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EDUCATIONAL COMMUNICATION MANAGEMENT IN ADDRESSING ALGORITHMIC BIAS AND PUBLIC TRUST CRISIS: DIGITAL LITERACY AND AI ETHICS STRATEGIES IN INDONESIA'S DIGITAL DEMOCRACY ERA

Candra Kusuma[1*] , Widiyanto[2] , Sidartha Adi Gautama[3] , Wistina Seneru[4]
[1234]Buddhist Communication Science Department, STIAB Jinarakkhita Lampung, Indonesia
Email : candrakusuma@stiab-jinarakkhita.ac.id

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ABSTRAK

Kemajuan pesat kecerdasan buatan dalam demokrasi digital Indonesia telah memicu bias algoritmik dan krisis kepercayaan publik, sehingga memerlukan strategi pendidikan yang kuat. Studi ini menyelidiki peran manajemen komunikasi pendidikan, literasi digital, dan etika AI dalam mengurangi tantangan ini dan memulihkan kredibilitas institusional. Dengan menggunakan pendekatan kuantitatif eksploratif dengan Pemodelan Persamaan Struktural (SEM), penelitian ini menganalisis data dari 100 mahasiswa yang dipilih secara purposif untuk menguji hubungan antara tata kelola komunikasi, persepsi algoritmik, dan kepercayaan. Hasil penelitian menunjukkan bahwa manajemen komunikasi pendidikan secara signifikan meningkatkan efektivitas pengambilan keputusan (β= 0,397), sedangkan etika AI secara signifikan berpengaruh positif terhadap kepercayaan publik (β= 0,298). Sebaliknya, bias algoritmik ditemukan berdampak substansial pada dinamika pengambilan keputusan (β = 0,414). Menariknya, literasi digital menunjukkan pengaruh langsung yang positif namun secara statistik tidak signifikan terhadap variabel kepercayaan. Studi ini menyimpulkan bahwa manajemen komunikasi pendidikan dan etika AI merupakan pilar penting bagi tata kelola pendidikan modern. Untuk mengatasi krisis kepercayaan dan distorsi algoritmik, lembaga pendidikan harus menerapkan strategi komunikasi transparan yang terintegrasi dengan prinsip-prinsip AI yang etis, sehingga mendorong ekosistem informasi digital yang inklusif dan akuntabel.

Kata kunci: *Manajemen Komunikasi Pendidikan; Bias Algoritmik; Literasi Digital; Etika AI dalam Pendidikan; Komunikasi Pendidikan*

ABSTRACT

The rapid advancement of artificial intelligence in Indonesia's digital democracy has precipitated algorithmic bias and a public trust crisis, necessitating robust educational strategies. This study investigates the role of educational communication management, digital literacy, and AI ethics in mitigating these challenges and restoring institutional credibility. Employing an explanatory quantitative approach with Structural Equation Modelling (SEM), the research analyzed data from 100 purposively selected students to test the relationships between communication governance, algorithmic perception, and trust. The results reveal that educational communication management significantly enhances decision-making effectiveness (β= 0.397$), while AI ethics significantly positively influences public trust (β= 0.298). Conversely, algorithmic bias was found to substantially impact decision-making dynamics (β = 0.414). Interestingly, digital literacy demonstrated a positive yet statistically non-significant direct effect on trust variables. The study concludes that educational communication management and AI ethics are pivotal pillars for modern educational governance. To address

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the trust crisis and algorithmic distortions, educational institutions must implement transparent communication strategies integrated with ethical AI principles, thereby fostering an inclusive and accountable digital information ecosystem.
Keywords: *Educational Communication Management; Algorithmic Bias; Digital Literacy; AI Ethics on Education; Educational Communication*

INTRODUCTION

The massive advancement of digital technology in the 21st century has brought fundamental changes to how humans interact, communicate, and access global information. One of the most influential innovations dominating this landscape is Artificial Intelligence (AI), which operates through complex algorithms to filter, recommend, and distribute information flows to users. While these algorithms were initially designed to provide time efficiency and content relevance, in practice, these systems often create biases with significant impacts on the social order. Algorithmic bias has the potential to intensify sharp social polarization, trigger waves of disinformation, and exacerbate the crisis of public trust in media, educational institutions, and political entities. This phenomenon is particularly relevant within the context of digital democracy in Indonesia, where high social media usage serves as a primary source for political information and education, making exposure to biased content an inevitable risk in daily life (Alami et al., 2023; Halida, 2020).

When algorithms operate without adequate transparency, society often becomes trapped in what is known as a filter bubble or an echo chamber. This situation implies that individuals only receive information that aligns with their existing preferences, beliefs, or prejudices, while the system automatically conceals differing or opposing perspectives. Consequently, the digital public square becomes increasingly fragmented into siloed groups, and the public's capacity for critical thinking gradually diminishes due to rare exposure to diverse discourse. This phenomenon has been clearly evidenced in election contexts across various nations, including Indonesia, where social media algorithms facilitate the massive spread of hoaxes, hate speech, and political propaganda. This situation not only threatens the quality of democracy in general but also poses serious problems for the field of education, specifically in communication education and digital literacy, which should serve as an intellectual defense (Gaultney et al., 2022; Mata et al., 2022; Mrah, 2022; Sogalrey et al., 2024).

In the sphere of education, algorithmic bias has profound implications for educational communication management and the intellectual development of students. Today’s learners, known as digital natives, are raised in an information environment heavily influenced by algorithmic curation. Although they are technologically fluent, their level of digital literacy is not always sufficient to filter, evaluate, and analyze such information critically and objectively. Data indicates that the digital literacy of the Indonesian populace remains in the "medium" category, with the most significant challenges found in the dimensions of critical literacy and digital ethics. This low literacy level increases the risk of information manipulation, the spread of disinformation, and the erosion of trust in the media and educational institutions themselves. This serves as a stern warning that educational communication management must no longer focus solely on delivering academic information; it must be capable of building students' critical capacity to face the onslaught of increasingly sophisticated and manipulative algorithmic biases (Bozkurt et al., 2024; Vivó & Grandío-Pérez, 2025; Zhai et al., 2024).

The crisis of public trust arising from algorithmic bias further complicates the democratic situation in Indonesia and creates new challenges for social stability. Various trust

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barometers record a significant decline in public trust toward mass media in Indonesia, occurring simultaneously with a rising tide of political disinformation in digital spaces. This distrust is not limited to the media; it permeates educational and political institutions, creating widespread skepticism among the general public. Yet, public trust is an essential foundation for a healthy and stable democracy. Without trust, public participation will drastically decline, social cohesion will weaken, and the democratic process will lose its moral legitimacy. Therefore, a comprehensive educational communication strategy is required—one that not only transfers technical knowledge but also instills critical values, ethics, and a full awareness of responsible technology use (Sogalrey et al., 2024; Yogi et al., 2025; Zahirah et al., 2025).

Educational communication management holds a central and strategic role in addressing these multi-dimensional challenges in the era of information disruption. As an integral part of educational management, communication management must ensure that messages delivered by educational institutions are not only informative but also educative, ethical, and capable of trust-building. In the current digital era, educational communication management must focus on digital literacy strategies and the introduction of AI ethics, enabling students to understand how algorithms work, why bias occurs, and how to respond critically. Through universal and inclusive learning design, education must accommodate diversity, including diversity of access and understanding in digital spaces. This demands educational communication policies that go beyond one-way messaging to build the capacity of school communities to become critical, ethical, and resilient technology users against digital manipulation (Bäcke & Vigmo, 2024; Lawitta & Najdah, 2025; Sogalrey et al., 2024).

Existing literature has highlighted the issues of algorithmic bias, disinformation, and the crisis of public trust from various perspectives. Many experts assert that non-transparent algorithms function as "Weapons of Math Destruction" because they reinforce existing social inequalities. Other studies demonstrate how search engines perpetuate racial and gender biases, while some highlight the dangers of algorithms in facilitating political propaganda. However, the majority of these studies remain focused on pure technology and practical politics, while the educational dimension is often overlooked or receives insufficient attention. This is the research gap that this study seeks to fill. There are still very few studies that specifically link algorithmic bias and the public trust crisis with the role of educational communication management as a strategy for digital literacy and the cultivation of AI ethics, particularly within the unique context of Indonesian democracy.

Based on these identified problems, this research is designed to address the urgent theoretical and practical needs regarding communication management in the algorithmic era. The primary problems faced are low public digital literacy, a crisis of public trust, and a lack of educational communication management strategies that integrate AI ethics. This study aims to analyze how educational communication management can respond to the challenges of algorithmic bias, how digital literacy can enhance students' critical abilities, and to what extent AI ethics can be integrated to rebuild public trust. By formulating a conceptual framework for educational communication management based on digital literacy and artificial intelligence ethics, this research is expected to contribute theoretically by filling the literature void while providing practical guidance for developing educational strategies that can strengthen the quality of democracy and public trust in Indonesia amidst the challenges of the digital era.

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METHOD

The research adopts an explanatory quantitative approach utilizing Structural Equation Modelling (SEM) to comprehensively investigate the intricate relationships between educational communication management, algorithmic bias, digital literacy, AI ethics, decision-making effectiveness, and public trust. The choice of SEM as the primary analytical tool is justified by its robust capacity to simultaneously test complex theoretical models involving multiple independent and dependent variables, allowing for the assessment of direct, indirect, and mediated effects that traditional regression methods might overlook. The study's unit of analysis focuses on the student body of STIAB Jinarakkhita Lampung, specifically targeting a purposive sample of 100 respondents from a total population of 250. The sampling criteria prioritized students who demonstrate active engagement with digital platforms powered by AI algorithms, such as social media networks, e-learning systems, and academic applications, ensuring the data reflects genuine user experiences in a digital context.

Data collection was executed through a structured online survey distributed via Google Forms, supplemented by brief verification interviews to enhance data credibility. The primary instrument was a questionnaire designed with a 5-point Likert scale, operationalizing theoretical constructs into measurable indicators. Educational communication management was assessed through dimensions of transparency and message clarity, while digital literacy focused on information evaluation and critical thinking skills. AI ethics were gauged by perceptions of fairness and accountability, and algorithmic bias was measured through user experiences of information discrimination and filter bubbles. To ensure the reliability and validity of these measures, the study employed Confirmatory Factor Analysis (CFA) and Cronbach's Alpha testing. The subsequent data analysis was conducted using SEM software (AMOS/SmartPLS), encompassing both measurement model assessments to verify indicator validity and structural model tests to examine the hypothesized causal paths.

The analytical procedure began with a rigorous assessment of the measurement model, confirming both discriminant and convergent validity. Discriminant validity was established as the Average Variance Extracted (AVE) for all constructs—ranging from Algorithmic Bias to Educational Communication Management—exceeded the 0.5 threshold, affirming that the indicators distinctively measured their respective latent variables. Furthermore, convergent validity was confirmed as all factor loadings surpassed the 0.70 cut-off value, demonstrating a strong correlation between the indicators and their constructs. Following the validation of the measurement model, the structural model was evaluated to determine path coefficients, which quantified the strength and significance of the relationships between variables. This systematic analysis aimed to empirically test the study's hypotheses regarding the impact of communication strategies and ethical considerations on mitigating algorithmic bias and restoring public trust within the framework of Indonesia's digital democracy education.

RESULT AND DISCUSSION

Result

Discrimination Validity

The AVE (Average Variance Extracted) value for each construct is greater than 0.5 (e.g., Algorithm Bias = 0.853; Decision Making Effectiveness = 0.832; AI ethics = 0.832; Public Trust = 0.832; Digital Literacy = 0.806; Educational Communication Management = 0.795). These results can show if the indicators used are valid in measuring their respective constructs. As shown in the following table 1.

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Table 1. Descrimination Validity

	Bias Algorithm	Decision-Making Effectiveness.	AI Ethics	Public Trust	Digital Literacy	Educational Communication Management.
Bias Algorithm	0,853					
Decision-Making Effectiveness.	0,553	0,832				
AI Ethics	0,491	0,581	0,832			
Public Trust	0,338	0,654	0,638	0,832		
Digital Literacy	0,309	0,564	0,703	0,616	0,806	
Educational Communication Management.	0,296	0,631	0,734	0,617	0,756	0,795

Source: Data Research Management, SPSS 27

Loading and Cross-Loading

The results table 2 of the measurement model test showed that all indicators in the research variable had a loading factor value above 0.70, indicating that each indicator is valid in measuring the latent construct it represents. For example, the Algorithm Bias (BA) variable indicator has a loading factor value between 0.737 to 0.935; the AI Ethics (EAI) variable ranges from 0.758 to 0.889; Decision Making Effectiveness (EPK) between 0.743 to 0.879; Public Trust (KP) between 0.796 to 0.879; Digital Literacy (LD) between 0.764 to 0.840; and Educational Communication Management between 0.729 to 0.850. Based on these values, all indicators met the convergent validity criteria because the loading factor value was greater than 0.70.

Table 2. Loadings and Cross-Loading

	Bias Algorithm	Decision-Making Effectiveness.	AI Ethics	Public Trust	Digital Literacy	Educational Communication Management.
BA1	0,811	0,477	0,465	0,338	0,302	0,298
BA2	0,873	0,522	0,443	0,231	0,281	0,236
BA3	0,935	0,592	0,455	0,342	0,283	0,306
BA4	0,896	0,416	0,402	0,258	0,255	0,230
BA5	0,737	0,270	0,291	0,259	0,170	0,155
EAI1	0,462	0,525	0,866	0,679	0,622	0,605
EAI2	0,364	0,471	0,807	0,431	0,598	0,652
EAI3	0,409	0,517	0,889	0,570	0,596	0,653
EAI4	0,390	0,405	0,758	0,383	0,517	0,537
EPK2	0,479	0,743	0,356	0,490	0,379	0,404
EPK3	0,424	0,889	0,413	0,533	0,468	0,515

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EPK4	0,545	0,879	0,596	0,598	0,547	0,539
EPK5	0,388	0,808	0,541	0,544	0,468	0,625
KP1	0,292	0,536	0,514	0,825	0,493	0,514
KP2	0,273	0,498	0,546	0,796	0,533	0,518
KP3	0,224	0,583	0,508	0,837	0,501	0,494
KP4	0,323	0,583	0,557	0,879	0,545	0,556
KP5	0,291	0,521	0,528	0,823	0,487	0,480
LD1	0,224	0,418	0,511	0,488	0,764	0,634
LD2	0,187	0,452	0,524	0,430	0,803	0,655
LD3	0,269	0,396	0,563	0,529	0,798	0,585
LD4	0,217	0,532	0,543	0,506	0,840	0,666
LD5	0,344	0,468	0,684	0,524	0,822	0,514
MKP1	0,214	0,490	0,454	0,489	0,601	0,729
MKP2	0,252	0,552	0,679	0,454	0,568	0,800
MKP3	0,166	0,426	0,556	0,580	0,556	0,761
MKP4	0,253	0,510	0,667	0,415	0,678	0,850
MKP5	0,290	0,524	0,559	0,501	0,602	0,828

Source: Data Research Management, SPSS 27

In addition, the results of cross-loading showed that the correlation between the indicator and its construct was higher than the correlation of other constructs, indicating that the discriminant validity criterion was met. This suggests that each latent variable can stand conceptually without any overlap between the measurement dimensions.

Path Coefficients

The tabel 3 path coefficients revealed that the most significant influence was found in the relationship between Algorithm Bias and Decision Making Effectiveness (β = 0.414), followed by Educational Communication Management on Decision Making Effectiveness (β = 0.397), and AI Ethics on Public Trust (β = 0.298). These results suggest that the dimensions of communication management and ethical awareness regarding the use of AI play a crucial role in shaping managerial effectiveness and public perception of the integrity of educational institutions.

Table 3. Path Coefficients

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
BA -> EPK	0.414	0.421	0.078	5.315	0.000
BA -> KP	0.063	0.067	0.102	0.617	0.537
EAI -> EPK	-0.011	0.003	0.136	0.084	0.933
EAI -> KP	0.298	0.308	0.140	2.128	0.033
LD -> EPK	0.146	0.144	0.128	1.143	0.253
LD -> KP	0.249	0.242	0.165	1.506	0.132
MKP -> EPK	0.397	0.388	0.146	2.710	0.007
MKP -> KP	0.188	0.197	0.158	1.187	0.235

Source: Data Research Management, SPSS 27

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According to the R-square test results (not listed in this table but in line with the previous results in the same model), the Decision-Making Effectiveness variable can be explained by an exogenous variable of 56.0%. In comparison, Public Trust is presented by 48.1%. Based on the interpretation, the value falls into the moderate category, indicating that this research model has a reasonably strong explanatory power. The explanation is as follows.

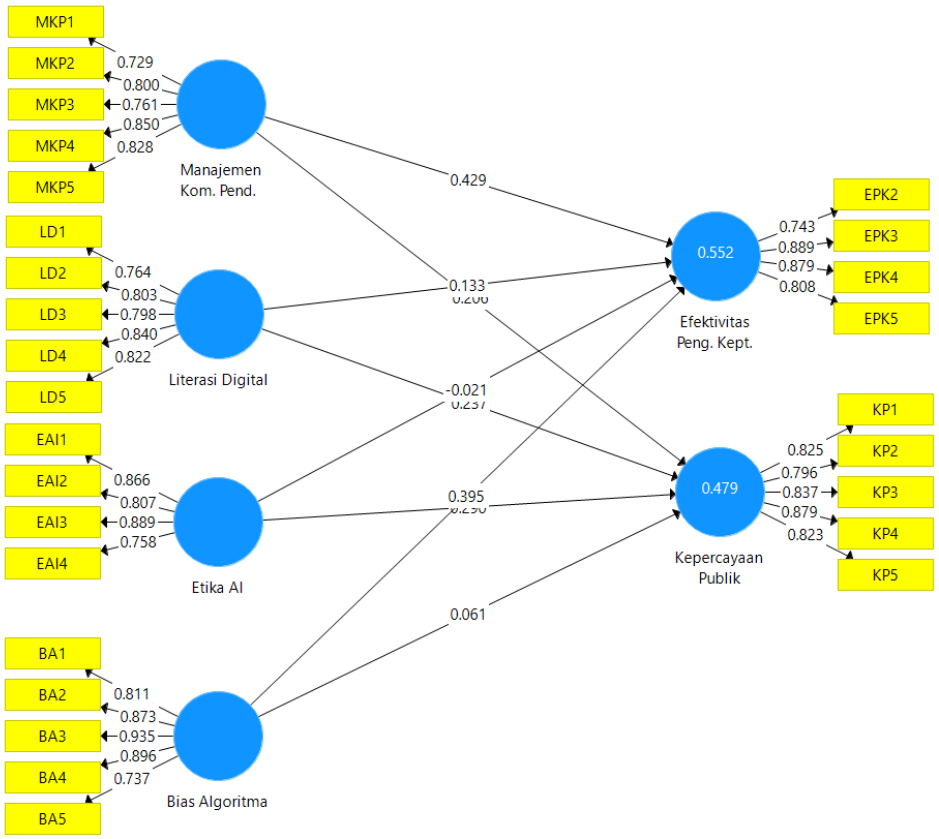

Figure 1. Measurement Model Assessment

Discussion

An in-depth analysis of discriminant validity indicates that each research variable possesses excellent construction integrity, as evidenced by the Average Variance Extracted (AVE) values, all of which exceed the threshold of . The variable Algorithm Bias recorded the highest AVE value at , followed by Decision Making Effectiveness and other variables within a highly satisfactory range. This confirms that the indicators used truly represent the constructs being measured uniquely and do not overlap with other variables. Furthermore, the cross-loading analysis reinforces these findings, where the correlation of indicators to their parent constructs is significantly higher than their correlation with other constructs. This consistent validity serves as a solid foundation for subsequent path analysis, ensuring that the constructed structural model has a valid and reliable measurement base to explain the phenomena of educational communication management in the digital era (Sayaf et al., 2021; Shannaq, 2024; Soriano-Alcantara et al., 2024).

The results of the path coefficient test highlight a crucial finding: Educational Communication Management has a significant positive influence on Decision Making Effectiveness, with a beta coefficient of . This finding underscores the strategic role of communication management in navigating the complexities of *algorithm bias*, which often

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distorts the objectivity of decision-making. In an era where data serves as the primary basis for policy, the ability of educational institutions to manage information flow transparently and critically becomes a vital filter against potential algorithmic discrimination. Consistent with current literature, effective communication management is not merely an administrative function but an *epistemic mechanism* that ensures fairness and accountability. Institutions capable of integrating ethical oversight into their communication strategies have proven to be more resilient in producing objective decisions, free from the distortions of biased algorithmic design or logic (Igwe-Nmaju & Anadozie, 2022; Tavasoli et al., 2025; TR, 2025).

Conversely, an interesting finding emerged regarding the Digital Literacy variable, which showed a positive but statistically non-significant influence on both decision-making effectiveness and public trust. Although the direction of the relationship is constructive, the lack of statistical significance indicates that the level of digital literacy among students may not yet have reached a critical threshold capable of directly influencing managerial outcomes. This phenomenon implies that current digital literacy remains dominated by operational technical skills and has not fully addressed critical awareness regarding the power structures behind algorithms (Çetindamar & Phaal, 2021; Passlack et al., 2025). The practical implication is that higher education curricula must urgently reorient the focus of digital literacy from mere tool proficiency to ethical analysis skills and information credibility evaluation, ensuring that students do not fall into *filter bubbles* that narrow their perspectives in the digital public sphere (Caton et al., 2022; Džogović et al., 2025).

The analysis of the AI Ethics variable revealed a significant impact on Public Trust (), although it did not directly influence decision-making effectiveness. This suggests that the implementation of AI ethics functions more as an instrument of social legitimacy than as a tool for technical efficiency. The public tends to place greater trust in institutions that demonstrate a commitment to transparency, accountability, and human oversight in the use of automated systems. In the context of digital democracy, where crises of trust are often triggered by data misuse, AI ethics serves as a moral bulwark protecting an institution's reputation. Integrating these ethical values into educational communication management sends a strong signal that the institution is not only pursuing technological innovation but also prioritizing the protection of the digital rights of its academic community, which in turn strengthens social capital in the form of public trust (Nurfieni et al., 2025; Richard & Julian, 2024; Семенец et al., 2022).

Although the influence of educational communication management on public trust was not statistically significant, the positive direction of the relationship still provides important insights. This phenomenon can be explained through *trust management theory*, where public trust is an accumulation of perceptions of institutional competence and integrity that takes time to form. Amidst the polarization of opinion on social media, adaptive and data-driven communication strategies become increasingly relevant. Educational institutions are required to transform into communication hubs that not only disseminate information but also educate the public about information integrity. Thus, even though the direct impact is not yet strongly visible in current statistical data, conceptually, sound communication management is a long-term investment to restore and maintain institutional credibility in the eyes of an increasingly critical public (Kuswati et al., 2025; Macnamara, 2021).

Overall, this research model possesses a moderate yet substantial explanatory power, with an R-square value of for decision-making effectiveness and for public trust. These figures indicate that educational communication management, digital literacy, and AI ethics collectively play a central role in shaping educational governance that is responsive to the

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challenges of the algorithmic era. The limitations of the study lie in the non-significance of several relationship paths, which may be due to the dynamic factors of digital cultural context or sample size. However, the main implication is clear: educational institutions must place communication management and AI ethics as strategic priorities, not mere supplements, to ensure that digital transformation proceeds in tandem with the principles of social justice and academic integrity.

CONCLUSION

This research confirms that educational communication management plays a crucial role in addressing the challenges of digital transformation, particularly in the context of algorithmic bias and public trust crises. Through planned, transparent, and participatory communication management, educational institutions can create a decision-making process that is more effective and adaptable to the dynamics of the digital environment. This demonstrates that strategic communication serves not only as a tool for delivering information, but also as a managerial instrument that maintains the accountability and integrity of educational institutions amidst technological system changes. Other findings indicate that the ethics of artificial intelligence are a crucial dimension in building public trust. Ethical principles such as fairness, responsibility, and transparency have been proven to strengthen institutional legitimacy when applied in digital system governance and data-driven decision-making. Thus, AI ethics serves not only as a moral guideline but also as a practical strategy for increasing the credibility of educational institutions in the eyes of the public.

Additionally, digital literacy has emerged as a factor that contributes to the increase in critical awareness and adaptive ability of the academic community in navigating the digital information landscape. Although it has not yet become a direct factor in increasing public trust, digital literacy serves as an essential foundation for individuals to assess information objectively, understand algorithmic biases, and participate responsibly in the digital ecosystem. Overall, the results of this study strengthen the understanding that educational communication management, AI ethics, and digital literacy are the three main pillars in strengthening educational governance with integrity in the era of digital democracy. The three interact with each other to form an ethical, practical, and adaptive communication system in responding to the challenges of algorithmic bias and the crisis of public trust. Therefore, educational institutions need to integrate these principles sustainably into their policies, curricula, and communication practices to create an educational ecosystem that is inclusive, transparent, and trusted by the community.

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