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The role of over-reliance on AI in the negative consequences of student learning: The moderating effects of ethical concerns and institutional policies

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ABSTRACT

This study investigates the impact of over-reliance on artificial intelligence (AI) in educational settings and its negative consequences on student learning, focusing on the moderating effects of ethical concerns and institutional policies. As students increasingly depend on AI tools, potential risks to critical thinking and engagement may arise. Understanding these dynamics is essential for educators and policymakers to develop strategies that mitigate the adverse effects of AI dependence. The research utilizes a quantitative approach, surveying undergraduate and postgraduate students from major universities in Mogadishu. A sample size of 226 participants was determined using G*Power for a linear multiple regression analysis. Findings reveal significant relationships between AI over-reliance, ethical concerns, and institutional policies, indicating that while AI can enhance educational experiences, its misuse poses risks, including diminished analytical skills and ethical dilemmas such as academic dishonesty and data privacy issues. The study highlights a gap between existing institutional policies and student confidence in their effectiveness, suggesting the need for improved communication and implementation. The regression analysis confirms that robust ethical frameworks and comprehensive policies can alleviate some adverse impacts of AI reliance. This research offers a novel contribution by empirically examining the moderating roles of ethics and institutional governance in a post-conflict higher education context, where AI policy infrastructure is still developing. Recommendations include promoting a balanced integration of AI tools, enhancing ethical awareness through workshops, and establishing clear institutional policies regarding AI usage. Furthermore, continuous evaluation of AI's impact on learning outcomes is vital for fostering responsible educational practices and ensuring that technology enhances, rather than hinders, student learning.

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Introduction

The over-reliance on artificial intelligence (AI) in educational settings presents significant challenges that can adversely impact student learning outcomes. Research indicates that while AI offers substantial benefits in personalizing learning experiences and enhancing efficiency, excessive dependence on these systems can diminish essential cognitive skills such as critical thinking, decision-making, and problem-solving abilities among students (Nadim & Fuccio, 2025; Talgatov et al., 2024; Zhai et al., 2024). This phenomenon, termed 'over-reliance', occurs when students place undue trust in AI-generated content, often neglecting their analytical capabilities, which can lead to superficial engagement with the learning material (Zhai et al., 2024; Zhou et al., 2024). In this context, *over-reliance* refers to excessive dependence on AI tools where students substitute independent thinking, problem-solving, and academic effort with automated responses, leading to diminish cognitive engagement. Conversely, responsible use of AI is

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predicated on an integrative approach that harmonizes human judgment with AI capabilities. This paradigm emphasizes the necessity of robust ethical frameworks, effective governance, and user education to foster appropriate reliance on AI tools (Giordani & Zeko, 2024). The effective presentation of AI uncertainties may guide users toward making more informed decisions, thus enhancing collaboration between human and AI systems (Biswas & Murray, 2024). Furthermore, it encourages the cultivation of critical thinking skills and the maintenance of professional autonomy, ensuring that AI serves to augment rather than replace the cognitive processes intrinsic to human decision-making (Sharma & Sarode, 2024).

A key mechanism underlying this over-reliance is the increasing tendency among students to accept AI recommendations without critical assessment. Studies highlight that failure to evaluate the reliability and accuracy of AI outputs often results in the abdication of accountability for academic tasks (Schoeffer et al., 2023; Wang et al., 2022). For instance, Klímová and Pikhart emphasize that educational approaches must teach students to critically analyze AI's outputs and compare them with human perspectives to mitigate biases inherent in AI systems (Klímová & Pikhart, 2025). Moreover, with the democratization of AI tools, students may also face pressure to conform to the perceived standards generated by AI, leading to a reduction in independent thought and creativity (Cabining & Dumayas, 2024; Zhou et al., 2024).

The psychological ramifications of AI over-reliance extend beyond cognitive abilities; they can also affect students' motivation and engagement levels (Abubakar et al., 2024; Rachmadtullah et al., 2024). The diminished source of motivation often stems from the ease of relying on AI to complete tasks, which may create complacency and a sense of inadequacy when addressing tasks independently (Talgatov et al., 2024; Tamrin et al., 2024). Consequently, this form of dependency risks reducing students' intrinsic motivation and self-efficacy, further eroding their academic performance (Ju, 2023; Morrill & Noetel, 2023).

Furthermore, ethical considerations arise from over-reliance on AI tools, as students may inadvertently engage in academic dishonesty, potentially leading to issues related to plagiarism and integrity (Abubakar et al., 2024; Rachmadtullah et al., 2024; Zhang & Tur, 2024). Over-reliance normalizes shortcuts in learning and assessment processes without an adequate understanding of the importance of original thought and ethical standards in academic work, which can lead to long-term detrimental effects on educational values (Dieterle et al., 2022; Zhang & Tur, 2024).

To address the negative consequences of over-reliance on AI, it is imperative to foster a balanced integration of AI tools in educational settings. Implementing targeted interventions that enhance AI literacy can empower students to use AI responsibly and critically, enabling them to leverage its advantages while maintaining their cognitive and ethical faculties (Morrill & Noetel, 2023; Schoeffer et al., 2023). Developing comprehensive educational guidelines that articulate the appropriate use of AI can also foster a learning environment that encourages self-directed thought and skepticism towards AI outputs (Ju, 2023; Klímová & Pikhart, 2025).

A significant ethical concern is the potential for AI tools to undermine academic integrity and proper ethical practices among students, as highlighted by Pan (2024). The study reveals that many students utilize AI tools without adequate guidance on ethical writing procedures, which can lead to significant issues related to plagiarism and the authenticity of academic work. Hence, institutions must establish clear ethical guidelines that delineate acceptable uses of AI, emphasizing the importance of originality and integrity in student work (Spivakovsky et al., 2023).

Moreover, the ethical implications of data usage in AI tools present considerable challenges. Holmes et al. (2023) emphasize the ethical dilemmas associated with data collection, including privacy concerns and transparency issues. Students must be assured that their data is handled ethically and that AI systems do not exploit their learning behaviors for detrimental purposes. Creating policies that protect data privacy and establish clear protocols for data usage is essential to maintain trust between students and educational institutions (Karimi & Khawaja, 2023; Saylam et al., 2023).

Another critical aspect is the need for effective guidelines on learner-instructor interactions when employing AI in online learning environments. The potential for AI systems to inadvertently disrupt student-teacher dynamics raises a significant concern. According to Seo et al. (Seo et al., 2021), ongoing discussions are required to refine the boundaries of trust and acceptance of AI by both students and instructors. Institutional policies must focus on fostering transparent communication about AI's roles, capabilities, and limitations in educational interactions.

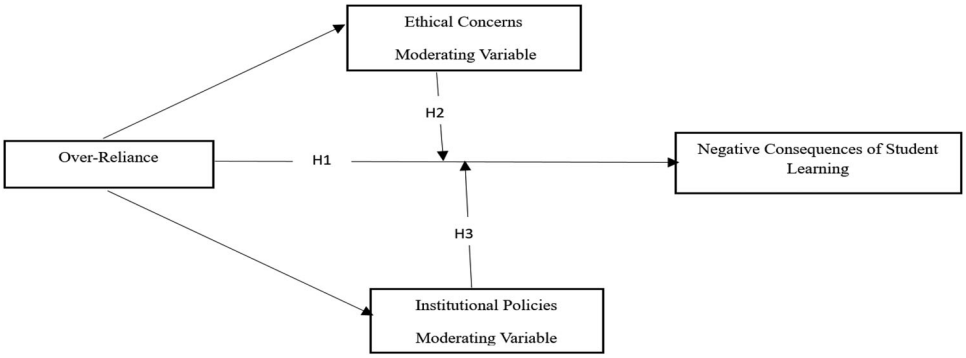


Figure 1. Study model.

Furthermore, there is a pressing need for ongoing education regarding AI ethics for both students and educators. D'Souza et al. (2024) suggest that continuous training and awareness-raising activities can help address emerging ethical challenges associated with AI use in education. Building comprehensive AI literacy programs that include ethical considerations is essential to empower students and educators alike to navigate the complexities of AI responsibly (Knowles, 2021).

The absence of a general framework for AI ethics in education, as identified by Holmes et al. (2022), further complicates policy development. Institutions should engage stakeholders from diverse backgrounds – including educators, students, ethicists, and technology experts – to co-create a flexible and adaptive framework that accommodates new technologies and evolving ethical standards within the educational landscape. Such participatory approaches can ensure that the developed policies reflect the community's values and practical realities (Nguyen et al., 2023; Valerio, 2024).

The increasing reliance on artificial intelligence (AI) in educational settings raises concerns about its potential negative consequences on student learning, particularly as students may become overly dependent on these tools. This study aims to explore the moderating effects of ethical concerns and institutional policies on this relationship, as the lack of clear guidelines and ethical awareness may exacerbate the negative outcomes of AI reliance. The Value of the Study lies in understanding these dynamics is crucial for educators and policymakers to develop effective strategies that mitigate the adverse effects of AI dependence, ensuring a balanced approach to technology integration in learning environments. Therefore, the general objective of this study is to investigate the role of over-reliance on AI in negatively impacting student learning while examining how ethical concerns and institutional policies influence this relationship. Based on this, the study tests the following hypotheses:

H1: There is a significant positive relationship between over-reliance on AI and the negative consequences of student learning.

H2: Ethical concerns significantly moderate the relationship between over-reliance on AI and the negative consequences of student learning

H3: Institutional policies significantly moderate the relationship between over-reliance on AI and the negative consequences of student learning.

To clarify the theoretical relationships explored in this study, a conceptual model has been developed (see Figure 1). This model illustrates the hypothesized direct effect of over-reliance on AI on negative learning consequences, as well as the moderating roles of ethical concerns and institutional policies in shaping this relationship.

Methodology

The study was designed using a quantitative cross-sectional approach to explore the role of over-reliance on AI in the negative consequences for student learning, while also examining the moderating effects of ethical concerns and institutional policies. The study sample consisted of 192 undergraduate students (85%) and 34 postgraduate students (15%) from major universities in Mogadishu. Among the

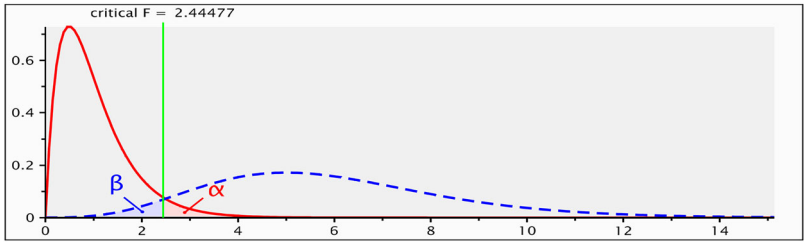


Figure 2. Statistical power for sample size.

participants, 89 (39.4%) were female and 137 (60.6%) were male. The universities were purposively selected because they are officially recognized by the Somali Ministry of Education, Culture, and Higher Education as the leading institutions in Mogadishu. To determine the sample size, the researcher utilized G*Power, a statistical software specifically designed for power analyses and sample size calculations across various statistical tests, commonly used in the social, behavioral, and biomedical sciences (Kang, 2021). It is essential for ensuring adequate sample sizes to achieve power levels of 0.80 or higher, as recommended in empirical research (Cantekin & Burucu, 2024; Nobarı et al., 2024). Additionally, it demonstrated versatility in a psychological study on parental attitudes and college adjustment, showcasing its capability for complex analyses (Choi et al., 2024).

The A Priori Compute Required Sample function was employed for a linear multiple regression fixed model with an R^2 increase. This analysis aimed to identify the minimum sample size required, considering a margin of error of $\alpha = 0.05$, an effect size of 0.15, and a statistical power of 0.95. The results indicated that at least 129 participants were necessary (Figure 2); however, the researchers ultimately gathered data from 226 participants after distributing the questionnaire.

The study used an organized questionnaire constructed to address four major dimensions of AI in education: (1) Over-Reliance on AI (social dependence, critical thinking, and problem-solving, supported by Aghaee et al., 2024, and Zhang, 2024); (2) Ethical Issues (academic integrity, privacy, and transparency, based on Valerio, 2024, and Kazim & Koshiyama, 2021); (3) Institutional Policies (governance frameworks, regulatory compliance based on AlAli & Wardat, 2024; Ifenthaler et al., 2024); and (4) Negative Learning Experiences (technological dependence, content accuracy, and the devaluing of the teacher's role based on Lérias et al., 2024; Goldman et al., 2024). Each construct was measured through five Likert-scale items built from existing research. The data collection was completed using the Kooba toolbox, and ethical concerns were taken into account during the process. Harman's Single Factor Test for Common Method Bias (CMB) indicated that the first factor explained 31.451% of the variance which is below the 50% benchmark, indicating that there were no significant issues with the data. To evaluate the internal consistency of the sub-scales, Cronbach's alpha coefficients were calculated: over-reliance ($\alpha = 0.769$), ethical concerns ($\alpha = 0.863$), institutional policies ($\alpha = 0.790$), and negative learning experiences ($\alpha = 0.826$). These values indicate acceptable to high reliability. The overall reliability of the instrument was determined to be strong, with Cronbach's alpha estimated at 0.895. Descriptive statistics and linear multiple regression were conducted using SPSS version 24 and JAMOVI version 2.6.44 software.

Results

Descriptive statistics

Table 1 presents the results of participants' perceptions regarding study variables related to over-reliance on AI and its negative consequences on student learning, outlined in the following sequence:

Over-reliance on AI

Data from 226 participants on students' over-reliance on AI tools in education shows a moderate mean score of 3.0162, indicating variability in responses. Students moderately disagree with relying on AI for assignments (mean: 2.60) but agree that it reduces critical thinking engagement (mean: 3.21) and motivation to read and

Table 1. Descriptive statistics of participants' perceptions for study variables, $N = 226$.

Study variables	Mean	Std. Deviation
Over-reliance of AI, a = 0.769		
I rely on AI tools for completing assignments rather than using my own knowledge.	2.60	1.276
AI-generated content reduces my engagement in critical thinking.	3.21	1.306
AI use in learning decreases my motivation to read and analyze study materials.	3.25	1.286
I frequently use AI-generated responses without verifying their accuracy.	2.58	1.253
AI assistance reduces my ability to independently solve academic problems.	3.07	1.224
My dependency on AI has negatively affected my problem-solving skills.	3.39	1.214
Grand mean	**3.0162**	**0.85821**
Ethical concerns of AI use, a = 0.863		
AI-generated content raises concerns about academic dishonesty.	3.28	1.188
AI-driven plagiarism detection tools may misinterpret original my work.	3.14	1.121
The use of AI in learning compromises my data privacy and security.	3.09	1.149
AI-based learning platforms lack transparency in how they process my personal data.	3.30	1.000
Ethical dilemmas arise when AI tools generate content that violates academic integrity.	3.11	1.122
The growing dependence on AI challenges traditional ethical standards in education.	3.33	1.147
Grand mean	**3.2072**	**0.86507**
Institutional Policies and Regulations, a = 0.790		
My institution has established formal AI policies for education.	2.90	1.156
AI governance policies mitigate potential risks associated with AI adoption.	3.32	1.085
Institutional AI regulations promote fairness and transparency in education.	3.22	1.064
AI policies help address ethical concerns in student assessments.	3.25	1.067
My institution actively monitors AI adoption to ensure responsible use.	3.06	1.130
AI-related institutional policies are updated regularly based on emerging challenges.	3.06	1.147
Grand mean	**3.1342**	**0.77487**
Negative consequence of student learning, a = 0.826		
AI-based tools make me overly dependent on technology rather than critical thinking.	3.59	1.072
AI-generated content sometimes lacks accuracy and reliability.	3.42	1.069
The use of AI in education raises ethical concerns, such as plagiarism and academic dishonesty.	3.23	1.108
AI decision-making in assessments can be biased and unfair.	3.49	1.055
Extreme reliance on AI may reduce the role of teachers in guiding students.	3.59	1.208
Grand mean	**3.4655**	**0.84788**

Scale: Very High to Very Low: Very High (4.20–5.00), High (3.40–4.19), Moderate (2.60–3.39), Low (1.80–2.59), and Very Low (1.00–1.79.The bold values in Table 1 represent the grand mean scores for each study variable (Over-reliance of AI, Ethical concerns, Institutional Policies, and Negative consequences of learning). These values summarize the overall average response for each construct, providing a central measure of participants' perceptions across all items in that category.

analyze materials (mean: 3.25). They exhibit reluctance to use AI-generated responses without verification (mean: 2.58) and express concern that AI negatively impacts their problem-solving skills (mean: 3.07) and has adverse effects on their learning (mean: 3.39). Overall, this highlights awareness of AI's usefulness alongside significant concerns about its negative impact on critical thinking and motivation.

Ethical concerns of AI use

Participants' responses regarding ethical concerns associated with AI use in education yield an overall mean score of 3.2072, indicating moderate concern (SD = 0.86507). Students moderately agree that AI-generated content raises issues of academic dishonesty (mean: 3.28) and express awareness of potential inaccuracies in plagiarism detection tools (mean: 3.14). Concerns about student data privacy and security (mean: 3.09) and the lack of transparency in AI data processing (mean: 3.30) are also noted. They recognize ethical dilemmas related to academic integrity (mean: 3.11) and believe that increased reliance on AI challenges traditional ethical standards (mean: 3.33). Overall, while students acknowledge the benefits of AI, they are increasingly aware of its ethical implications.

Institutional policies and regulations

Data on students' perceptions of institutional policies regarding AI use in education shows an overall mean score of 3.1342, indicating moderate perception (SD = 0.77487). The belief that formal AI policies are established is low to moderate (mean: 2.90), while confidence in the effectiveness of AI governance policies is higher (mean: 3.32). Similarly, students moderately agree that institutional regulations promote fairness and transparency (mean: 3.22) and address ethical concerns in assessments (mean: 3.25). They also recognize that their institution actively monitors AI adoption (mean: 3.06). Overall, students see existing policies as moderately effective, suggesting a need for improvement in AI governance in education.

Negative consequences of student learning

Participants expressed significant concern regarding the negative consequences of AI use in education, reflected in a high overall mean score of 3.4655, and (SD = 0.84788). Students strongly agree that 'AI-based tools make students overly dependent on technology' (mean: 3.59) and express concerns about AI content accuracy (mean: 3.42) and ethical issues like plagiarism (mean: 3.23). They also worry that 'AI decision-making in assessments can be biased' (mean: 3.49) and recognize that extreme reliance on AI may reduce teachers' roles (mean: 3.59). Overall, these results highlight students' awareness of the negative consequences of AI use in education, including dependency, reliability, and ethical issues.

Results of multiple linear regression analysis

Multiple linear regression analysis was conducted to examine the role of over-reliance on AI in student learning outcomes, specifically focusing on the moderating effects of ethical concerns and institutional policies. This analysis includes assessments of data normality, residual statistics, model summary, autocorrelation using the Durbin-Watson test, analysis of variance, standards for multiple linear regression coefficients, and collinearity statistics. The normal distribution of data was examined, and the result revealed well normal distribution as shown in Figures 3 and 4.

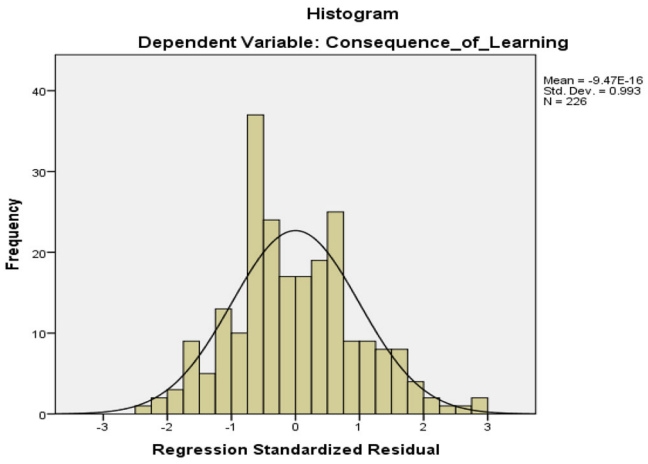


Figure 3. Histogram.

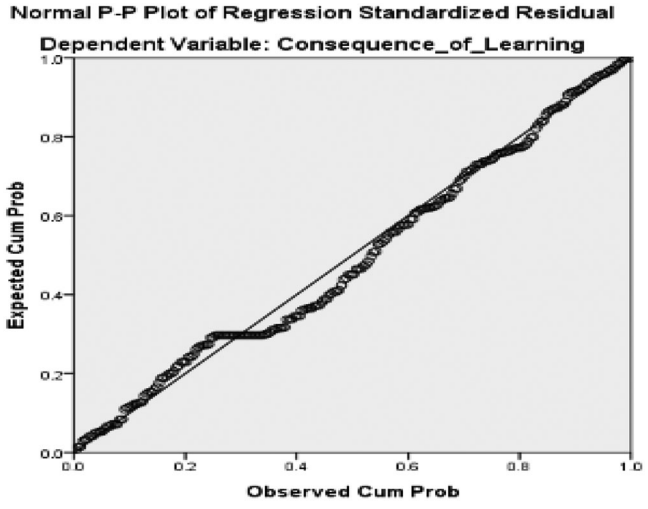


Figure 4. P-P plot.

Table 2. Residual statistics.

	Minimum	Maximum	Mean	Std. Deviation	*N*
Predicted value	1.8070	4.9031	3.4655	0.52889	226
Residual	−1.66191	1.93791	0.00000	0.66270	226
Std. predicted value	−3.507	2.133	0.000	1.000	127
Std. residual	−2.491	2.905	0.000	0.993	226

Table 3. Model summary.

Model	*R*	*R* square	Adjusted *R* square	Std. error of the estimate	Durbin–Watson
	0.624	0.389	0.381	0.66716	1.980

Table 4. Analysis of variance for standard regression model.

Model	Sum of squares	df	Mean square	*F*	Sig.
Regression	62.938	3	20.979	47.133	0.000
Residual	98.813	222	0.445		
Total	161.751	225			

Table 5. Standards of multiple linear regression coefficients.

		Unstandardized coefficients		Standardized coefficients			Collinearity statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	1.033	0.222		4.657			
	Over-Reliance	0.205	0.059	0.207	3.481	0.001	0.777	1.288
	Ethical Concerns	0.421	0.060	0.429	7.065	0.000	0.745	1.342
	Institutional Policies	0.148	0.064	0.136	2.302	0.022	0.793	1.261

Dependent variable: Negative learning consequences.

Table 2 illustrates the statistics of the residuals, showing standardized residual values that range from −2.491 to 2.905. Since these values do not exceed ±2.9, they fall within an acceptable range, indicating that there are no concerns regarding outliers.

Table 3 reveals important findings from the regression analysis on 'The Role of Over-Reliance on AI in the Negative Consequences of Student Learning', focusing on the moderating effects of ethical concerns and institutional policies. The correlation coefficient (R) is 0.624, indicating a moderate positive relationship between the predictors – over-reliance on AI, institutional factors, and ethical concerns – and the negative consequences for student learning outcomes. The R Square value of 0.389 shows that the model explains approximately 38.9% of the variance in these negative outcomes, with an adjusted R Square of 0.381 refining this estimate. The standard error of 0.66716 reflects the average deviation from the regression line, while the Durbin-Watson statistic of 1.980 is close to 2, indicating minimal autocorrelation among the residuals, which is beneficial as it suggests the residuals are independent. Overall, these findings underscore the moderate relationship between AI reliance and negative learning outcomes, highlighting the significance of ethical and institutional factors.

Table 4 reveals the analysis of variance (ANOVA) table evaluates the standard regression model examining the predictors' impact on the dependent variable, 'negative consequence of learning'. The regression sum of squares is 62.938, with 3 degrees of freedom, resulting in a mean square of 20.979. The F statistic is 47.133, indicating a highly significant model ($p < 0.001$), which suggests that the predictors – institutional factors, reliance on AI, and ethical concerns – collectively have a strong effect on the negative consequences of learning. The residual sum of squares is 98.813, with 222 degrees of freedom, yielding a mean square of 0.445. The total sum of squares is 161.751, confirming the overall variance in the dependent variable. This analysis highlights the model's effectiveness in explaining the variance in negative learning outcomes.

Table 5 presents the coefficients from the multiple linear regression analysis examining predictors of 'Negative Consequence of Learning'. The unstandardized coefficients indicate that reliance on AI contributes 0.205, ethical concerns contribute 0.421, and institutional factors contribute 0.148 to negative outcomes. The standardized coefficients (Beta) highlight that ethical concerns have the strongest effect

(Beta = 0.429), followed by reliance on AI (Beta = 0.207) and institutional factors (Beta = 0.136). All predictors are statistically significant, with t-values showing ethical concerns as the most influential (t = 7.065). For the collinearity statistics, the Variance Inflation Factor (VIF) was measured to determine the impact of collinearity among the variables in the regression model. All values of the independent variables are (< 10). Thus, there is no concern or problem about the collinearity. Some authors suggest a more conservative level of 2.5 or above is considered a high **VIF**. However, all values of **VIF** shown in Table 5 are less than 2.5; therefore, there is no collinearity concern. The regression findings indicate that a one-unit increase in ethical concern ($\beta = 0.429$, $p < 0.000$) is associated with a meaningful reduction in the negative consequences of AI over-reliance. Practically, this suggests that when students become more ethically aware – through clearer guidance, training, or policy exposure – they are less likely to misuse AI or disengage from cognitive tasks. Similarly, a one-unit increase in institutional policy awareness ($\beta = 0.136$, $p = 0.022$) may translate to students being more conscious of the rules governing AI use, leading to more responsible application in assignments or exams. These findings underscore the importance of not just having policies and ethical frameworks in place, but ensuring that they are well-communicated and internalized by students.

Results of moderating variables

Table 6 shows the effects of over-reliance and ethical concerns on negative consequence for students learning. Over-reliance has a significant positive effect (estimate = 0.2290, $p < 0.001$), and ethical concerns also show a strong positive relationship (estimate = 0.4504, $p < 0.001$). However, the interaction term (estimate = −0.0978, $p = 0.031$) suggests that ethical considerations diminish the negative effect of over-reliance, acting as a moderating factor.

Table 7 reveals that **over-reliance** (estimate = 0.358, $p < 0.001$) and **institutional policies** (estimate = 0.283, $p < 0.001$) significantly have a relationship with negative consequences for student learning. However, their interaction term (estimate = −0.115, $p = 0.035$) indicates that institutional policies **reduce** the negative effect of over-reliance, serving as a moderating factor.

Discussion of findings

The findings of this study provide critical insights into the effects of over-reliance on Artificial Intelligence (AI) in education. It highlights several factors contributing to students' perceptions of AI's impact on their learning outcomes, including the role of ethical considerations and institutional governance. The results demonstrate a complex interplay among these factors, necessitating careful consideration by educators and policymakers.

Over-reliance on AI

The research indicates a moderate mean score of 3.0162 for students' perceptions of over-reliance on AI. Participants expressed concerns about AI's detrimental effects on critical thinking and motivation.

Table 6. Moderation estimates of ethical concerns.

	Estimate	SE	Z	*p*
Reliance	0.2290	0.0517	4.43	<0.001
Ethical	0.4504	0.0510	8.82	<0.001
Over-reliance × ethical concern	−0.0978	0.0453	−2.16	0.031

Dependent Variable: Negative Consequence.

Table 7. Moderation estimates of institutional policies.

	Estimate	SE	Z	*p*
Reliance	0.358	0.0568	6.30	<0.001
Institutional	0.283	0.0623	4.55	<0.001
Over-Reliance ✻ Institutional	−0.115	0.0543	−2.11	0.035

Dependent Variable: Negative Consequence.

This finding reflects a broader recognition among students of the potential downsides associated with reliance on AI tools, particularly concerning critical thinking and engagement skills. As emphasized by Yim and Wegerif, teachers recognize the impact of AI usage on enhancing students' analytical capabilities, indicating a need for balanced AI integration that fosters rather than inhibits critical skills Yim and Wegerif (2024). Moreover, Chen suggests that while AI can serve as a motivational tool, an over-reliance may lead to diminished problem-solving skills, thereby hindering students' learning experiences (Chen, 2025). Acknowledging that AI can facilitate engagement and creativity when engaged in a reflective and supported way, in their study, however, Yim and Wegerif (2024) note that AI tools, when used along with instructional scaffolding, can enrich student curiosity, explorative thinking, and collaborative thinking. Therefore, there is nothing inherently wrong with AI, it becomes wrong when the distance learning environment utilizes AI without any form of critical reflection, or an understanding of the pedagogical intent. Specifically, developing reflexive practices around distance learning in AI such as comparing the AI suggestions with their own ideas, or using AI simply for brainstorming, rather than the end product for final outputs, may mitigate creativity when harnessing the power of AI.

Further consideration of the use of AI in education in a distance learning environment, is the teacher-artifact-student relationship. Seo et al. (2021) suggest that increasing levels of AI usage in blended and online training may contribute to a decrease in learner-instructor interaction, which has the potential to erode mentoring and feedback. Teachers may feel construed, or unprepared to support students impacted by AI, discounting their role in the process of learning that has inbuilt institutional support and training as they adopt a more AI enhanced learning environment. For example, as significant examples, Yim and Wegerif (2024) note that teachers who use AI and help develop student literacy relate to AI can begin to develop collaborative environments for learning.

Ethical concerns

Students expressed moderate ethical concerns regarding AI usage, achieving a mean score of 3.2072. These concerns encompassed issues such as academic dishonesty, data privacy, and transparency in AI operations. This highlights the growing awareness among students of the implications of AI in educational settings. As noted by Nguyen et al., the establishment of ethical principles in AI education is imperative to guide stakeholders in addressing these concerns effectively (Nguyen et al., 2023). Furthermore, Aisyah et al. argue that fostering awareness about the ethical implications of AI can enhance critical thinking and promote responsible learning (Aisyah et al., 2024). The findings suggest a need for educators and policymakers to engage in discussions emphasizing academic integrity and the ethical use of AI.

Institutional policies

With a moderate mean score of 3.1342 regarding institutional policies on AI, students recognized the existence of AI governance but expressed varying degrees of confidence in its effectiveness. This reflects a significant gap between policy formulation and student awareness or satisfaction. Selvaratnam and Venaruzzo highlight that many educational institutions utilize AI technologies without robust governance frameworks, thus raising issues of responsible use (Selvaratnam & Venaruzzo, 2024). This gap necessitates more effective communication and implementation of policies that not only promote fairness and transparency but also address the ethical concerns associated with AI reliance. The variation in student responses regarding institutional policy awareness indicates differing perceptions among students. While the overall mean score for awareness was moderate ($M = 3.13$, $SD = 0.77$), specific items showed significant differences. For instance, the mean score for awareness of formal AI policies was lower ($M = 2.90$), whereas perceptions of fairness and transparency in AI governance were higher ($M = 3.32$). This disparity reflects inconsistent levels of awareness and trust in institutional policies, potentially stemming from inadequate policy communication or insufficient student involvement in policy development. The results highlight a gap between the existence of policies and their perceived effectiveness, underscoring the necessity for institutions to improve the clarity, dissemination, and enforcement of AI usage

policies to enhance student understanding and compliance. Mogadishu's distinct cultural and institutional environment presents obstacles for students in understanding AI ethics and policy frameworks. As universities experience swift digital changes, the communication and enforcement of policies frequently fall behind, resulting in students being uncertain about ethical expectations regarding AI. This highlights the importance of addressing ethical issues and establishing regulations to promote responsible AI usage (Ahmed et al., 2024).

Negative consequences of student learning

Participants showed strong concern about the adverse effects of AI on learning, with a high mean score of 3.4655. Students noted that AI fosters dependency on technology and raises questions of content accuracy, which can lead to biased decision-making in assessments. This finding aligns with Arowosegbe et al., who point out the potential pitfalls of relying too heavily on AI in educational settings (Arowosegbe et al., 2024). The study asserts the importance of actively engaging stakeholders in developing strategies to balance AI integration with the cultivation of essential learning skills, thereby ensuring educational quality and integrity are preserved.

Regression analysis findings

The regression analysis revealed a significant positive relationship ($R = 0.624$) among over-reliance on AI, ethical concerns, and institutional factors impacting negative learning outcomes. The explanation of approximately 38.9% of variance suggests that while these factors significantly influence student learning, other variables may also contribute to this issue. These findings resonate with the work of Kwak et al., who stress the importance of integrating students' ethical awareness into AI educational frameworks to mitigate negative impacts (Kwak et al., 2022).

Moderating effects

Moderation analysis indicated that both ethical concerns and institutional policies significantly influence the relationship between reliance on AI and negative learning outcomes. Ethical concerns were found to weaken the positive relationship between AI use and negative consequences, suggesting that a robust ethical framework can alleviate some adverse effects associated with AI (Daher & Hussein, 2024). Similarly, the incorporation of comprehensive institutional policies can strengthen this effect (Selvaratnam & Venaruzzo, 2024). The necessity to foster ethical frameworks and effective policies that can support educational integrity and minimize the negative repercussions of AI usage is therefore underscored.

One limitation of this study is its exclusive reliance on self-reported data, which may be subject to response bias or inaccuracies in how students perceive and report their AI usage. To enhance the validity of future findings, researchers are encouraged to adopt a mixed-methods approach – triangulating survey results with objective data sources such as usage logs from AI platforms or conducting follow-up interviews. This would help validate reported behaviors and provide deeper insight into how students interact with AI tools in academic settings.

The results of this study reflect recent work by Hamamra et al. (2024) exploring the use of generative AI, specifically ChatGPT, by students in Palestine. They conducted a case study of the students' use of AI for the purposes of convenience and idea generation, and while the participating students were embracing AI, the were mostly unsuccessful in seeking ethical boundaries and there were institutional aspects of acceptable use that confused students. There appeared to be a gap between students adopting AI in their studies and institutions communicating ethical or pedagogical boundaries. Referring to their findings, this study adds to a wider cross cultural discussion about integrating AI in both fragile and in rapidly changing educational contexts and illustrates the global relevance of local ethical and policy issues.

Testing hypotheses

The results support **Hypothesis 1**, which predicted a positive relationship between over-reliance on AI and the negative consequences of student learning. As shown in Table 5, over-reliance was a significant predictor ($\beta = 0.207$, $p = 0.001$), indicating that higher dependence on AI tools is associated with increased negative academic outcomes such as reduced critical thinking and reliance on automated content.

Hypothesis 2, which proposed that ethical concerns moderate this relationship, was also supported. The moderation analysis in Table 6 shows a significant interaction effect ($\beta = -0.0978$, $p = 0.031$), suggesting that higher ethical awareness among students weakens the link between over-reliance and negative outcomes.

Likewise, **Hypothesis 3** was confirmed through the findings in Table 7. The interaction term between institutional policies and AI reliance was negative and significant ($\beta = -0.115$, $p = 0.035$), indicating that effective institutional governance reduces the harmful effects of AI overuse. Thus, all hypotheses of this study were supported.

Conclusion

The findings of this study highlight the complex relationship between over-reliance on AI and its negative consequences on student learning, emphasizing the critical moderating roles of ethical concerns and institutional policies. The research reveals that while AI tools offer significant benefits in education, excessive dependence on them leads to reduced critical thinking, diminished motivation, and heightened concerns about academic integrity. Students recognize both the advantages and risks of AI, expressing moderate to high levels of concern regarding ethical dilemmas, data privacy, and the effectiveness of institutional governance. The regression analysis confirms that ethical considerations and strong institutional policies can mitigate some of the adverse effects of AI reliance, yet gaps remain in policy implementation and ethical awareness. These insights underscore the need for a balanced approach to AI integration in education—one that leverages technological advancements while safeguarding students' cognitive development and academic integrity.

Recommendations

In light of the study's findings, it is recommended that:

Fostering ethical awareness

To foster ethical awareness, institutions should embed AI ethics into their curricula, emphasizing the responsible use of AI technologies. This integration should cover essential topics such as data privacy, academic honesty, and the societal implications of AI. Additionally, regular workshops and discussions should be organized to facilitate dialogue around AI's ethical implications. These platforms will help students cultivate a critical perspective on the role of AI in their learning processes, enabling them to assess both its benefits and limitations.

Strengthening institutional policies

Strengthening institutional policies is crucial for responsible AI usage. Institutions must develop and communicate clear guidelines regarding acceptable AI use in academic assignments, examinations, and research activities. These policies should emphasize transparency, fairness, and the importance of maintaining academic integrity. Furthermore, institutions should actively monitor AI tool usage to identify and mitigate biases and inaccuracies, particularly in automated assessments. Regular reviews of AI tool efficacy and fairness will help ensure that educational standards are upheld.

Mitigating over-reliance on AI

Educational professionals should promote blended learning approaches to encourage the normal use of AI while being conscious of over-reliance on it. The goal would be to extend learning opportunities and help build student engagement. Assessments should take the approach of being unique in that they allow for original thought and creativity, not the use of AI-generated ideas. Some types of assessment may be project-based, oral (viva), or reflective writing entries that require cognitive processes to be engaged.

Practical activities

Practical activities are also important for encouraging open discussion, and for being ethical regarding the use of AI. This could include developing mandatory orientations at the start of academic term for students and staff, specifically to discuss ethical and acceptable use of AI in coursework, helping to inform expectations and mindful behaviors, as well as arranging workshops that bring together students and faculty into the same space to discuss and collaborate on the possibilities of responsible AI use, and discuss how they then may co-construct classroom norms regarding AI use. Universities should also conduct periodic audits of AI usage, monitoring patterns of AI-assisted submissions and assessing assignment originality to proactively address any misuse and maintain academic integrity.

Finally, Future studies should examine the long term cognitive effects of the potential for AI to drop the quality of learning retention, creativity, and agency for students. Knowing these things will help us find best practices and potentially, better policies. Future studies must also include considerable cross-cultural comparisons of local norms, culturally-sensitive values, and local institutional capacities of different methods of operationalizing AI related ethics and policies and how those differences manifest through an ethical AI lens from diverse contexts. Lastly, qualitative research methods (i.e. interviews, focus groups) with students and instructors would allow tensions and social dynamics that are shaping and impacting academic AI use to be examined in depth and from multiple perspectives or realities. This study urges researchers to try and obtain the phenomenology of AI use that may be embedded in the individual lived experience that numerical data cannot adequately capture alone.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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