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Absence of AI Regulation and Its Effects on Students' Learning Behavior: A Case Study of Sokoine University of Agriculture

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Abstract: *Artificial Intelligence (AI) technologies are increasingly influencing higher education worldwide, including in Tanzanian universities. Despite their potential to enhance learning, the absence of clear AI regulations in Tanzania poses significant challenges to students' learning behavior. Unregulated use of AI tools such as essay generators, chatbots, and automated research assistants has been observed to contribute to academic dishonesty, over-reliance on technology, and reduced development of critical thinking skills among students. While global studies have explored AI integration in education, there is limited research on the specific effects of the lack of AI regulation on Tanzanian university students. This study uses a qualitative approach to explore students' experiences, perceptions, and coping strategies in the context of unregulated AI usage. Findings reveal that inadequate institutional guidance and policy gaps lead to inconsistent learning practices, ethical dilemmas, and a decline in independent academic skills. The study recommends the establishment of comprehensive AI policies, ethical guidelines, and awareness programs in universities to ensure that AI tools support rather than hinder students' academic development.*

Keywords: *Artificial Intelligence (AI); Higher Education; AI Regulation; Student Learning Behavior; Academic Dishonesty*.

Introduction

Artificial Intelligence (AI) is transforming education globally, offering tools for personalized learning, automated assessment, and content generation (Luckin et al., 2016; Holmes et al., 2021). Students worldwide increasingly rely on AI applications such as generative AI, automated writing assistants, and intelligent tutoring systems to support coursework, research, and learning activities. While these tools have the potential to enhance learning efficiency, creativity, and accessibility, their rapid adoption has often outpaced regulatory frameworks, raising concerns about academic integrity, ethical use, and over-reliance (Williamson & Piattoeva, 2019; Baker & Smith, 2019). Studies from North America and Europe indicate that students frequently use AI to complete assignments and generate content, sometimes bypassing critical thinking or independent problem-solving, prompting universities to implement AI policies, digital literacy programs, and monitoring systems to guide responsible use (Zawacki-Richter et al., 2019; Chen et al., 2021).

In Africa, AI adoption in education is growing, but the regulatory environment is still evolving. Many African universities have limited guidelines on AI use, leaving students to navigate AI tools with minimal institutional support or oversight. Research indicates that in countries such as Kenya, Nigeria, and South Africa, students demonstrate a mixture of beneficial and problematic AI engagement: some use AI to enhance learning and creativity, while others rely on AI in ways that compromise academic integrity or diminish critical thinking skills (Mhlanga & Moloi, 2020; Adeoye & Ogunleye, 2021). Institutional policies are often fragmented, and there is a lack of awareness programs or frameworks to guide ethical AI integration, creating challenges for both students and educators.

In Tanzania, AI adoption in higher education is at an early stage, yet students are rapidly incorporating AI tools into their learning practices. Preliminary observations and survey data from this study reveal that students frequently use AI for research, assignment writing, and problem-solving, often without guidance on responsible or ethical use. The absence of institutional or national AI regulations has led to patterns of over-reliance, reduced critical thinking, and occasional academic misconduct. Conversely, when instructors provide structured guidance, AI use contributes positively to creativity, efficiency, and learning outcomes. By examining these patterns, this study contributes to understanding the real-world impact of unregulated AI use on student learning behavior in Tanzanian higher education, providing context-specific evidence that can inform policy, institutional guidelines, and pedagogical strategies.

Furthermore, by situating Tanzanian experiences within global and African contexts, the study offers comparative insights, highlighting both challenges and opportunities for integrating AI responsibly in higher education. The findings emphasize the urgent need for regulatory frameworks, ethical guidelines, and training programs to foster responsible AI adoption, enhance critical thinking, and safeguard academic integrity. In doing so, this research not only fills a critical knowledge gap but also provides practical

recommendations for policymakers, educators, and institutions seeking to leverage AI as a tool to support effective learning outcomes.

Theoretical Framework

This study is grounded in **Technology Acceptance Theory (TAM)** (Davis, 1989) and **Self-Regulated Learning Theory (SRL)** (Zimmerman, 2002), providing a conceptual lens to analyze the ways in which the absence of AI regulation affects students' learning behavior. Technology Acceptance Theory suggests that users' engagement with new technologies is influenced by their perceived usefulness and ease of use. In the context of this study, AI tools are highly accessible and perceived as useful by students for completing assignments, generating content, and enhancing learning efficiency. Data analysis indicates that, in the absence of formal guidance or regulatory policies, students' perceptions of AI usability significantly shape how they integrate AI into their learning processes, sometimes leading to over-reliance and reduced independent cognitive engagement.

Self-Regulated Learning Theory emphasizes students' ability to plan, monitor, and evaluate their own learning. The analysis shows that unregulated AI adoption affects these self-regulatory behaviors: students frequently substitute AI-generated content for critical thinking, reflection, or problem-solving, compromising the development of essential cognitive and metacognitive skills. Conversely, where instructors provided structured guidance on AI use, students demonstrated higher levels of self-regulation, integrating AI tools as a supplement rather than a replacement for independent learning.

The combination of TAM and SRL provides a framework to interpret the findings across global, African, and Tanzanian contexts. For example, globally, students' perceived ease of use and accessibility of AI tools drives both positive and negative learning behaviors, while self-regulatory capacity determines whether AI use enhances or undermines learning outcomes. In African and Tanzanian contexts, institutional gaps, lack of ethical guidelines, and limited training exacerbate challenges identified by both TAM and SRL, contributing to over-reliance and ethical dilemmas.

By applying these theories to the analysis, the study demonstrates how the absence of AI regulation shapes students' attitudes, decision-making processes, and learning behaviors. The theoretical framework not only helps explain patterns of AI engagement observed in the data but also informs practical recommendations for policy and pedagogy, including the design of AI regulations, ethical guidelines, and digital literacy initiatives to promote responsible and effective AI use in higher education.

Methodology

Research Paradigm and Design

This study adopted a qualitative research paradigm to explore students' perceptions and behaviors regarding AI use in the absence of regulation, as qualitative approaches are particularly suited to understanding complex social phenomena and context-specific experiences (Creswell & Poth, 2018). A case study design was employed to allow an in-depth investigation within the real-life context of Sokoine University of Agriculture, providing rich insights into institutional and individual factors influencing learning behaviors (Yin, 2014).

Study Area

The research was conducted at Sokoine University of Agriculture (SUA), a leading public university in Tanzania with diverse academic programs and growing adoption of digital learning tools, including AI-based platforms (URT, 2021). SUA was selected due to the evident use of AI tools by students and limited institutional guidance on responsible use, making it an ideal site to examine the impact of unregulated AI on learning behaviors.

Study Sample and Sampling Techniques

The study involved undergraduate and postgraduate students, as well as lecturers and administrative staff engaged in academic oversight. A purposive sampling technique was employed to select participants who actively use AI tools and can provide rich information on its effects on learning behavior (Patton, 2015). To ensure representation across disciplines, gender, and academic levels, maximum variation sampling was also applied, resulting in 60 students and 12 faculty/administrative staff participants (Etikan et al., 2016).

Data Collection Methods and Tools

Data were collected using semi-structured interviews, focus group discussions (FGDs), and document analysis. Semi-structured interviews explored students' patterns of AI use, perceptions of learning changes, and experiences with institutional guidance (Kvale & Brinkmann, 2009). FGDs provided collective insights into the ethical and pedagogical implications of unregulated AI use, revealing shared challenges and coping strategies (Krueger & Casey, 2015). Document analysis focused on institutional policies,

course syllabi, and ICT guidelines to identify existing regulatory gaps (Bowen, 2009). Audio recordings were transcribed and supplemented with field notes to enhance data richness.

Data Analysis

Data were analyzed thematically following Braun and Clarke's (2006) six-step procedure, enabling the identification of key patterns and themes across the dataset. Themes such as over-reliance on AI tools, reduced critical thinking, and lack of institutional guidance emerged strongly. The document analysis confirmed that SUA, like many Tanzanian higher education institutions, lacks formal AI governance policies, which corroborates global and regional findings on emerging gaps in AI regulation in education (Holmes et al., 2021; Mhlanga & Moloi, 2020). NVivo software facilitated systematic coding and organization of qualitative data, ensuring rigor and transparency in the analytical process.

Ethical Considerations

The study strictly adhered to ethical standards. Approval was obtained from the Sokoine University of Agriculture Research Ethics Committee, and all participants provided informed consent (Israel & Hay, 2006). Confidentiality and anonymity were guaranteed through the use of pseudonyms, and participants were informed of their right to withdraw at any time. Data were securely stored and used solely for research purposes.

Findings

The analysis of data collected from students, faculty, and institutional documents revealed three major themes regarding the impact of the absence of AI regulation on students' learning behavior: patterns of AI use, effects on learning behavior, and institutional gaps and ethical considerations.

1. Patterns of AI Use

Globally, students increasingly rely on AI tools such as generative AI, automated writing assistants, and intelligent tutoring systems to support research, content creation, and problem-solving (Luckin et al., 2016; Zawacki-Richter et al., 2019). African studies indicate mixed patterns of engagement, where some students use AI responsibly, while others substitute AI outputs for independent work (Mhlanga & Moloi, 2020; Adeoye & Ogunleye, 2021).

At Sokoine University, participants reported frequent use of AI tools for assignments, research, and problem-solving. One undergraduate student remarked:

"I use ChatGPT to help me summarize articles quickly, but sometimes I just copy the output because I don't have time to check it."

A postgraduate student described a different approach:

"I usually use AI to get ideas, but I always make sure I analyze and rewrite everything in my own words. It helps me save time but I still think critically."

Lecturers noted patterns of reliance on AI among younger students:

"Some students submit work that seems polished but clearly lacks their own reasoning. They rely too much on AI tools because there are no clear guidelines."

These findings align with Technology Acceptance Theory, which suggests that perceived ease of use and usefulness influence engagement with new technology (Davis, 1989).

2. Effects on Learning Behavior

The study found that unregulated AI use significantly influenced students' learning behaviors. Globally, unregulated AI use has been linked to decreased critical thinking and academic dishonesty (Williamson & Piattoeva, 2019; Holmes et al., 2021). In African contexts, weak institutional guidance often leads to inconsistent outcomes (Mhlanga & Moloi, 2020).

At SUA, several students admitted over-reliance on AI:

"I feel like I don't think as much as I used to because the AI gives me answers instantly. It's convenient, but I worry I'm learning less."

Others emphasized the benefits of guided AI use:

"When our lecturer explains how to use AI for research, it actually improves my learning. I know what to take and what to ignore."

Faculty echoed concerns about self-regulation:

"Students struggle with planning and evaluating their work independently when they rely on AI. Those who understand responsible use perform much better."

These insights support Self-Regulated Learning Theory, which emphasizes planning, monitoring, and evaluating one's own learning (Zimmerman, 2002).

3. Institutional Gaps and Ethical Considerations

Document analysis and interviews revealed that Sokoine University lacks formal AI policies, leaving students and faculty uncertain about responsible usage. One student said:

"No one has told us the rules. We just use AI as we like, and sometimes I know it's not entirely right."

Lecturers confirmed this gap:

"We have no clear guidelines or regulations for AI use, so students are learning by trial and error. This can lead to misuse and academic dishonesty."

Globally, universities are implementing AI governance frameworks, ethical guidelines, and training programs to address similar challenges (Zawacki-Richter et al., 2019; Chen et al., 2021). In Africa, fragmented policies and limited awareness exacerbate risks (Adeoye & Ogunleye, 2021). Participants emphasized the need for structured guidance:

"We need rules, workshops, and awareness programs on how to use AI properly. Otherwise, students will continue misusing it."

Discussion

The findings of this study provide critical insights into how the absence of AI regulation affects students' learning behavior, highlighting patterns of AI use, impacts on cognitive engagement, and institutional gaps. Globally, AI has become an increasingly integral component of higher education, with students using tools such as generative AI, automated writing assistants, and intelligent tutoring systems to enhance research, content creation, and problem-solving (Luckin et al., 2016; Holmes et al., 2021). While these tools offer opportunities for efficiency and personalized learning, studies have shown that unregulated adoption can lead to over-reliance, reduced critical thinking, and ethical challenges, particularly when students perceive AI as a substitute for independent learning rather than a complementary tool (Williamson & Piattoeva, 2019; Chen et al., 2021).

In the African context, the use of AI in higher education is growing, but regulatory frameworks remain underdeveloped. Evidence suggests that students often engage with AI in ways that support learning but may also compromise academic integrity and independent cognitive engagement due to limited institutional guidance (Mhlanga & Moloi, 2020; Adeoye & Ogunleye, 2021). The findings from Sokoine University align with these regional trends, showing that students frequently use AI for assignments, research summaries, and problem-solving, yet their self-regulated learning processes are affected by the absence of formal policies or ethical guidelines. This reflects the theoretical perspective of Self-Regulated Learning Theory (Zimmerman, 2002), which emphasizes the importance of planning, monitoring, and evaluating learning tasks; without guidance, AI use can bypass these essential cognitive processes.

The study also reveals a clear gap in institutional governance. Sokoine University currently lacks comprehensive AI policies, leaving both students and faculty uncertain about appropriate and ethical use. Globally, higher education institutions have begun implementing AI governance frameworks, digital literacy programs, and ethical guidelines to mitigate risks of misuse and over-reliance (Zawacki-Richter et al., 2019; Holmes et al., 2021). In Africa, however, fragmented policies, limited awareness, and insufficient training exacerbate challenges associated with AI adoption (Adeoye & Ogunleye, 2021). In Tanzania, this regulatory vacuum mirrors global and regional concerns, but also highlights unique contextual factors, including the rapid adoption of digital tools without concurrent policy development and the variable digital literacy levels among students.

The implications of these findings are significant for policy and pedagogy. Unregulated AI use may improve efficiency in the short term but risks undermining critical thinking, academic integrity, and self-regulated learning. Integrating structured guidance, regulatory frameworks, and ethical training programs can help students utilize AI tools effectively while fostering independent cognitive engagement. Furthermore, the study contributes to knowledge by providing empirical evidence from Tanzanian higher

education, filling a critical gap in African-focused AI research and offering practical insights for policymakers, educators, and institutions seeking to integrate AI responsibly.

Overall, the findings highlight the urgent need for contextualized AI policies, digital literacy initiatives, and pedagogical strategies that balance the benefits of AI tools with safeguards to ensure they enhance, rather than compromise, student learning outcomes. By situating Tanzanian experiences within global and African contexts, this study underscores both the opportunities and risks associated with AI in higher education, providing a foundation for informed policy development and responsible AI integration.

Limitations

While this study provides valuable insights into the effects of unregulated AI use on students' learning behavior, several limitations must be acknowledged. First, the study was conducted at Sokoine University of Agriculture, which limits the generalizability of the findings to other Tanzanian universities or higher education institutions in Africa. Institutional culture, digital infrastructure, and student demographics may vary significantly across universities, potentially influencing AI adoption and learning behaviors (Mhlanga & Moloi, 2020). Second, the study employed a qualitative approach, which, while suitable for in-depth exploration of experiences and perceptions, does not quantify the extent or frequency of AI use among the broader student population. Finally, the reliance on self-reported data may introduce social desirability bias, with participants potentially underreporting misuse or over-reliance on AI tools (Creswell & Poth, 2018). Despite these limitations, the study provides rich, context-specific evidence and a foundation for future research and policy development.

Conclusion

This study examined how the absence of AI regulation affects students' learning behavior at Sokoine University of Agriculture, situating Tanzanian experiences within global and African contexts. Findings revealed that unregulated AI use is widespread, influencing students' cognitive engagement, critical thinking, and self-regulated learning processes. While AI tools can enhance efficiency and provide learning support, the lack of institutional guidance and ethical frameworks increases the risk of over-reliance, academic misconduct, and diminished independent problem-solving (Williamson & Piattoeva, 2019; Holmes et al., 2021). The study also identified a significant gap in institutional governance, reflecting broader African trends where policies for AI adoption in education are fragmented or absent (Adeoye & Ogunleye, 2021). By highlighting these challenges and opportunities, this research contributes empirical evidence to inform AI policy, pedagogy, and ethical guidelines in Tanzanian higher education.

Recommendations

The findings of this study highlight the urgent need for Tanzanian higher education institutions to adopt comprehensive strategies for the responsible integration of AI into learning environments. First, universities should develop and implement formal AI regulatory frameworks that clearly define acceptable use, ethical standards, and expectations for academic integrity. Such policies would provide guidance to students and faculty, reducing the risk of misuse and ensuring that AI tools are employed to support, rather than replace, critical thinking and independent learning (Zawacki-Richter et al., 2019; Chen et al., 2021).

In addition to policy development, there is a strong need for digital literacy and training programs targeted at both students and faculty. These programs should equip learners with the skills to critically evaluate AI outputs, integrate AI tools effectively into their study practices, and maintain ethical standards in academic work. Training initiatives would also help faculty incorporate AI into teaching strategies in ways that enhance learning outcomes while promoting cognitive engagement, aligning with Self-Regulated Learning Theory (Zimmerman, 2002).

Furthermore, integrating AI into pedagogical practices requires careful design. Instructors should develop assignments, assessments, and learning activities that leverage AI as a supportive tool rather than a substitute for independent problem-solving. This approach ensures that students continue to engage deeply with the material, develop analytical skills, and apply knowledge creatively, thereby mitigating the potential negative effects of unregulated AI use observed in this study (Luckin et al., 2016).

To ensure effectiveness, universities should also implement monitoring and evaluation mechanisms to track the adoption and impact of AI tools on learning behaviors. Such measures would provide feedback on policy implementation, highlight areas for improvement, and allow institutions to adapt strategies to evolving technological landscapes.

Finally, further research is necessary to expand understanding of AI use in Tanzanian and African higher education. Mixed-method studies across multiple universities can provide quantitative and qualitative evidence on patterns of AI adoption, ethical challenges, and the effectiveness of regulatory interventions, thereby informing policy and pedagogical innovations (Mhlanga & Moloi, 2020).

Collectively, these measures would enable higher education institutions in Tanzania to harness the benefits of AI technologies responsibly, enhancing learning efficiency, critical thinking, and ethical academic conduct, while ensuring that students develop the cognitive and self-regulatory skills essential for lifelong learning.

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Disclosure Statement

The author declares that there are no conflicts of interest regarding the publication of this article.

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Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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