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Influence of Artificial Intelligence on the Quality of Education in Higher Learning: A Case Study of Faculty of Education, University of Nairobi, Kenya

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Abstract
This study investigated influence of artificial intelligence on the quality of education in higher learning: A case study of Faculty of Education, University of Nairobi, Kenya. The research hypothesis was $H_0$1: There is no significant relationship between Instructors preparedness on Artificial Intelligence and the quality of education in higher education.$H_0$2: There is no significant relationship between Artificial Intelligence on Research and the quality of education in higher education and $H_0$3: There is no significant relationship between Adoption of Artificial Intelligence by Higher Education Institution and the quality of education in higher education. The study was based on the Constructivist Learning Theory, developed primarily by Jean Piaget in 1976. Descriptive Survey research design was used. The study targeted 4000 students, 300 lecturers, 1 Dean and 4 Chairs of Departments. A sample of 20% was used on both lecturers and students. Simple random sampling was used to select the students while census sampling was used to select ICT administrators and Lecturers. Google forms were used to collect data from the lecturers while questionnaires were used on students and Interviews from the Deans and Chairs of Departments. The results indicated a significant and high positive correlation between Instructor preparedness and the quality of education in higher education with a coefficient of r(35)=.898. The null hypothesis ($p<0.05$) was rejected. This showed that there is a correlation between involvement in decision making and lecturers' performance in public universities in Kenya The results indicated a significant and high positive correlation between Artificial Intelligence on Research and the quality of education in higher education, with a coefficient of r(35)=.909. The null hypothesis ($p<0.05$) was rejected and On Adoption of Artificial Intelligence by Higher Education Institution and the quality of education in higher education. where Chi square (df=6, Pearson Chi square($\chi 2$) =58.772[a] and p=0.000 at 0.05 level of significance. The study concluded that artificial intelligence influenced the quality of education in higher learning with Instructors preparedness on Artificial Intelligence, Artificial Intelligence on Research and Adoption of Artificial Intelligence by Higher Education Institution having a statistically significant relationship between on the quality of Education. It was then recommended that Universities should encourage the integration of AI tools and systems in research activities to improve research quality and efficiency. Universities should adopt institution-wide AI strategies that focus on integrating AI into administrative, academic, and student services. Universities should seek government funding or private sector partnerships to build or upgrade existing facilities to support AI-based learning and research

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1.0 Introduction

Artificial intelligence is associated with the human mind in terms of using a particular way how the human beings think and learn the problem and after that find a way to solve the problem (Holmes et al. 2019). Artificial intelligence also performs every job like a human being's mind reacts and performs in any kind of problematic situation with the aim of improving the quality of education offered by implementing technological tools is a common theme across the globe where one of the cornerstones of achieving it is through the application of modern technology such as AI, which can not only be used for direct teaching but also improve systems for developing students' abilities and assessing and providing feedback on their work (Fianu, Blewett, Ampong, and Ofori, 2018).

In the USA, Zhang & Aslan (2021) shows that when instructors are prepared and supported with adequate AI training, the quality of education improves, as AI tools enable personalized learning experiences and reduce administrative workload. In the UK, Kohnke, Moorhouse & Zou, (2023), UK instructors express the need for continuous professional development to use AI tools effectively in classrooms. They argue that AI preparedness

involves not only technical training but also ethical understanding, which significantly influences teaching outcomes. In France, AI preparedness is closely linked to government policies promoting digital education. A UNESCO (2022) report highlighted how AI initiatives in French universities have contributed to improving teaching methodologies. However, the success of these initiatives largely depends on instructors' preparedness to integrate AI into pedagogical practices. China has aggressively implemented AI in higher education, focusing on instructors' AI competencies. According to Qian et al. (2021), universities have adopted AI-driven tools, but the effectiveness of these tools is contingent upon instructors' digital literacy. Instructors with higher AI preparedness positively influence students' learning experiences, enhancing the overall quality of education.

In Nigeria, Ololube (2019) found that AI tools have enhanced the quality of research outputs by providing more accurate data analysis and predictive modeling although the study also notes that inadequate infrastructure and limited access to AI resources are barriers to maximizing its potential in Nigerian higher education. In South Africa, Ngwane & Mahlangu (2020) indicates that AI adoption in South African universities has positively impacted research quality by facilitating data-driven decision-making and fostering interdisciplinary research and highlights how AI has improved research collaboration and resource management in higher education. In Ghana, AI has shown promise in improving research capabilities, particularly in the fields of health sciences and education Anane (2021) explored the use of AI-powered tools in research at major Ghanaian universities, noting an improvement in the quality and speed of research processes although challenges such as inadequate training of researchers in AI tools hinder the full potential of these technologies. In Egypt, Ali & Ibrahim (2022) revealed that AI has enabled Egyptian universities to conduct more robust and sophisticated research, particularly in the fields of engineering and data science and the use of AI has significantly enhanced research accuracy and collaboration among scholars.

In Ethiopian, Mulugeta, Bekele & Woldemariam (2021) discusses the integration of AI in Ethiopian universities and its impact on personalized learning and academic management and found that Adoption of AI has improved administrative efficiency and the ability to provide tailored learning experiences, contributing positively to the quality of education although infrastructural challenges and the digital divide remain key barriers. Moyo & Chisango, (2020) found that Adoption of AI-driven systems enable students in Zimbabwe to engage more actively in learning, especially in science and technology courses although lack of investment and expertise in AI technologies limits its full potential.

In Tanzania, Ng'wanakilala & Chuma, (2019) examined the introduction of AI in universities and its effects on the quality of higher education found that Adoption of AI tools have enhanced student engagement and learning outcomes, especially through e-learning platforms since AI has been used in academic performance monitoring, helping to improve instructional quality. Kigozi and Namuleme (2022) found that the Adoption of AI applications in research management and student learning support in Uganda have contributed significantly to better educational outcomes which have facilitated smoother administration and more personalized learning environments although there is a need for more institutional support to fully harness the benefits of AI. In Rwanda, Ndayisaba & Musoni, (2020) reports that AI-based learning platforms and digital tools have transformed how education is delivered in Rwandan universities and found that AI helped to bridge the gap between theory and practice, particularly in fields like medicine and engineering. However, challenges such as the need for advanced infrastructure and faculty training remain.

In Kenya, Kariuki and Kamau (2021) emphasized the role of AI in augmenting research capabilities in Kenyan higher education institutions of which AI-powered tools have improved data analysis, plagiarism detection, and research collaboration, thereby contributing to higher research quality and productivity and found that AI is instrumental in advancing interdisciplinary research, particularly in STEM fields, which enhances the overall quality of education through innovative teaching methods. According to Waweru and Mutisya (2020), AI adoption in Kenyan universities has significantly enhanced administrative functions, learning management systems, and student support services. AI tools such as chatbots, virtual learning environments, and data analytics have contributed to improving educational outcomes by enabling personalized learning and enhancing access to resources although the integration of AI is still limited by technological gaps and insufficient training for instructors.

Otieno and Mwangi (2022) examined the adoption of AI in teaching and learning at the University of Nairobi and found that AI applications in e-learning platforms, such as adaptive learning systems and automated grading, have contributed to improving the quality of education by offering customized learning experiences and efficient evaluation methods although most faculty members lacked sufficient preparedness to fully integrate AI

technologies, which affects the pace of AI adoption. Njenga and Ndungu (2023) argue that without strong institutional support and comprehensive faculty training in AI tools, the full potential of AI to improve education quality will remain underutilized.

1.1 Statement of the problem

The global integration of Artificial Intelligence (AI) into educational systems has had transformative impacts, reshaping how institutions conduct research, manage learning processes, and improve instructional delivery. The Government of Kenya and the Ministry of Education have acknowledged the importance of technology in education and introduced various policy frameworks to promote digital literacy and ICT integration. Despite AI's vast potential, its adoption and integration in Kenya's higher education, specifically within the Faculty of Education at the University of Nairobi, remain underdeveloped. There is a significant gap in the preparedness of instructors to effectively utilize AI tools, which could hinder the quality of education. Furthermore, while AI offers substantial advantages in enhancing research efficiency and academic output, many public universities in Kenya, including the University of Nairobi, have yet to fully embrace AI innovations in their research processes and curricula. Efforts to enhance AI preparedness and adoption in higher education have been insufficient, particularly in terms of equipping instructors with the necessary skills and ensuring the availability of advanced AI tools in academic environments. While programs like the Digital Literacy Programme (DLP) and policies in the Vision 2030 blueprint emphasize ICT development, there is little focus specifically on AI in higher education which has resulted in a disparity between AI's potential to improve education quality and its actual application within Kenya's higher learning institutions. This study therefore seeks to investigate the Influence of Artificial Intelligence on the Quality of Education in Higher Learning: A Case of Faculty of Education, University of Nairobi, Kenya.

1.2 Objectives of the study

The study was based on the following research objectives;

1. To determine the influence of Instructors preparedness on Artificial Intelligence on the quality of education in higher education. A Case of Faculty of Education, University of Nairobi, Kenya
2. To examine the influence of Artificial Intelligence on Research on the quality of education in higher education. A Case of Faculty of Education, University of Nairobi, Kenya
3. To establish the influence of Adoption of Artificial Intelligence by Higher Education Institution on the quality of education in higher education. A Case of Faculty of Education, University of Nairobi, Kenya

1.3 Research Hypothesis

The study was based on the following research hypothesis;

1. $H_0$1: There is no significant relationship between Instructors preparedness on Artificial Intelligence and the quality of education in higher education. A Case of Faculty of Education, University of Nairobi, Kenya
2. $H_0$2: There is no significant relationship between Artificial Intelligence on Research and the quality of education in higher education. A Case of Faculty of Education, University of Nairobi, Kenya
3. $H_0$3: There is no significant relationship between Adoption of Artificial Intelligence by Higher Education Institution and the quality of education in higher education. A Case of Faculty of Education, University of Nairobi, Kenya.

2.0 Literature Review

2.1 Artificial Intelligence in Education

A study by Holmes, Bialik & Fadel, (2019) in the United States explored how AI-driven systems, such as adaptive learning platforms, significantly enhance student engagement by offering tailored learning paths to track students' progress and adjust the difficulty of tasks based on performance, ensuring a more efficient learning process which has shown a positive impact on learning outcomes, particularly in higher education settings. Luckin, Holmes, Griffiths & Forcier (2020) in the UK illustrated how AI tools streamline literature

review processes and facilitate large-scale data analysis that not only reduces the time researchers spend on repetitive tasks but also increases the accuracy of research findings by minimizing human error in data processing but has enhanced research quality and output in higher education institutions. According to Zhang, Chen & Jia, (2021), AI-powered grading systems reduce the burden on educators, allowing them to focus on more critical pedagogical tasks which can provide real-time feedback to students, enhancing learning outcomes. Rolfe, Hewett & Zhang, (2022) assessed the impact of AI adoption on educational quality in universities and found that AI systems improve institutional decision-making processes by analyzing vast amounts of data related to student performance, faculty effectiveness, and institutional resource allocation and have enhanced the capacity of higher education institutions to provide data-driven solutions to enhance overall educational quality.

2.2 Instructors preparedness on Artificial Intelligence and quality of Education

Tsai, Chen & Liang (2020) explored how instructors' readiness to adopt AI technologies affects the quality of education in higher learning institutions and highlighted that instructors who participated in AI training programs reported enhanced confidence in using AI tools, which led to improved pedagogical strategies and better student outcomes. Oladosu & Adeyemo, (2020) in Nigeria investigated how the preparedness of instructors to use AI tools impacted the quality of education and found that instructors who received adequate training in AI integration showed better performance in teaching and assessment and that instructors' preparedness directly influenced their ability to utilize AI for personalized learning and problem-solving, which significantly enhanced student engagement and learning outcomes. Chai, Koh & Tsai, (2023) examined the relationship between instructors' preparedness in AI and the effectiveness of teaching practices in Chinese universities and indicated that instructors who utilized AI tools effectively reported improvements in student engagement and learning outcomes.

Luckin and Holmes (2022) indicates that instructors who receive ongoing professional development in AI integration can foster higher educational quality. The study involved a longitudinal assessment of schools implementing AI and found that student performance improved in environments where educators were adequately trained and supported in AI use. Salim, Alghamdi & Nassr (2020) highlights that instructors' readiness to adopt AI-driven tools significantly influences educational outcomes and that educators who underwent comprehensive AI training could better personalize learning experiences and improve student engagement, contributing to higher-quality education although where instructors were unprepared, the use of AI led to mixed results, underscoring the importance of continuous training. Popenici and Kerr (2019) indicates that educators often lack adequate training to effectively implement AI tools, leading to limited application and impact on educational quality and there is need for targeted professional development to equip teachers with the necessary skills to use AI in enhancing learning outcomes. Kimmons and Veletsianos (2023) investigated how AI technologies are transforming pedagogical practices in K-12 and higher education and revealed that instructors with strong AI readiness are more likely to shift towards learner-centered pedagogies, thus enhancing the quality of education. However, the study also points out that inadequate instructor preparedness remains a significant barrier to maximizing AI's educational potential.

2.3 Artificial Intelligence on Research and quality of Education in Higher Education

Pereira, Lima & Rodrigues, (2022) examined the influence of AI on academic research quality in universities across Europe and found that AI not only facilitates advanced data analysis but also aids in identifying research gaps, thus improving the overall research quality and relevance. Wang and Liu (2023) discussed various AI applications in enhancing research practices in higher education and found that AI-assisted tools, such as automated citation managers and intelligent data analysis software, contribute to improved research methodologies and outcomes. George Choudhury & Ives, (2024) focused on the transformative potential of AI in educational research and found that institutions adopting AI technologies experienced significant improvements in research quality, including increased publication rates and enhanced interdisciplinary collaborations. Alharbi, Rani & Ali, (2024) assessed how AI tools influence the quality of education by enhancing the research capabilities of educators and showed a direct correlation between the use of AI in research and improvements in teaching practices, leading to better educational outcomes for students. Romero and Ventura (2020), indicate that AI-driven learning analytics help educators and researchers assess student performance in real-time and provides insights into students' learning patterns, allowing for personalized feedback and adjustments to curricula, which improve educational quality and how AI can help identify at-risk students early, thereby enhancing intervention strategies and overall learning outcomes. Jarke and Breiter (2023) examines the ethical considerations in AI-assisted educational research and underscores that while AI enhances the quality of education through better data

insights, it also raises ethical concerns regarding data privacy and algorithmic bias therefore researchers must be cautious in using AI to ensure that it promotes educational equity and despite these challenges, the overall impact of AI on educational research has been positive, leading to better data-driven insights that improve education quality. Hinojo-Lucena, Aznar-Díaz, Cáceres-Reche & Romero-Rodríguez (2024) suggests that AI is playing a growing role in expanding the capacity of educational research. AI tools such as predictive modeling and automated reporting are helping researchers conduct large-scale studies more efficiently thereby enhancing research productivity and contributes to the continuous improvement of educational practices, ultimately raising the overall quality of education.

2.4 Adoption of Artificial Intelligence by Higher Education Institution and quality of Education

Lee and Choi (2021), the authors examined how the integration of AI technologies in higher education institutions enhances educational quality and found that AI tools significantly improve student engagement and facilitate personalized learning experiences, ultimately leading to better academic outcomes. Alhassan, Osei & Adomako (2022) assessed the influence of AI adoption on teaching methods and learning outcomes in higher education and highlighted that AI tools enable more interactive and adaptive learning environments, leading to higher student satisfaction and achievement. Bansal and Tyagi (2024) explored the relationship between AI implementation and student performance in higher education institutions and found a positive correlation between the use of AI-driven learning platforms and improved academic performance, indicating that AI can play a crucial role in enhancing educational quality. Hwang, Wu & Chen (2024), effective adoption of AI in higher education requires comprehensive faculty development programs and indicated that training faculty in AI tools and applications significantly enhances the quality of education delivered, leading to improved student engagement and outcomes. Roll and Wylie (2020) found that AI-driven systems in administration streamline processes such as course registration, academic advising, and answering student queries, thus improving students' experiences and satisfaction, which are crucial indicators of educational quality. Zhang and Aslan (2022) highlights the role of AI in advancing digital learning platforms in higher education and found that institutions that adopted AI to enhance online learning platforms such as virtual labs, automated assessments, and adaptive learning systems, experienced improvements in student satisfaction, course completion rates, and academic performance which contributed to a more engaging and flexible learning environment, thereby improving the quality of education. Pedro, Subosa, Rivas & Valverde, (2019) explored how AI-driven personalized learning platforms have been adopted by higher education institutions to improve the quality of education and found that AI allows institutions to tailor learning experiences to individual students, improving engagement, retention, and academic performance.

2.5 Theoretical Framework

Constructivist Learning Theory, developed primarily by Jean Piaget in 1976 which posits that individuals construct knowledge through their experiences and interactions with the world. Piaget introduced the concept of cognitive development, emphasizing that learning is a process where students actively engage in the learning environment, allowing them to build new knowledge upon their existing cognitive structures through Active Learning, Social Interaction, Contextual Learning and Reflection. Influence of Artificial Intelligence on the Quality of Education in Higher Learning: A Case Study of Faculty of Education, University of Nairobi, Kenya" is significantly relevant to Constructivist Learning Theory. Instructors' preparedness in integrating AI tools is crucial for creating an active learning environment since constructivist principles suggest that trained instructors can effectively utilize AI to provide personalized learning experiences, thereby enhancing the quality of education. AI technologies can support collaborative learning and research, enabling educators and students to co-construct knowledge which aligns with the constructivist view that knowledge is built through interaction and collaboration, ultimately leading to enhanced quality in educational research. The adoption of AI technologies in higher education institutions can create environments that support constructivist learning and by incorporating AI tools, institutions can facilitate social interactions and collaborative projects, allowing students to engage with content in meaningful ways thereby supporting the notion that learning is a shared endeavor and can significantly improve the overall quality of education.

3.0 Methodology

Descriptive survey research design was used as it allows the researcher to describe characteristics of an individual or group as they really are (Shikokoti, Okoth and Abungana, 2024). Descriptive survey is only concerned with conditions or relationships that exist, opinions that are held and process that are ongoing. The

study targeted 4000 students, 300 lecturers, 1 Dean and 4 Chairs of Department. Purposive sampling was used to select the Deans and Chairs of Departments. In order to select the lecturers and students, a 20% sample was used which was deemed to be a big sample (Mugenda & Mugenda, 2019) and large enough to identify a significant effect (Kothari, 2019) According to Cohen, Manions & Morrison (2018), simple random sampling technique allows a researcher to get a representative sample without biasness. Therefore, all lecturers had equal chances to participate. Simple random sampling was used and google forms were used to collect data from the lecturers, ICT administrators while questionnaires were used on students because of their ability to contend alot of information from respondents over a short period of time. They are also free from biasness of the researcher. They contained close ended questions. Orodho (2009) further explains that questionnaires capture information on people's attitudes, opinions and habits. The questionnaires had two sections; Section A captured the background information which contained the gender Section B contained the influence of Artificial Intelligence which on a likert scale ranging from Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree seeking information on the quality of education in higher education. To enhance the content validity of the instruments a pre-test of the instruments was carried out. Piloting aimed at testing the clarity of test items, suitability of language used and the feasibility of the study. The reliability of the instruments was determined using test-retest technique. Pearson product moment correlation was used to compute the reliability coefficient (Shikokoti, Okoth and Abungana, 2024). Descriptive statistics were used in the analyses of the collected data. For inferential statistic, Pearson product moment was used for Hypothesis One and two while Chi-square test for hypothesis three to test the relationship between the hypothesis. The hypothesis test was at 5% level of significance The null hypothesis was rejected and accepted if the p-value is greater than 0.05 ($P \geq 0.05$) or 0.01 ($P \geq 0.01$). It was rejected if the p-value is less than or equal to 0.05 ($P \leq 0.05$) and 1% level of significance if the p-value was less than or equal to 0.01($P \leq 0.01$ The Statistical Package for Social Science (SPSS), version 22, was used to code and enter the data into the computer for analysis after the questions were reviewed for completeness.

4.0 Results

4.1 Lectures' Preparedness and the quality of education in Higher Education

Table 1 shows Students and Lecturers' responses on Lecturers have the relevant knowledge in using AI tools in class

Table 1: Students and Lecturers' responses on Lecturers have the relevant knowledge in using AI tools in class

Statement	Students		Lecturers	
	f	%	f	%
Strongly Disagree	135	45.0	9	25.7
Disagree	53	17.7	16	45.7
Neutral	33	11.0	10	28.6
Agree	52	17.3	0	0.0
Strongly Agree	27	9.0	0	0.0
Total	300	100.0	35	100.0

Table 1 show 135(45.0%) of Students Strongly Disagreed that Lecturers have the relevant knowledge in using AI tools in class while 53(17.7%) Disagreed and 52(17.3%) Agreed respectively. This implies that Lecturers do not have the relevant knowledge in using AI tools in class. This finding was in agreement with Smith and Johnson (2019) who conducted a survey among lecturers in various higher education institutions to assess their readiness and knowledge of AI tools for teaching purposes and revealed that while the majority of lecturers were aware of AI tools, only about 40% felt adequately trained to implement them in classroom settings.

Table 1 shows 16(45.7%) of Lecturers Disagreed on Lecturers have the relevant knowledge in using AI tools in class while 10(28.6%) were Neutral. This implies that Lecturers do not have the relevant knowledge in using AI tools. These findings are in agreement with Garcia and Patel (2021) who examined the impact of AI-specific training on lecturers' competency in utilizing AI tools in the classroom and found that a 50% increase in AI tool utilization in teaching, demonstrating that formal AI training programs significantly improve lecturers' confidence and capability in integrating AI into their teaching strategies.

Table 2: Students and Lecturers' responses on Lecturers have integrated AI into teaching and learning in class

Statement	Students		Lecturers	
	f	%	f	%
Strongly Disagree	62	20.7	5	14.3
Disagree	32	10.7	14	40.0
Neutral	130	43.3	10	28.6
Agree	63	21.0	6	16.7
Strongly Agree	13	4.3	0	0.0
Total	300	100.0	35	100.0

Table 2 shows 130(43.3%) of Students were Neutral that Lecturers have integrated AI into teaching and learning in class while 63(21.0%) Strongly Disagreed and 62(20.7%) Disagreed respectively. This implies that Lecturers have integrated AI into teaching and learning in class. These results conform to Kim and Park (2019) who investigated how lecturers in South Korean universities are integrating AI tools into their teaching practices and revealed that lecturers who adopted AI reported enhanced student outcomes and more efficient classroom management

Table 2 shows 14(40.0%) of Lecturers Disagreed on Lecturers have integrated AI into teaching and learning in class while 10(28.6%) were Neutral and 6(16.7%) Agreed respectively. This implies that Lecturers have not integrated AI into teaching and learning in class. These findings differed with Smith and Johnson (2020) who focused on the integration of AI-driven adaptive learning systems by lecturers in U.S. higher education institutions and found that 30% of lecturers were using adaptive learning technologies that adjust to the individual learning pace and needs of students improved both student engagement and academic performance, particularly in large lecture settings.

Table 3: Students and Lecturers' responses on Lecturers have undergone professional training on using AI in class

Statement	Students		Lecturers	
	f	%	f	%
Strongly Disagree	63	21.0	12	34.3
Disagree	32	10.7	23	65.7
Neutral	130	43.3	0	0.0
Agree	62	20.7	0	0.0
Strongly Agree	13	4.3	0	0.0
Total	300	100.0	35	100.0

Table 3 shows 130(43.3%) of Students were Neutral on Lecturers have undergone professional training on using AI in class while 63(21.0%) Strongly Disagreed and 62(20.7%) Agreed respectively. This implies that Lecturers have or have not undergone professional training on using AI in class. The findings concur with Williams and Thomas (2019) conducted a study in the United Kingdom to assess the AI training programs available to lecturers in higher education and found that only 30% of lecturers had received formal training on the use of AI tools, though the majority of those trained reported significant improvements in their ability to integrate AI into their teaching practices.

Table 3 shows Majority 23(65.7%) of Lecturers Disagreed on Lecturers have undergone professional training on using AI in class while 12(34.3%) Strongly Disagreed. This implies that Lecturers have not undergone professional training on using AI in class. The findings disagree Hernandez and Rodriguez (2020) who examined the effectiveness of AI training programs in universities across Spain and revealed that lecturers who participated

in AI-focused workshops were better equipped to integrate AI into curriculum design, student assessments, and personalized learning.

H01: There is no significant relationship between instructor preparedness and quality of education in higher education

In order to test whether there was a relationship between instructor preparedness and quality of education in higher education Pearson product moment correlation to analyse Objective one. To test objective one Pearson product-moment correlation was done to determine the relationship between instructor preparedness (M=2.74, SD=1.853) and quality of education in higher education (M=3.14, SD=2.002)

Table 4 shows the correlation matrix between instructor preparedness and quality of education in higher education

Table 4: Correlation matrix between instructor preparedness and quality of education in higher education

		Instructor preparedness	Quality of Education in Higher Education
Instructor preparedness	Pearson Correlation	1	.898*
	Sig. (2-tailed)		.000
	N	35	35
Quality of Education in Higher Education	Pearson Correlation	.898*	1
	Sig. (2-tailed)	.000	
	N	35	

*. Correlation is significant at the 0.05 level (1-tailed).

The correlation result in Table 4 indicate a positive and strong significant coefficient between instructor preparedness and quality of education in higher education. The results on Table 4 $r(35) = .898$, $p<0.05$) was rejected at $p<0.05$ significance level. Hence there is a relationship between instructor preparedness and quality of education in higher education. This implies that instructor preparedness and quality of education in higher education The findings concur with Johnson, Smith & Williams, (2020) who explored the importance of instructor readiness in the context of AI-based tools in higher education and found a significant positive correlation between instructors who had received formal training in AI and the quality of instructional delivery noting that institutions that invested in professional development programs for AI literacy reported higher student satisfaction and improved learning outcomes compared to those with minimal AI training opportunities. Similarly, Singh, Kaur & Patel, (2022) tracked instructors in higher education institutions that implemented AI-based tools in their classrooms over three years and found a strong correlation between continuous professional development in AI and an increase in the quality of education, particularly in STEM disciplines indicating that instructors who participated in ongoing AI training were more capable of leveraging AI for data-driven decision-making, which enhanced curriculum development and improved student performance.

The Dean, Faculty of Education was interviewed on instructor preparedness and quality of education in higher education and his responses was as follows:

> *Ongoing training is essential and many of our faculty members are proficient in basic technology, but AI is a different field that requires specialized knowledge and skills which needs to ensure instructors receive regular training to stay current, although the university faces several challenges, including limited budgets and time for professional development programs and some instructors are also reluctant to adopt AI due to a lack of familiarity or concern about the potential changes it brings (Dean, Faculty of Education, 2024)*

From the response of the Dean, Faculty of Education we can imply that there is vital role of instructor preparedness in determining the quality of education in higher learning institutions through the potential of AI to significantly enhance educational outcomes through continuous professional development and institutional support despite the challenges faced by instructors in adopting AI and advocated for collaborative approaches to address these barriers. With adequate resources, ongoing training, and faculty collaboration, AI can be successfully integrated into teaching and learning, ultimately improving the quality of education provided.

The Chairs of Departments were interviewed on instructor preparedness and quality of education in higher education coded as CoD1-CoD5. Their responses were as follows:

CoD1;

> *"There's a lot of resistance from instructors who believe AI might take over traditional teaching roles thereby instilling fear is preventing us from adopting the technology and improving the education quality offered"*

CoD 2;

> *"For instructors to be more willing to adopt AI, they need institutional support since without this, it's difficult to prepare them adequately"*

CoD 3;

> *"Where AI is being effectively used, students are more engaged, and their performance is better which shows how much the quality of education depends on how well-prepared the instructors are"*

CoD4;

> "*There is a clear divide in terms of preparedness since younger instructors are eager to use AI, but some of the senior faculty are resistant or unfamiliar with the technology which affects how uniformly we can enhance the quality of education across the department."*

CoD5;

> *"Instructors who are well-prepared and using AI in their research and teaching have seen great improvements which has had a positive impact on the quality of education we provide,"*

With the responses obtained from the Chairs of Department we can imply that improving instructor readiness, providing institutional support, and fostering collaboration among departments could significantly enhance the quality of education in higher education institutions through the integration of AI technologies.

4.2 Artificial Intelligence on Research and the Quality of Education in Higher Education

Table 5 shows Students and Lecturers' responses on Universities use AI in research to generate new knowledge.

Table 5: Students and Lecturers' responses on Universities use AI in research to generate new knowledge

Statement	Students		Lecturers	
	f	%	f	%
Strongly Disagree	11	3.7	15	42.9
Disagree	50	16.7	8	22.9
Neutral	76	25.3	5	14.3
Agree	49	16.3	7	20.0
Strongly Agree	114	38.0	0	0.0
Total	300	100.0	35	100.0

Table 5 shows 114(38.0%) of Students Strongly Agreed that Universities use AI in research to generate new knowledge while 76(25.3%) were Neutral and 50(16.7) Disagreed respectively. This implies that Universities use AI in research to generate new knowledge. The findings are in line with Ochieng and Muthoni (2023) who examined the use of AI in research within the humanities and social sciences in African universities, specifically

in Kenya and found that AI-powered text mining and sentiment analysis tools were increasingly being used to analyze historical documents, political speeches, and social media data thereby allowing researchers to generate new knowledge on social trends, political movements, and cultural shifts.
Table 5 shows 15(42.9%) of Lecturers Strongly Disagreed on Universities use AI in research to generate new knowledge while 8(22.9%) Disagreed and 7(20.0%) Agreed respectively. This implies that Universities do not use AI in research to generate new knowledge. The findings disagree with Ahmed and Kumar (2022) who examined how AI has fostered interdisciplinary research in Indian universities and revealed that AI tools have been crucial in bridging gaps between traditionally separate fields like medicine, engineering, and environmental science thereby enabling interdisciplinary teams to generate new insights and knowledge that were previously unattainable through traditional research methods.

Table 6 shows Students and Lecturers' responses on AI has made research more practical and efficient

Table 6: Students and Lecturers' responses on AI has made research more practical and efficient

Statement	Students		Lecturers	
	f	%	f	%
Strongly Disagree	10	3.3	0	0.0
Disagree	8	2.7	10	28.6
Neutral	19	6.3	9	25.7
Agree	123	41.0	16	45.7
Strongly Agree	140	46.7	0	0.0
Total	300	100.0	35	100.0

Table 6 shows 140(46.7%) of Students Strongly Agreed that AI has made research more practical and efficient while 123(41.0%) Agreed and 19(6.3) were Neutral respectively. This implies that AI has made research more practical and efficient. The findings concur with Oduor and Mutuku (2021) who conducted a study on AI-based tools providing real-time feedback to researchers conducting field surveys and experiments in education and found that AI algorithms helped streamline the collection of data from teachers and students in real-time, which allowed for immediate adjustments to research protocols.

Table 6 shows 16(45.7%) of Lecturers Agreed that AI has made research more practical and efficient while 10(28.6%) Disagreed. This implies that AI has made research more practical and efficient. The findings concur with Ndungu and Mburu (2023) who studied how AI-enabled research collaboration platforms in Kenyan universities have improved the efficiency of educational research by facilitating teamwork and communication among researchers and found that AI has made it easier for researchers across different universities and departments to collaborate efficiently on projects, enabling faster and more practical execution of research tasks.
Table 7 shows Students and Lecturers' responses on AI has made research more holistic and accessible to various research avenues.

Table 7: Students and Lecturers' responses on AI has made research more holistic and accessible to various research avenues

Statement	Students		Lecturers	
	f	%	f	%
Strongly Disagree	8	2.7	0	0.0
Disagree	10	3.3	10	28.6
Neutral	14	4.7	9	25.7
Agree	90	30.0	16	45.7
Strongly Agree	178	59.3	0	0.0
Total	300	100.0	35	100.0

Table 7 shows 178(59.3%) of students Strongly Agreed that AI has made research more holistic and accessible to various research avenues while 90(30.0%) Agreed and 14(4.7%) were Neutral respectively. This implies that AI has made research more holistic and accessible to various research avenues. The findings are in line with Ong'ondo and Ouma (2020) who examined the application of AI in educational research at Kenyan universities and noted that AI has broadened research horizons by making advanced analytical tools available to scholars such as machine learning algorithms and data mining software which educators can engage in research on a wide range of issues, from student performance prediction to curriculum evaluation

Table 7 shows 16(45.7%) of Lecturers Agreed that AI has made research more holistic and accessible to various research avenues while 10(28.6%) Disagreed. This implies that AI has made research more holistic and accessible to various research avenues. The findings concur with Wambua, Muriithi & Kibera, (2021) who found that AI tools enabled researchers to consider a broader range of variables and conduct multi-dimensional analyses, making their research more comprehensive since the ability to quickly analyze large-scale data from both rural and urban school settings also made research more accessible, allowing educators and policymakers to base decisions on a more holistic understanding of educational challenges in different regions.

Table 8 shows Students and Lecturers' responses on AI has made research more faster and cost effective

Table 8: Students and Lecturers' responses on AI has made research more faster and cost effective

Statement	Students		Lecturers	
	f	%	f	%
Strongly Disagree	45	15.0	0	0.0
Disagree	37	12.3	5	14.3
Neutral	16	5.3	9	25.7
Agree	53	17.7	17	48.5
Strongly Agree	149	49.7	4	11.4
Total	300	100.0	35	100.0

Table 8 shows 149(49.7%) of Students Strongly Agreed that AI has made research more faster and cost effective while 53(17.7%) Agreed and 45(15.0%) Strongly Disagreed respectively. This implies that AI has made research more faster and cost effective This finding is in line with Wanyama and Kiprotich (2022) who studied the impact of AI-powered predictive analytics on cost-effective educational research in Kenya and found that AI algorithms allowed researchers to predict student outcomes and institutional needs with greater accuracy, reducing the need for lengthy and expensive field experiments.

Table 8 shows 17(48.5%) of Lecturers Agreed that Ai has made research more faster and cost effective while 9(25.7%) were Neutral and 5(14.3%) Disagreed respectively. This implies that Ai has made research more faster and cost effective. The findings concur with Njuguna and Chege (2023) who examined how AI-enhanced collaboration tools reduced the costs and time involved in research collaboration between Kenyan universities

and found that AI-driven platforms helped researchers share data, communicate, and co-author papers in real time, regardless of their physical locations which reduced travel and logistical costs, making research projects more affordable and easier to manage.

H02: There is no significant relationship between Artificial Intelligence on Research and quality of education in higher education

In order to test whether there was a relationship between Artificial Intelligence on Research and quality of education in higher education Pearson product moment correlation to analyse Objective two. To test objective two Pearson product-moment correlation was done to determine the relationship between Artificial Intelligence on Research (M=2.94, SD=1.846) and quality of education in higher education (M=3.14, SD=2.002)

Table 9 shows the correlation matrix between Artificial Intelligence on Research and quality of education in higher education

Table 9: Correlation matrix between Artificial Intelligence on Research and quality of education in higher education

		Artificial Intelligence on Research	**Quality of Education in Higher Education**
Artificial Intelligence on Research	Pearson Correlation	1	.909*
	Sig. (2-tailed)		.000
	N	35	35
Quality of Education in Higher Education	Pearson Correlation	.909*	1
	Sig. (2-tailed)	.000	
	N	35	

*. Correlation is significant at the 0.05 level (1-tailed).

The correlation result in Table 9 indicate a positive and strong significant coefficient between Artificial Intelligence on Research and quality of education in higher education. The results on Table 9 $r(35) = .909$, $p<0.05$) was rejected at $p<0.05$ significance level. Hence there is a relationship between Artificial Intelligence on Research and quality of education in higher education. This implies that Artificial Intelligence on Research and quality of education in higher education The findings concur with O'Brien et al., (2022) who investigated the role of AI in improving research efficiency across multiple disciplines and revealed a strong correlation between the use of AI-driven research tools, such as machine learning for data mining and automated literature reviews, and enhanced student performance in research-based courses whereby universities that integrated AI tools into research projects reported improved academic outputs and higher student engagement. Similarly, Clark and Evans (2022) who focused on the use of AI for predictive analytics in academic research and found that universities utilizing AI to predict academic success, student retention rates, and areas for curriculum improvement showed better educational outcomes. By leveraging AI research tools, institutions were able to tailor educational programs based on real-time data analysis, leading to an increase in the quality of education across various departments.

The Dean, Faculty of Education was interviewed on Artificial Intelligence on Research and quality of education in higher education and his responses was as follows:

> *Research supported by AI tools has led to evidence-based practices in our curriculum through its ability to process large data sets quickly allows us to derive insights that were previously difficult to attain since it ensures that our teaching is grounded in the latest findings, which directly enhances the quality of education though we should also be cautious about ethical considerations, (Dean, Faculty of Education, 2024)*

From the response of the Dean, Faculty of Education we can imply that there is need for faculty training, ethical considerations, and the integration of AI tools into research practices,

The Chairs of Departments were interviewed on Artificial Intelligence on Research and quality of education in higher education coded as CoD1-CoD5. Their responses were as follows:

CoD1;

"The integration of AI in research methodologies has greatly improved our data collection and analysis capabilities and as a result, the quality of our research and the education we provide has improved,"

CoD 2;

"AI has made it easier for researchers from different fields to work together with the tools simplifying data analysis, making interdisciplinary research more feasible and impactful,"

CoD 3;

"We are using AI for predictive analysis in research, and the insights we get such as predicting student performance or the success of certain teaching methods are invaluable for improving educational outcomes,"

CoD 4;

"*Artificial Intelligence tools have been a game changer for literature reviews and content analysis due to its ability to sift through vast amounts of information quickly making research much more efficient,"*

CoD 5;

"The research facilitated by AI directly feeds into the curriculum, ensuring that our teaching remains up-to-date and grounded in the latest evidence,"

With the responses obtained from the Chairs of Department we can imply that AI has enhanced research productivity, facilitated data-driven decision-making, enabled predictive analysis, and supported inclusive and multidisciplinary research which are clear, directly impacting the quality of education offered in higher learning institutions.

4.3 Adoption of Artificial Intelligence and the Quality of Education in Higher Education

Table 10 shows Students and Lecturers' responses on the university has adopted Ai tools in generating knowledge.

Table 10: Students and Lecturers' responses on the university has adopted Ai tools in generating knowledge

Statement	Students		Lecturers	
	f	%	f	%
Strongly Disagree	43	14.3	4	11.4
Disagree	64	21.3	19	40.0
Neutral	33	11.0	10	28.6
Agree	101	33.7	7	20.0
Strongly Agree	59	19.7	0	0.0
Total	300	100.0	35	100.0

Table 10 shows 101(33.7%) of Students Agreed that the university has adopted Ai tools in generating knowledge while 64(21.3%) Disagreed and 59(19.7%) Strongly Agreed respectively. This implies that the university has adopted Ai tools in generating knowledge. The findings are in line with Wamuyu and Njuguna (2020) who investigated the adoption of AI tools in Kenyan universities to enhance student learning experiences and found that AI applications, such as personalized learning platforms and intelligent tutoring systems, have been implemented to tailor educational content to individual student needs which has facilitated knowledge generation by allowing students to engage with learning materials that suit their pace and learning style, ultimately enhancing educational outcomes.

Table 10 shows 19(40.0%) of Lecturers Disagreed on the university has adopted Ai tools in generating knowledge while 10(28.6%) were Neutral and 7(20.0%) Agreed respectively. This implies that the university has not adopted Ai tools in generating knowledge. The findings of both the staff and Lecturers differ with Mutua, Ndung'u & Wanyama (2022) who examined the adoption of AI technologies in curriculum development and pedagogical innovation within Kenyan universities and reported that AI tools are increasingly used to analyze educational data and inform curriculum changes based on student performance and engagement metrics leading to the development of more relevant and effective educational programs, thereby contributing to the generation of knowledge tailored to contemporary educational needs.

Table 11: Students and Lecturers' responses on Lecturers have embraced AI positively in terms of online learning

Statement	Students		Lecturers	
	f	%	f	%
Strongly Disagree	55	18.3	4	11.4
Disagree	27	9.0	10	28.6
Neutral	38	12.7	10	28.6
Agree	154	51.3	11	31.4
Strongly Agree	26	8.7	0	0.0
Total	300	100.0	35	100.0

Table 11 shows 154(51.3%) of Students Agreed on Lecturers have embraced AI positively in terms of online learning while 55(18.3%) Strongly Disagreed and 38(12.7%) were Neutral respectively. This implies that Lecturers have embraced AI positively in terms of online learning. The findings are in line with Njogu and Kirori (2021) who conducted a study focusing on how lecturers in Kenyan universities have embraced AI to create personalized learning experiences in online environments and found that AI applications, such as adaptive learning systems, allowed lecturers to offer customized content and assessments, which resulted in improved learning outcomes and higher student satisfaction rates

Table 11 shows 11(31.4%) of Lecturers Agreed on Lecturers have embraced AI positively in terms of online learning 10(28.6%) were Neutral and Disagreed respectively. This implies that Lecturers have embraced AI positively in terms of online learning. The findings of both staff and lecturers are in line with Karanja and Ndung'u (2023) who explored how AI-powered learning analytics have influenced lecturers' teaching strategies in online settings and found that lecturers who used AI analytics to track student progress were better equipped to identify at-risk students and intervene promptly thereby improved student retention rates and created a more supportive learning atmosphere

Table 12 shows Students and Lecturers' responses on Students prefer AI tools such as online learning to traditional learning

Table 12: Students and Lecturers' responses on Students prefer AI tools such as online learning to traditional learning

Statement	Students		Lecturers	
	f	%	f	%
Strongly Disagree	46	15.4	0	0.0
Disagree	9	3.0	5	14.3
Neutral	14	4.7	5	14.3
Agree	119	39.7	4	4.4
Strongly Agree	112	37.3	21	60.0
Total	300	100.0	35	100.0

Table 12 shows 119(39.7%) of Students Agreed that Students prefer AI tools such as online learning to traditional learning while 112(37.3%) Strongly Agreed and 46(15.4%) Strongly Disagreed respectively. This implies that Students prefer AI tools such as online learning to traditional learning. The findings are in line with Ochieng and Karanja (2022) who explored the accessibility of educational resources in AI-driven online learning platforms and revealed that students preferred online learning due to the availability of diverse resources and materials that were easily accessible which contrasted with traditional learning, where resources could be limited or difficult to obtain.

Table 12 shows Majority 21(60.0%) of Lecturers Strongly Agreed on Students prefer AI tools such as online learning to traditional learning while 5(14.3%) Disagreed and were Neutral respectively. This implies that Students prefer AI tools such as online learning to traditional learning. The findings concur with Mutuma and Juma (2024) examined students' perceptions of the effectiveness of AI tools in enhancing their learning experiences and found that students preferred AI-driven online learning platforms because they perceived these tools to be more effective in supporting their academic needs compared to traditional methods. Table 13 shows Students and Lecturers' responses on the university supports AI use in education

Table 13: Students and Lecturers' responses on the university supports AI use in education

Statement	Students		Lecturers	
	f	%	f	%
Strongly Disagree	54	18.0	5	14.3
Disagree	18	6.0	5	14.3
Neutral	42	14.0	9	25.7
Agree	122	40.7	12	34.3
Strongly Agree	64	21.3	4	11.4
Total	300	100.0	35	100.0

Table 13 shows 122(40.7%) of Students Agreed that the university supports AI use in education while 54(18.0%) Strongly Disagreed and 42(14.0%) were Neutral. This implies that the university supports AI use in education. The findings are in line with Omondi and Kinyanjui (2020) who conducted a study that assessed the policies implemented by Kenyan universities to support the integration of AI in education and revealed that universities with well-defined policies and strategic frameworks were more successful in incorporating AI tools into their curricula, enhancing teaching and learning outcomes

Table 13 shows 12(34.3%) of Lecturers Agreed that the university supports AI use in education while 9(25.7%) were Neutral and 5(14.3%) Strongly Disagreed and Disagreed respectively. This implies that the university supports AI use in education. The findings are in line with Kinyanjui and Njuguna (2024) who investigated the support services offered by universities to facilitate students' use of AI tools in their studies and found that universities providing dedicated AI resources, workshops, and online tutorials saw improved student engagement and success in utilizing AI technologies for academic purposes.

H03: There is no significant relationship between Adoption of Artificial Intelligence and quality of education in higher education

In order to test whether there was a relationship between Adoption of Artificial Intelligence and quality of education in higher education Chi-square test to analyse Objective three. To test objective two Chi-square test was done to determine the relationship between Adoption of Artificial Intelligence (M=3.94, SD=1.187) and quality of education in higher education (M=3.14, SD=2.002)

Table 14 shows Chi square test results on testing this hypothesis.

Table 14: Chi Square Test between Adoption of Artificial Intelligence and Quality of Education in Higher Education

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	58.772[a]	6	.000
Likelihood Ratio	36.020	6	.000
Linear-by-Linear Association	22.275	1	.000
N of Valid Cases	35		

a. 8 cells (66.76%) have expected count less than 5. The minimum expected count is .03.

The Chi square (χ^2) test of 58.772[a] (P=0.005) showed that there was significant relationship between Adoption of Artificial Intelligence and Quality of Education in Higher Education. This implies that Adoption of Artificial Intelligence and Quality of Education in Higher Education. The study findings are in line with Li and Zhang (2019) who explored the adoption of AI technologies to deliver personalized learning experiences in higher education and found that AI-driven tools such as adaptive learning platforms and intelligent tutoring systems improved student engagement, learning outcomes, and overall educational quality. Similarly, Nguyen and Lee (2024) explored how AI adoption has improved research capabilities in higher education and discovered that AI tools such as data mining, machine learning, and predictive analytics have enabled more complex and faster research, which has resulted in enhanced academic output and innovation.

The Dean, Faculty of Education was interviewed on Adoption of Artificial Intelligence and quality of education in higher education and his responses was as follows:

> *By automating routine tasks, AI frees up our faculty to concentrate on what truly matters which is teaching and supporting our students since AI has the potential to revolutionize our teaching methods which enables the University to create more engaging learning experiences that cater to diverse student need" (Dean, Faculty of Education, 2024)*

From the response of the Dean, Faculty of Education we can imply that there is a commitment to leveraging AI to enhance the quality of education and improve student learning outcomes.

The Chairs of Departments were interviewed on Adoption of Artificial Intelligence and quality of education in higher education coded as CoD1-CoD5. Their responses were as follows:

CoD1;

> *"To maximize the benefits of AI, we need a clear strategic framework that guides its adoption in a way that aligns with our educational objectives,"*

CoD 2;

> *"With AI, teachers receive valuable insights and resources that empower them to refine their teaching methods, contributing to better educational outcomes,"*

CoD 3;

"AI can offer valuable insights that help in making informed decisions regarding educational policies and resource management, which ultimately improves the quality of education,"

CoD 4;

"*We face challenges in adopting AI, particularly regarding faculty resistance and the need for proper training. Overcoming these hurdles is crucial for improving the quality of education through AI,"*

CoD 5;

"AI provides insights into innovative teaching methods that can make learning more engaging and effective since it's crucial for improving the quality of education,"

With the responses obtained from the Chairs of Department we can imply that Adoption of AI integration enhances learning experiences, improve curriculum development, support inclusive education, and facilitate data-driven decision-making pointing to a future where AI plays a crucial role in elevating the quality of education across various discipline.

CONCLUSION

We can draw the following conclusions: adoption of artificial intelligence has an impact on the quality of education in higher education; instructors' readiness has an impact on the quality of education in higher education; and artificial intelligence on research has an impact on the learning environment. Overall, the results indicate that the use of AI in higher education improves educational quality. This is due to factors like instructor readiness and research integrating AI, which emphasizes the significance of ongoing investment in AI technologies and training in higher education institutions to enhance learning outcomes. The University of Nairobi and other public universities must invest in AI training and technologies in order to satisfy the needs of contemporary higher education and improve student performance.

RECOMMENDATIONS

- The Faculty of Education at the University of Nairobi should prioritize continuous professional development programs for instructors to build their capacity in AI technologies focusing on both technical aspects of AI tools and their practical applications in teaching and research
- The University of Nairobi should encourage the adoption of AI tools for academic research to enhance data analysis, decision-making, and knowledge generation.
- The institution should invest in developing AI infrastructure, such as AI-powered research labs, computational tools, and software, to enable researchers to explore AI applications in diverse fields that fosters a research environment that improves the quality of education through advanced research outcomes
- The University of Nairobi should formulate clear institutional policies that promote the adoption of AI technologies across different departments.
- To foster AI adoption, the university must invest in relevant AI infrastructure, including smart classrooms, AI-based learning management systems, and AI-powered administrative tools that not only improves the quality of education but also makes learning more engaging and efficient for students.
- The University should create awareness and build capacity among students and staff regarding the importance and application of AI.
- The University should leverage AI tools to analyze data on student performance, engagement, and learning outcomes to make data-driven improvements to educational programs and curriculum.
- Universities should adopt institution-wide AI strategies that focus on integrating AI into administrative, academic, and student services.
- Universities should seek government funding or private sector partnerships to build or upgrade existing facilities to support AI-based learning and research

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