



The effect of ethical digital governance based educational management on the managerial readiness of *madrasah ibtidaiyah* teachers

Sulfa Potiua^{1*}, Wadan Y. Anuli²

¹Islamic Education Management Study Program, State Islamic Institute of Manado

Dr. S.H. Sarundajang Street, Kawasan Ringroad I, Malendeng, Manado, North Sulawesi 95128, Indonesia

²Elementary Madrasah Teacher Education Study Program, State Islamic Institute of Manado

Dr. S.H. Sarundajang Street, Kawasan Ringroad I, Malendeng, Manado, North Sulawesi 95128, Indonesia

*Corresponding Author. E-mail: sulfapotiua@iain-manado.ac.id

Received: 30 January 2026; Revised: 3 February 2026; Accepted: 2 April 2026

Abstract: Digital educational management in *Madrasah Ibtidaiyah* (MI) in North Sulawesi faces challenges related to ethical security and data integrity amid the rapid expansion of artificial intelligence (AI). This study examines the relationship between Ethical Digital Governance (EDG) based educational management and teachers' managerial readiness. Using a quantitative correlational design, data were collected from 524 MI teachers through a five point Likert questionnaire developed from the POAC framework (Planning, Organizing, Actuating, and Controlling). Data were analyzed using descriptive statistics, Pearson correlation, and simple linear regression. The results show a statistically significant positive relationship between EDG and managerial readiness ($R = 0.361$; $R^2 = 0.13$; $p < 0.05$), indicating that EDG explains 13% of the variance in readiness. Although the correlation is weak, the positive direction suggests that strengthening ethical standards and digital transparency supports teachers' psychological safety and pedagogical autonomy. Teachers demonstrate responsible AI use; however, institutional control remains largely compliance-oriented, potentially contributing to technostress. EDG therefore functions as a foundational enabling factor rather than a dominant predictor of managerial readiness. Future research should incorporate additional structural and competency-based variables to better explain managerial preparedness in Islamic educational institutions.

Keywords: educational management, ethical digital governance, managerial readiness, POAC

How to Cite: Sulfa, P. & Anuli, W. Y. (2026). The effect of ethical digital governance based educational management on the managerial readiness of *madrasah ibtidaiyah* teachers. *Jurnal Prima Edukasia*, 14(2), 251-268. DOI: <https://doi.org/10.21831/jpe.v14i2.95547>



Introduction

The acceleration of digitalization in educational management within *Madrasah Ibtidaiyah* (MI) in North Sulawesi has increasingly encountered critical challenges related to data integrity and security. The implementation of information technology often prioritizes technical functionality while neglecting ethical dimensions, thereby triggering risks related to privacy violations, governance bias, and the potential misuse of academic information (Floridi, 2018b; Stahl, 2021; Zuboff, 2019a). The phenomenon of technostress among educators indicates that, in the absence of an ethical framework, digitalization may instead degrade managerial quality (Mulyasa, 2019). Therefore, the adoption of Ethical Digital Governance (EDG) emerges as a determining factor in strengthening teachers' managerial readiness to ensure that the digital transformation of madrasahs aligns with principles of accountability and institutional moral values (Bahrudin, 2022; Fauzi, 2023; Fernández et al., 2026).

In practice, the relationship between Ethical Digital Governance (EDG) and teachers' managerial readiness is not merely procedural but urgent and systemic. The rapid integration of artificial intelligence and digital administration in madrasahs has intensified risks related to data breaches, algorithmic opacity, and unauthorized surveillance. Without clearly institutionalized ethical standards, teachers operate in conditions of legal ambiguity and moral uncertainty, exposing them to potential privacy

This is an open access article under the [CC-BY-SA](#) license.



violations and professional liability. Such conditions do not only reduce managerial confidence but may also undermine institutional credibility and public trust. When madrasahs implement structured ethical governance frameworks, teachers experience greater psychological safety and legal protection, which directly strengthens their self efficacy in managing digital administration (Lucky, 2023; UNESCO, 2021; Vakkuri, 2021). In contrast, the absence of ethical governance hampers teachers' managerial readiness due to uncertainty; educators tend to adopt defensive attitudes or hesitate in making data driven decisions out of fear of privacy violations or algorithmic errors (Tolsdorf, 2022; Wahyudi, 2023). This, EDG functions not merely as a supervisory instrument but as a stimulus that provides procedural certainty, enabling teachers to optimize managerial functions such as planning and classroom organization in a more professional manner (Muali, 2021; Suryadi, 2021).

Fundamentally, the relationship between EDG based management and teachers' readiness is rooted in institutional trust theory (Meyers, 2023; Nemorin, 2023; Vakkuri, 2021). Within the madrasah context, teachers carry a dual burden: rigid digital administrative demands and the moral responsibility of character education (*akhlak*). When digital systems are implemented without ethical transparency, "role ambiguity" emerges, hindering managerial readiness. Conversely, ethical governance mechanisms such as clear data ownership and privacy protection serve as enabling structures that reduce digital anxiety (Pangrazio, 2021). This shift allows teachers to move from being mere "technology users" to becoming confident "technology managers," where managerial efficiency is achieved through guaranteed system integrity.

It is therefore important to note that teachers' managerial readiness does not develop in a vacuum. Amid digitalization pressures, the phenomenon of algorithmic anxiety arises, wherein educators feel constrained by opaque automated systems. Without Ethical Digital Governance, technologies intended as empowering tools may instead transform into instruments of control that alienate educators from their professional autonomy. The positive relationship between EDG and teachers' managerial readiness reflects that system trust is an essential prerequisite for managerial effectiveness (Akgun, 2022; Bond, 2023; Divya A, 2026; Holmes, 2022). Teachers who trust that their institutions uphold data justice are more open to adopting innovations, less resistant to change, and more proactive in enhancing their managerial competencies within a dynamic digital ecosystem.

Nevertheless, current research realities reveal that while studies on digital management in madrasahs are abundant, significant gaps remain in the ethical governance dimension. Previous research has predominantly focused on teachers' pedagogical competencies in the era of disruption (Mulyasa, 2021) and the effectiveness of information technology infrastructure (Umiarso, 2021). Meanwhile, discussions on data ethics and digital governance have largely been situated within the broader industrial context (Mittelstadt, 2019; Stahl, 2021). To date, the empirical integration of *Akhlakul Karimah* values with digital data security protocols in madrasah managerial practices remains underexplored (Huda, 2020; Postman, 1993).

In the context of *Madrasah Ibtidaiyah*, digitalization demands carry a distinctive moral dimension. EDG based management essentially represents a modern manifestation of the principles of *Amanah* (integrity) and *Maslahah* (public benefit) in the governance of educational data (Khosravi, 2022; Tolsdorf, 2022). Existing gaps often stem from the separation between technological sophistication and institutional spiritual values. Integrating digital ethics into managerial functions is therefore a crucial step in preventing the dehumanization of education. By positioning ethics as the compass of digital governance, madrasahs can achieve not only administrative efficiency but also preserve their institutional dignity as centers of character education relevant to contemporary developments.

As a result, a significant gap persists between the demands of educational digitalization and the availability of ethical frameworks that protect teachers' privacy and integrity (Selwyn, 2020; Zuboff, 2019). Most Islamic educational management policies remain technocratic administrative in nature and have yet to address the protection of teachers' digital rights within managerial readiness (Stahl, 2021; Wahyudi, 2023). Prior studies have tended to overlook the linkage between ethical security and the administrative productivity of MI teachers (Suryadi, 2021). The novelty of this study lies in its empirical examination of the extent to which ethical digital governance principles significantly contribute to teachers' managerial readiness offering a new perspective that integrates strategic management with technology ethics in Islamic educational management.

Despite the expanding literature on digital management in Islamic education, prior studies have primarily focused on technological infrastructure, administrative efficiency, and teachers' pedagogical competencies, while rarely conceptualizing ethical digital governance as a measurable managerial construct. Discussions on data ethics have largely remained normative or situated within industrial and public sector contexts, leaving a significant empirical gap in faith based primary education. The novelty of this study lies in its empirical operationalization of Ethical Digital Governance (EDG) within the POAC managerial framework and its quantitative examination of EDG as a predictive determinant of teachers' managerial readiness using regression analysis. Furthermore, this study uniquely integrates Islamic ethical principles *Amanah* (integrity) and *Maslahah* (public benefit) with contemporary digital governance theory, offering a contextualized analytical model for *Madrasah Ibtidaiyah*. By bridging strategic management, institutional trust theory, and technology ethics, this research contributes a new perspective in understanding ethical governance not merely as compliance, but as a structural driver of managerial professionalism in digitally transforming Islamic schools.

These conditions underscore the objective problem of low teachers' managerial readiness resulting from uncertainty in ethical standards within madrasah information systems (Floridi, 2018; Stahl, 2021). This situation is exacerbated by weak institutional data protection, which undermines educators' managerial self efficacy (Mulyasa, 2021; Wahyudi, 2023). Global reports indicate that without ethical digital governance, teachers feel threatened by excessive surveillance and legal uncertainty regarding the data they manage (Floridi, 2018a; Zuboff, 2019). Evidence from North Sulawesi shows that variations in digital ethics understanding lead to inefficiencies in data driven decision making at the madrasah level. In the absence of ethical governance, educators experience heightened vulnerability to surveillance and legal ambiguity.

This issue is not merely a local concern in North Sulawesi but reflects a broader global crisis surrounding data sovereignty in the public sector. However, the urgency is particularly acute at the *Madrasah Ibtidaiyah* level, given teachers' strategic role as the foundation of basic education. Failure to integrate ethical digital standards at this level will have long term implications for the quality of future data driven decision making. Accordingly, this study not only addresses a theoretical gap regarding the relationship between ethical management and teacher readiness but also offers practical solutions for strengthening digital resilience within Islamic educational institutions.

To address these challenges, strengthening educational management based on Ethical Digital Governance principles is essential (Huda, 2020; Stahl, 2021). This solution encompasses the standardization of privacy protocols, transparency of algorithmic processes, and managerial training that integrates digital ethics literacy (Bahrudin, 2022; Fauzi, 2023). With legal certainty and ethical protection embedded in the digital ecosystem, teachers will gain greater confidence in managing madrasah administration in an accountable manner (Suryadi, 2021; Wahyudi, 2023).

This study aims to conduct an in depth analysis of the relationship between the implementation of Ethical Digital Governance based educational management and the managerial readiness of *Madrasah Ibtidaiyah* teachers in North Sulawesi. Furthermore, it seeks to demonstrate that ethical governance serves as a primary stimulus for educators' managerial professionalism in the digital era. The findings are expected to provide strategic references for the Ministry of Religious Affairs in formulating humane and integrity driven digital transformation policies.

Methods

This study employed a quantitative approach with a correlational predictive design to examine the effect of Ethical Digital Governance based educational management as the independent variable (X) on the managerial readiness of *Madrasah Ibtidaiyah* teachers as the dependent variable (Y). The design was selected to analyze both the direction and magnitude of the effect between variables in an objective and measurable manner. The research was conducted in twelve *Madrasah Ibtidaiyah* located in North Sulawesi, selected due to the high intensity of digital system implementation and the observable variation in teachers' managerial readiness in responding to digital transformation. The study was carried out during the odd semester of the 2025/2026 academic year.

The population of this study comprised all *Madrasah Ibtidaiyah* teachers in North Sulawesi, with a total sample of 524 respondents selected using Proportional Stratified Random Sampling. This

technique was applied because the teacher population is heterogeneous and distributed across institutions with differing organizational and managerial characteristics. The study involved two primary variables: Ethical Digital Governance based educational management, encompassing data protection, digital system transparency, accountability in information management, and the integration of Islamic ethical values (*akhlakul karimah*) into madrasah digital governance; and teachers' managerial readiness, which includes planning readiness, data driven decision making, digital administrative management, and managerial self efficacy within a digital work environment.

Data were collected using a closed-ended questionnaire employing a five point Likert scale. The instrument was developed based on a theoretical synthesis of the POAC framework (*Planning, Organizing, Actuating, and Controlling*) and adapted to the context of digital governance in madrasahs. Prior to data collection, the instrument underwent content validity assessment by experts in educational management and digital ethics and was confirmed to be reliable based on the Cronbach's Alpha coefficient. The reliability test showed that the Ethical Digital Governance scale obtained a Cronbach's Alpha of $\alpha = 0.85$, while the Teachers' Managerial Readiness scale achieved $\alpha = 0.82$, both exceeding the acceptable threshold of 0.70, indicating good internal consistency. Data analysis utilized both descriptive and inferential statistics. Descriptive analysis was used to describe the level of Ethical Digital Governance implementation and teachers' managerial readiness, while inferential analysis was conducted using Pearson Product Moment correlation and simple linear regression analysis to examine the effect of the independent variable on the dependent variable. Prior to hypothesis testing, prerequisite assumption tests were performed to ensure the suitability of the data for regression analysis.

Results and Discussion

Results

Descriptive Analysis

Digital transformation in educational management is not merely a matter of procuring hardware or software but represents a fundamental paradigm shift in institutional governance. The management of education in *Madrasah Ibtidaiyah* is currently required to adopt Ethical Digital Governance principles to ensure that digitalization remains grounded in moral values, accountability, and the protection of madrasah stakeholders' rights. To examine the extent of managerial readiness and the implementation of such management practices, this study employed the POAC framework (Planning, Organizing, Actuating, and Controlling), adapted with indicators of digital governance.

Aspect 1: Planning (Ethical Digital Planning)

The findings indicate that the planning aspect of Ethical Digital Governance-based educational management falls within the moderate to high category. This conclusion is supported by three main indicators representing teachers' managerial readiness in addressing ethical digital transformation.

1. *Madrasahs* have a clear strategic plan (School Work Plan) outlining a roadmap for digital transformation and the use of artificial intelligence.

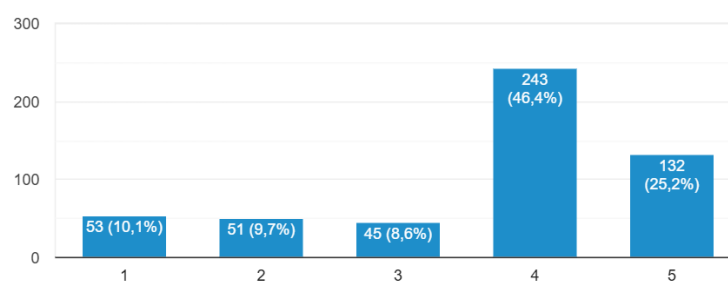


Figure 1. Madrasahs' Strategic Plan

The graph presented in Figure 1 illustrates the Strategic Plan (School Work Plan) for Digital Transformation and Artificial Intelligence. The research data indicate that the majority of madrasahs have developed strategic awareness regarding digitalization. Based on the data, 132

respondents (25.2%) selected strongly agree and 243 respondents (46.4%) selected agree. This means that 71.6% of respondents confirmed that their madrasahs have a School Work Plan (RKM) that includes a roadmap for digital transformation and the use of Artificial Intelligence (AI). This high percentage suggests that digital transformation is no longer merely a technical discourse but has been formally institutionalized within madrasah policy documents. However, approximately 19.8% of madrasahs expressed disagreement (a combined total of 9.7% disagree and 10.1% strongly disagree). This finding indicates the persistence of a strategic planning gap, or digital divide, at the basic education level, where some madrasahs may still prioritize meeting daily operational needs over developing a long term technological vision.

This condition has important implications for Ethical Digital Governance (EDG). The institutionalization of digital transformation within the RKM indicates that governance structures are beginning to integrate ethical and strategic considerations into digital management. A clearly formulated roadmap provides procedural certainty, which can reduce managerial ambiguity and strengthen teachers' readiness to manage digital administration effectively. Conversely, the absence of strategic planning in a number of madrasahs may hinder the establishment of accountable and ethically grounded digital governance practices.

2. *Madrasahs* have written ethical guidelines regulating teachers' rights and responsibilities in the use of digital technology.

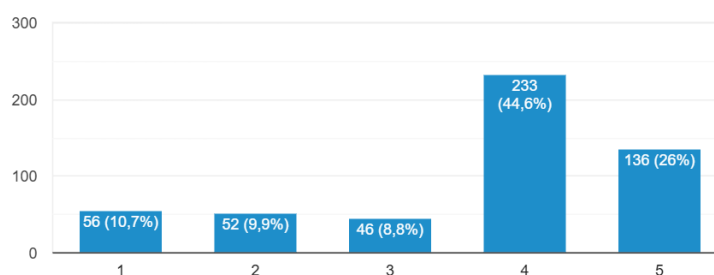


Figure 2. Madrasahs Have Written Ethical Guidelines

The second indicator presented in Figure 2 relates to internal madrasah regulations. A total of 136 respondents (26%) indicated strongly agree and 233 respondents (44.6%) indicated agree that their madrasahs have written ethical guidelines governing teachers' rights and responsibilities in the use of digital technology. The presence of such written guidelines is crucial as a foundational element of Ethical Digital Governance. With a total of 70.6% of madrasahs reporting the existence of these regulations, the findings reflect a systematic effort to mitigate digital risks, such as student data privacy violations and the misuse of digital content. Nevertheless, the level of disagreement, which reached 20.6%, signals that digital ethics literacy at the managerial level still requires more uniform standardization. In the absence of clear guidelines, teachers lack strong legal and moral protection when engaging in digital environments.

The existence of written ethical guidelines represents a formalization of normative control within madrasah governance structures. In the context of Ethical Digital Governance, such guidelines function as regulatory safeguards that institutionalize principles of accountability, transparency, and data protection. When teachers operate within clearly defined ethical boundaries, their managerial confidence increases, as the risk of legal ambiguity or moral misjudgment is minimized. Conversely, the 20.6% absence of such guidelines indicates a governance vulnerability that may weaken institutional trust and limit teachers' readiness to make autonomous digital decisions. Therefore, written ethical regulations are not merely administrative documents but enabling mechanisms that strengthen both professional protection and managerial effectiveness.

3. Madrasah budget planning supports the procurement of secure and ethically standardized digital facilities.

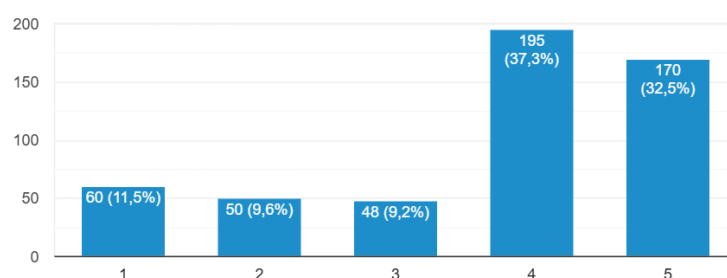


Figure 3. Madrasah Budget Planning

Figure 3 shows budget planning for secure digital facilities. The madrasahs' financial commitment is reflected in the third indicator, where 170 respondents (32.5%) strongly agree and 195 respondents (37.3%) selected agree that budget planning supports the procurement of secure and ethically standardized digital facilities. These data indicate that budgetary support constitutes a significant priority in strengthening digital governance. The percentage of strongly agreed responses in the budgeting aspect (32.5%) is higher than that in strategic planning (25.2%) and ethical guidelines (26%). This finding suggests that, in practice, madrasahs tend to be more responsive in allocating funds for the procurement of physical infrastructure (hardware and software). However, challenges remain for approximately 21.1% of madrasahs that perceive their budgets as insufficient, which is likely due to limitations in School Operational Assistance (BOS) funding or more pressing priorities related to physical building development.

From an Ethical Digital Governance perspective, budget allocation represents the material foundation of ethical commitment. Financial planning that prioritizes secure and standardized digital facilities demonstrates that ethical governance is not merely rhetorical, but operationalized through resource distribution. Adequate budgeting strengthens institutional capacity to implement data protection measures, cybersecurity safeguards, and system reliability, which in turn enhances teachers' managerial readiness by reducing technical disruptions and security risks. However, the existence of budget constraints in a portion of madrasahs reveals a structural vulnerability: ethical digital governance cannot be sustainably implemented without stable financial support. Therefore, budget planning functions as a strategic enabler that determines whether digital ethics can move from policy formulation to practical execution.

Overall, in Aspect 1 (Planning), Madrasah Ibtidaiyah in North Sulawesi Province have begun to institutionalize digital administration and instructional planning, including the integration of academic information systems and online evaluation tools. This indicates an emerging structural awareness of digital transformation at the policy and budgeting levels. However, the findings reveal that not all planning mechanisms explicitly incorporate core principles of Ethical Digital Governance, such as data protection safeguards, clarity of information management authority, and standardized digital ethical protocols. Consequently, current digital planning practices remain predominantly oriented toward technical efficiency rather than a fully integrated and systematic ethical governance framework. This gap suggests that while strategic, regulatory, and financial elements of planning are increasingly present, the ethical dimension has not yet been comprehensively embedded within managerial decision making structures.

Aspect 2: Organizing (Organization of Digital Systems and Roles)

Within the management function, organizing serves as the bridge between planning and implementation. In the current era of digital transformation, organizing no longer merely involves establishing traditional organizational structures (line and staff), but rather focuses on integrating human resources with technology to create agile workflows.

1. Digital Management of Student Records and Academic Score Data

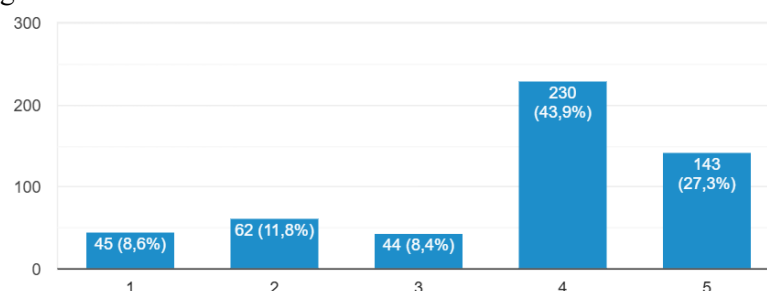


Figure 4. Digital Management of Student Records and Academic Score Data

Teachers' ability to organize sensitive data constitutes a fundamental pillar of data security in madrasahs. Based on the survey results, 143 respondents (27.3%) indicated strongly agree and 230 respondents (43.9%) indicated agree. Cumulatively, 71.2% of teachers reported that they are able to manage student records and academic score data digitally in an orderly, secure, and systematic manner. The majority of teachers have demonstrated autonomy in organizing digital data, indicating that digital assessment systems (such as digital report cards) have been internalized within teachers' routine work procedures. However, 20.4% of respondents still perceived themselves as not yet capable (disagree and strongly disagree). This finding suggests that data organization responsibilities remain concentrated on madrasah operators, resulting in systemic dependence that poses a risk of delayed educational information distribution when data management relies on a single unit.

From an Ethical Digital Governance perspective, the ability to manage digital academic data reflects not only technical competence but also the clarity of organizational role distribution and accountability mechanisms. When teachers are capable of independently organizing student records, managerial readiness increases as decision making becomes more efficient and less dependent on centralized operators. Conversely, unequal digital competence may create structural vulnerability, where data control is concentrated in limited personnel, potentially weakening institutional resilience and data security. Therefore, strengthening digital role clarity and ethical data management protocols is essential to ensure sustainable and accountable digital governance within madrasahs.

2. Time Management between Teaching and Digital Administration

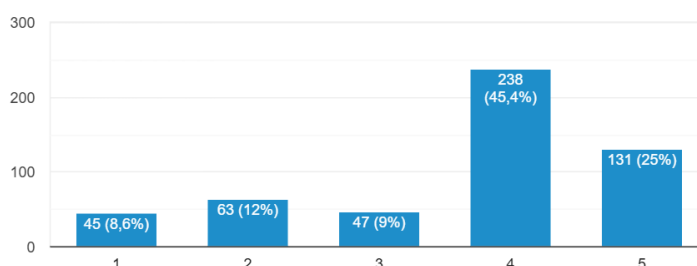


Figure 5. Time Management between Teaching and Digital Administration

Figure 5 illustrates that the effectiveness of self organization is reflected in how teachers distribute their workload. The data show that 131 respondents (25.0%) strongly agree and 238 respondents (45.4%) agree that teachers are able to manage their time effectively between face-to-face teaching responsibilities and application based administrative tasks. A total of 70.4% of teachers demonstrate a good level of adaptation to digital multitasking. This ability to organize time is crucial to ensure that administrative application workloads (such as *Simpatika* or *EMIS*) do not erode the quality of pedagogical interaction in the classroom. Nevertheless, the presence of 20.6% of teachers who reported difficulties in time management indicates the emergence of technostress, whereby digital workloads are perceived as administrative distractions that interfere with teachers' primary role as educators.

From an Ethical Digital Governance perspective, time management between teaching and digital administration reflects the balance between technological efficiency and professional autonomy. Effective organizing of workload indicates that digital systems are functioning as supportive tools rather than instruments of excessive control. When teachers are able to integrate administrative applications into their workflow without compromising instructional quality, their managerial readiness is strengthened, as they perceive digital governance as enabling rather than burdensome. However, the presence of technostress among a portion of teachers signals a potential imbalance in system design and workload distribution. If digital governance mechanisms prioritize data reporting over pedagogical priorities, they may inadvertently undermine teachers' professional focus. Therefore, organizing digital responsibilities must be aligned with ethical workload standards to ensure that digital transformation enhances, rather than disrupts, educational quality.

3. Organization of Credible Digital Learning Resources

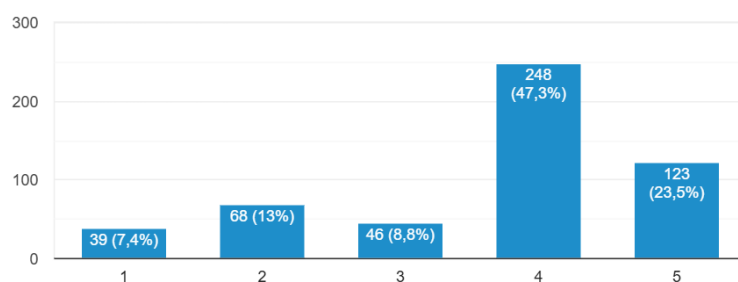


Figure 6. Management of Time between Teaching and Digital Administration

Figure 6 shows that this indicator measures teachers' capacity as content curators. A total of 123 respondents (23.5%) selected strongly agree and 248 respondents (47.3%) selected agree regarding their ability to organize online learning resources into credible instructional materials. Approximately 70.8% of teachers reported being able to filter and select information from the internet to be used as teaching materials. From the perspective of Ethical Digital Governance, this capability reflects teachers' responsibility to present valid information and to avoid plagiarism or the dissemination of misinformation to students. However, 20.4% of teachers still reported difficulties, indicating the need for targeted digital literacy training focused on content curation to ensure that instructional materials meet high academic quality standards.

From an organizational governance perspective, the ability to curate credible digital learning resources reflects the ethical distribution of epistemic responsibility within the madrasah. Teachers who are capable of filtering and validating online information demonstrate not only technical literacy but also professional accountability in safeguarding students from misinformation and intellectual misconduct. This competence strengthens managerial readiness, as teachers function not merely as content users but as responsible knowledge managers within the digital ecosystem. However, uneven capacity in content curation may create instructional disparities and weaken institutional standards of academic integrity. Therefore, organizing digital learning resources must be supported by systematic ethical guidelines and continuous digital literacy development to ensure that digital transformation enhances educational credibility rather than exposing students to informational risks.

Overall, the analysis of Aspect 2 (Organizing) reveals considerable variation among madrasahs in North Sulawesi. Some madrasahs have established clear role distribution in managing digital data and systems, including the presence of administrative officers and system operators who support teachers' tasks. However, this study identifies a fundamental limitation in the clarity of ethical authority structures. There remains ambiguity regarding which actors hold the highest authority in legally ensuring the protection of teachers' and students' personal data at the madrasah level. This weak organization of digital ethics contributes to the emergence of a "grey zone" in managerial accountability, in which teachers often manage information independently without standardized institutional security support.

Aspect 3: Actuating (Implementation of Digital Managerial Practices)

The actuating function in this context reflects how *Madrasah Ibtidaiyah* teachers actively implement digital technologies in both managerial and pedagogical tasks. The findings indicate that the effectiveness of digital task implementation is strongly influenced by teachers' perceptions of system security and the clarity of ethical regulations. Specifically, the implementation data are elaborated as follows:

1. Motivating Students to Use Artificial Intelligence Wisely

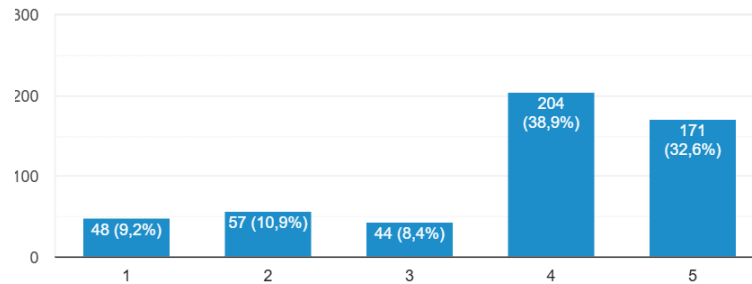


Figure 7. Motivating Students to Use Artificial Intelligence Wisely

Figure 7 shows that this indicator measures the teacher's role as a motivator in instilling technological ethics from an early stage. The data indicate that 171 respondents (32.6%) strongly agree and 204 respondents (38.9%) selected agree. In total, 71.5% of teachers reported making efforts to motivate students to position AI technology merely as a supporting tool rather than a substitute for critical thinking processes. The percentage of strongly agreed responses for this indicator (32.6%) is among the highest within the actuating aspect. This finding suggests that *Madrasah Ibtidaiyah* teachers in North Sulawesi possess strong moral awareness regarding the risks of dependency on AI. Teachers act as ethical "gatekeepers," ensuring that although technology is present in the classroom, academic integrity and students' cognitive processes remain the top priorities.

However, challenges are evident among the 20.1% of teachers who expressed disagreement, indicating the presence of a group of educators who may feel that they have not yet developed sufficient capacity or appropriate pedagogical strategies to guide students in navigating AI driven disruption. From the perspective of Ethical Digital Governance, teachers' efforts to motivate students to use Artificial Intelligence wisely represent the operationalization of ethical values within daily instructional practice. This finding indicates that actuating digital governance is not limited to administrative compliance, but extends to moral leadership in shaping students' digital behavior. When teachers function as ethical gatekeepers, they strengthen their managerial readiness by aligning technological implementation with institutional values such as integrity, responsibility, and critical reasoning. However, the existence of teachers who feel unprepared to guide AI usage signals a potential gap between ethical awareness and pedagogical capacity. Without systematic professional development and clear institutional guidelines, the integration of AI may risk shifting from ethical empowerment to unregulated dependence. Therefore, strengthening ethical AI literacy is essential to ensure that digital implementation remains aligned with both academic standards and moral objectives.

2. Leadership in Moral Discussions on Internet and AI Use

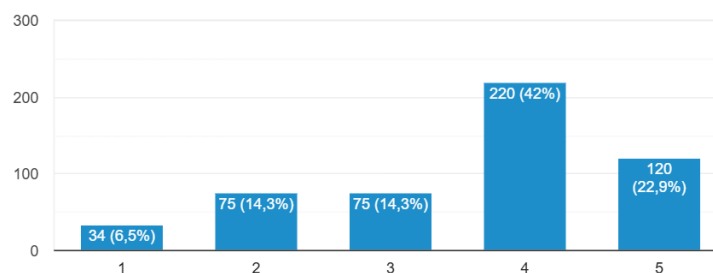


Figure 8. Leadership in Moral Discussions on Internet and AI Use

Figure 8 illustrates the role of teachers as opinion leaders. A total of 120 respondents (22.9%) reported strongly in agreement and 220 respondents (42.0%) reported that teachers are capable of leading classroom discussions on the moral boundaries of internet and AI use (such as ChatGPT and Gemini). Overall, 64.9% of teachers have assumed an active role as facilitators of ethical digital literacy. This figure indicates that teachers are not only teaching how to use digital tools, but also why and how to use them responsibly.

Nevertheless, 20.8% of respondents expressed disagreement. This finding signals that discussions concerning the “moral boundaries” of AI remain relatively new and complex, leading some teachers to feel insufficiently confident in guiding in depth ethical debates about artificial intelligence at the madrasah level. From an Ethical Digital Governance perspective, teachers’ leadership in facilitating moral discussions on internet and AI use reflects the enactment of normative authority within the classroom. This role extends beyond technical instruction and positions teachers as ethical mediators who translate institutional values into practical digital behavior. When teachers confidently lead discussions on the moral boundaries of AI, they strengthen their managerial readiness by demonstrating alignment between governance principles and pedagogical practice. However, the proportion of teachers who feel unprepared suggests that ethical digital leadership has not yet been fully institutionalized through structured training or policy support. Without clear ethical frameworks and professional development mechanisms, digital governance risks remaining procedural rather than transformative. Therefore, strengthening teachers’ capacity to engage in ethical dialogue is essential to ensure that digital implementation is guided by reflective judgment rather than reactive adaptation.

3. Proactivity in Coordinating Digital Managerial Tasks

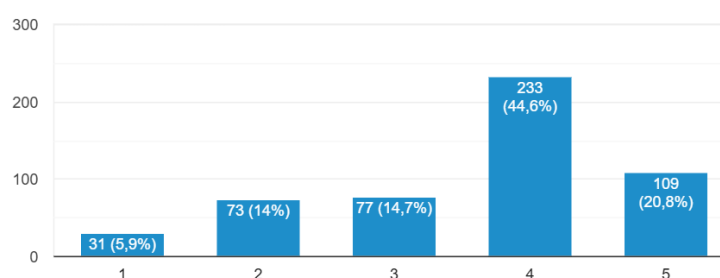


Figure 9. Proactivity in Coordinating Digital Managerial Tasks

In terms of managerial initiative shown in Figure 9, 109 respondents (20.8%) strongly agree and 233 respondents (44.6%) indicated that teachers proactively seek digital solutions to facilitate task coordination in madrasahs. These data reflect that 65.4% of teachers demonstrate a proactive attitude toward administrative innovation. Teachers no longer merely wait for instructions from superiors; instead, they actively explore applications or software that can enhance the efficiency of work coordination. On the other hand, a cumulative 19.9% level of disagreement indicates that barriers to independent initiative still exist. These constraints are likely influenced by rigid bureaucratic cultures or a lack of institutional recognition and appreciation for digital innovation at the madrasah level.

From the standpoint of Ethical Digital Governance, teachers’ proactivity in coordinating digital managerial tasks reflects the internalization of governance responsibility at the operational level. Proactive initiative indicates that digital transformation is not solely directive driven, but supported by participatory engagement from educators. Such initiative strengthens managerial readiness, as teachers develop adaptive problem solving skills and demonstrate ownership of digital processes. However, the presence of structural and cultural barriers suggests that governance environments may not yet fully encourage decentralized innovation. If bureaucratic rigidity limits teacher initiative, digital governance risks becoming compliance oriented rather than innovation oriented. Therefore, fostering an institutional culture that recognizes and ethically guides digital innovation is essential to ensure that proactivity contributes to accountable and sustainable managerial performance.

Aspect 4: Controlling (Ethical Digital Monitoring and Evaluation)

The controlling function in this study focuses on mechanisms for verification, monitoring of digital activities, and evaluation of the impact of technology on managerial performance. The findings related to this aspect are presented as follows:

1. Verification of the Accuracy of AI Generated Information

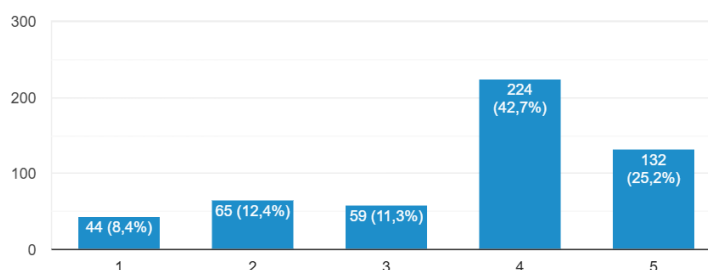


Figure 10. Verification of the Accuracy of AI Generated Information

Figure 10 illustrates the information accountability aspect, showing that 132 respondents (25.2%) strongly agree and 224 respondents (42.7%) agree that AI-generated information should be verified before being used in official reports. Cumulatively, 67.9% of teachers reported conducting cross check procedures. This finding indicates a growing awareness of the risks of “AI hallucinations” or potential data inaccuracies produced by artificial intelligence. Teachers do not uncritically accept technological outputs, reflecting a critical stance in data management practices. However, 20.8% of teachers tend to overlook the verification process, which may pose administrative or legal risks if AI generated information contains inaccuracies in statistical data or policy-related content.

From an Ethical Digital Governance perspective, verification of AI generated information represents a core mechanism of digital accountability within the controlling function. Monitoring is not merely technical supervision, but a safeguard to ensure the reliability, transparency, and legitimacy of institutional data. When teachers consistently conduct cross check procedures, they demonstrate managerial readiness characterized by critical judgment and procedural responsibility. Such practices reduce the risk of misinformation, protect institutional credibility, and strengthen trust in digital systems. Conversely, the absence of systematic verification mechanisms may expose madrasahs to reputational and legal vulnerabilities, particularly when AI generated outputs are used in official reporting. Therefore, ethical digital monitoring must be institutionalized through clear verification protocols and standard operating procedures to ensure that technological efficiency does not compromise data integrity.

2. Monitoring Students’ Digital Activities (Plagiarism Mitigation)

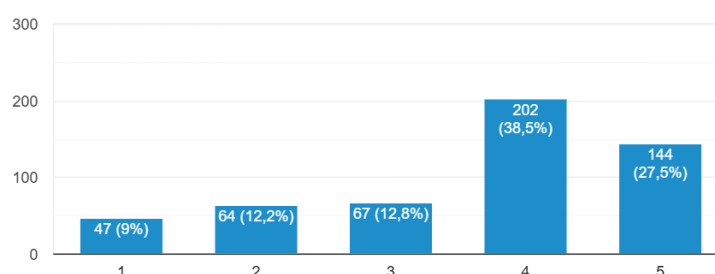


Figure 11. Plagiarism Mitigation

Figure 11 relates to the supervision of ethical behavior in the classroom. A total of 144 respondents (27.5%) strongly agree and 202 respondents (38.5%) agree that teachers routinely monitor students’ digital activities to prevent plagiarism. Overall, 66% of teachers have performed their role as digital ethics supervisors at the classroom level. This effort is essential for maintaining academic integrity amid the ease of access to information. Nevertheless, a disagreement rate of 21.2% indicates technical challenges in supervision. Madrasah Ibtidaiyah teachers may experience

difficulties in monitoring each student's digital activities in real time due to limitations in teacher student ratios or the lack of supporting classroom monitoring software.

From the perspective of Ethical Digital Governance, monitoring students' digital activities represents a preventive control mechanism aimed at safeguarding academic integrity and responsible technology use. This supervisory role reflects the translation of institutional ethical standards into daily classroom practice. When teachers actively mitigate plagiarism, they reinforce a culture of accountability and honesty, thereby strengthening their managerial readiness in maintaining both instructional quality and moral discipline. However, the identified technical and structural constraints suggest that ethical supervision cannot rely solely on individual teacher vigilance. Without adequate technological support systems and balanced teacher student ratios, digital monitoring may become inconsistent and reactive rather than systematic. Therefore, strengthening institutional monitoring frameworks and providing appropriate digital tools are essential to ensure that controlling functions effectively protect academic credibility in the digital era.

3. Self Evaluation of Managerial Work Efficiency

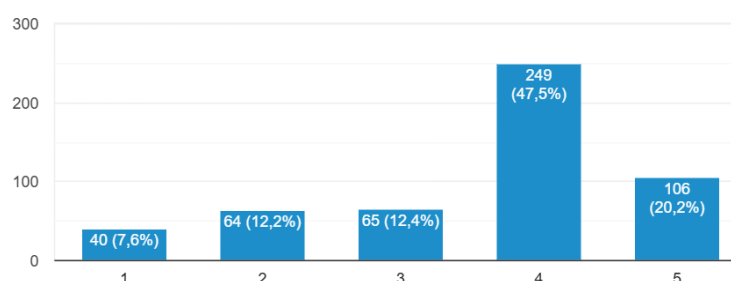


Figure 12. Self Evaluation of Managerial Work Efficiency

Regarding the effectiveness of technology as shown in Figure 12, 106 respondents (20.2%) strongly agree and 249 respondents (47.5%) agree that teachers independently evaluate whether technology has improved the efficiency of madrasah operations. Approximately 67.7% of teachers demonstrate metacognitive ability in assessing the usefulness of technology in relation to their workload. This self evaluation represents a form of Ethical Digital Governance at the individual level, in which teachers ensure that technology functions as a solution rather than an additional burden. However, the 19.8% of teachers who have not engaged in such self evaluation are at risk of becoming trapped in redundant technology use, where digital tools are adopted without yielding tangible improvements in productivity.

From an Ethical Digital Governance perspective, self-evaluation of managerial work efficiency represents a reflective control mechanism that ensures technology adoption remains purposeful and accountable. This practice demonstrates that controlling is not solely external monitoring, but also involves internal professional judgment. When teachers critically assess whether digital tools genuinely enhance productivity, they strengthen their managerial readiness by aligning technological use with institutional goals and workload balance. Conversely, the absence of reflective evaluation may lead to symbolic digitalization, where technology is implemented for compliance rather than effectiveness. Therefore, cultivating a culture of continuous digital reflection is essential to ensure that technological innovation contributes to sustainable and meaningful managerial performance.

4. Independence from AI in Developing Lesson Plans

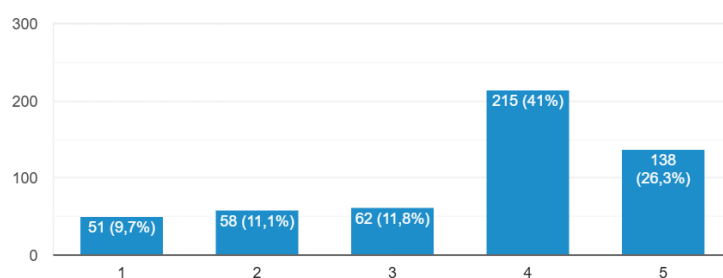


Figure 13. Independence from AI

Regarding technological dependence as shown in Figure 13, 138 respondents (26.3%) strongly agree and 215 respondents (41.0%) agree that they do not rely entirely on AI in developing lesson plans (RPP) or instructional modules. In total, 67.3% of teachers maintain their pedagogical autonomy. These findings confirm that, for the majority of Madrasah Ibtidaiyah teachers, AI is positioned merely as an assistant, while the substance and contextualization of instructional materials remain under the professional control of teachers. Conversely, 20.8% of teachers tend to be highly dependent on AI, which, if left unregulated, may lead to the “blunting” of instructional creativity and the loss of local contextual nuances in learning.

From the perspective of Ethical Digital Governance, independence from AI in developing lesson plans reflects the preservation of professional autonomy within digital transformation. Controlling, in this context, involves setting normative boundaries that prevent technology from replacing pedagogical judgment. When teachers maintain authorship and contextual adaptation of instructional materials, they demonstrate managerial readiness characterized by critical discernment and ethical responsibility. However, increasing reliance on AI without regulatory guidance may gradually shift decision making authority from educators to algorithms, potentially weakening instructional authenticity and cultural relevance. Therefore, institutional policies must clearly define the role of AI as a supportive instrument rather than a substitute for professional expertise, ensuring that digital innovation reinforces, rather than diminishes, educational integrity.

The findings further indicate that although teachers have individually demonstrated practices of verification and self-evaluation, supervisory mechanisms at the institutional madrasah level remain predominantly compliance oriented. Monitoring systems tend to emphasize procedural indicators such as punctual data submission rather than ensuring substantive ethical safeguards related to data protection, privacy, and responsible technology use. This imbalance reflects a governance gap in which digital control mechanisms prioritize administrative efficiency over ethical accountability. Consequently, a perception of excessive surveillance may emerge, where monitoring is experienced as error detection rather than professional support. Such conditions can undermine teachers’ psychological safety and weaken managerial readiness, as educators may adopt defensive behaviors instead of proactively engaging in ethical digital innovation. Strengthening institutional level ethical standards and shifting from punitive oversight to supportive governance are therefore essential to foster trust-based and sustainable digital transformation within madrasahs.

Inferential Analysis

To examine the relationships between variables, a series of parametric statistical tests were conducted as follows. The normality test was employed to ensure that the data were normally distributed, which is a prerequisite for parametric statistical analysis. The Kolmogorov–Smirnov test was used (for a large sample, $N = 524$) with a significance level of 5%. The data are considered normally distributed if the Sig. value is greater than 0.05.

Table 1. Results of the Normality Test

Variable	Statistical Test	N	Asymp. Sig. (2-tailed)	Decision
Ethical Digital Governance	Kolmogorov–Smirnov	524	0.680	Normal
Teacher Managerial Readiness	Kolmogorov–Smirnov	524	0.101	Normal

Based on Table 1 above, both variables have probability values greater than 0.05; therefore, it can be concluded that the data in this study are normally distributed. Subsequently, a homogeneity test was conducted to ensure that the sample originated from a population with equal variances. The test results indicate a significance value of 0.328. Since the Sig. value of 0.328 is greater than 0.05, the data are declared to have homogeneous variances. Proceeding to the hypothesis testing stage, the regression significance test (F-test) was performed, as presented in Table 2 below.

Table 2. Results of the Regression Significance Test

Statistical Test	F-table	F-count	Sig.	Conclusion
F-test	3.86	4.190	0.050	H ₀ rejected

Table 2 shows that the calculated F value (4.190) is greater than the F-table value, with a significance level of 0.05. This result demonstrates that there is a statistically significant relationship between Ethical Digital Governance and teachers' managerial readiness at Madrasah Ibtidaiyah in Manado City. Accordingly, the null hypothesis (H₀) is rejected and the alternative hypothesis (H₁) is accepted.

The strength of the relationship between variables was measured using the Pearson Product Moment correlation test, which yielded a correlation coefficient of 0.361. Referring to the guidelines for the degree of correlation, this value indicates that the relationship between ethical digital management and managerial readiness falls within the *weak* category. However, the positive direction of the relationship suggests that improvements in ethical digital governance tend to be followed by increases in teachers' managerial readiness, although the magnitude of this effect remains limited. Finally, the coefficient of determination test produced the following results.

Table 3. Results of the Coefficient of Determination Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.361	0.130	0.099	1.792

As shown in Table 3, the R² value of 0.130 indicates that Ethical Digital Governance contributes 13% to teachers' managerial readiness, while the remaining 87% is influenced by other factors outside the scope of this research model.

Discussion

The findings of this study, grounded in the POAC framework (Planning, Organizing, Actuating, and Controlling), affirm that Ethical Digital Governance (EDG) functions as a foundational dimension in educational management within Madrasah Ibtidaiyah in North Sulawesi. However, the statistical contribution (R² = 0.13) indicates that its influence is structural rather than dominant. This suggests that ethical governance shapes the managerial climate in which readiness develops, but does not independently determine managerial competence. This finding supports contemporary governance theory which positions ethics as a regulatory and trust-building mechanism rather than a direct productivity driver.

In the planning dimension, digital planning remains largely technocratic, focusing on document digitalization without embedding explicit ethical safeguards. Floridi (2018) and Stahl (2021) argue that ethical principles must be integrated at the system design stage ("ethics by design") to prevent reactive governance. The absence of ethical articulation within the Madrasah Work Plan (RKM) indicates that digital transformation may still operate within an instrumental logic. This finding extends previous Indonesian digital transformation studies, which emphasize infrastructure expansion but rarely examine ethical institutionalization. Thus, this study contributes by demonstrating that ethical planning gaps may weaken managerial coherence even when technological tools are available.

Regarding the organizing function, this study found that ambiguity in ethical digital authority structures may weaken managerial accountability. Although teachers demonstrate technical capability in managing digital data, the absence of strong written regulations regarding personal data protection creates potential legal and administrative risks. Tolsdorf and Igel (2022) argue that organizing digital educational institutions requires clear role delineation to maintain information integrity. In the madrasah context, management based on *akhlakul karimah* values represents a significant distinguishing factor (Hamzah, 2022; Meyers, 2023). This reinforces prior findings that madrasah leadership integrating spiritual values with digital governance fosters organizational structures that are more resilient and trusted by the school community (Muali, 2021). However, without formal institutional codification, ethical values may remain normative rather than structurally operational.

The actuating function highlights an important phenomenon in which Madrasah Ibtidaiyah teachers in North Sulawesi actively motivate students to use AI strictly as a supportive tool rather than a substitute for critical thinking. This critical stance reflects a tangible manifestation of ethical managerial readiness. The findings resonate with Zuboff's (2019) concerns regarding threats to human autonomy in the digital era. Teachers demonstrating high self efficacy in this study show their capacity to position AI as an "intelligent assistant" while maintaining pedagogical authority. This aligns with previous research indicating that the effectiveness of digital task implementation in schools is strongly influenced by teachers' perceptions of psychological comfort and system security (Lucky, 2023).

Finally, within the controlling function, the dominance of a purely administrative approach such as compliance with data upload deadlines was found to potentially generate over surveillance. Previous studies suggest that excessively rigid digital monitoring lacking a humanistic ethical framework may trigger technostress and ultimately reduce work productivity (Lucky, 2023; Vakkuri, 2021). Therefore, supervisory mechanisms in madrasahs should evolve beyond technical verification toward self evaluation and ethical protection. Transparent and ethically grounded monitoring practices are likely to reduce managerial barriers and enhance teachers' readiness to engage with digital innovation.

Overall, integrating Ethical Digital Governance into the POAC framework offers a renewed direction for Islamic educational management, positioning technology as a means to uphold human dignity and educational values rather than merely achieving bureaucratic efficiency. The statistical findings confirm a significant positive relationship between Ethical Digital Governance and teachers' managerial readiness ($F = 4.190 > F\text{-table} = 3.86, p < 0.05$). However, the correlation coefficient ($R = 0.361$) and coefficient of determination ($R^2 = 0.13$) indicate that Ethical Digital Governance explains only 13% of the variance in managerial readiness. This relatively modest contribution suggests that although ethical governance plays a meaningful role, it is not the primary determinant of managerial preparedness.

Several contextual factors may explain this limited contribution. Recent studies highlight that ethical governance and digital capability are increasingly recognized as key factors in strengthening organizational accountability, technological adaptation, and institutional performance. Integration of ethics, governance, and digital capability contributes to organizational transparency and effectiveness (Thi Thu Thuy Lai, 2026), while responsible adoption of artificial intelligence and big data requires governance systems that balance innovation with ethical oversight (Manzur, 2026). In educational contexts, AI-enabled management systems and digital transformation enhance institutional governance and support mechanisms (Dela Cruz, 2025; Nnaji et al., 2026). Organizational readiness to adopt emerging technologies is also influenced by human resource management, digital competencies, and employees' behavioral intentions toward new technologies (ramanjaneyulu et al., 2026; Wisedpanich, 2026).

First, managerial readiness is multidimensional and may be more strongly influenced by variables such as digital literacy competence, leadership style, infrastructure availability, organizational culture, and workload distribution. Recent studies also highlight that digital literacy plays a crucial role in strengthening educators' capacity to manage digital learning environments. Teachers' ability to understand and critically utilize digital technologies is essential for ensuring that digital tools are used effectively and responsibly in educational contexts (Achmad & Utami, 2023; Ratri & Aviyanti, 2025). Ethical governance functions primarily as an enabling condition that provides psychological safety and procedural clarity, rather than as a direct driver of technical capability. Second, in contexts where digital systems are already operationally established, teachers may perceive technological competence and practical efficiency as more immediate determinants of readiness than abstract ethical frameworks.

Third, the compliance-oriented monitoring culture identified in this study may weaken the transformative potential of Ethical Digital Governance, as ethics becomes procedural rather than internalized.

Therefore, the relatively weak correlation should not be interpreted as insignificance. Instead, it indicates that Ethical Digital Governance operates as a foundational yet indirect factor shaping the managerial ecosystem. It contributes to trust, autonomy, and professional security, which in turn support readiness development. For Madrasah Ibtidaiyah teachers in Manado, this means that ethical governance provides psychological assurance that digital transformation can proceed without compromising academic integrity and the values of *akhlakul karimah*. However, other structural and competency-based variables exert stronger direct influence. Future research is recommended to incorporate mediating or moderating variables such as digital competence, organizational support, and leadership ethics to better explain the complex relationship between ethical governance and managerial performance in Islamic educational institutions.

Conclusion

This study concludes that Ethical Digital Governance-based Educational Management has a statistically significant positive relationship with teachers' managerial readiness in Madrasah Ibtidaiyah in North Sulawesi ($F = 4.190 > F\text{-table} = 3.86, p < 0.05$). However, the coefficient of determination ($R^2 = 0.13$) indicates that Ethical Digital Governance explains 13% of the variance in managerial readiness, suggesting that while its contribution is meaningful, it is not the dominant predictor of readiness in the digital era. Through the POAC framework, the findings demonstrate that digital planning and organizing have been formally implemented but remain limited in strengthening ethical authority structures and data protection mechanisms. In the actuating dimension, teachers show pedagogical autonomy by positioning AI as a supportive tool rather than a substitute for professional judgment. Meanwhile, in the controlling function, institutional supervision is still largely compliance-oriented, focusing on administrative procedures rather than comprehensive ethical protection. This condition may contribute to perceptions of over-surveillance and technostress, which can affect psychological safety and managerial performance.

Overall, Ethical Digital Governance functions as a foundational enabling factor that supports trust, autonomy, and value-based digital transformation in madrasahs. Its role lies in providing an ethical framework that safeguards academic integrity and the principles of *akhlakul karimah*, even though other structural and competency-related factors exert stronger direct influence on managerial readiness.

Future research is recommended to incorporate additional variables such as digital literacy competence, leadership ethics, organizational culture, infrastructure readiness, and psychological safety as mediating or moderating factors. Expanding the study across different provinces or educational levels may also provide comparative insights into how Ethical Digital Governance interacts with contextual factors in shaping teachers' managerial readiness in Islamic educational institutions.

References

- Achmad, W. K. S., & Utami, U. (2023). Sense-making of digital literacy for the future education era: A literature review. *Jurnal Prima Edukasia*, 11(1), 47–53. DOI: <https://doi.org/10.21831/jpe.v11i1.52911>
- Akgun, S., & Greenhow, C. (2022). Artificial intelligence in education: Addressing ethical challenges in K–12 settings. *AI and Ethics*, 2(3), 431–440. DOI: <https://doi.org/10.1007/s43681-021-00096-7>
- Bahrudin, & Makin, M. (2022). *Islamic education management: Strategies for managing educational institutions in the era of disruption*. UIN-Maliki Press.
- Dela Cruz, C. S., & Delos Santos, D. C. L. (2026). Leveraging artificial intelligence for intelligent student support: An AI-enabled SRM framework for higher education. *Multidisciplinary Science*

Journal, 8(3), Article 2026160. DOI: <https://doi.org/10.31893/multiscience.2026160>

- Divya, A. (2026). Federated digital-twin-empowered blockchain architecture for autonomous and resilient smart water management in sustainable cities. *Sustainable Computing: Informatics and Systems*, 50, Article 101303. DOI: <https://doi.org/10.1016/j.suscom.2025.101303>
- Fernández, P., Tost, M., Climent, D. M., Nowaz, T., & Castillo, E. (2026). A conceptual framework for mineral supply chain traceability: Enabling conditions and core dimensions. *The Extractive Industries and Society*, 26, Article 101858. DOI: <https://doi.org/10.1016/j.exis.2026.101858>
- Hamzah, A. (2022). *Digital Transformation in Education: Challenges and Opportunities in Indonesia*. Kencana.
- Holmes, W., & Tuomi, I. (2022). State of the art and practice in AI in education. *European Journal of Education*, 57(4), 542–570. DOI: <https://doi.org/10.1111/ejed.12533>
- Khosravi, H., Shum, S. B., Chen, G., Conati, C., Tsai, Y.-S., Kay, J., Knight, S., Martínez-Maldonado, R., Sadiq, S., & Gašević, D. (2022). Explainable artificial intelligence in education. *Computers and Education: Artificial Intelligence*, 3, Article 100074. DOI: <https://doi.org/10.1016/j.caeai.2022.100074>
- Manzur, J. D. V., & Andrade-Arenas, L. E. (2026). Models, applications, and limitations of the responsible adoption of big data and artificial intelligence in public policy. *Multidisciplinary Reviews*, 9(8), Article 2026354. DOI: <https://doi.org/10.31893/multirev.2026354>
- Mulyasa, E. (2019). *Early Childhood Education Management*. Bumi Aksara.
- Mulyasa, E. (2021). *Management and Leadership of Madrasah Principals*. Remaja Rosdakarya.
- Nnaji, I. L., Ayanwale, M. A., Ukeje, I. O., Ekwunife, R. A., Igwe, C. M., Okwor, E. O., & Nwuzor, C. I. (2026). Enhancing governance and performance in Nigerian higher education through AI-driven digital transformation: Insights from stakeholder perspectives. *Social Sciences & Humanities Open*, 13, Article 102348. DOI: <https://doi.org/10.1016/j.ssaho.2025.102348>
- Postman, N. (1993). *Technopoly: The Surrender of Culture to Technology*. Vintage Books.
- Ramanjaneyulu, S., Jalandharachari, A. S., Bindhani, S., Kasodhan, P., Harish, D., & Murthy, B. R. (2026). Integrating digital competency into aviation training: An auditable inputs–processes–outcomes framework. *Journal of the Air Transport Research Society*, Article 100104. DOI: <https://doi.org/10.1016/j.jatrs.2026.100104>
- Ratri, S. Y., & Aviyanti, L. (2025). Unlocking digital literacy in Indonesia: Insights from the use of social media platforms. *Jurnal Prima Edukasia*, 13(1), 191–200. DOI: <https://doi.org/10.21831/jpe.v13i1.83433>
- Selwyn, N. (2020). *Should Robots Replace Teachers? AI and the Future of Education*. Polity Press.
- Stahl, B. C. (2021). *Artificial intelligence for a better future: An ecosystem perspective on the ethics of AI and emerging digital technologies*. Springer. DOI: <https://doi.org/10.1007/978-3-030-69978-9>
- Lai, T. T. T. (2026). Internal audit quality and financial reporting transparency in Vietnam: The roles of ethics, governance, and digital capability. *Multidisciplinary Science Journal*, 8(7), Article 2026467. DOI: <https://doi.org/10.31893/multiscience.2026467>
- UNESCO. (2021). *Recommendation on the ethics of artificial intelligence*. <https://unesdoc.unesco.org/ark:/48223/pf0000381137>

- Vakkuri, V., Kemell, K.-K., Kultanen, J., & Abrahamsson, P. (2020). The current state of industrial practice in artificial intelligence ethics. *IEEE Software*, 37(4), 50–57. DOI: <https://doi.org/10.1109/MS.2020.2985621>
- Wisedpanich, N., & Sittiprapaporn, W. (2026). A conceptual model of employees' behavioral intention to use generative artificial intelligence technology in mid-sized organizations. *Multidisciplinary Science Journal*, 8(8), Article 2026531. DOI: <https://doi.org/10.31893/multiscience.2026531>
- Zuboff, S. (2019). *The age of surveillance capitalism: The fight for a human future at the new frontier of power*. PublicAffairs.