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Digital-Age Ethics for Elementary Teachers: Challenges and Strategies for Professional Integrity

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ABSTRACT

Digital transformation has expanded elementary teachers' work into learning platforms, social media, messaging applications, data systems, and generative artificial intelligence. These tools support collaboration and instructional improvement but raise ethical concerns about professional boundaries, children's privacy and safety, information integrity, copyright, equity, and accountability. This article synthesizes the ethical challenges faced by elementary school teachers in digital environments and identifies strategies for maintaining professional integrity while prioritizing children's best interests. A narrative literature review was conducted through exploratory searches of scholarly articles, academic books, international frameworks, policy documents, and Indonesian legislation, prioritizing publications from 2020 to 2026 alongside foundational theories. The thematic synthesis identifies risks involving blurred personal and professional boundaries, children's data governance, unsafe online communication, unverified digital and AI-generated content, and unequal access to technology. It proposes a Five-Dimension Framework of Teachers' Digital Integrity comprising pedagogical, relational, information-and-data, epistemic, and civic-professional integrity. Recommendations are directed to teachers, schools, teacher education programs, families, and professional associations. The framework is a conceptual synthesis, not a validated instrument, and requires empirical testing in Indonesian elementary schools

INTRODUCTION

Elementary school teachers practice a profession that is inherently both pedagogical and moral. Teachers are not only tasked with imparting knowledge but also with managing relationships characterized by disparities in age and authority, protecting children, providing assessments, maintaining the trust of families, and serving as role models in communal life. Campbell (2008) emphasizes that ethics is not an add-on to teaching competencies but a constitutive part of professional practice, as teachers' daily decisions always have consequences for students' rights, opportunities, and well-being. Tirri and Kuusisto (2022) also identify moral sensitivity, professional goals, and a willingness to grow as crucial aspects of ethical decision-making.

Digital transformation is changing the context in which these responsibilities are carried out. Teachers use messaging apps to communicate with parents, social media to share teaching practices, digital platforms to manage assignments and grades, and AI-based services to prepare materials or provide feedback. Technology can expand access to learning resources and professional collaboration, but at the same time it expands digital footprints, increases data processing, accelerates the dissemination of content, and blurs the boundaries between personal and professional spheres (OECD, 2023; UNESCO, 2023a). Because digital footprints can be copied,

searched, and shared, actions initially considered limited can have consequences long after a post or message is created.

One key issue is the tendency to oversimplify digital ethics into merely prohibiting the posting of certain content. Noakes and Hook (2021) point out that social media raises questions about the extent to which professional obligations can regulate teachers' behavior outside of working hours and how those boundaries are balanced with personal rights. On the other hand, Henderson et al. (2014) point out that the use of social media for learning raises issues of consent, traceability, virtual identity, and the boundary between public and private spheres. Thus, digital ethics must be understood as the ability to make proportionate decisions, not merely as oversight of online behavior.

The context of elementary schools makes this issue even more critical. Children are not always able to understand the permanent consequences of sharing photos, audio recordings, assignment results, behavioral records, or information about their family circumstances. Data that seems simple can become sensitive when combined with other information. UNESCO (2023a) reminds us that the transformation of educational technology must be evaluated in terms of who benefits, who bears the risks, and whether the technology truly aligns with learning objectives. UNICEF (2021) emphasizes that AI systems involving children must take into account children's rights, safety, privacy, equity, and age-appropriate development. These principles align with the UN Convention on the Rights of the Child, which prioritizes the best interests of the child and child protection as fundamental considerations (United Nations, 1989).

In the Indonesian context, the professional standards for teachers are regulated, among other things, by Law No. 14 of 2005 on Teachers and Lecturers, while child protection, personal data, copyright, and electronic activities each have their own legal foundations. The Indonesian Teachers' Code of Ethics, published by the Indonesian Teachers' Association (PGRI), also emphasizes responsibility toward students, society, the profession, and setting a good example. The government has issued guidelines on the use of artificial intelligence for teachers in early childhood education, elementary education, and secondary education, which prioritize professional judgment, the students' context, and ethical values as the foundation for technology use (Purwarianti et al., 2025). However, the existence of regulations or guidelines does not automatically ensure an understanding of and adherence to ethics in real-world situations.

Recent Indonesian studies have begun to address professional ethical dilemmas, the use of social media, and the challenges of enforcing codes of ethics in the digital age (Manziz et al., 2026; Sa'diyah et al., 2026). Meanwhile, Gouseti et al. (2025), through a systematic review, demonstrate that AI ethics issues in K–12 education have been discussed in the international literature but still require policies tailored to children's characteristics and the school context. This highlights the need for a synthesis that not only identifies risks but also connects ethical principles, legal responsibilities, pedagogical practices, and institutional governance.

This article offers a conceptual contribution by developing a Five-Dimensional Framework for Teachers' Digital Integrity specifically designed to understand the responsibilities of elementary school teachers. This framework integrates pedagogical, relational, information and data, epistemic, and professional-citizenship integrity. The research questions guiding this article are: (1) how does digital transformation reshape the ethical challenges of the elementary school teaching profession; (2) what principles and obligations are relevant to maintaining professional integrity; and (3) what strategies can teachers and institutions implement to manage digital dilemmas in a consistent, proportionate, and child-centered manner?

METHODS

This article employs a narrative literature review. This approach was chosen because the study aims to integrate professional ethics theory, empirical research, conceptual analyses, policy documents, and regulations to construct an

interpretive framework relevant to elementary school teachers. The study is not intended to calculate effect sizes, conduct a meta-analysis, or claim to cover all available publications.

An exploratory search was conducted in October 2026 using SciSpace, along with targeted searches on journal publishers' websites, academic repositories, and the official websites of UNESCO, UNICEF, and PGRI, as well as Indonesia's government regulations database. The combination of English keywords included "teacher professional ethics," "digital professionalism," "teacher social media," "student data privacy," "child online safety," "AI ethics in K-12 education," "teacher accountability," "digital citizenship," and "academic integrity." Indonesian-language keywords included "etika profesi guru," "integritas guru," "etika digital," "privasi peserta didik," "kode etik guru," "kecerdasan artifisial dalam pendidikan," and "perlindungan anak di ruang digital."

Priority is given to primary literature published between 2020 and 2026, particularly peer-reviewed journal articles, literature reviews, and official documents relevant to elementary education. Older works are still included if they hold significant theoretical importance, such as studies on teacher professional ethics, AI literacy, and the theory of technology-pedagogy-content knowledge. Legal documents are included based on their direct relevance to teacher professionalism, child protection, privacy, copyright, and the use of digital spaces.

Sources are considered if they contribute to one or more of the following themes: (a) the ethical foundations and professional identity of teachers; (b) social media and relational boundaries; (c) data, privacy, and child safety; (d) information integrity, AI, and assessment; (e) equity, access, and inclusion; and (f) school governance and Indonesian policies. Sources whose bibliographic metadata cannot be traced or that lack a substantial connection to the research questions are not used as primary sources.

The synthesis was conducted thematically. First, ethical concepts and obligations were identified from theories and codes of ethics. Second, digital risks were mapped based on the context of use and the affected parties. Third, normative principles were compared with research findings and policy provisions. Fourth, these themes were integrated into a five-dimensional framework and implementation strategies. Because the approach is narrative and the selection of sources is purposive, this article does not report the number of records, the number of articles screened, or the PRISMA flow diagram. This procedure is not claimed to be a systematic review; readers should interpret the results as an informative conceptual synthesis, rather than a comprehensive literature review.

RESULTS AND DISCUSSION

Professional Ethics as the Core of Teacher Integrity

Professional ethics govern how professional authority is exercised, not merely what is technically permissible. Campbell (2008) distinguishes between compliance with rules and the moral considerations required when rules do not provide a direct answer to a dilemma. Teachers may face conflicts between confidentiality and the duty to report, between openness on social media and the protection of privacy, or between the efficient use of technology and the need to provide individualized support to students. In such situations, integrity is reflected in the ability to weigh reasons, rights, consequences, and responsibilities.

Tirri and Kuusisto (2022) outline teacher ethics through a theoretical framework and empirical evidence that emphasize moral sensitivity, professional goals, and professional growth. Moral sensitivity helps teachers recognize that an action has ethical consequences; professional goals help determine the educational objectives to be achieved; while the willingness to grow enables teachers to learn from less-than-ideal decisions. Shapira-Lishchinsky (2011), through a study of 50 teachers and an analysis of critical incidents, demonstrated that ethical dilemmas arise from conflicts between school rules, standards, and norms and require responses that are not always straightforward. These findings support the need for ethics education that utilizes real-life cases, rather than merely memorizing a code of ethics.

The ethics of care are also relevant for elementary school teachers. According to Noddings' (2013) approach, educational relationships cannot be reduced to the application of procedures because attention to students' concrete needs is part of a moral responsibility. However, care does not mean erasing professional boundaries. Teachers can be

empathetic toward students and their families while maintaining confidentiality, avoiding unnecessary private communication, and using school procedures to handle sensitive issues. In the digital space, clear boundaries can actually protect both students and teachers.

The Indonesian Teachers' Code of Ethics emphasizes respect for students' rights to grow and develop, professional responsibility, collaboration with colleagues, and exemplary behavior (PGRI, n.d.). These values remain applicable when actions are carried out via digital devices. Changing the medium of communication does not diminish responsibility for the content of messages, the use of data, the accuracy of assessments, or the impact on students' dignity.

Changes in the Professional Sphere in the Digital Age

The digital space expands the scope of teachers' actions. A comment, a classroom photo, instructional materials, or a conversation on a messaging app can be taken out of its original context, saved, and shared by others. The OECD (2023) explains that the digital education ecosystem encompasses a variety of actors, platforms, data, and infrastructure; therefore, the benefits of technology depend on governance and user capacity, not merely on the availability of devices. UNESCO (2023a) also emphasizes the importance of evaluating technology based on educational goals and evidence of benefits, rather than treating technology adoption as an end in itself.

Social media provides teachers with opportunities to share learning resources, build networks, and participate in public conversations. However, these platforms also encourage visibility, rapid responses, and the presentation of identity through metrics such as the number of followers or interactions. Nejadghanbar and Song (2025), in a qualitative study of English teachers active on Instagram, demonstrated that the interpretation of professionalism on social media is influenced not only by professional norms but also by platform design and its socio-material dynamics. Although the research context did not involve elementary school teachers, these findings help explain why professional behavior in digital spaces cannot be understood solely as an individual choice.

Noakes and Hook (2021) highlight the tension between teachers' professional obligations and personal rights regarding social media use. Ethically, teachers retain a right to privacy and freedom of expression; schools should not control all personal expressions without proportionate justification. Conversely, personal freedom does not negate the obligation not to disclose student information, engage in harassment, spread false information, or use professional authority to harm others. Therefore, sound digital policies must clarify the relationship between demonstrable risks, child protection interests, teachers' rights, and fair resolution mechanisms.

Digital citizenship adds a dimension of responsible participation in the public sphere. Jones and Mitchell (2016) distinguish digital citizenship from the mere ability to use technology; this concept encompasses behavior that respects others and responsible civic engagement. For teachers, digital role modeling means practicing critical evaluation of information, non-demeaning communication, respect for differences, and an understanding that online content can influence public trust in schools.

Key Challenges for Teachers' Professional Ethics in the Digital Space

Social Media and the Boundaries Between Personal and Professional Identities

The first challenge is managing the boundaries between personal identity, professional identity, and school identity. Teachers may share their views, experiences, or daily activities on personal accounts, but the public may still associate those posts with their profession. The risk increases when teachers post photos of students without adequate consent, make snide remarks about parents, publicize school conflicts, comment on students' circumstances in a derogatory manner, or share private conversations for entertainment. Even when a student's name is not mentioned, the combination of a school uniform, face, location, and context can make their identity easily identifiable.

Not all social media activity should be considered a violation. Teachers have the right to a private life and to engage in social, cultural, and political discussions. Noakes and Hook (2021) point out that regulating teachers' behavior on social media requires consideration of personal rights and the limits of an employer's authority. A proportional

approach must distinguish legitimate personal expression from actions that clearly violate confidentiality, involve discrimination, pose a risk to children, or abuse a professional position.

Practical strategies include separating professional and personal communication channels, reviewing privacy settings, prohibiting the use of personal accounts as the school's sole official channel, conducting a review before posting, and implementing approval procedures for the publication of activity documentation. Teachers should avoid posting when they are angry or in the midst of a conflict. The "pause before sharing" principle is not merely a matter of etiquette, but a form of professional self-control and risk mitigation.

Privacy, Personal Data, and Children's Digital Footprints

Educational data encompasses more than just names and grades. Photos, audio recordings, addresses, attendance records, assessment results, special needs, behavior, family communications, and device identifiers can all be data that identifies a child or reveals sensitive aspects of their life. UNESCO (2023a) highlights that educational technology can expand the collection and processing of data, while children and families often lack an equal understanding of or bargaining power over these platforms. UNICEF (2021) prioritizes privacy protection, safety, transparency, and the best interests of the child as key considerations in AI systems involving children.

In the Indonesian context, Law No. 27 of 2022 on Personal Data Protection classifies children's data as a specific category of personal data and regulates the processing of personal data along with the obligations of those who process it. Practical implications for teachers include not entering students' identifying information into public applications without a valid basis and proper authorization, not storing grade lists on open links, not sharing screenshots of family conversations, and not uploading photos or student work that reveal identities without adhering to school policies and applicable regulations. This article does not replace legal advice for specific cases; schools must review applicable legal obligations and data control policies.

A useful principle is data minimization: collect, store, and share only the information necessary for legitimate educational purposes. If teachers need AI assistance to develop learning strategies, anonymous scenarios are usually sufficient; a child's full name, diagnosis, photos, or personal notes are not required. Schools also need to establish data retention limits, determine who is authorized to access the data, define how incidents are reported, and specify when data is deleted. Privacy protection must be built into the initial design of digital activities, not an afterthought once data has already been disseminated.

Online Interactions, Communication with Parents, and Child Protection

Messaging apps facilitate coordination between teachers, students, and parents, but they can also create the expectation that teachers must always be available. Messages sent outside of working hours, unrecorded one-on-one communications, the use of personal accounts for sensitive conversations, and the exchange of images or personal information can blur role boundaries. For elementary school students, teacher-student relationships require additional safeguards because age differences and power imbalances limit children's ability to assess risks or refuse uncomfortable interactions.

Schools should establish official communication channels, reasonable response times, procedures for one-on-one communication, rules for using class groups, and escalation mechanisms for sensitive issues. Communication related to child protection should not be handled through undocumented private conversations if school policy requires the involvement of authorities. Teachers must maintain professional language, avoid humiliating students in group chats, and refrain from using digital messages as a means of threats or public punishment.

Law No. 35 of 2014, amending Law No. 23 of 2002 on Child Protection, strengthens the framework for protecting children from violence and discrimination. In school practice, the obligation to protect children must be translated into safety, reporting, documentation, and response procedures that prioritize the best interests of the child. Digital policies must include procedures for addressing cyberbullying, threats, the unauthorized sharing of photos, harassment, and communications that violate professional boundaries.

Information Integrity, AI Use, and Teacher Accountability

Generative AI tools can help teachers create lesson plans, varied questions, rubrics, examples, and feedback. However, the generated output is not always accurate, fair, age-appropriate, or aligned with the curriculum. Gouseti et al. (2025), through a systematic review of 25 studies on AI ethics in K–12 education, mapped out ethical issues and highlighted the need for policies and research better suited to the characteristics of compulsory education. UNESCO (2023b) emphasizes a human-centered approach, pedagogical validation, privacy, and regulations for the safe and age-appropriate use of GenAI.

Risks for elementary school teachers include misleading explanations, questions with incorrect answer keys, stereotypical examples, nonexistent reference sources, insensitive feedback, and recommendations that do not take student circumstances into account. Therefore, AI should not be positioned as the final authority. Teachers are responsible for verifying AI outputs against textbooks, curriculum documents, official sources, and their professional knowledge. When AI is used for assessment, teachers need to check the alignment of indicators, difficulty levels, potential biases, and the impact of errors on students' grades or learning opportunities.

Miao and Cukurova (2024) emphasize that teacher competencies in the AI era include a human-centered mindset, ethics, a basic understanding of AI, AI-based pedagogy, and professional development. This means that AI literacy is not merely the ability to write prompts; it encompasses conceptual understanding, critical evaluation, and the ability to interact meaningfully with AI systems (Long & Magerko, 2020). Teachers need to be aware of the system's limitations, understand when the use of AI is inappropriate, protect data, and be able to explain the rationale behind pedagogical decisions. The use of AI to process children's information or make high-stakes decisions requires special caution and human oversight.

Epistemic integrity means that teachers are responsible for what they teach and share, including when materials are supported by technology. Teachers must not claim to have verified a source if they have not done so, cite references they have never read, or shift responsibility to an application. If school or publisher policies require disclosure of AI use, transparency must be maintained. The use of technology is acceptable when it supports educational goals and does not eliminate human responsibility.

Copyright, Attribution, and Reuse of Digital Materials

Teachers frequently use images, videos, worksheets, music, infographics, and digital materials found online. The availability of access does not mean that all materials are free to reuse. Use without attribution, removal of watermarks, redistribution of works with limited licenses, or uploading copyrighted material to external services can lead to legal and ethical issues. Law No. 28 of 2014 on Copyright serves as a key legal foundation for understanding creators' rights and the use of works.

Recommended strategies include selecting open-licensed sources or those that explicitly permit educational use, crediting the creator and source, reviewing license terms, and creating original materials when permission is unclear. For AI-generated images or text, teachers must still verify for similarities to others' works, ensure content appropriateness, and comply with the rules of the platform being used. In instructional materials, attribution is not merely a legal obligation; it also serves as a model of academic integrity for students.

Equity, Inclusion, and the Digital Divide

Technology does not always benefit all students equally. Differences in internet quality, devices, digital literacy skills, home language, disabilities, economic circumstances, and parental support can affect a student's ability to participate in digital learning. The OECD (2023) emphasizes that a digital education ecosystem requires coordination, capacity, and policies that ensure technology supports learning objectives. UNESCO (2023a) warns that access to and use of technology must be critically evaluated because the distribution of its benefits is not automatically equitable.

Professional equity requires that teachers not interpret a student's inability to access an application as a lack of motivation. Teachers need to provide offline or low-bandwidth alternatives, ensure that materials are accessible to students with diverse needs, and avoid assignments that require paid

devices or accounts without strong pedagogical justification. When using AI to simplify reading material or generate variations in activities, teachers need to verify that the results do not reinforce stereotypes, preserve students' dignity, and maintain meaningful learning expectations.

Equity also applies to the use of digital assessment. Algorithms or automated systems may misclassify answers, provide biased feedback, or fail to recognize variations in language and ways of explaining concepts. Teachers must provide correction mechanisms, allow space for student explanations, and not rely solely on automated scores as the basis for decisions. Professional integrity requires that technology be used in a manner proportionate to the risks involved and accompanied by clear appeal procedures.

Indonesia's Normative and Policy Framework

Table 1 summarizes a number of relevant instruments. The inclusion of regulations does not mean that each instrument specifically governs all features of social media or AI; their relevance depends on the actions, data, employment relationships, and context of their use.

Table 1. Indonesia's Normative and Policy Framework

Instrument	Relevance and Practical Implications
Law No. 14 of 2005 on Teachers and Lecturers	Relevance: Establishes the status, principles of professionalism, rights, and obligations of teachers. Practical implications: Places the use of technology under the professional responsibility and competence of teachers.
Law No. 20 of 2003 on the National Education System	Relevance: Serves as the basis for the implementation of national education and educational responsibilities. Practical implications: Digital activities must support educational objectives and the rights of students.
Law No. 35 of 2014 Amending Law No. 23 of 2002 on Child Protection	Relevance: Strengthens the framework for protecting children from violence and discrimination. Practical implications: Documentation, communication, and online activities must prioritize the safety and dignity of children.
Law No. 27 of 2022 on the Protection of Personal Data	Relevance: Regulates the processing of personal data; children's data falls under the category of specific personal data. Practical implications: Implement data minimization, restricted access, security measures, and appropriate legal grounds for processing.
Law No. 28 of 2014 on Copyright	Relevance: Regulates the protection of works and the rights of creators. Practical implications: Check licenses, attributions, and permissions for the use of digital materials.
Law No. 1 of 2024 on the Second Amendment to the ITE Law	Relevance: Amends provisions related to electronic information and transactions. Practical implications: Online communication must be conducted responsibly; the application of articles must take into account current legal provisions.

Instrument	Relevance and Practical Implications
Indonesian Teachers' Code of Ethics (PGRI)	Relevance: Emphasizes responsibility toward students, the profession, society, and setting a good example. Practical implications: Use this as a basis for professional conduct in both online and offline settings.
Guidelines for the Use of Artificial Intelligence for Teachers (2025)	Relevance: Provides guidance for early childhood, elementary, and secondary school teachers on the appropriate use of AI. Practical implications: Teachers must verify AI outputs, maintain decision-making autonomy, and consider the students' context.
Joint Decision on Guidelines for the Use and Learning of Digital Technology and AI (2026)	Relevance: Aligns guidelines for the use of digital technology and AI in the education system with child protection measures. Practical implications: Schools must translate national guidelines into rules and operational procedures.

From a legal perspective, teachers must distinguish between ethical obligations, internal school rules, and legal norms. An action may be professionally unwise even if it does not automatically constitute a legal violation. Conversely, compliance with administrative procedures is not always sufficient to ensure child protection. Therefore, incident handling must follow the principles of proportionality, documentation, the opportunity to explain, protection of affected parties, and fair review mechanisms.

PGRI provides the Indonesian Teachers' Code of Ethics and information about the Indonesian Teachers' Honorary Council through its official channels. The professional code of ethics serves as a guide for professional conduct and evaluation, while school policies should outline how these principles are applied to digital contexts: the use of class photos, communication with students, parent groups, grade processing, publication of materials, and the use of AI. When the code of ethics does not explicitly mention specific technologies, principles such as the best interests of students, confidentiality, honesty, fairness, and setting a good example can still be used to evaluate actions.

Government guidelines on artificial intelligence for teachers state that AI should be viewed as a tool to support analysis and decision-making, while professional judgment and the students' context remain the foundation (Purwarianti et al., 2025). Joint guidelines announced by the government in March 2026 also emphasize the ethical, safe, prudent, and responsible use of digital technology and AI, in alignment with child protection (Ministry of Primary and Secondary Education, 2026). Thus, teachers' responsibilities extend beyond mere compliance with application rules to include assessing whether the use of technology is necessary and appropriate for educational purposes.

The Five-Dimensional Framework for Teachers' Digital Integrity

Based on a synthesis of professional ethics theory, findings on digital risks, international guidelines, and Indonesian regulations, this article proposes the Five-Dimensional Framework for Teachers' Digital Integrity (LID-G). This framework is not a standardized, validated instrument, but rather a conceptual synthesis designed to help schools and teacher education programs translate ethical principles into observable behaviors. These five dimensions are interrelated: a privacy violation can simultaneously damage relationships, pedagogical integrity, and public trust.

Table 2. Five-Dimensional Framework for Teachers' Digital Integrity

Dimension	**Meaning, Indicators, and Reflective Question**
1. Pedagogical integrity	Meaning: Technology is used to support learning objectives, content accuracy, fair assessment, and children's developmental needs. Example indicators: Materials are verified; assessments align with learning objectives; decisions are not entirely left to automated systems. Reflective question: Does this technology improve the quality of learning or does it just make my job easier?
2. Relational Integrity	Meaning: Teacher-student-parent relationships are built on respect, professional boundaries, and protection against abuse of power. Example indicators: Official communication channels; language is not demeaning; there are no risky or undocumented private conversations. Reflective question: Are these interactions safe, necessary, professional, and in the best interests of the child?
3. Information and Data Integrity	Meaning: Personal information is safeguarded through data minimization, restricted access, appropriate consent, and secure storage. Example indicators: Do not share sensitive data; avoid posts that identify the child; review link access and data retention. Reflective question: Is this information necessary to share, with whom, and on what basis?
4. Epistemic integrity	Meaning: Teachers are responsible for the accuracy, sources, attribution, transparency, and limitations of digital or AI-generated content. Example indicators: Verify sources; include attributions; disclose AI use in accordance with policy; correct errors. Reflective question: Can I explain the evidence and reasoning behind the information I teach?
5. Professional-Civic Integrity	Meaning: Teachers participate responsibly in the public sphere and strive for digital justice and inclusion. Example indicators: Do not spread misinformation; uphold the dignity of the profession without infringing on personal rights; provide alternative access. Reflective question: Is this action fair, proportionate, and justifiable in the eyes of students or families?

The pedagogical dimension reminds us that technology must serve educational goals. The relational dimension focuses on dignity, trust, and safe boundaries. The information and data dimension positions privacy as part of child protection. The epistemic dimension requires teachers to ensure the accuracy and transparency of content. The civic-professional dimension extends responsibility to participation in the public sphere, justice, and inclusion. This framework avoids the assumption

that digital ethics is solely related to behavior on social media or merely compliance with laws. The TPACK framework also emphasizes that technology integration must connect technological, pedagogical, and content knowledge—not merely add applications to learning (Mishra & Koehler, 2006).

To implement LID-G, schools can develop a checklist to be used before digital activities take place. Teachers should review the pedagogical objectives and the need for technology use; the parties involved and the boundaries of their communication; the types of data being processed; the accuracy and rights of use regarding content; and the impact on different student groups. If risks involve sensitive data, child safety, or high-stakes decisions, the assessment must involve school leadership or designated staff—not be left solely to individual teachers.

Strategies for Maintaining Professional Integrity

Strategies at the Teacher Level

First, establish the habit of ethical reflection before acting. Teachers can use four simple questions: who might be affected; what rights or interests are at stake; is this action necessary and proportionate; and can the decision be openly explained to the relevant authorities. This process aligns with the idea that ethical dilemmas require sensitivity and reasoning, not spontaneous reactions (Campbell, 2008; Tirri & Kuusisto, 2022).

Second, implement digital hygiene: use strong passwords, multi-factor authentication when available, up-to-date devices, access based on need, and official channels for school data. Third, practice data minimization by not including student identities in AI prompts or public documents unless necessary. Fourth, review materials, links, images, and AI outputs before sharing them. Fifth, establish consistent communication boundaries, including response times and procedures for sensitive communications.

Sixth, develop proportionate professional documentation. For the use of AI or external content that affects instructional materials, teachers can record sources, changes, and reviews conducted. Documentation is not intended to create an excessive administrative burden, but rather to ensure that important decisions can be traced and reviewed. Seventh, teachers must immediately report incidents such as data breaches, posts that identify students, or risky communications in accordance with school procedures, and avoid attempts to cover up mistakes.

Strategies at the School Level

Schools need to have digital policies that are concise, easy to understand, and consistently enforced. At a minimum, the policy should cover the use of social media, the publication of student photos or videos, the management of communication groups, the storage of grades, the selection of applications, the use of AI, the attribution of materials, incident reporting, and the handling of complaints. The policy should be developed through consultation with teachers, parents, data managers, and, where appropriate, student representatives so that the rules can be implemented and understood.

Second, schools need to establish clear lines of responsibility. Teachers should not be expected to bear the full risk of institutionally selected platforms without support in the form of training, infrastructure, and procedures. School leaders need to assess the risks of digital services before they are used, restrict data access, clarify information retention policies, and provide review mechanisms in the event of an incident. This principle aligns with AI ethics guidelines that emphasize governance, human oversight, and accountability (UNESCO, 2022; European Commission, Directorate-General for Education, Youth, Sport and Culture, 2022). Selwyn's (2022) critique of technological determinism also serves as a reminder that the selection of digital tools must be based on educational goals and context, not on the assumption that technology in and of itself improves practices.

Third, training should not be limited to one-time seminars. Schools can hold periodic case discussions, simulations of responses to data breaches, workshops on reviewing AI outputs, and collaborative reviews of digital communication. Fourth, schools need to have fair mechanisms for handling alleged violations: fact-checking, protection of those affected, opportunities for teachers to provide explanations, proportionality of actions, and documentation of decisions. An approach that relies solely on punishment without organizational learning risks encouraging a culture of covering up problems.

Strategies for the PGSD Program and Teacher Professional Education

PGSD programs need to integrate digital ethics into courses on the teaching profession, instructional planning, learning assessment, instructional media, field experience, and educational research. These competencies are best developed across courses rather than treated as separate, supplementary material. UNESCO's AI Competency Framework for Teachers can help structure competencies that encompass a human-centered approach, ethics, AI fundamentals, AI pedagogy, and professional development (Miao & Cukurova, 2024).

Learning can incorporate authentic case studies: Should teachers upload classroom videos to a portfolio? How should they respond to parents who share other students' grades in a group chat? How can AI be used to create test questions? What should be done when AI generates false references? Or how should teachers handle messages from students outside of school hours? Students are asked to identify stakeholders, risks, relevant rules, course of action options, and the rationale behind their decisions. Assessment should evaluate the decision-making process, not just right-or-wrong answers.

Field placements may incorporate a digital ethics observation rubric. Students are assessed on their management of communication, privacy, use of sources, inclusion, and reflection on technology use. Faculty advisors and mentor teachers need to use consistent criteria so that prospective teachers do not receive conflicting messages between the university and the school. Students also need to learn that the efficient use of AI or applications does not justify delegating pedagogical responsibility to the system.

Strategies in Collaboration with Families, Professional Organizations, and Policymakers

Parents need to be provided with clear information about official communication channels, the use of photos or videos, the types of data stored, and how to raise objections. Communication with families should not assume that all parents have the same amount of time, devices, internet connections, or digital literacy. Professional organizations can update examples of code of ethics applications for digital scenarios and provide consultations, training, and forums for sharing case studies without unnecessarily revealing the identities of students or teachers.

Policymakers need to ensure that national guidelines are translated into operational guidance that is aligned with schools' capacities. Regulations must be accompanied by training, infrastructure support, complaint mechanisms, and a clear delineation of responsibilities among schools, platform providers, teachers, and parents. UNICEF (2021) and UNESCO (2022, 2023b) emphasize that the governance of technology involving children must be centered on rights, safety, inclusion, and human oversight. These principles must be applied without disregarding Indonesia's social, cultural, and infrastructural context.

Theoretical Implications and Research Agenda

Theoretically, the Five-Dimensional Framework of Teachers' Digital Integrity connects classical professional ethics with issues shaped by digital infrastructure. Pedagogical and relational integrity are rooted in the understanding of teaching as a moral and relational practice (Campbell, 2008; Noddings, 2013). The information-data and epistemic dimensions address the rise in data processing, the use of AI, and the circulation of digital content (UNESCO, 2022, 2023b; UNICEF, 2021). The civic-professional dimension extends ethics to public participation and digital communication responsibilities (Jones & Mitchell, 2016; Noakes & Hook, 2021). Thus, digital integrity is not a standalone technical competency but rather a way of fulfilling professional responsibilities within a technology-mediated ecosystem.

In practice, this framework can be used to develop school digital codes of ethics, assessment rubrics for prospective teachers, guidelines for AI use, and risk audits of learning applications. However, the framework lacks empirical validity evidence. Further research could employ interviews with elementary school teachers, analysis of school policy documents, observation of communication practices, or the Delphi method to test the comprehensiveness and applicability of the indicators. Quantitative studies could develop instruments to measure digital ethics literacy, but should avoid measures that rely solely on self-perception.

Key research priorities include: (1) differences in digital ethics practices by grade level, location, and infrastructure conditions; (2) how teachers balance personal rights with professional

responsibilities on social media; (3) how schools manage consent, photos, and children's data; (4) the impact of digital ethics training on decision-making in real-world scenarios; (5) AI oversight mechanisms in the development of assessments; and (6) students' and parents' experiences with teachers' digital communication. Research should also explore successful cases—not just violations—so that recommendations can support good and sustainable practices.

Limitations of the Study

This study has limitations. First, the narrative approach and exploratory review do not guarantee that all relevant literature has been covered. Second, some international findings originate from educational and legal contexts different from those in Indonesia, so their application requires critical adaptation. Third, digital and AI policies are evolving rapidly; the status and implementation of regulations need to be re-examined before the article is submitted. Fourth, the Five-Dimensional Framework of Teachers' Digital Integrity has not yet been tested as an instrument or intervention model. Therefore, this article should be understood as a conceptual synthesis and a foundation for further research, not as evidence that a particular strategy has been proven effective in all schools.

CONCLUSION

Professional ethics for elementary school teachers in the digital age cannot be limited to social media etiquette. Digital transformation is changing how teachers build relationships, manage information, produce materials, conduct assessments, and take responsibility for their decisions. Key challenges include the blurring of personal-professional boundaries, risks to children's privacy and safety, unbounded online communication, the use of unverified content or AI, copyright issues, and disparities in access.

Professional integrity requires teachers to combine moral sensitivity with technological understanding, compliance with regulations, and contextual consideration. Teachers must uphold students' dignity, minimize data processing, verify information, acknowledge sources, set communication boundaries, and ensure that technology continues to support pedagogical goals. Responsibility cannot be shifted to platforms, algorithms, or policies that are not fully understood.

This article proposes a Five-Dimensional Framework for Teachers' Digital Integrity: pedagogical, relational, information and data, epistemic, and professional-civic integrity. This framework can help translate ethical principles into reflective questions and indicators of practice. Its implementation requires support from schools, elementary teacher education programs, families, professional organizations, and policymakers. Since this framework is a conceptual synthesis, its validity and effectiveness need to be tested through empirical research in elementary schools in Indonesia.

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