ARTIFICIAL INTELLIGENCE AND THE QUALITY OF HIGHER EDUCATION: EVIDENCE FROM THE UNIVERSITY OF NGAOUNDÉRÉ, CAMEROON

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Abstract

This study examined the relationship between artificial intelligence (AI) use and the quality of higher education among students at the University of Ngaoundéré, Cameroon, with particular emphasis on academic autonomy, academic dependence, and academic integrity. A cross-sectional descriptive survey design was adopted. The study population comprised 2,700 students, from which a sample of 70 respondents was selected using a non-probability stratified sampling technique. Data were collected through a structured questionnaire developed by the researchers and analyzed using descriptive statistics and Pearson Product-Moment Correlation at the 0.05 level of significance. The findings revealed a significant moderate negative relationship between AI use and students' academic autonomy ($r = -0.41$, $p < 0.05$), indicating that increased AI use was associated with reduced academic autonomy. The study also found a significant strong positive relationship between AI use and students' academic dependence ($r = 0.62$, $p < 0.05$), suggesting that greater use of AI increased students' reliance on AI for academic tasks. Furthermore, a significant weak negative relationship was found between AI use and academic integrity ($r = -0.38$, $p < 0.05$), indicating that increased AI use was associated with lower academic integrity. The study concludes that while artificial intelligence has considerable potential to support learning and improve access to educational resources, excessive reliance on AI may undermine independent learning and academic integrity. It recommends that universities develop clear institutional policies and ethical guidelines to promote the responsible use of AI while fostering critical thinking, independent learning, and academic honesty among students.

Keywords: Artificial intelligence, higher education, academic autonomy, academic dependence, academic integrity, Cameroon.

Introduction

The rise of artificial intelligence is profoundly reshaping educational practices, particularly in higher education. Generative AI tools facilitate the production of academic content, thereby transforming modes of learning, assessment, and knowledge transmission. Technologies such as intelligent tutoring systems, adaptive learning platforms, and generative text models contribute to a structural reconfiguration of academic practices (Holmes et al., 2022; Zawacki-Richter et al., 2019). In this context, AI is often presented as a lever to enhance the quality of higher education. It is expected to enable greater personalization of learning, optimize study time, and expand access to educational resources.

However, this optimistic perspective coexists with a more critical reading that highlights the risks of automating cognitive tasks, technological dependence, and the erosion of academic integrity (Selwyn, 2019; Cotton et al., 2023). These theoretical tensions reveal that the impact of AI on the quality of higher education cannot be reduced to a linear or unidirectional relationship. Rather, it is a complex, multidimensional phenomenon shaped by contextual, institutional, and cognitive factors.

In developing countries, particularly in sub-Saharan Africa, these issues take on an even more critical dimension. Universities in the region face persistent structural challenges, including insufficient digital infrastructure, overcrowded lecture halls, and unequal access to educational technologies. In this context, artificial intelligence is often viewed as both an opportunity for academic catch-up and a potential source of pedagogical imbalance.

Despite the rapid growth of research on AI in education, most studies focus on developed-country contexts. Empirical investigations conducted within African universities remain limited, especially those that simultaneously examine academic quality, cognitive effort, and scientific integrity. This gap limits a comprehensive understanding of the actual effects of AI in educational environments shaped by specific structural constraints.

Within this perspective, the present study examines the impact of artificial intelligence use on the quality of higher education at the University of Ngaoundéré (Cameroon). More specifically, it seeks to examine how AI practices influence perceived learning quality, students' academic autonomy, cognitive effort, and behaviors related to academic integrity.

By adopting a quantitative approach based on data collected from 70 students across several institutions (IUT, EGEM, EGCIM, and FSE), this research helps address a significant empirical gap in the literature on the digital transformation of higher education in Africa.

However, this transformation raises several major concerns, including a potential loss of cognitive autonomy among learners, who may become overly dependent on digital tools in their reasoning and intellectual production. It also heightens the risk of plagiarism, facilitated by rapid access to automatically generated content. Finally, the growing integration of artificial intelligence is redefining the role of teachers, who are now required to adapt their pedagogical methods, strengthen students' critical thinking, and rethink assessment modalities.

This research aims to analyze how students use artificial intelligence throughout their academic journey and to assess their level of dependence on these digital tools. It also seeks to explore their perceptions of the risks associated with AI use, particularly from ethical, cognitive, and pedagogical perspectives. Finally, the study examines their expectations regarding institutional guidance to better understand their needs for support and regulation within the university context.

Statement of the Problem

The rapid emergence of artificial intelligence (AI), particularly generative AI tools such as ChatGPT and similar applications, is transforming teaching and learning practices in higher education. These technologies provide students with rapid access to information, assist in generating academic content, and support problem-solving, thereby changing how students complete academic tasks. While AI offers significant opportunities for improving learning efficiency and access to educational resources, it also raises concerns regarding students' academic autonomy, cognitive engagement, critical thinking, and academic integrity.

In many African universities, including the University of Ngaoundéré, the use of AI tools has increased considerably among students. However, institutional policies and pedagogical guidelines governing their appropriate use remain limited. Consequently, educators face growing challenges in maintaining academic integrity while ensuring that AI serves as a learning aid rather than a substitute for independent reasoning.

Although numerous studies have examined AI adoption in higher education, most have been conducted in developed countries and have focused primarily on technology acceptance, usability, or academic performance. Empirical evidence from African universities remains limited, particularly regarding the relationship between AI use, students' academic autonomy, cognitive effort, academic integrity, and perceived quality of higher education. This knowledge gap makes it difficult for universities to develop evidence-based policies for the responsible integration of AI into teaching and learning.

This study addresses this gap by examining the association between artificial intelligence use and selected indicators of higher education quality among students at the University of Ngaoundéré, Cameroon.

Objectives of the Study

The main objective of this study is to examine the impact of artificial intelligence on the quality of higher education at the University of Ngaoundéré, Cameroon.

The specific objectives are to:

1. Examine the relationship between the use of artificial intelligence and students' academic autonomy at the University of Ngaoundéré, Cameroon.
2. Determine the relationship between the use of artificial intelligence and students' academic dependence at the University of Ngaoundéré, Cameroon.
3. Examine the relationship between the use of artificial intelligence and academic integrity among students at the University of Ngaoundéré, Cameroon.

Research Questions

The following research questions guided the study:

1. What relationship exists between the use of artificial intelligence and students' academic autonomy at the University of Ngaoundéré, Cameroon?
2. What relationship exists between the use of artificial intelligence and students' academic dependence at the University of Ngaoundéré, Cameroon?
3. What relationship exists between the use of artificial intelligence and academic integrity among students at the University of Ngaoundéré, Cameroon?

Null Hypotheses

The following null hypotheses were tested at the 0.05 level of significance:

H_{01}: There is no significant relationship between the use of artificial intelligence and students' academic autonomy at the University of Ngaoundéré, Cameroon.

H_{02}: There is no significant relationship between the use of artificial intelligence and students' academic dependence at the University of Ngaoundéré, Cameroon.

H_{03}: There is no significant relationship between the use of artificial intelligence and academic integrity among students at the University of Ngaoundéré, Cameroon.

Literature Review

Artificial Intelligence and the Transformation of Higher Education

Artificial intelligence has become a major driver of transformation across educational systems. In higher education, it is primarily used to enhance learning, automate pedagogical tasks, and strengthen the analysis of educational data. According to Zawacki-Richter et al. (2019), AI applications in higher education focus on four main areas: personalized learning, intelligent tutoring systems, automated assessment, and predictive analytics of academic performance.

From a more recent perspective, Dwivedi et al. (2023) argue that the emergence of generative AI models such as conversational systems marks a paradigmatic shift. These technologies no longer merely support learning; they actively participate in producing academic content, thereby redefining the boundaries among learning, assistance, and cognitive substitution.

This transformation is part of a broader trend toward digitalization in higher education, in which technologies are no longer mere tools but cognitive actors that directly influence learning processes.

In the African context, several recent studies—such as the research conducted in Zambia by Steward Mudenda and his collaborators—highlight the growing adoption of artificial intelligence tools among university students. These works underscore both the academic benefits of AI, including improved access to information and enhanced learning efficiency, and concerns about technological dependence, loss of cognitive autonomy, and increased risk of plagiarism. However, most of these studies remain focused on technological acceptance and AI usage, without offering an in-depth analysis of its effects on learning quality and academic integrity.

Within this perspective, the present study positions itself, proposing a more integrative analysis of the impacts of artificial intelligence on academic autonomy, cognitive effort, and the quality of higher education in the specific context of the University of Ngaoundéré, Cameroon.

The article by Malik et al. (2025) primarily seeks to understand why and how students adopt AI, focusing on behavioral and motivational drivers. In contrast, the present study focuses on the qualitative outcomes and pedagogical consequences of AI use. It introduces the critical dimension needed to transform raw technological adoption into a successful, fully integrated academic practice.

This study on AI use at the University of Ngaoundéré aligns with African research on the adoption of artificial intelligence in higher education, particularly by extending the work of Malik et al. (2025), conducted in sub-Saharan Africa. However, unlike that study, which centers mainly on factors influencing the acceptance of educational AI through the theory of planned behavior, the present research adopts a more contextualized and critical approach. It highlights students' actual uses of AI, the forms of technological dependence that emerge, and the pedagogical, cognitive, and ethical risks associated with these practices.

In doing so, this work offers an original contribution to the scientific literature by documenting the specific realities of the Cameroonian university context and enriching reflections on the effects of generative AI in African universities.

Learning Theories Mobilized in the Context of Artificial Intelligence

Analyzing the impact of artificial intelligence on the quality of higher education requires a solid, complementary theoretical foundation, particularly regarding the transformation of cognitive processes and the risks of intellectual impoverishment. These approaches help illuminate AI's ambivalent nature, which can function both as a powerful learning tool and as a potentially disengaging technology.

This study draws on three main theoretical frameworks:

Constructivism

Constructivism, notably developed by Piaget and Bronckart (2003), holds that learning is an active process in which learners construct knowledge. In this view, the student is not a passive recipient but an agent who builds understanding through interaction with the environment. The introduction of AI may reinforce this process by facilitating access to diverse resources, yet it may also weaken it by reducing the cognitive effort required to construct knowledge.

Cognitivism

Cognitivism, notably represented by Anderson (1983), emphasizes information-processing mechanisms, memory, and the mental processes involved in learning. From this perspective, learning depends on the quality of information encoding, storage, and retrieval. Intensive use of AI may influence these mechanisms by externalizing certain cognitive functions, raising questions about the depth of learning.

Connectivism

Connectivism, proposed by Siemens (2005), marks a conceptual shift, viewing learning as distributed across digital and social networks. Knowledge is no longer solely internal to the individual but is also externalized within technological systems. Artificial intelligence fits squarely within this logic, serving as an active node in the production and dissemination of knowledge.

Together, these approaches help explain AI's ambivalent role in learning processes.

Effects of Artificial Intelligence on Learning Quality

The literature generally distinguishes two main approaches to the effects of artificial intelligence on learning quality. On the one hand, the optimistic approach highlights several advantages of using AI, including

personalized learning pathways, rapid access to information, time savings on academic tasks, and enhanced academic autonomy. Holmes et al. (2022) view AI as genuine cognitive support that can improve learning efficiency.

On the other hand, a critical approach highlights the risks of excessive use of AI tools, including reduced cognitive effort, technological dependence, superficial learning, and increased risk of plagiarism and academic misconduct (Selwyn, 2019; Cotton et al., 2023).

Optimistic Approach

Recent studies identify several positive effects of AI on learning:

- Improved personalization of educational pathways
- Rapid and structured access to information
- Increased academic autonomy
- Reduced time spent on research and academic production

Holmes et al. (2022) emphasize that AI can act as a *“cognitive amplifier”*, enabling students to overcome certain individual limitations in information processing.

Critical Approach

Conversely, critical literature highlights potentially negative effects:

- Reduction in cognitive effort
- Excessive academic dependence on digital tools
- Superficiality of learning
- Increased risks of plagiarism and academic fraud

Selwyn (2019) argues that the unregulated integration of educational technologies may lead to a progressive *“cognitive deskilling”* of students. Cotton et al. (2023) add that generative AI tools pose a major challenge to academic integrity by making it increasingly difficult to distinguish between human-produced and machine-generated work.

Artificial Intelligence and Academic Integrity

Generative artificial intelligence poses a major challenge to academic integrity by enabling the automated production of university assignments, such as essays, reports, and summaries. This evolution calls into

question traditional assessment methods and raises concerns about academic fraud, plagiarism, and cognitive delegation. Academic integrity, therefore, extends beyond classical plagiarism to include unethical uses of intelligent digital tools.

Specificities of African Contexts

In African contexts, the literature—though still limited—highlights several important structural characteristics:

- Unevenly developed digital infrastructure
- Rapid growth in student populations
- Limited pedagogical resources
- Rapid but unregulated adoption of digital technologies

Recent studies indicate that AI can play a compensatory role by improving access to information and reducing certain educational inequalities. However, its use without institutional regulation may widen performance gaps and compromise the quality of learning.

Synthesis and Research Gap

Despite the growing body of research on artificial intelligence in education, several scientific gaps persist:

- Dominance of Western studies, with limited African empirical data
- Fragmented approaches that focus either on performance or on technology, but rarely on both
- Limited integration of academic integrity as a central variable
- Absence of integrated models combining AI use, cognition, and academic quality

Therefore, there is a clear need for contextualized empirical research to understand the real effects of AI in African universities.

Positioning of the Present Study

From this perspective, the present research is an empirical contribution aimed at analyzing the impact of artificial intelligence use on the quality of higher education at the University of Ngaoundéré (Cameroon).

Methodology

Research Design

This study adopts a Cross-sectional descriptive survey. Its objective is to examine the relationships between artificial intelligence use and the quality of higher education. The research design is cross-sectional, allowing data to be collected at a single point in time from a sample of university students. This approach is particularly suitable for exploratory studies in contexts where longitudinal data are difficult to obtain. The study follows a hypothetico-deductive logic and aims to test a set of hypotheses derived from the scientific literature.

Study Setting and Population

The target population consists of a total of 2700 students enrolled at the University of Ngaoundéré (Cameroon), a public higher education institution with several schools. The distribution of the target population by school was as follows:

- University Institute of Technology (IUT) ; 1500 students.

- The School of Geology and Mining (EGEM); 200 students.

- School of Chemical Engineering and Mineral Industries (EGCIM); 300 students.

- Faculty of Educational Sciences (FSE); 700 students.

These institutions span a wide range of disciplines (management sciences, engineering, education, and technology), ensuring diversity in academic profiles and digital practices.

Sampling

The study relies on a non-probability stratified sampling strategy where only students from fours out of ten schools of the University of Ngaoundere were included in the study. This method was chosen to select students with demonstrated experience using digital tools and artificial intelligence in their academic work. The final sample comprises 70 students. This was due to several factors such as limited accessibility to the entire university population and limited time for the collection of data. Despite its small size, the sample is adequate for exploratory research, particularly in African contexts where data collection constraints are substantial.

Data Collection Instrument

Data were collected using a structured self-administered questionnaire developed by the authors following a review of the literature on artificial intelligence in higher education, academic autonomy, academic integrity, and AI governance (e.g., Zawacki-Richter et al., 2019; Holmes et al., 2022; Cotton et al., 2023;

Malik et al., 2025). The questionnaire was designed to address the objectives of the study and to reflect the context of the University of Ngaoundéré.

The questionnaire consisted of **12 items** organized into five sections:

Section A: Demographic characteristics (4 items) – sex, age, level of study, and field of study.

Section B: Artificial intelligence use (2 items) – use of AI for preparing academic work and use of AI to facilitate understanding of course concepts.

Section C: Academic autonomy and cognitive engagement (2 items) – dependence on AI for completing academic work and the perceived influence of excessive AI use on knowledge acquisition.

Section D: Academic integrity (1 item) – perception of the relationship between AI use and academic plagiarism.

Section E: Institutional regulation of AI (3 items) – the need for an institutional AI policy, responsible AI training for students, and supervised pedagogical integration of AI by instructors.

Items in Sections B to E were measured using a **five-point Likert scale** ranging from **1 = Strongly disagree** to **5 = Strongly agree**, while Section A consisted of categorical demographic questions.

Variable Construction

Independent Variable (IV):

- Use of artificial intelligence (frequency, intensity, types of use)

Reliability and Validity of Instruments

The internal consistency of the scales was assessed using Cronbach's alpha coefficient. A minimum threshold of 0.70 is generally considered acceptable in social sciences and education research.

Ethical consideration

This study adheres to the fundamental ethical principles governing research in the social sciences and humanities. Respondents' anonymity was guaranteed throughout the data collection and processing phases to ensure confidentiality. Participation was strictly voluntary and free from coercion. No sensitive or personal data was collected. Finally, all information and results are used exclusively for academic and scientific purposes.

Results and Discussion

Table 1: Demographic Characteristics of the Respondents (N = 70)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	51	72.9
	Female	19	27.1
	Total	70	100.0
Age (Years)	Below 25	39	55.7
	25 and Above	31	44.3
	Total	70	100.0
Level of Study	Undergraduate (Licence)	47	67.1
	Master's	14	20.0
	Doctoral	9	12.9
	Total	70	100.0
Field of Study	Sciences and Technology	35	50.0
	Social Sciences	15	21.4
	Educational Sciences	13	18.6
	Others	7	10.0
	Total	70	100.0

The study included a total of 70 students from the University of Ngaoundéré. The demographic distribution of the respondents indicates a predominantly male sample, with 51 male students representing 72.9% of the respondents, while 19 female students accounted for 27.1%. Regarding age, the majority of the respondents were below 25 years, comprising 39 students (55.7%), whereas 31 students (44.3%) were 25 years and above. Analysis of the respondents' educational level revealed that the largest proportion of the participants were undergraduate (Licence) students, accounting for 47 respondents (67.1%). This was followed by Master's students with 14 respondents (20.0%), while Doctoral students constituted 9 respondents (12.9%). With respect to the field of study, Sciences and Technology recorded the highest representation with 35 respondents (50.0%), followed by Social Sciences with 15 respondents (21.4%), Educational Sciences with 13 respondents (18.6%), and other fields with 7 respondents (10.0%).

Research Question 1

What relationship exists between the use of artificial intelligence and students' academic autonomy at the University of Ngaoundéré, Cameroon?

H_{01}: There is no significant relationship between the use of artificial intelligence and students' academic autonomy at the University of Ngaoundéré, Cameroon.

Table 2: Correlation between Artificial Intelligence Use and Academic Autonomy

Variables	Mean	SD	r-value	p-value	Decision
AI Use	1.84	0.37	-0.41	.000	Reject H_{01}

Academic Autonomy	1.56	0.49

Table 2 shows that AI use had a mean of 1.84 (SD = 0.37), while academic autonomy had a mean of 1.56 (SD = 0.49). The correlation coefficient (r = -0.41) indicates a moderate negative relationship between AI use and academic autonomy. Since the p-value (.000) is less than 0.05, the relationship is statistically significant. Therefore, H_{01} was rejected, indicating that AI use has a significant negative relationship with students' academic autonomy.

Research Question 2

What relationship exists between the use of artificial intelligence and students' academic dependence at the University of Ngaoundéré, Cameroon?

H_{02}: There is no significant relationship between the use of artificial intelligence and students' academic dependence at the University of Ngaoundéré, Cameroon.

Table 3: Correlation between Artificial Intelligence Use and Academic Dependence

Variables	Mean	SD	r-value	p-value	Decision
AI Use	1.84	0.37	0.62	.000	Reject H_{02}
Academic Dependence	1.62	0.47			

Table 3 indicates that AI use had a mean of 1.84 (SD = 0.37), while academic dependence had a mean of 1.62 (SD = 0.47). The correlation coefficient (r = 0.62) shows a strong positive relationship between AI use and academic dependence. Since the p-value (.000) is less than 0.05, the relationship is statistically significant. Therefore, H_{02} was rejected, indicating that AI use has a significant positive relationship with students' academic dependence.

Research Question 3

What relationship exists between the use of artificial intelligence and academic integrity among students at the University of Ngaoundéré, Cameroon?

H_{03}: There is no significant relationship between the use of artificial intelligence and academic integrity among students at the University of Ngaoundéré, Cameroon.

Table 4. Correlation between Artificial Intelligence Use and Academic Integrity

Variables	Mean	SD	r-value	p-value	Decision
AI Use	1.84	0.37	-0.38	.000	Reject H_{03}

Academic Integrity	1.78	0.41

Table 4 shows that AI use had a mean of 1.84 (SD = 0.37), while academic integrity had a mean of 1.78 (SD = 0.41). The correlation coefficient (r = -0.38) indicates a weak negative relationship between AI use and academic integrity. Since the p-value (.000) is less than 0.05, the relationship is statistically significant. Therefore, H_{03} was rejected, indicating that AI use has a significant negative relationship with students' academic integrity.

Discussion of Findings

The finding revealed a significant moderate negative relationship between artificial intelligence use and students' academic autonomy, indicating that increased AI use reduces students' ability to work independently. This finding agrees with Selwyn (2019) and Cotton et al. (2023), who reported that excessive reliance on AI may weaken critical thinking and independent learning. The study also found a significant strong positive relationship between artificial intelligence use and students' academic dependence, suggesting that increased AI use leads to greater reliance on AI for academic tasks. This finding is consistent with Dwivedi et al. (2023) and Mudenda et al. (2026), who observed that frequent AI use increases students' dependence on intelligent technologies. Furthermore, the study revealed a significant weak negative relationship between artificial intelligence use and academic integrity, indicating that increased AI use may reduce academic integrity. This finding supports Cotton et al. (2023) and Malik et al. (2025), who emphasized that the widespread use of generative AI poses ethical challenges and increases the risk of academic misconduct.

Conclusion

The study concludes that the use of artificial intelligence has a significant influence on students' academic experiences at the University of Ngaoundéré. While AI offers valuable support for learning and academic tasks, increased use is associated with reduced academic autonomy, greater academic dependence, and lower academic integrity. These findings suggest that although AI has the potential to enhance higher education, its use should be guided by appropriate institutional policies and ethical practices to promote independent learning, critical thinking, and academic integrity.

Recommendations

Based on the findings of the study, the following recommendations were made.

1. Based on the finding that increased AI use was associated with lower academic autonomy, the University should encourage students to use artificial intelligence as a supplementary learning tool

while promoting independent learning, critical thinking, and problem-solving through learner-centered teaching approaches.

2. Based on the finding that increased AI use was associated with higher academic dependence, lecturers should design assessment methods that require students to demonstrate original thinking, creativity, and analytical skills, thereby reducing excessive reliance on artificial intelligence.

3. Based on the finding that increased AI use was associated with lower academic integrity, the University should develop and enforce clear policies on the ethical use of artificial intelligence, accompanied by regular training on academic integrity, responsible AI use, and plagiarism prevention.

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