenomenology	1
Quantitative	Quasi-Experiment	7
	Survey	2
Mixed Method	Embedded	1
	Sequential Explanatory Design	1
Research and Development	4D Model	5
	ADDIE Model	6
	Borg and Gall Model	3
	Plomp & Nieveen Model	2

The distribution of data collection techniques in research on the integration of local wisdom into digital teaching materials shows the use of various techniques to obtain comprehensive information. The most frequently used technique was testing, applied in 23 articles, followed by interviews in 22 articles, observations in 21 articles, and questionnaires in 17 articles. Meanwhile, documentation was used in 9 articles. These findings indicate that researchers tend to combine multiple data collection techniques—both quantitative and qualitative—to obtain a more complete picture of the effectiveness of digital teaching materials based on local wisdom, their impact on 21st-century skills, and students' responses in the learning context. Details of the distribution are outlined in Table 3.

Table 3 Distribution of articles based on data collection techniques used.

Data Collection Technique	Frequency
Questionnaire	17
Test	23
Interview	22
Observation	21
Documentation	9

The distribution of types of local wisdom used in research shows a diversity of cultural resources serving as the basis for digital teaching materials. Out of 35 articles, the most frequently studied type of local wisdom was cultural practices with 9 articles, followed by values with 6 articles, traditional ceremonies and performing arts with 5 articles each, as well as beliefs/myths also with 5 articles. Traditional knowledge was applied in 2 articles, while language and cultural heritage sites were each noted in 1 article. Figure 5 presents the distribution of articles based on the types of local wisdom.

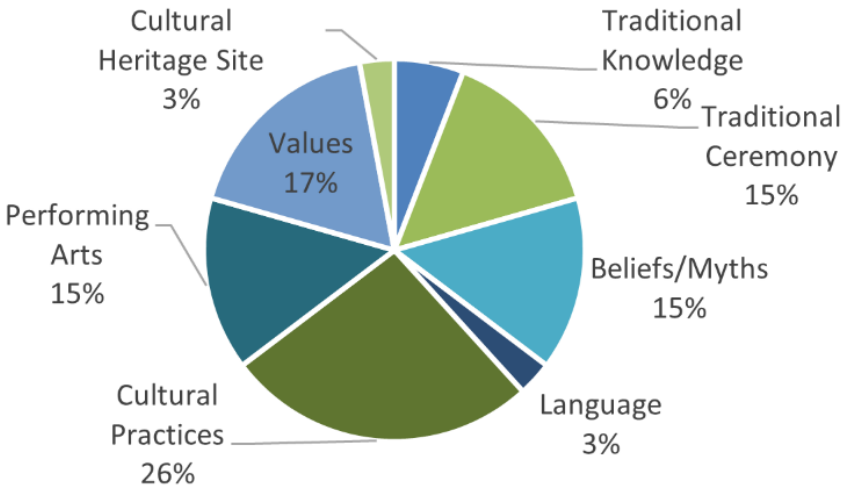

Figure 5 Distribution of articles based on types of local wisdom.
Source: Scopus, Web of Science & EBSCO Database.

The types of local wisdom used as the basis for digital teaching materials are highly diverse and reflect the richness of Indonesian culture. Some examples include ethnoscience from Aceh and other regions, folktales such as the Bandung Folktale and Central Java Folktale, local languages such as the Banjar Language, as well as local values such as Pancasila Value and Tri Karya Parisudha Value. Additionally, the studies also highlighted region-specific local wisdom such as Betawi, Bima, Bugis,

Makassar, Maluku, North Sulawesi, Papua, Sasak, and Yogyakarta, as well as cultural practices or traditional games. The distribution of various types of local wisdom can be seen in the Figure 6.

Figure 6 Distribution of articles based on related local wisdom.

The types of local wisdom-based digital teaching materials examined in the studies show a variety of media used to support learning. The most frequently used media include books (7 articles) and learning tools (7 articles), followed by modules (6 articles) as means of delivering material. Interactive media such as interactive multimedia and game applications were each used in 4 articles, while comics were examined in 3 articles. Furthermore, some studies also explored curricula, stories, and podcasts, although with lower frequencies. This variation in media types demonstrates flexibility and innovation in delivering local wisdom through digital formats tailored to the needs and characteristics of learners. Details of the distribution are outlined in Figure 7.

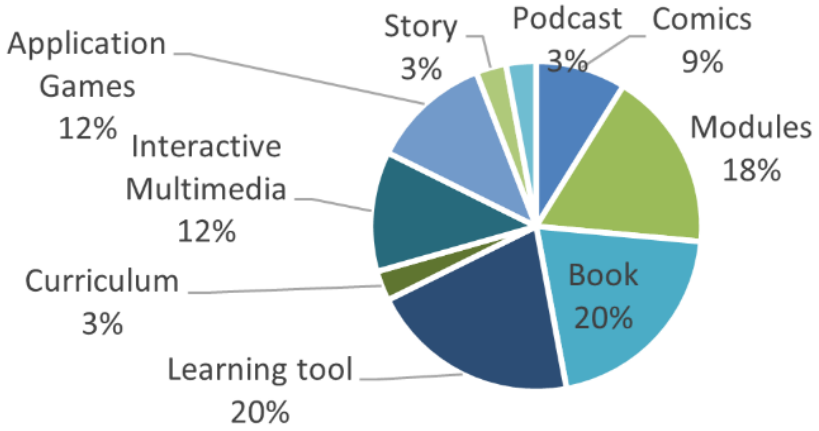

Figure 7 Distribution of articles based on the types of local wisdom-based digital teaching materials.
Source: Scopus, Web of Science & EBSCO Database.

Furthermore, the variables associated with or influenced by local wisdom-based digital teaching materials encompass various aspects of learners' competencies—cognitive, affective, and psychomotor. The most frequently examined variables are learning performance (8 articles) and character (5 articles), highlighting the focus on learning outcomes and character development. In addition, critical thinking skills and cultural understanding each appeared in 3 articles, while problem solving was noted in 2 articles. Other variables considered, though with lower frequency, include collaboration, conservation attitudes, digital literacy, eco-literacy, higher-order thinking skills, indigenous knowledge, learning motivation, listening skills, manipulative movements, multicultural competence, scientific literacy, speaking skills, understanding concepts, and writing skills. This indicates that the integration of local wisdom into digital teaching materials has a wide impact, encompassing

character development, 21st-century skills, and various learner competencies. Details of the distribution are outlined in Figure 8.

Figure 8 Distribution of articles based on related variables.

4. Discussion

4.1. Strategies for integrating local wisdom into innovative digital teaching materials

Based on the analysis of 35 articles, strategies for integrating local wisdom into digital teaching materials are carried out through a combination of selecting local content, utilizing innovative digital media, and adopting pedagogical approaches that involve active student engagement. Several types of local wisdom highlighted in the studies include folktales, cultural traditions, moral values, local history, cultural practices, and local languages. For example, the Central Java Folktale was used to instill character values such as responsibility, cooperation, and honesty among elementary school students. Acehnese Ethnoscience focused on introducing traditional knowledge relevant to the local ecosystem, enabling students to understand scientific concepts through their own cultural experiences. Pancasila Values were also incorporated as local wisdom in several studies, such as those reported in Ramadhana et al. (2023), to build social awareness and student character. Additionally, local languages such as the Banjar Language were integrated into digital teaching materials, supporting the preservation of local languages while enhancing students' literacy and communication skills (Awaluddin et al., 2024). This approach emphasizes the importance of contextual learning based on the local environment and culture as an effective strategy for developing 21st-century competencies (Ermiana et al., 2024; Jufrida et al., 2024).

The packaging strategies for local wisdom into digital media were highly diverse and adapted to the types of teaching materials used. From the 35 articles, the use of digital books was found in 7 articles, allowing the presentation of local content in interactive text and visual formats. These digital books were often equipped with illustrations, simple animations, and multimedia links to enhance student understanding. Digital modules were used in 6 articles, focusing on systematic learning steps, activity guides, and structured assignments to strengthen students' analytical and practical competencies. Digital learning tools appeared in 7 articles, including simulation devices, virtual laboratories, and practicum applications that enabled students to conduct experiments or project-based activities. This strategy aligns with the concept of active learning as emphasized by Fadilurrahman et al. (2019), which highlights active student involvement in the learning process to deepen conceptual understanding and cultural values.

Additionally, interactive multimedia use was reported in 4 articles. This multimedia combines text, audio, images, video, and animation to present local wisdom content in a more engaging and accessible way. For example, local history content or traditional ceremonies could be visualized through interactive videos or animations, allowing students not only to receive information passively but also to explore and understand cultural contexts more immersively (Apdelmi et al., 2025; Wijayanti et al., 2025). Digital comics were used in 3 articles as a means to present folktales or moral values narratively, making it easier for students to grasp cultural messages through character visualization and storytelling. In addition, application-based games were adopted in 4 articles, providing game-based learning experiences that enhanced students' motivation, engagement, and problem-solving abilities. Meanwhile, some studies used podcasts (1 article) and curriculum guides (1 article) as supplementary media to facilitate audio-based learning or curriculum frameworks incorporating local wisdom.

From a pedagogical perspective, several studies (10 articles) adopted project-based learning or problem-based learning approaches, where students were actively engaged in projects integrating local wisdom. This approach encouraged the

development of critical thinking, collaboration, communication, and creativity—the core competencies of the next-generation competencies (Hikmawati et al., 2024; Syahfitri & Muntahanah, 2024). For instance, students might be tasked with creating digital projects visualizing their regional folktales in the form of animations, interactive comics, or multimedia modules, while learning the embedded cultural values (Sofyan et al., 2019).

4.2. Impact of local wisdom-based digital teaching materials on next-generation competencies

The integration of local wisdom into digital teaching materials has been proven to significantly impact the development of next-generation competencies. Based on the analysis of 35 articles, the most dominant effects were observed in learning performance, followed by the strengthening of character, improvement of critical thinking skills, and cultural understanding. These impacts align with the goals of future-oriented education, which emphasize the combination of cognitive, affective, and social competencies, including critical, creative, collaborative, communicative, and culturally and digitally literate skills (Lestari et al., 2021; Syahfitri & Muntahanah, 2024).

Learning performance was the most frequently reported variable, appearing in 8 articles. The studies revealed that local wisdom-based digital teaching materials improved learning motivation, conceptual understanding, and students' academic achievement. For example, modules based on Acehnese Ethnoscience and Maluku Local Wisdom enhanced students' understanding of scientific and cultural concepts simultaneously. This aligns with meaningful learning, which emphasizes that knowledge relevant to students' experiences and contexts is more easily understood, remembered, and applied (Damayanti et al., 2022). In other words, the integration of local wisdom not only enriches learning content but also makes the learning process more contextual, relevant, and enjoyable, thereby positively impacting academic achievement (Andriyanto et al., 2025; Darmawati et al., 2024).

In addition, character development was reported in 5 articles. The use of folktales, cultural practices, and moral values, such as those embedded in Yogyakarta Local Wisdom, Malaqbiq Tau Mandar Value, and Bima Local Wisdom, was proven to strengthen integrity, responsibility, cooperation, and environmental awareness. These character values not only provide students with social ethics but also form an essential foundation for addressing the challenges of globalization, which often promotes individualistic behaviors (Masie et al., 2025; Saminan et al., 2024). Materials delivered through digital books, modules, comics, and interactive multimedia enabled students to experience simulations of real-life situations where such values are applied (Toharudin et al., 2021; Winarni et al., 2021). For example, learners could engage in digital projects simulating traditional ceremonies or local games, allowing them to appreciate culture while developing empathy and discipline.

Additionally, variables such as collaboration, digital literacy, higher-order thinking skills, learning motivation, listening skills, speaking skills, writing skills, scientific literacy, manipulative movements, multicultural competence, eco-literacy, understanding concepts, and indigenous knowledge each appeared in 1 article. Although less frequent, this demonstrates that local wisdom-based digital teaching materials hold wide potential for developing diverse student skills. This reinforces that digital teaching materials combining local content and innovative technology can equip learners with relevant competencies to face the challenges of future education, including readiness for society 5.0 and the dynamics of globalization (Hikmawati et al., 2024; Santoso et al., 2024).

4.3. Challenges and obstacles in implementing local wisdom-based digital teaching materials

The implementation of local wisdom-based digital teaching materials faces several key challenges that arise at various levels of education. Based on the analysis of 35 articles, these obstacles can be grouped into several crucial aspects that affect the effectiveness of integrating local values into digital media. Limitations in technology and digital infrastructure constitute significant barriers, especially in remote schools or those with limited resources. Restricted access to devices, internet networks, and multimedia facilities hindered the use of interactive modules, digital comics, multimedia, or game-based applications. The study by Al Farisi et al. (2024) emphasized the importance of digital equity to ensure that all students receive equal learning experiences, and 9 of the 35 articles highlighted these technical barriers as major challenges.

The second challenge relates to teacher capacity and adapting local content into interactive digital formats. Transforming traditional materials such as folktales, cultural practices, moral values, or local history into interactive digital media requires advanced technical and pedagogical skills. Around 12 articles indicated that teachers and developers often struggled to present content in engaging ways, maintain the authenticity of cultural messages, and adjust it to learners' characteristics. Multimedia learning theory emphasizes that effective presentation of visual and audio information can improve comprehension and retention, but requires careful design to ensure educational quality (Mawaddah et al., 2024; Wiradnyana et al., 2024). This challenge demands teacher training and collaboration with cultural experts and instructional designers.

The third challenge stems from the complexity of content and the diversity of local wisdom across Indonesia. Each province, ethnic group, or community has unique values, practices, and traditions that must be selected and adapted to ensure relevance to learning objectives and learners' characteristics. The use of content such as Acehnese Ethnoscience, Central Java Folktale, or Pancasila Values requires proper context to enable students to understand and apply the values effectively. Patras

et al. (2025) and Rood & Barbour (2024) stressed that culturally responsive learning must be aligned with learners' cultural backgrounds to enhance engagement, comprehension, and motivation.

Additionally, further challenges related to resources, institutional support, and content quality also arise. Developing local wisdom-based digital teaching materials requires costs, time, and collaboration among teachers, cultural experts, technology developers, and educational stakeholders. Resistance to changes from conventional methods, inaccuracy in cultural information, and the need to adapt content to modern learning models fostering 21st-century skills present additional barriers. Ahmad et al. (2016) emphasized the importance of authentic learning experiences and social interaction, suggesting that local wisdom-based digital teaching materials should be designed to support holistic and relevant learning contexts.

5. Conclusion

Based on the findings and discussion above, several conclusions can be drawn. First, there has been a significant upward trend in the period 2019–2025. Second, various innovative strategies have been applied, including the use of digital books, modules, interactive multimedia, comics, and game-based applications. Third, the impact of integrating local wisdom-based digital teaching materials is evident in the enhancement of next-generation competencies, such as learning performance, character, critical thinking, problem solving, and cultural understanding. Fourth, the implementation faces challenges in terms of technological and infrastructural limitations, teachers' ability to digitally adapt local content, and the complexity of selecting content relevant to learners' characteristics and learning objectives. Overall, local wisdom-based digital teaching materials have proven effective in supporting the development of next-generation competencies while preserving cultural values. This study provides practical guidance and an evidence map for educators, policymakers, and researchers to design innovative and culturally sustainable digital learning resources. The findings also affirm the importance of collaboration among technology, pedagogy, and local values to create inclusive and relevant future education.

6. Final Considerations

This study highlights the growing importance of integrating local wisdom into digital teaching materials as a way to foster next-generation competencies in the context of future education. By systematically reviewing 35 studies from 2019 to 2025, the findings confirm that such integration not only enriches learning performance, character building, and critical thinking but also ensures the preservation of cultural identity within digital-based education. The upward trend of research during this period reflects an increasing recognition that technology-based learning resources must remain connected to local values to maintain contextual relevance and cultural sustainability. Innovative strategies—ranging from digital books, interactive multimedia, comics, to game-based applications—have been successfully employed to embed local wisdom into digital platforms. These strategies demonstrate that educational technology can function not merely as a tool for knowledge transfer, but as a medium that bridges global competencies with local cultural heritage. At the same time, the challenges identified, such as limited infrastructure, teachers' digital readiness, and the complexity of adapting diverse local content, underline the necessity of ongoing teacher training, investment in digital infrastructure, and context-sensitive content selection.

Despite providing meaningful insights, this study acknowledges its limitations in terms of regional scope, uneven representation of local wisdom types, and a lack of long-term impact evaluations. Addressing these gaps in future research will be essential to enhance the generalizability and sustainability of findings. Expanding the geographical coverage, diversifying the forms of local wisdom and digital media, and conducting longitudinal studies are particularly important to generate more robust evidence on the long-term contribution of local wisdom-based digital materials to educational transformation. In conclusion, the synthesis affirms that integrating local wisdom into digital teaching materials is a powerful approach to cultivating next-generation competencies. By linking cultural heritage with innovative digital resources, educators and policymakers are better equipped to design inclusive, adaptive, and future-ready education systems.

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Ethical Considerations

Not applicable.

Conflict of Interest

The authors declare no conflicts of interest.

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