

PANCASILA EDUCATION AND GENERATIVE AI IN ELEMENTARY SCHOOLS: DIGITAL ETHICS, ACADEMIC INTEGRITY, AND AI LITERACY

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ABSTRACT

Purpose: This study examines the intersection of generative artificial intelligence (GenAI) and Pancasila Education in elementary schools, focusing on digital ethics, academic integrity, and AI literacy. **Methods:** This study employs a structured literature review of peer-reviewed publications primarily from 2022 to 2026, complemented by UNESCO guidance and Indonesian education policy documents. The literature was synthesized thematically around GenAI use in schools, ethical risks, academic integrity, AI literacy, digital citizenship, and Pancasila values. **Findings:** The synthesis indicates that GenAI can support creativity, personalized learning, feedback, and educational activities. However, responsible use requires critical evaluation, privacy protection, authorship awareness, transparent disclosure, and preservation of student agency. Research on AI literacy in primary education remains limited. Pancasila is proposed as an ethical-civic framework for connecting technological competence with humanity, responsibility, democratic judgment, unity, and social justice. **Research Implications:** The findings provide a conceptual basis for developing Pancasila-oriented GenAI literacy models, age-appropriate ethical guidance, teacher professional development, and assessment approaches that protect academic integrity and student agency. Further empirical research is needed to evaluate these approaches in elementary-school contexts. **Originality:** This study connects GenAI literacy and responsible AI use with the ethical and civic values of Pancasila, offering a conceptual foundation for integrating digital competence, academic integrity, and character education in elementary schools.

Keywords: Generative AI; Pancasila Education; AI Literacy; Digital Ethics; Academic Integrity

1. INTRODUCTION

Generative artificial intelligence (GenAI) has become an increasingly visible technology in education, offering opportunities to support idea generation, text production, explanation, translation, and feedback. In school education, these capabilities may facilitate creative learning and differentiated instruction, but they also require students to evaluate generated information and retain responsibility for their own work. For elementary education, the central issue is not merely whether GenAI can support learning, but how its use can be aligned with children's developing capacity for critical judgement, independent thinking, and ethical decision-making. Recent reviews of K–12 research identify opportunities for educational innovation alongside continuing concerns about responsible implementation, teacher readiness, and the suitability of AI-supported learning for younger students (Alfarwan, 2025; Marzano, 2026).

A useful starting point is to distinguish AI literacy from GenAI literacy. AI literacy is the broader competence to understand, interact with, evaluate, and make informed decisions about artificial intelligence systems, including their capabilities, limitations, and social implications. GenAI literacy is a more specific area that concerns the use and critical evaluation of systems that generate new content, such as text, images, and explanations. It includes recognizing that generated outputs may be inaccurate or biased, protecting personal information, checking information against reliable sources, and making appropriate decisions about authorship and disclosure. Research on primary-school AI literacy has emphasized the development of knowledge, skills, critical understanding, and ethical awareness rather than technical operation alone (Yim & Su, 2025). Similarly, Chung et al. (2025) developed an AI-literacy diagnostic tool for elementary-school students, demonstrating the importance of age-appropriate competency assessment. Yue et al. (2025) also examined design-based learning as an approach to developing AI literacy among elementary learners. Although these studies provide a foundation for understanding children's general AI competencies, they do not, by themselves, establish how elementary students should negotiate the specific questions of authorship, disclosure, and intellectual responsibility raised by GenAI.

The ethical implications of GenAI in elementary education can be organized around three interconnected concerns: the reliability and fairness of generated content, the protection of students' privacy and dignity, and the preservation of student agency and academic integrity. GenAI systems may produce misleading information, reproduce biases, or encourage students to depend excessively on automated answers. These concerns are particularly significant for younger learners, who are still developing the capacity to distinguish reliable information from plausible but unsupported claims. Reviews of AI ethics in primary and secondary education have documented concerns involving privacy, fairness, autonomy, accountability, safety, and educational practice (Gouseti et al., 2025; Wiecek et al., 2025). Research on GenAI literacy has also highlighted the need for explicit guidance on critical evaluation, data security, and responsible use (Park, 2025). Rather than treating these concerns as separate prohibitions, elementary education needs an integrated pedagogical approach that helps students understand why responsible use matters and how to apply ethical judgement in concrete learning situations.

Academic integrity provides an important link between GenAI literacy and student agency. GenAI can be used to brainstorm ideas, clarify difficult concepts, improve a draft, translate text, or generate an entire assignment. The educational significance of these practices depends on the learning objective, the degree of student involvement, and the transparency of the assistance received. Responsible use therefore requires students to remain actively involved in thinking, composing, checking, and revising their work. It also requires teachers to establish age-appropriate expectations about acceptable assistance and disclosure. For elementary students, academic integrity should consequently be approached as a learning practice involving honesty, ownership of ideas, verification

of information, and reflection on the role of AI, rather than solely as a mechanism for detecting or punishing misconduct.

In Indonesia, the policy context provides a relevant basis for examining these questions within elementary education. The Ministry of Primary and Secondary Education issued Ministerial Decree No. 127/P/2025 concerning the implementation of coding and artificial intelligence in early childhood, basic, and secondary education. According to the policy references cited in this article, AI competencies can be integrated across subjects, while AI ethics can be connected with Pancasila Education (Kementerian Pendidikan Dasar dan Menengah, 2025a, 2025b). The associated elementary-level guidance reportedly includes understanding AI's effects, recognizing that AI-generated outputs are not always correct, protecting personal data, and using AI responsibly. These policy directions establish a curricular rationale for discussing AI literacy and ethical responsibility in Indonesian schools. Nevertheless, policy provisions should not be treated as evidence that GenAI is already widely used by elementary students or that existing classroom practices have achieved the intended competencies. Empirical claims about actual adoption, frequency of use, and student experiences require independent evidence from surveys, classroom observations, or other relevant studies. The 2025 Pancasila Education guidance also provides a curricular context for connecting character development, knowledge, skills, and digital learning (Sinaga et al., 2025).

Pancasila offers a contextually relevant ethical-civic framework for addressing these challenges. Its five principles can be translated into practical considerations for responsible GenAI use in elementary education. The first principle, belief in the One and Only God, provides a basis for moral reflection and accountability. The second principle, just and civilized humanity, directs attention to human dignity, privacy, safety, and non-discrimination. The third principle, the unity of Indonesia, supports respectful digital communication and sensitivity to cultural and social diversity. The fourth principle, democracy guided by the inner wisdom of deliberations among representatives, encourages dialogue, critical examination of evidence, and reasoned decision-making. The fifth principle, social justice for all Indonesian people, highlights equitable access to AI-supported learning and the need to address digital inequalities. This mapping positions Pancasila not simply as a set of values to be memorized, but as a framework for interpreting and evaluating students' decisions when interacting with GenAI. Previous Indonesian studies have examined connections between Pancasila values, digital literacy, and digital citizenship in elementary education (Damanik et al., 2026; Hasanah et al., 2026). However, the specific relationship between these values, GenAI literacy, and academic integrity requires further conceptual clarification.

The research gap becomes clearer when the existing literature is compared according to its primary focus and analytical contribution. First, reviews of GenAI in school education primarily examine educational applications, pedagogical opportunities, implementation challenges, and governance concerns (Alfarwan, 2025; Marzano, 2026). Second, research on elementary AI literacy focuses on age-appropriate competencies, learning approaches, and assessment, but general AI literacy does not necessarily address the full range of authorship and disclosure issues associated with generative systems (Yim & Su, 2025; Chung et al., 2025; Yue et al., 2025). Third, reviews of AI ethics in school education consolidate ethical concerns and identify the need for stronger engagement with educational and ethical theory (Gouseti et al., 2025; Wiczorek et al., 2025). Fourth, Indonesian studies connecting Pancasila with digital literacy and citizenship provide a national values-based perspective but, as represented in the literature considered here, do not yet establish an integrated framework specifically addressing GenAI use and academic integrity among elementary students (Damanik et al., 2026; Hasanah et al., 2026).

These strands of research are complementary, but their intersection remains insufficiently developed in the literature reviewed for this article. The principal gap is therefore the absence of a clearly articulated synthesis connecting (1) the specific competencies required for GenAI literacy, (2) ethical decision-making and academic integrity, and (3) the five principles of Pancasila as an ethical-

civic framework for elementary education in Indonesia. This claim concerns the conceptual integration of these domains and should not be interpreted as proof that no previous study has examined the same combination. Establishing the extent of that novelty requires verification through a systematic search of relevant publications and databases.

To address this gap, the present review aims to develop a conceptually grounded synthesis of GenAI literacy, responsible use, academic integrity, and Pancasila Education in elementary-school contexts. Its theoretical contribution is to connect technology-related competencies and ethical-civic values in an integrated framework that explains how Pancasila may inform students' evaluation and use of generated content. Its practical contribution is to identify implications for classroom activities, teacher guidance, age-appropriate assessment, responsible disclosure, and the integration of AI ethics into Pancasila Education. The review is guided by the following research questions:

- a. How does the existing literature characterize GenAI use and its educational implications in elementary-school contexts?
- b. What ethical concerns are associated with GenAI use by elementary students, particularly regarding information reliability, privacy, fairness, and student agency?
- c. How does GenAI use intersect with academic integrity, authorship, disclosure, and students' responsibility for their learning?
- d. What AI-literacy and GenAI-literacy competencies are needed to support responsible use among elementary students?
- e. How can the five principles of Pancasila inform an ethical-civic framework for responsible GenAI use in elementary education?
- f. What conceptual, pedagogical, and empirical gaps should guide future research and the development of Pancasila-oriented GenAI education in Indonesia?

2. METHOD

2.1. Research Design

This study employed an integrative literature review to analyze research on Generative Artificial Intelligence (GenAI), AI literacy, digital ethics, academic integrity, and Pancasila Education in elementary schools. The reporting of study identification, screening, and selection followed the PRISMA 2020 guidelines to improve the transparency and traceability of the selection process (Page et al., 2021). PRISMA was used as a reporting guideline rather than as an analytical method or a meta-analysis framework. The review covered publications from 2022 through 2026, with the search cutoff date set at October 7, 2026.

2.2. Data Sources and Search Strategy

The literature search was conducted using the databases actually consulted, namely [insert database names], with Google Scholar and official government websites used as supplementary sources where applicable. The search terms included generative AI, ChatGPT, AI literacy, GenAI literacy, AI ethics, academic integrity, digital citizenship, Pancasila Education, and elementary school. The terms were combined using the Boolean operators AND and OR, as appropriate to the search characteristics of each database. Search dates, complete search strings, applied filters, and the number of records retrieved from each source were documented to support research reproducibility.

2.3. Eligibility Criteria and Selection Procedures

Articles were included if they were published between 2022 and 2026, contained verifiable bibliographic information, and were relevant to GenAI, AI literacy, digital ethics, academic integrity, or Pancasila Education in elementary education. Eligible publication types included empirical studies, literature reviews, conceptual articles, and official policy documents. Publications were excluded if they were duplicates, irrelevant to the research questions, unverifiable, or lacked sufficient information for analysis. The selection process involved screening titles and abstracts, followed by full-text assessment.

According to the reported selection process, 250 records were identified from various sources. After 40 duplicate records were removed, 210 articles underwent title and abstract screening. Of these, 130 were excluded because they were not relevant to the research focus. The full texts of the remaining 80 articles were assessed, and 50 were excluded because they did not meet the inclusion criteria. Consequently, 30 articles were included in the final synthesis and analyzed thematically to identify connections among GenAI, AI literacy, digital ethics, academic integrity, and Pancasila values in elementary education.

2.4. Data Extraction and Analysis

Data were extracted using a structured matrix containing the authors, publication year, research objectives, methods, research context, main findings, ethical issues, AI literacy competencies, academic integrity considerations, and relevance to Pancasila values. The analysis followed a thematic approach involving repeated reading, coding, code grouping, and comparison of findings across articles. The main themes included GenAI use in education, AI ethics, academic integrity and student agency, AI and GenAI literacy, digital literacy and digital citizenship, and the integration of Pancasila values. The coding process was documented through code definitions and a thematic matrix to make analytical decisions traceable.

2.5. Quality Appraisal and Ethical Considerations

The methodological quality of the included publications was assessed based on the appropriateness of the research design, clarity of the methods, adequacy of the data, rigor of the analysis, and acknowledgment of study limitations. The assessment criteria were adapted to the publication type because empirical studies, literature reviews, and policy documents cannot be evaluated using exactly the same standards. Any formal appraisal instrument and assessment procedures are reported only if they were actually used. This study relied on publicly available scholarly publications and policy documents and did not directly involve human participants. Research integrity was maintained through reference verification, accurate citation, and a clear distinction between findings reported in the original sources and the authors' interpretations.

3. RESULTS

The results are organized around six research areas: trends in GenAI research in education, ethical dimensions, academic integrity, GenAI literacy competencies, integration of Pancasila values, and research gaps. The synthesis was conducted by comparing the objectives, methods, contexts, and findings of relevant literature. Findings reported in previous studies are distinguished from the authors' conceptual interpretations, particularly when connecting GenAI literacy competencies with the five principles of Pancasila. This distinction is necessary to ensure that the conclusions do not extend beyond the available evidence. The numbers of studies mentioned in this section refer to previously published research, not to the number of articles included in the present review.

3.1. Trends in GenAI Research in School Education

Research on GenAI in education has expanded alongside the growing use of artificial intelligence technologies to support learning, provide feedback, generate instructional materials, and facilitate more personalized learning experiences. However, research attention has not been distributed evenly across educational levels. Park (2025), in a review of 51 empirical studies on GenAI literacy in education, reported that only approximately 7.5% focused on elementary education. This finding suggests that empirical knowledge about GenAI use among elementary school students remains limited compared with the attention given to college students and older learners.

Yim and Su (2025) reviewed 25 empirical studies on AI literacy among elementary school students. Their findings indicated that AI literacy involves more than the ability to operate technology; it also encompasses an understanding of AI, digital and data literacy, computational thinking, human–AI interaction, and ethical considerations. These findings demonstrate that AI literacy development requires a multidimensional approach. In the context of GenAI, students need to

do more than generate answers using artificial intelligence systems. They also need to understand technological limitations, evaluate information quality, and recognize their responsibilities when using these tools for learning.

Based on these two reviews, GenAI literacy development in elementary schools should balance technical skills, critical thinking, and ethical awareness. Instruction should help students understand that GenAI outputs are not always accurate, complete, or appropriate to the context of a question. Teachers can design activities that require students to compare AI-generated answers with textbook content, explain why they accept or reject particular information, and identify potential errors. These recommendations represent pedagogical implications derived from the literature synthesis rather than claims that all these strategies have been proven effective in every elementary school context.

3.2. Ethical Dimensions of GenAI Use

Ethics is an important dimension of GenAI use because these systems can generate inaccurate, biased, or contextually inappropriate information. In addition, using GenAI for learning raises concerns about privacy, data security, transparency, accountability, and student autonomy. Wieczorek et al. (2025) reviewed 48 sources on AI ethics in primary and secondary education and identified 17 categories of ethical themes, comprising four categories of benefits and 13 categories of potential negative impacts. These findings demonstrate that AI implementation in education requires systematic ethical consideration rather than an assessment of technological benefits alone.

Ma et al. (2025), in a review of 68 publications on AI ethics in K–12 education, highlighted the need to strengthen responsible AI principles and develop approaches for assessing ethical learning outcomes. These findings are relevant to elementary education because students still need guidance in understanding technological risks and the consequences of their digital actions. In GenAI-based learning, ethical considerations may include protecting personal information, verifying the accuracy of responses, respecting others' work, recognizing potential bias, and taking responsibility for AI-generated content. These topics should be adapted to students' developmental levels.

The synthesis of these studies indicates that GenAI ethics education should integrate knowledge, judgment, and responsible behavior. Students need to understand technological risks while also having opportunities to practice appropriate decision-making. For example, teachers can ask students to consider whether personal information should be entered into an AI system, verify the accuracy of generated responses, or discuss appropriate actions when AI produces information that harms a particular group. These examples are instructional recommendations developed from the literature synthesis. Their effectiveness in improving students' ethical behavior must still be tested through empirical research using measurable assessment indicators.

3.3. Academic Integrity and Student Learning Autonomy

The use of GenAI in education raises questions about the boundary between technological assistance and the replacement of students' own thinking processes. On the one hand, GenAI can help explain concepts, provide examples, generate practice questions, and support the exploration of ideas. On the other hand, unsupervised use may encourage students to accept answers without checking their accuracy or understanding how those answers were produced. Park (2025) identified academic integrity, privacy, and data security as important components of GenAI literacy. This finding indicates that technology use should be accompanied by an understanding of academic responsibility and the appropriate limits of technological assistance.

In elementary education, academic integrity can be developed by encouraging students to acknowledge AI assistance, verify information, explain material in their own words, and remain actively involved in completing assignments. Teachers should establish clear rules about when GenAI may be used, what forms of assistance are permitted, and how such use must be disclosed. Assessment can also be designed to evaluate the learning process through oral explanations, records of work in progress, discussions, or student reflections. These strategies are pedagogical recommendations derived from the literature synthesis, and their implementation should account for

learning objectives, students' ages, technology availability, and school policies.

Although there are concerns that GenAI use may reduce independent thinking, this effect cannot be presented as a definitive empirical finding among elementary school students without direct research evidence. The influence of GenAI may depend on the purpose of use, task type, level of teacher guidance, and students' ability to evaluate information. Future research should therefore examine how students use GenAI across different learning activities and how such use relates to conceptual understanding, problem-solving skills, and learning autonomy. This approach can help distinguish AI use that supports learning from use that replaces students' own learning processes.

3.4. GenAI Literacy Competencies Required by Students

GenAI literacy encompasses the ability to understand, use, evaluate, and consider the consequences of using generative systems. Yim and Su (2025) found that AI literacy among elementary school students involves technological understanding, digital and data literacy, computational thinking, human–AI interaction, and ethics. These findings provide a foundation for developing instruction that goes beyond the ability to write prompts for an AI system. Students also need to understand that GenAI produces outputs based on data patterns, can make mistakes, and does not always provide information that can be trusted without verification. This understanding is essential for developing critical technology-use habits.

Yue et al. (2025) investigated design-based learning among fifth-grade students in Hong Kong using a mixed-methods approach. The study reported improvements in AI knowledge, ethical understanding, and attitudes toward AI based on pre- and post-instruction assessments. Qualitative findings also described problem-solving processes involving the use of AI skills. These results provide an example of how structured instruction can support the development of students' AI competencies. However, findings from a single instructional context cannot be generalized directly to all elementary schools. Adaptations are needed to account for curriculum requirements, student characteristics, teacher readiness, and technology access.

Based on the literature synthesis, this study conceptually categorizes GenAI literacy competencies into four dimensions: foundational understanding of GenAI, information evaluation, ethical and responsible use, and learning autonomy. Foundational understanding involves recognizing the functions and limitations of the technology. Information evaluation includes examining accuracy, relevance, and supporting sources. Ethical use involves protecting privacy, respecting others, and acknowledging AI assistance. Learning autonomy emphasizes students' active engagement in thinking and decision-making. These four dimensions represent the authors' conceptual synthesis rather than a standardized instrument validated for all elementary education contexts.

3.5. Integrating GenAI Literacy with Pancasila Values

Integrating GenAI literacy with Pancasila Education offers a context-sensitive approach to developing digital responsibility among elementary school students. This approach treats technology use not merely as a technical skill but also as part of character development, respect for others, and social responsibility. Hasanah et al. (2026) discussed value-based digital literacy in the context of Pancasila Education in elementary schools. Their work is relevant to developing a conceptual connection between digital literacy and character education. Nevertheless, this relationship must be formulated carefully because empirical evidence on the effectiveness of integrating all five Pancasila principles with GenAI literacy still requires further investigation.

Within this study's conceptual framework, the first principle is associated with moral responsibility and honesty in GenAI use. The second principle is linked to respect for human dignity, privacy protection, and opposition to discrimination. The third principle provides a foundation for respectful digital communication and appreciation of diversity. The fourth principle is associated with verifying information, considering different perspectives, and making informed decisions. The fifth principle is linked to equitable technology access and inclusive learning opportunities. This mapping represents the authors' conceptual interpretation rather than a direct empirical finding reported by

Hasanah et al. (2026).

This integration can be implemented through learning activities that connect GenAI use with real-life situations familiar to students. For example, teachers can ask students to examine information that may harm others, discuss the importance of protecting personal data, or compare GenAI responses with reliable learning resources. Reflective activities can help students connect their decisions with the values of honesty, respect, deliberation, and justice. However, these activities remain instructional proposals that require evaluation. Further research should examine whether integrating Pancasila values actually improves students' information evaluation skills, academic integrity, and digital responsibility.

3.6. Research Gaps

The literature synthesis indicates that research on GenAI literacy specifically involving elementary school students needs further development. Existing reviews provide a foundation for understanding AI literacy competencies, ethical issues, and instructional approaches, but they do not fully explain how these dimensions can be integrated into everyday classroom activities. In addition, children's developmental characteristics require approaches that differ from those used in higher education, particularly in explaining technical concepts, introducing digital risks, and developing academic responsibility. This gap highlights the need for research focused on elementary school students' needs and grounded in authentic learning contexts.

Another research gap concerns the assessment of GenAI competencies and use-related behaviors. Research should not merely measure students' knowledge of AI or their ability to use applications; it should also evaluate their ability to verify information, acknowledge technological assistance, protect privacy, and remain engaged in the thinking process. Assessment instruments should be developed using indicators appropriate to students' ages and learning objectives. Research should also distinguish among students' perceptions, demonstrated performance on assignments, and technology-use behaviors in real-world situations. This distinction is important because evaluation results should extend beyond declarative knowledge and provide insight into how competencies are applied in learning.

A further gap concerns the development and testing of instructional models that integrate GenAI literacy with Pancasila values. The conceptual mapping of each principle to digital behavior needs to be translated into learning objectives, activities, observational indicators, and assessment instruments that can be applied consistently. Research should also consider the roles of teachers, parental support, school policies, and unequal access to technology. Accordingly, a key priority for future research is to develop and test a GenAI literacy instructional framework that is developmentally appropriate for elementary school students, supports academic integrity, and integrates Pancasila values through clearly defined indicators that can be empirically evaluated.

4. DISCUSSION

The literature synthesis indicates that the central issue surrounding the use of Generative Artificial Intelligence (GenAI) in education is not simply whether the technology should be permitted or prohibited, but how its use can be guided to support responsible learning. Alfarwan (2025), Marzano (2026), and Ma et al. (2025) provide a foundation for understanding the importance of AI literacy, ethical development, and educational readiness in response to advances in generative technologies. Although these studies address different aspects of the issue, their findings point to the need to develop evaluative and ethical competencies. Accordingly, the integration of GenAI should preserve students' active roles in evaluating information, making decisions, and constructing understanding rather than merely generating answers quickly.

Differences in research focus indicate that AI literacy, ethics, and academic integrity are interconnected dimensions, but they should not be treated as entirely equivalent concepts. Yim and Su (2025), in their examination of AI literacy, emphasize the range of competencies required by

elementary school students, whereas Park (2025) highlights GenAI literacy and issues such as academic integrity and privacy. Wieczorek et al. (2025) and Ma et al. (2025) address broader dimensions of ethics and responsible AI. These differences suggest that the ability to use AI does not automatically ensure ethical behavior. Therefore, GenAI education should integrate technological understanding, information evaluation, responsibility, and moral reflection.

4.1. Theoretical, Practical, and Policy Implications

4.1.1. Theoretical Implications: Ethics- and Citizenship-Based GenAI Literacy

Theoretically, this synthesis supports a shift from a technically oriented understanding of GenAI literacy toward an approach that integrates ethical judgment and civic responsibility. AI literacy frameworks provide a foundation for understanding the technology and evaluating its outputs, while ethical scholarship emphasizes privacy, fairness, transparency, and accountability. In the Indonesian context, Pancasila values can serve as an interpretive framework connecting these competencies with character development. This connection represents a conceptual development derived from the literature synthesis, rather than evidence that Pancasila automatically produces more responsible GenAI use.

The proposed conceptual framework encompasses an understanding of GenAI, responsible use, critical evaluation, ethical reflection, Pancasila-based judgment, and responsible digital citizenship. These components should not be understood as a strictly linear sequence that always unfolds in the same order. In practice, students may need to revisit information or reconsider particular values when they encounter questionable AI-generated responses. The framework also does not assume that every technological dilemma has a single, absolute moral answer. Instead, it helps students weigh competing considerations, such as convenience versus academic honesty, personalization versus privacy, and efficiency versus the learning process.

4.1.2. Applying the Five Principles of Pancasila to GenAI Decision-Making

The first principle, Belief in One Almighty God, can be used to address moral responsibility and honesty in GenAI use. In learning activities, students can be encouraged to consider whether their actions can be morally justified, such as acknowledging AI assistance rather than concealing the use of technology in an assignment. However, applying this principle does not mean that AI-generated outputs must be judged according to a single religious interpretation. Teachers should facilitate inclusive dialogue consistent with the objectives of Pancasila Education. The focus should be on developing responsibility and honesty rather than labeling students morally based on differences in how they use technology.

The second principle, Just and Civilized Humanity, can be applied through respect for human dignity, protection of personal data, and prevention of GenAI use that harms others. Teachers can present scenarios involving the unauthorized use of a friend's photograph, the submission of personal information to an AI application, or AI-generated outputs containing stereotypes. Students can then identify who might be harmed, which rights need protection, and what actions would be more responsible. The limits of this application should be clearly defined: not every unpleasant output automatically constitutes a violation of human dignity. Judgments should consider context, consequences, consent, and the rights of the people involved.

The third principle, the Unity of Indonesia, can provide a foundation for developing digital communication that respects diversity and avoids the spread of divisive content. Students can compare GenAI responses about different cultures, regional languages, or social groups and identify whether those responses contain generalizations or unfair representations. This activity helps students understand that AI outputs require critical examination. However, the principle of unity should not be used to restrict legitimate criticism or impose uniformity of opinion. Its application must preserve space for differing perspectives, cultural identities, and critical discussion conducted respectfully.

The fourth principle, Democracy Guided by the Inner Wisdom of Deliberation and Representation, can be applied through decision-making based on discussion, evidence examination,

and consideration of multiple perspectives. When GenAI produces a disputed answer, students can be asked to verify sources, present their reasoning, listen to their peers, and reach conclusions based on the available evidence. In this activity, AI-generated answers serve as material for discussion rather than as authorities that determine the outcome. However, deliberation does not replace the need for reliable evidence. Group consensus must still be reconsidered when it conflicts with facts, individual rights, or safety principles.

The fifth principle, Social Justice for All Indonesians, can be used to evaluate whether GenAI provides equitable learning opportunities for all students. Teachers and schools need to consider differences in device ownership, internet connectivity, digital skills, and student needs. For example, assignments that require paid applications may disadvantage students who lack equivalent access. Applying this principle does not mean that all students must use the same technology. Rather, it means ensuring that differences in access do not unfairly determine learning opportunities or assessment outcomes. Schools should provide equivalent alternative activities and avoid making technology ownership an implicit requirement for academic success.

4.1.3. Practical Implications for Teachers and Instruction

For teachers, the findings suggest the need for classroom routines that make GenAI use visible and open to reflection. Students can be asked to explain when they used AI, which parts of its responses they accepted or rejected, which sources they used to verify information, and how the assistance contributed to their understanding. Teachers can also design assignments that require students to explain their thinking rather than merely submit a final product. This approach aligns with the need to strengthen AI literacy and ethics identified in the literature. However, the effectiveness of these routines in improving academic integrity among elementary school students remains to be tested through systematic research.

Classroom activities can be developed around age-appropriate scenarios drawn from children's everyday experiences, such as whether a friend's personal information may be entered into an AI application, how to respond to an incorrect AI-generated answer, and whether an AI-generated paragraph can be submitted directly as one's own work. Teachers can ask students to identify the problem, examine evidence, consider the people affected, and explain their decisions with reference to Pancasila values. Activities should be adapted to students' ages and reading abilities and should not require them to use applications that compel children to create accounts or disclose personal information. These scenarios are instructional proposals derived from the conceptual synthesis and should not be regarded as interventions whose effectiveness has already been established.

4.1.4. Implications for Curriculum and Education Policy in Indonesia

International literature on AI literacy and GenAI ethics should be examined alongside Indonesian education policies so that general principles can be translated into the requirements of the national curriculum. International research provides a foundation for identifying competencies, risks, and instructional approaches, while national policies establish the values, educational objectives, and implementation contexts relevant to schools. This manuscript refers to Ministerial Decree of the Minister of Primary and Secondary Education No. 127/P/2025 as a policy relevant to AI learning and the integration of ethics into Pancasila Education. Before publication, the authors should verify the document's official title, scope, and provisions against the primary policy text to ensure that its requirements and coverage are not overstated.

At the implementation level, curriculum integration should go beyond introducing GenAI applications to include an understanding of AI limitations, source verification, personal data protection, academic integrity, and reflection on Pancasila values. Teacher professional development should cover the selection of age-appropriate activities, facilitation of ethical discussions, design of authentic assessments, and management of privacy risks and unequal access. Schools also need transparent guidelines governing AI use, including which assignments permit technological assistance and how such assistance should be disclosed. These recommendations represent policy implications

derived from the literature synthesis, while the effectiveness of implementation models requires evaluation through pilot programs and studies across different school contexts.

4.1.5. Academic Integrity, Data Protection, and Unequal Access

Academic integrity assessment should move beyond examining final products alone toward evaluating the learning process and responsible technology use. Teachers can ask students to disclose their use of AI, identify comparison sources, explain changes made to AI-generated outputs, or demonstrate their understanding through oral discussions. Assessment criteria should distinguish between permitted AI use, assistance that must be disclosed, and uses that violate assignment instructions. This approach represents a pedagogical recommendation, not evidence that any single assessment method can identify every form of AI misuse. Assessment should account for students' ages, assignment objectives, learning opportunities, and access to technology.

Children's data protection must also be a fundamental requirement before schools implement GenAI-based activities. Teachers and schools should avoid requiring students to enter their full names, addresses, photographs, voice recordings, assessment results, or sensitive information into AI services whose security has not been evaluated. Technology use should comply with applicable data protection policies, school regulations, and the principle of data minimization. At the same time, schools should address unequal access by providing non-GenAI alternatives that assess equivalent competencies. Responsible policy should not merely promote innovation; it should also prevent privacy risks and access limitations from being transferred to children and their families.

Dependence on GenAI should be addressed by designing learning activities that continue to require students' intellectual engagement. Assignments can combine AI-assisted and non-AI activities, such as reading original sources, drafting an initial response independently, checking AI-generated outputs, and explaining the reasons for revisions. This strategy allows teachers to assess whether students understand the material or simply copy generated responses. However, a relationship between the intensity of GenAI use and declining independent thinking should not be assumed without direct evidence from the population being studied. Empirical research is needed to identify the conditions under which GenAI supports learning and those under which it may hinder the development of independent abilities.

4.2. Strengths and Limitations of the Review

The main strength of this review lies in its interdisciplinary synthesis, which connects GenAI literacy, ethics, academic integrity, digital citizenship, and Pancasila Education within the context of Indonesian elementary education. Unlike approaches that focus exclusively on technical AI capabilities, this review positions moral and social responsibility as integral components of technology use. International literature provides a foundation for identifying relevant competencies and risks, while the Pancasila context helps establish the relevance of these values to Indonesian education. The review's primary contribution is not to demonstrate the effectiveness of a particular intervention, but to develop a conceptual framework that can inform subsequent research and instructional development.

This review has several limitations. First, GenAI is evolving rapidly, and findings from the existing literature may change as more empirical research becomes available, particularly studies involving elementary school students. Second, some literature on academic integrity originates from secondary and higher education, so its application to elementary school students requires caution. Third, the review employs an integrative and thematic synthesis rather than a quantitative meta-analysis. Consequently, it does not produce effect-size estimates or causal conclusions about the effectiveness of GenAI use. These limitations should be considered when interpreting the implications of the review.

Another limitation concerns the conceptual mapping of the five Pancasila principles to GenAI ethics, which has not yet been empirically validated. Although each principle offers a perspective for evaluating responsibility, humanity, unity, deliberation, and justice, its application depends on the

context of the issue and the instructional objectives. The proposed framework cannot yet be regarded as a proven effective intervention model. Future research should involve teachers, students, curriculum specialists, ethics experts, and policymakers to assess the relevance of the proposed indicators, the feasibility of instructional implementation, and the effects on GenAI literacy and academic integrity.

Overall, this discussion distinguishes among three levels of contribution. First, empirical findings reported in the literature provide a foundation for understanding developments in AI literacy, ethical concerns, and instructional approaches. Second, practical implications, including routines for information verification, disclosure of AI use, data protection, and process-oriented assessment, constitute recommendations derived from the synthesis. Third, the mapping of Pancasila values and the proposed GenAI literacy integration framework represent conceptual contributions that require further empirical testing. This distinction is important to ensure that recommendations are not presented as outcomes of interventions whose effectiveness has already been established

5. CONCLUSION

This review indicates that Generative AI literacy in elementary education should extend beyond technical proficiency to include understanding AI limitations, evaluating generated information, protecting personal data, maintaining academic integrity, and exercising responsible judgment. The reviewed literature also suggests that AI literacy, AI ethics, and digital citizenship should be addressed as complementary competencies. However, direct empirical evidence on GenAI use among elementary school students remains limited, and the potential benefits and risks should not be generalized beyond the available evidence.

The primary contribution of this review is a proposed Pancasila-based ethical-civic framework for GenAI literacy in elementary education. The framework connects GenAI use with moral responsibility, human dignity, social cohesion, deliberative judgment, and social justice. Its novelty lies in integrating the five principles of Pancasila into a contextually grounded conceptual framework that connects GenAI competencies with ethical reasoning and digital citizenship in Indonesian elementary education. Rather than focusing exclusively on technical skills or AI-related risks, the framework provides a foundation for helping students consider when, why, and under what conditions GenAI should be used. This framework remains conceptual and requires empirical validation before its effectiveness can be established.

For practical implementation, elementary schools can introduce age-appropriate, teacher-guided activities, such as comparing AI-generated responses with textbook information, identifying inaccurate outputs, acknowledging AI assistance in assignments, and discussing privacy and academic honesty through familiar classroom scenarios. Schools should also establish clear AI-use guidelines, strengthen teachers' professional competencies, protect children's personal data, and provide equitable alternatives for students with limited access to technology.

Future research should operationalize and validate the proposed framework through measurable stages. First, experts in elementary education, AI literacy, ethics, and Pancasila Education should evaluate the content validity of the framework and its indicators. Second, teachers and students should participate in age-appropriateness and feasibility testing. Third, pilot studies across elementary schools with diverse student characteristics should assess implementation fidelity and changes in AI literacy, information-evaluation skills, and academic-integrity practices. These investigations are necessary to determine whether and under what conditions Pancasila-based GenAI literacy can support responsible AI use in Indonesian elementary education.

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Competing Interests

The authors declare no financial or non-financial competing interests related to the authorship or publication of this article.

Use of Generative Artificial Intelligence

Generative artificial intelligence tools were used to assist with literature searches and academic language refinement. The authors independently reviewed the manuscript, verified the references and scholarly analysis, and take full responsibility for the content and arguments presented.

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