



Beyond Perceived Usefulness: Trust as a Generative Mechanism in AI-Driven Epistemic Transformation in Educational Management

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ABSTRACT

Keywords:

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This study aims to reposition the adoption of generative artificial intelligence (AI) in education as an epistemic transformation process by examining how digital literacy shapes multidimensional trust and how such trust mediates creativity as an expression of epistemic agency within educational management contexts. A constructivist grounded theory approach was employed, involving 24 participants. Data were collected through in-depth interviews, focus group discussions, and analysis of AI-assisted academic tasks, and analyzed using open, axial, and selective coding with a constant comparative method. The findings reveal differentiated dimensions of digital literacy (operational, evaluative, reflective, and strategic) that produce layered forms of trust (functional, relational, and epistemic). Only reflective epistemic trust was found to stimulate generative creativity, while functional trust tended to result in reproductive use of AI. The study proposes a conceptual model of "Reflexive Trust-Mediated Epistemic Agency," positioning trust as a generative mechanism linking digital literacy and creative transformation. The implications highlight the need for educational management to move beyond utility-based adoption frameworks by fostering evaluative and reflective digital literacy, ensuring that AI serves as a catalyst for meaningful learning transformation rather than merely a productivity tool.

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INTRODUCTION

The rapid expansion of generative artificial intelligence (AI), particularly large language models (LLMs), has significantly reshaped higher education worldwide. This transformation is important because it not only alters instructional practices but also redefines how knowledge is produced, evaluated,

and managed within educational systems. From an educational management perspective, institutions are increasingly required to design policies, governance structures, and pedagogical strategies that align with AI-driven learning environments. Empirical evidence shows an exponential growth in AI-related educational research since 2019, reflecting a paradigm shift toward digital and intelligent learning systems (Turmuzi & Tyaningsih, 2025). Furthermore, post-pandemic higher education has accelerated AI integration in assessment, adaptive tutoring, and content development (Al Husaeni et al., 2025; Prahani et al., 2024). AI is no longer merely a technical tool but functions as a cognitive partner influencing students' thinking processes (Zhou, 2023). Therefore, understanding AI adoption is crucial not only for technological advancement but also for ensuring meaningful and sustainable educational transformation.

Despite these advancements, a critical problem persists in how AI adoption is conceptualized and managed within higher education. Most frameworks, particularly the Technology Acceptance Model (TAM), emphasize perceived usefulness and ease of use as primary determinants of adoption (Davis, 1989). While these variables provide predictive value, they oversimplify the complex socio-cognitive processes underlying AI integration. In educational management, this reductionist approach limits institutional capacity to design policies that address deeper epistemic and ethical implications of AI use. Emerging studies suggest that trust and perceived risk play mediating roles in AI adoption, particularly in the use of tools such as ChatGPT (Balaskas et al., 2025). Additionally, AI literacy has been shown to influence students' readiness to engage with technology reflectively (Börekci & Çelik, 2024), while digital literacy significantly shapes trust and behavioral intention (Wicaksono, 2024). These findings indicate that adoption is not merely technical but deeply embedded in cognitive and psychological readiness.

In practice, the implementation of generative AI in higher education reveals complex and sometimes contradictory phenomena. On the one hand, AI enhances academic efficiency, enabling faster task completion and supporting personalized learning pathways (Mula-Grau, 2025). On the other hand, unstructured integration can reduce students' critical reflection and depth of understanding (Haroud & Saqri, 2025). In high-stakes assessment contexts, AI demonstrates efficiency in generating test items but still requires human oversight to ensure cognitive rigor (Kim et al., 2025). Furthermore, disparities in digital literacy and access create unequal learning experiences among students (Etkin & Carter, 2025). These field realities highlight a significant challenge for educational management: balancing innovation with quality assurance and equity. Consequently, AI integration must be understood not only as a technological shift but also as a managerial and pedagogical challenge requiring

contextualized and adaptive strategies.

Existing literature has extensively examined AI adoption through dominant theoretical frameworks such as TAM and UTAUT, often incorporating variables like trust, perceived risk, and enjoyment (Balaskas et al., 2025; Liang & Suwanragasa, 2025). Cross-national studies indicate that AI literacy and social support significantly influence students' attitudes and intentions (Merhej Sayegh et al., 2025; Wicaksono, 2024). Additionally, sociomaterial perspectives emphasize that AI is not merely a passive tool but an active participant in shaping knowledge construction and learning practices (Choung et al., 2023; Wu, 2024a). However, much of this research remains focused on predictive modeling and structural relationships, often neglecting the contextual and experiential dimensions of AI use. As a result, the literature provides limited insight into how students negotiate meaning, trust, and creativity in everyday interactions with AI, particularly in diverse and non-metropolitan educational contexts.

Furthermore, recent studies highlight the growing importance of trust as a multidimensional construct encompassing competence, integrity, and benevolence (Choung et al., 2023). Trust has been shown to mediate the relationship between perceived usefulness and student creativity, particularly in collaborative AI learning environments (A. Khoso et al., 2025). Other research suggests that perceiving AI as a collaborative partner enhances emotional engagement and exploratory behavior (Fan & Zhang, 2024; Huang et al., 2024), while AI anxiety may negatively affect interaction quality (Liu, 2025). Despite these insights, the relationship between digital literacy, trust, and creativity remains underexplored as a dynamic and layered process. Moreover, most studies treat creativity as a secondary outcome rather than a central theoretical construct, limiting our understanding of AI's role in fostering epistemic agency (Kaufman & Beghetto, 2009).

This study offers a novel contribution by integrating digital literacy, multidimensional trust, and creativity within a unified conceptual framework grounded in epistemic transformation. Unlike previous studies that emphasize behavioral intention or technical efficiency, this research positions trust as a generative mechanism that mediates the relationship between digital literacy and creative outcomes. The novelty lies in framing AI not only as a technological innovation but as an epistemic actor that reshapes how knowledge is constructed and validated. From an educational management perspective, this approach provides a more holistic understanding of AI integration, emphasizing the need for policies and practices that foster reflective and evaluative literacy. By situating the study within a semi-urban educational context, this research also addresses the lack of contextual diversity in existing literature, offering insights into how socio-cultural factors influence AI adoption and learning transformation.

Based on these gaps, this study addresses the central research problem: how digital literacy shapes multidimensional trust and how trust mediates creativity as an expression of epistemic agency in AI-supported learning environments. This study argues that AI adoption should be understood as a relational and epistemic process rather than a purely utilitarian decision. It is hypothesized that higher levels of evaluative and reflective digital literacy foster epistemic trust, which in turn enables generative creativity, while lower levels of literacy lead to functional trust and reproductive use of AI. By employing a constructivist grounded theory approach, this study seeks to develop a context-sensitive model that captures the dynamic interplay between technology, cognition, and social context. The findings are expected to contribute to both theoretical advancement and practical implications in educational management, particularly in designing policies that promote meaningful and transformative AI integration.

RESEARCH METHODS

This study employed a qualitative approach using a constructivist–interpretive paradigm and a case study design to explore the digital pedagogical and epistemic implications of generative AI use in higher education. This paradigm assumes that social reality is constructed through interactions among individuals, technological systems, and institutional contexts (Lincoln & Guba, 1985; Creswell & Poth, 2018). A qualitative case study was selected because it enables an in-depth and contextualized understanding of complex phenomena, particularly how digital literacy, trust, and creativity are experienced and negotiated by students. This design is appropriate for examining AI not merely as a technical tool but as an epistemic actor shaping knowledge construction and learning practices. From an educational management perspective, this approach allows for the exploration of how institutional contexts, policies, and academic cultures influence AI adoption and its pedagogical implications. The study thus aims to generate a context-sensitive conceptual model grounded in participants’ lived experiences (Charmaz, 2014; Corbin & Strauss, 2015; Denzin & Lincoln, 2018; Maxwell, 2013).

The study was conducted in several higher education institutions located in semi-urban areas, selected as a theoretical site to capture variations in digital literacy, infrastructure access, and academic culture. This context was chosen based on its relevance to understanding how AI adoption unfolds in settings that are often underrepresented in the literature (Corbin & Strauss, 2015; Merhej Sayegh et al., 2025; Turgut & Kunuroglu, 2025). Participants were undergraduate students in semesters three to seven who actively used generative AI for

academic purposes. A purposive sampling technique was initially applied, followed by theoretical sampling to ensure depth and variation until theoretical saturation was achieved (Charmaz, 2014; Creswell & Poth, 2018). Data collection employed multiple techniques to ensure richness and triangulation, including semi-structured in-depth interviews, focus group discussions, document analysis of AI-assisted academic work, and written reflections. These methods allowed the researcher to capture both individual experiences and collective dynamics in AI usage, while also reflecting institutional influences relevant to educational management practices (Patton, 2015; Miles, 2014).

Data analysis was conducted iteratively using an integrated approach combining grounded theory procedures and qualitative data analysis techniques. The process involved data condensation, data display, and conclusion drawing or verification (Miles, 2014), alongside open, axial, and selective coding to develop conceptual categories and relationships (Charmaz, 2014). In the data condensation stage, raw data from interviews, discussions, and documents were systematically reduced and coded to identify meaningful units. These were then organized and visualized in matrices and thematic displays to facilitate pattern recognition and interpretation. Finally, conclusions were drawn and continuously verified through constant comparison across data sources and participants, ensuring theoretical sensitivity and validity (Glaser & Strauss, 1967). Trustworthiness was ensured through triangulation, member checking, audit trails, and reflexivity practices (Lincoln & Guba, 1985; Creswell & Poth, 2018; Patton, 2015). Ethical considerations were addressed through informed consent, confidentiality, and secure data management (Israel et al., 2007). Overall, this methodological design supports the development of a robust and contextually grounded model relevant to both theory and educational management practice.

RESULTS AND DISCUSSION

Results

This section presents empirical findings derived from constructivist grounded theory analysis of 24 students. The analysis followed open coding (1,246 initial codes), axial coding (27 focused categories), and selective coding, resulting in one core category. The presentation emphasizes conceptual patterns, cross-case variations, and relationships between categories without normative interpretation. From an educational management perspective, these findings also provide insights into how institutional contexts shape students' interaction with AI. Four main themes were identified: differentiation of digital literacy, formation of multidimensional trust, configuration of academic creativity, and trust as a mediating mechanism of epistemic agency.

The analysis identified 312 codes related to AI usage practices, categorized into four dimensions: operational, evaluative, reflective, and strategic literacy. These dimensions illustrate varying levels of students' engagement with AI and reflect differences in learning management environments.

Table 4.1 Distribution of Digital Literacy Categories

Dimension	Number of Code References	city (n=12)	regency (n=12)
Operational	148	68	80
Evaluative	92	61	31
Reflective	44	30	14
Strategic	28	19	9

The table shows that operational literacy dominates across both groups, indicating that most students primarily use AI for technical efficiency. However, evaluative and reflective literacies are significantly more prevalent among urban students, suggesting a higher capacity for critical engagement. From an educational management perspective, this disparity highlights the importance of institutional support in fostering higher-order digital literacy. Students in rural contexts tend to perceive AI as a task-completion tool, while urban students frame it as a brainstorming partner requiring verification.

Axial coding grouped 417 codes related to trust into three dimensions: functional, relational, and epistemic trust. These dimensions form a hierarchical structure that reflects increasing depth of cognitive engagement with AI.

Table 4.2 Hierarchical Structure of Trust

Dimension	Sub-indicators	Dominant Empirical Pattern
Functional	Accuracy, Speed, Coherence	High (all participants)
Relational	Helpfulness, Dialogic Interaction, Neutrality	Moderate (majority urban)
Epistemic	Selectivity, Cross-verification, Critical Evaluation	Variable (higher in urban)

The table illustrates that functional trust is nearly universal, as all participants recognize AI's efficiency and accuracy. However, epistemic trust varies significantly, particularly across contexts. Students with higher evaluative literacy demonstrate selective trust, engaging in verification and critical assessment. From an educational management standpoint, this finding underscores the need for institutional frameworks that cultivate critical trust rather than blind reliance on AI tools.

Selective coding identified two main configurations of creativity: reproductive and generative. These configurations represent different levels of epistemic engagement in AI-supported learning.

Table 4.3 Creativity Configurations

Configuration	Key Characteristics	Relationship with Trust
Reproductive	Minor modification of AI outputs	Functional trust dominant
Generative	Critical elaboration and idea reconstruction	Reflective epistemic trust

The table indicates that most participants exhibit reproductive creativity, characterized by minor modifications of AI outputs. In contrast, generative creativity marked by critical elaboration and idea reconstruction—is associated with reflective epistemic trust. This suggests that creativity is not an automatic

outcome of AI use but depends on how students cognitively and critically engage with AI. Educational management plays a crucial role in designing learning environments that promote generative rather than reproductive practices.

Selective coding crystallized the core category: “Reflexive Trust-Mediated Epistemic Agency.” This mechanism demonstrates that digital literacy does not directly produce creativity but operates through trust as a mediating factor.

Table 4.4 Final Category Integration

Antecedent	Mediator	Outcome Proksimal	Outcome Distal
Operational Literacy	Functional Trust	Efficiency	Reproductive
Evaluative Literacy	Epistemic Trust	Elaboration	Generative
Reflective Literacy	Self-regulation	Internal Critique	Epistemic Agency

The table highlights indirect pathways between literacy and creativity. Operational literacy leads to functional trust and efficiency, while evaluative literacy fosters epistemic trust and generative outcomes. Reflective literacy further strengthens internal critique and epistemic agency. From a management perspective, this emphasizes the importance of curriculum design that integrates reflective and evaluative competencies.

Cross-case analysis reveals key differences between student groups.

Table 4.5 Contextual Comparison Summary

Aspect	Urban	Rural
Evaluative Literacy	High	Sedang
Epistemic Trust	Selective-Reflective	Instrumental
Generative Creativity	Dominant	Limited

The table shows that urban students demonstrate higher evaluative literacy, epistemic trust, and generative creativity, while rural students emphasize efficiency. These differences reflect variations in institutional resources, academic culture, and digital access. This finding reinforces the role of educational management in addressing inequality and ensuring equitable AI integration. Overall, the results indicate that the relationship between digital literacy and creativity is non-linear and mediated by epistemic trust. When trust develops reflectively, AI becomes a catalyst for epistemic agency; otherwise, it remains an efficiency tool.

Discussion

The findings challenge fundamental assumptions of the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), which frame technology adoption as a rational evaluation based on utility (Davis, 1989; Venkatesh et al., 2003). While perceived usefulness and ease of use remain important, they are insufficient to explain epistemic transformation. Even when functional trust is high, generative creativity does not automatically emerge. From an educational management perspective, this

implies that institutional policies focusing solely on adoption metrics fail to capture deeper learning transformations. This study instead positions AI as a relational epistemic actor rather than a passive tool, where trust—particularly epistemic trust—becomes the determining mechanism of whether AI is used critically or instrumentally, aligning with critiques of instrumental reductionism in educational technology (Choung et al., 2023; Turgut & Kunuroglu, 2025).

This study also integrates three major strands of literature: technology adoption, trust in AI, and creativity. While previous studies emphasize predictive relationships, the findings demonstrate that trust operates as an epistemic filter linking digital literacy and creativity. Functional trust supports efficiency, consistent with previous findings (Hui et al., 2025; Mula-Grau, 2025), but only epistemic trust enables critical elaboration and idea reconstruction (Fan & Zhang, 2024; Huang et al., 2024). From an educational management perspective, this highlights the importance of fostering reflective and evaluative literacy within institutional learning environments. The sociomaterial perspective further explains how AI actively shapes thinking processes and knowledge production (Orlikowski, 2007), indicating that students' epistemic agency is not diminished but reconfigured through interaction with AI.

The study contributes theoretically by redefining trust as a generative mechanism rather than a linear mediator and by positioning creativity as an expression of epistemic agency (Kaufman & Beghetto, 2009). It also highlights the importance of contextual sensitivity, as the semi-urban setting reveals limitations in generalizing findings from metropolitan contexts (Merhej Sayegh et al., 2025). Methodologically, the study moves beyond dominant quantitative approaches toward a processual grounded theory analysis (Charmaz, 2014; Corbin & Strauss, 2015), enabling a deeper understanding of how trust and creativity are formed. Practically, the findings suggest that educational management should prioritize evaluative and reflective digital literacy, design curricula that encourage critical engagement with AI, and address disparities in access and institutional support. Future research should test the proposed model quantitatively and explore its applicability across different contexts. Overall, AI integration in higher education is not merely technological but epistemological, relational, and managerial, requiring a comprehensive and context-sensitive approach.

CONCLUSION

This study demonstrates that the integration of generative AI in higher education cannot be understood solely as a utility-based adoption issue. The most important insight is that digital literacy shapes a layered structure of trust, ranging from functional to reflective epistemic trust. Only epistemic trust enables students to engage with AI critically and creatively, resulting in generative creativity as an expression of epistemic agency. Thus, the relationship between

digital literacy and creativity is indirect and mediated by trust as an epistemic mechanism. From an educational management perspective, this finding highlights the need for institutional strategies that go beyond technical training by fostering evaluative and reflective competencies. The strength of this study lies in its theoretical contribution through the development of the “Reflexive Trust-Mediated Epistemic Agency” model, which reconceptualizes trust as an epistemic infrastructure rather than merely a psychological mediator, while also extending technology adoption models such as TAM by incorporating creativity as a non-utilitarian outcome.

However, this study has several limitations. The findings are context-specific and based on a limited number of participants, which may restrict their generalizability across different educational settings. In addition, the focus on students’ perspectives does not fully capture institutional and managerial dimensions from faculty or policy-makers. Future research is recommended to test the proposed conceptual model using quantitative or mixed-method approaches, particularly through longitudinal designs to examine the stability of epistemic trust over time. Further studies should also explore diverse institutional contexts, including metropolitan and rural settings, to better understand contextual variations. Expanding the analysis to include multiple stakeholders will strengthen the applicability of findings and provide deeper insights for educational management in designing sustainable and transformative AI integration policies.

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