

## The role of Artificial Intelligence (AI) in Higher Education in Libya: Students' Perceptions, Challenges, and Ethical Concerns: A case study of Misurata University

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دور الذكاء الاصطناعي في التعليم العالي في ليبيا: تصورات الطلاب، والتحديات، والمخاوف  
الأخلاقية: دراسة حالة جامعة مصراتة

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Received: January 11, 2026

Accepted: February 15, 2025

Published: February 25, 2026

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### Abstract:

Artificial Intelligence (AI) has emerged as a transformative force in higher education, offering innovative opportunities to enhance teaching, learning, and institutional management. Despite its rapid global adaptation, empirical research examining students' perceptions of AI within the Libyan higher education context, particularly at Misurata University (MU), remains limited. This study aims to investigate Misurata University (MU) students' perceptions of the role and importance of AI in the educational process, identify the technical and ethical challenges associated with its adoption, and examine the influence of selected demographic variables on these perceptions. A descriptive quantitative research design was employed, data were collected through an online questionnaire administered to 348 students from various faculties at MU, Libya. The instrument assessed students' awareness, and use of AI, perceived benefits, technical challenges, societal and ethical concerns, and demographic characteristics. Data analysis was conducted using the Statistical Package for the Social Science (SPSS), utilizing descriptive statistics, Chi-Square tests, and Pearson correlation analysis. The findings reveal a generally positive perception of AI among students, particularly regarding to its capacity to support flexible learning, personalize educational resources, and enhance student motivations and engagements. However, significant challenges were identified including inadequate technological infrastructure, insufficient training and concerns related to data privacy, academic integrity and societal acceptance. Furthermore, results indicate that students' attitudes toward AI are significantly influenced by technical efficiency, academic discipline, and English language proficiency, whereas age and gender showed no statistically significant effect.

**Keywords:** Artificial Intelligence (AI), Educational process, Students' perceptions, Ethical concerns, Technological infrastructure.

### المخلص

برز الذكاء الاصطناعي AI بوصفه قوة تحويلية في التعليم العالي، حيث يوفر فرصاً مبتكرة لتعزيز عمليتي التعليم والتعلم وتحسين إدارة المؤسسات التعليمية. وعلى الرغم من الانتشار العالمي المتسارع لهذه التقنيات، فإن الدراسات التجريبية التي تتناول تصورات الطلبة حول الذكاء الاصطناعي في سياق التعليم العالي الليبي، وخاصة في جامعة مصراتة، مازال محدوداً للغاية. هدفت هذه الدراسة إلى استكشاف تصورات طلبة جامعة مصراتة حول دور وأهمية الذكاء الاصطناعي في العملية التعليمية، وتحديد التحديات التقنية والاجتماعية والأخلاقية المرتبطة بتبنيها، إضافة إلى فحص تأثير

بعض المتغيرات الديموغرافية (العمر، الجنس، التخصص الأكاديمي، كفاءة اللغة الإنجليزية، الكفاءة التقنية) في هذه التصورات. اعتمدت الدراسة المنهج الوصفي، وجمعت البيانات باستخدام استبيان إلكتروني طُبق على عينة مكونة من 348 طالبا وطالبة من كليات مختلفة بجامعة مصراتة، ليبيا. قاست أداة الدراسة مستوى وعي الطلبة بالذكاء الاصطناعي، ومدى استخدامهم له، والفوائد المتوقعة منه، بالإضافة إلى التحديات التقنية والمخاوف الاجتماعية والأخلاقية المرتبطة به، بالإضافة إلى الخصائص الديموغرافية. تم تحليل البيانات باستخدام الحزمة الإحصائية للعلوم الاجتماعية (SPSS) بالاعتماد على الإحصاء الوصفي، واختبار كاي تربيع (Chi-square)، ومعامل ارتباط بيرسون (Pearson correlation analysis). أظهرت النتائج وجود تصورات إيجابية عامة لدى الطلبة تجاه الذكاء الاصطناعي، خاصة فيما يتعلق بقدرته على دعم التعلم الشخصي المرن، وتخصيص الموارد التعليمية، وتعزيز دافعية الطلبة ومشاركتهم في العملية التعليمية. في المقابل كشفت الدراسة عن تحديات مهمة، أبرزها ضعف البنية التحتية التكنولوجية، ونقص الدعم والتدريب، إضافة إلى مخاوف تتعلق بخصوصية البيانات، والنزاهة الأكاديمية، ومدى تقبل المجتمع لهذه التقنيات. كما أشارت النتائج إلى أن تصورات الطلبة تجاه الذكاء الاصطناعي تتأثر بشكل ملحوظ بالكفاءة التقنية، والتخصص الأكاديمي، ومستوى إتقان اللغة الإنجليزية، في حين لم يُظهر متغيرا العمر والجنس أي تأثير ذي دلالة إحصائية في هذه التصورات.

**الكلمات المفتاحية:** الذكاء الاصطناعي، العملية التعليمية، تصورات الطلاب، المخاوف الأخلاقية البنية التحتية التكنولوجية.

## Introduction

The rapid advancement of Information and Communication Technology (ICT) has substantially increased societies' dependence on digital resources across various domains, with education emerging as a primary beneficiary [1,2]. Within this context, the integration of AI has become a pivotal development, serving as a catalyst for improving the learning and teaching processes [3,4]. AI is increasingly recognized for its significant role in enhancing the quality of the educational experiences [5], a trend accelerated by the global technological expansion [6,7]. The growing implementation of AI in educational settings has fundamentally transformed traditional learning and teaching paradigms [8]. The integration of AI holds immense potential to revolutionize knowledge delivery by offering personalized learning experience, enhancing teaching methodologies, and optimizing administrative functions[4,8].

Technologies such as Natural Language Processing (NLP), machine learning, and adaptive learning systems are now being employed to personalize instruction, provide real-time feedback, and boost student engagement[9]. These developments are further supported by AI applications in automated assessment, performance analysis, and the emergence of AI-powered chatbots and big data analytic in education system [10,11]. While global adoption of AI in education continues to accelerate, the higher education sector in Libya, including institutions such as MU is actively seeking to adopt innovative approaches to keep pace with these technological breakthroughs.

This study is situated with this context, aiming to provide a framework for the coherent integration of AI in educational experience. A profound understanding students' perspectives, expectations, and concerns is crucial for developing effective national AI strategies [12]. Despite the transformative potential of AI, empirical research specifically examining university students' perceptions of its role, benefits, and challenges within the Libya context remains limited. This lack of localized research hinders the development of informed strategies for successful AI adoption. Therefore, this study addresses this gap by investigating the perceptions, usage patterns and challenges associated with AI-based tools for learning and teaching among students at MU. This study contributes empirical evidence to the limited body of research on AI within Libyan context. By focusing on students' perspectives, the research provides valuable insights for policymakers, university administrators, and educators. The findings are essential for strategic planning, capacity building, and the development of ethical and regulatory frameworks necessary to ensure the effective and responsible integration of AI into the Libyan higher education system.

### 1.1 Research Objectives

The present study aims to achieve the following objectives:

- 1-To examine students' perceptions of the role and importance of AI in the educational process at MU.
- 2-To identify the perceived educational benefits of AI integration, as well as technical challenges associated with its implementation in higher education.
- 3-To explore students' perceptions of the social and ethical concerns related to the use of AI in education, including issues of data privacy, academic integrity, and social interaction.
- 4-To investigate the extent to which selected demographic variables (gender, age, academic discipline, IT efficiency, and English language proficiency) are associated with students' attitudes toward the role of AI in higher education.

## 1.2 Research Questions

In line with research objectives, the study seeks to answer the following questions:

- 1-What are MU students' overall perceptions of the role and importance of AI in the educational process?
- 2-What educational benefits do students associate with the use of AI in higher education?
- 3-What technical challenges do students perceive as hindering the effective integration of AI into the educational process?
- 4-What social and ethical concerns do students express regarding the use of AI in higher education?
- 5-Is there a statistically significant association between students' demographic characteristics ((gender, age, academic discipline, technical proficiency, and English language proficiency) and their attitudes toward the role of AI in higher education?

## 1.3 Research Hypotheses

Based on the research questions and the quantitative nature of the study, the following hypotheses were formulated and tested:

### Gender

H0<sub>1</sub>: There is no statistically significant association between students' gender and their attitudes toward the role of AI in higher education.

H1<sub>1</sub>: There is statistically significant association between students' gender and their attitudes toward the role of AI in higher education.

### Age

H0<sub>2</sub>: There is no statistically significant association between students' age and their attitudes toward the role of AI in higher education.

H1<sub>2</sub>: There is statistically significant association between students' age and their attitudes toward the role of AI in higher education.

### IT Efficiency

H0<sub>3</sub>: There is no statistically significant correlation between students' IT Efficiency and their attitudes toward the role of AI in higher education.

H1<sub>3</sub>: There is statistically significant positive correlation between students' IT Efficiency and their attitudes toward the role of AI in higher education.

### Academic Discipline

H0<sub>4</sub>: There is no statistically significant association between students' academic discipline and their attitudes toward the role of AI in higher education.

H1<sub>4</sub>: There is statistically significant association between students' academic discipline and their attitudes toward the role of AI in higher education.

### English language proficiency

H0<sub>5</sub>: There is no statistically significant association between students' English language proficiency and their attitudes toward the role of AI in higher education.

H1<sub>5</sub>: There is statistically significant association between students' English language proficiency and their attitudes toward the role of AI in higher education.

## 2. Literature Review

Recent years have witnessed significant technological, social, and cultural changes affecting human activities [13]. Technology's presence in daily life and education has grown sustainably, and AI has become indispensable in modern education system [14]. While risks of misuse exist, AI techniques hold considerable promise for enhancing student learning outcomes [13]. AI is now harnessed across multiple educational spheres, including teaching, learning, learner assessment, lecture management and the improvement administrative functions [13,15]. In this connection, Chassignol et al. [16] reported that AI is employed to enhance educational content, develop intelligent instructing techniques and systems, evaluate learners and improve teacher-student interaction. In light of this, Dai et al. [17] indicated that fostering students' readiness for an AI-infused future should be a central goal of current educational programs to ensure they are equipped for evolving technological landscape.

The growing interest in AI, Machine Learning and Big Data techniques has accelerated the advancement of AI in educational experiences [18]. Consequently, the widespread adoption of AI technologies establishes a foundation for significant transformation in both education systems and the learning environments. Therefore, a pressing need to focus on AI-supported teaching methods to enhance students' capabilities and skills [19]. Students' perceptions of AI have the potential to significantly influence their acceptance and future use of AI-supported education [14].

Demir and Güraksın [15], posit that the integration of AI into decision-making processes is inevitable, establishing it as a cornerstone of future. In this context, exploring students' perceptions is paramount, given their role as the generation that will navigate this landscape. This perspective is substantiated by

Luea et al. [20], who assert that students must be adequately prepared for an AI-supported educational future.

Furthermore, Chang and Lu [21] emphasize the critical importance of understanding learners' engagement and motivation to facilitate the effective integration of AI, thereby, enhancing the assessment of educational outcomes. In summary, existing research reveals divergent perspectives among learners regarding the role of AI technologies in the learning experience, yet there remains limited understanding of personalized learning technologies [18]. Furthermore, the challenges associated with AI implementation for personalized learning warrant further systemic exploration [14]. Given the paucity of empirical AI research within Libyan higher education context, investigations such as the present study are essential to inform and facilitate the successful integration and adoption of AI in the national education system.

## **2.1 The Concept of Artificial Intelligence**

Artificial Intelligence is a branch of computer science focusing on developing machines capable of mimicking human mental abilities and operational patterns [13]. It refers to technologies and methods that enable computers to simulate human intelligence, allowing them to learn, think, reason, solve problems in ways comparable to human [14]. AI is an advanced discipline developed at the intersection of computer science, automation, information theory, neurophysiology, psychology, philosophy, and linguistics [22].

## **2.2 Types of Artificial Intelligent**

Artificial Intelligent is conventionally classified into three categories based on functional capabilities and application scope [23].

1-Artificial Narrow Intelligence (ANI), or weak AI, refers to a system designed to perform specific predefined tasks such as language translation or facial recognition and represents the only form of AI currently in existence.

2-Artificial General Intelligence (AGI), or strong AI, embodies a general form of Intelligence capable of executing a wide range of tasks across different domains and remains a theoretical concept.

3-Artificial Superintelligence (ASI) represents the advanced stage of AGI, defined as an intellect far surpassing the best human brain in practically every field, including scientific creativity and social skills [23].

## **2.3 Impact of AI Adoption in the Educational System**

AI has become an essential component of the educational vision in many teaching and learning systems worldwide, exerting a profound and far-reaching impact on educational frameworks [24]. The deep integration of AI and education has promoted the emergence and development of effective AI educational applications [14]. Learning AI is also seen as empowering students to cope with emerging societal, technological, and environmental challenges [25]. AI is employed to enhance the educational content, and develop intelligent instructing techniques and systems [16]. It facilitates personalized learning experience by adjusting the educational process to meet the needs of individual students [26]. Adaptive learning systems use AI to understand students' strengths and weaknesses, providing tailored resources and guidance [26].

AI revolutionizes the quality of instructional services by establishing a more dynamic and efficient learning environment [27]. It supports teachers in delivering customized instructional materials and overseeing student progress. However, while AI can improve personalization and efficiency, its widespread use may cause students to rely excessively on technology and potentially weaken their critical thinking abilities [14]. The integration of AI into educational experiences requires careful attention to academic ethical issues [28]. Concerns include data privacy, the potential for AI to exacerbate the educational gap students with and without access to technology, and the risk of over-reliance on technology diminishing critical thinking [14]. Furthermore, there are concerns about the use of AI in cheating and scientific fraud.

## **3. Methodology**

### **3.1. Research Design**

The study adopted a descriptive quantitative research design to examine MU students' perception of the role and importance of AI in the educational process, as well as the technical, social, and ethical challenges associated with integration in higher education.

### **3.2. Population and Sample**

The target population of the study consisted of undergraduate students enrolled in various faculties at MU, Libya. A total of 348 students participated in the study. Participants were drawn from both from scientific and humanities disciplines to ensure diversity in academic background. Data were collected using an online survey distributed electronically to students. Participation was voluntary, and respondents were informed of the purpose of the study and assured of the confidentiality and anonymity of their responses. Although the sampling technique was primarily convenience-based, efforts were

made to include students from different demographic categories to enhance the representativeness of the sample.

### **3.3. Research Instrument**

Data were collected using a structured questionnaire designed specifically for the purpose of this study and informed by relevant literature on AI in higher education. The questionnaire consisted of 29 items divided into four main sections:

1. Demographic Information: gender, age, academic discipline (science/arts), English proficiency and IT efficiency.

2. Perception of the role and importance of AI in education: 12 items measuring students' perceptions of AI benefits, such as personalized learning, flexible access to educational resources, and enhanced engagement.

3. Perceived technical challenges: 5 items addressing challenges related to technological infrastructure, accessibility of AI tools, and the need for technical training

4. Perceived of social and ethical challenges: 7 items focusing on concerns related to data privacy, academic integrity, social interaction, and the digital divide.

Items were measured using a five-point Likert scale ranging from 1 (Strongly disagree) to 5 (Strongly agree).

### **3.4. Validity and Readability**

To ensure content validity, the questionnaire items were developed based on previous empirical studies and established theoretical discussion related to AI in education. The instrument was reviewed by academic experts in educational technology to assess the clarity, relevance, and appropriateness of the items. The internal consistency of the questionnaire was assessed using Cronbach's Alpha coefficient. The results indicated acceptable readability levels for all measurement scales, confirming the suitability of the instrument for data collection and statistical analysis.

### **3.5. Data Collection Procedure**

The questionnaire was administered online using a digital survey platform. This method facilitated access to a wide range of students and ensured efficient data collection. Responses were collected over a defined period, after which the data were screened for completeness and accuracy prior to analysis.

### **3.6. Data Analysis Techniques**

The collected data were analyzed using the Statistical Package for Social Sciences (SPSS). Both descriptive and statistical inferential techniques were employed as follows:

1- Descriptive Statistics: Frequencies, percentages, means, and standard deviation were used to describe participants' demographic characteristics and summarize students' perception of AI, technical challenges and ethical concerns.

2- Inferential Statistics: Chi-square tests of independence were applied to examine association between categories demographic variables (gender, age group, academic discipline, English language proficiency) and students' attitude toward the role and importance of AI in the educational experience. Pearson correlation analysis was used to assess the relationship between IT efficiency and students' attitude toward the role and importance of AI in the educational process. A significance level of  $p < 0.05$  was adopted for all statistical tests.

### **3.7. Ethical Consideration**

Ethical principles were observed throughout the study. Participation was voluntary, informed consent was obtained from all respondents, and no personally identifiable information was collected. The data were used exclusively for research purpose and were stored securely to ensure confidentiality.

## **4. Findings**

This section presents the empirical findings of the study based on statistical analysis of data collected from 348 students at MU, Libya. The results are reported objectively without interpretation, in line with best practices for quantitative research reporting.

### **4.1. Demographic Characteristics of Participants**

The study sample consisted of 348 students from various faculties at MU. Female students constituted the majority of respondents (69.25%), while male students represented (30.74%). In terms of age, most participants between 21 and 25 years old (53.73%), followed by students older than 25 years (27.58%) and those younger than 20 years (18.67%). Regarding academic discipline, (52.01%) of respondents were enrolled in scientific programs, whereas (47.89%) belonged to humanities disciplines. With respect to English language proficiency (47.42%) of students reported an intermediate, (29.88%) an elementary level, and (22.70%) an advanced level. Concerning IT efficiency (58.90%) of respondents reported 11-20 years of experience, while (25.00%) had less than 10 years, and (16.09%) had more than 20 years of experience.

**Table 1: Demographic Characteristics of Respondents.**

Demographic Characteristics	Descriptive Statistics	Respondents	Percentage
Gender	Male	107	30.74%
	Female	241	69.25%
Age	Less than 20	65	18.67%
	21-25 years	187	53.73%
	More than 25	96	27.58%
English proficiency	Elementary	104	29.88%
	Intermediate	165	47.41%
	Advanced	79	22.70%
Academic discipline	Science	181	52.01%
	Arts	167	47.90%
IT efficiency	Less than 10 years	87	25.00%
	11-20 years	205	58.90%
	More than 20 years	56	16.09%

#### 4.2. Students' Perceptions of the Role and Importance of AI

Students' perceptions of the role and importance of AI in the educational process were measured using 12 items. The overall mean score of this scale was (4.18), SD (0.75), indicating a high level of agreement among participants.

**Table 2: Students' Perceptions of the Role and Importance of AI**

No	Statement	AVG	SD
1	I understand the basic principles of AI and use it in the educational process.	4.04	0.84
2	AI helps to customize educational resources to suit individuals' abilities and needs.	4.02	0.91
3	AI provides annotative and diverse educational resources, such as simulation and interactive videos.	4.34	0.65
4	AI contributes to the development the essential skills such as problem-solving and critical thinking.	4.09	0.81
5	AI reduces the stress of trial and error in learning process.	4.31	0.77
6	AI reduces reliance on textbooks.	3.98	0.77
7	I understand courses better when using AI.	4.06	0.75
8	AI reduces the number of hours student spend learning different courses.	4.50	0.61
9	AI allows students to learn anytime, anywhere in the world.	4.55	0.56
10	AI increases students' motivation to engage in the learning process.	3.92	0.90
11	AI helps students think about how to use information rather than simply searching for it.	4.06	0.85
12	AI helps students to move beyond a single learning style and diversity their learning approaches.	4.26	0.62
Students' perceptions of the role and importance of AI		4.18	0.75

The highest mean scores were recorded for items related to flexible learning opportunities (M=4.55, SD=0.56) and time efficiency in learning (M=4.50, SD=0.61), reflecting strong agreement. Other items, such the contribution of AI to innovative learning resources (M=4.34, SD=0.65) and diversification of learning styles (M=4.26, SD=0.62), also fell with the agreement range. Overall, the findings indicate that students generally hold positive perceptions regarding the education value of AI.

#### 4.3. Perceived Technical Challenges of AI Integration

Five items were employed to assess students' perceptions regarding the technical challenges of integrating AI in education. The overall mean score for this dimension was (M=3.83, SD=0.81), suggesting that students generally agree on the existence of technical challenges.

**Table 3:** Students' Perceptions Regarding the Technical Challenges of AI Integration

No	Statement	AVG	SD
1	The technological infrastructure represents the most important challenges for implementing of AI technologies in the educational process.	4.40	0.59
2	The difficulty of using and dealing with AI technologies is a major challenge.	4.04	0.85
3	The lack or insufficient knowledge in using AI technologies is considered one of the most important challenges.	4.35	0.62
4	I feel I need additional training to gain the technical skills to use AI tools effectively	4.11	0.75
5	I find difficult to access educational AI platforms and tools.	2.24	1.22
Technical challenges of AI Integration		3.83	0.81

The highest levels of agreement were observed for inadequate technological infrastructure (M=4.40, SD=0.59) and insufficient technological knowledge (M=4.35, SD=0.62). In contrast, difficulty in accessing AI platforms were recorded a lower mean score (M=2.24, SD=1.22), indicating disagreement. The results suggest that infrastructure and training, rather than access itself, constitute the primary technical challenge.

#### 4.4. Perceived Social and Ethical Concerns of AI Integration

Students' perceptions of social and ethical concerns were measured using seven items. The overall mean score of this dimension was (M=3.38, SD=1.17), indicating a moderate level of agreement.

**Table 4:** Students' Perceptions Regarding the Social and Ethical Concerns of AI Integration.

No	Statement	AVG	SD
1	I have concerns regarding the privacy my personal data when using AI systems in the educational process.	3.90	0.85
2	I fear that relying on AI will lead to a reduction in direct interaction with colleagues and faculty members.	3.94	1.02
3	I believe that use AI may increase the educational gap between students who have access to technology and those who do not.	4.11	1.04
4	I believe that over-reliance on AI may reduce my ability to solve problems and think independently.	2.99	1.43
5	I have concerns regarding the use AI in cheating or scientific fraud.	3.19	1.44
6	I believe that Libyan society is generally ready to accept the integration of AI in the educational process	3.49	1.29
7	I have concerns regarding the accuracy and quality of information provided by AI systems.	2.03	1.13
Social and ethical concerns of AI Integration		3,38	1.17

Concerns regarding the potential widening of educational gap (M=4.11, SD=1.04) and reduced social interaction (M=3.94, SD=1.02) received agreement-level responses. Conversely, concerns related to information accuracy (M=2.03, SD=1.13) and reduced independent thinking (M=2.99, SD=1.43) fell within the disagreement to neutral range. These findings indicate that ethical concerns exist, but the intensity varies across different dimensions.

#### 4.5. Hypotheses Testing

##### 4.5.1. Students' Gender and their Attitudes toward AI

A Chi-square test of independence revealed no statistically significant association between gender and students' attitudes toward AI ( $\chi^2 = 1.840$ , df=2, p-value=0.398). Therefore, H0<sub>1</sub> was accepted, and H1<sub>1</sub> was rejected.

**Table 5.** Gender and students' attitudes toward the role and of AI

Variable	Test	$\chi^2$	Df	p-value	Interpretation
Gender	Chi-square	1.840	2	0.398	Not Significant

##### 4.5.2. Students' Age and their Attitudes toward AI

The Chi-square test results indicated no statistically significant association between age and students' attitudes toward AI ( $\chi^2 = 2.110$ , df=4, p-value=0.716). Accordingly, H0<sub>2</sub> was accepted, and H1<sub>2</sub> was rejected.

**Table 6:** Age and students' attitudes toward the role of AI

Variable	Test	$\chi^2$	Df	p-value	Interpretation
Age Groups	Chi-square	2.110	4	0.716	Not Significant

#### 4.5.3. Students' IT Efficiency and their Attitudes toward AI

Pearson correlation analysis showed a statically a significant moderate positive correlation between IT Efficiency and students' attitudes toward AI ( $r= 0.480$ ,  $p<0.01$ ). Thus,  $H_{03}$  was rejected, and  $H_{13}$  was accepted.

**Table 7:** IT Efficiency and students' attitudes toward the role of AI

Variable	Test	r	df	p-value	Interpretation
IT Efficiency	Pearson correlation	0.840	2	0.01	Moderate Positive Correlation

#### 4.5.4. Students' Academic Discipline and their Attitudes toward AI

The Chi-square test revealed statically significant association between academic discipline and students' attitudes toward AI ( $\chi^2 = 9.760$ ,  $df=2$ ,  $p\text{-value}=0.008$ ). Consequently,  $H_{04}$  was rejected, and  $H_{14}$  was accepted.

**Table 8:** Academic major and students' attitudes toward the role of AI

Variable	Test	$\chi^2$	df	p-value	Interpretation
Academic discipline	Chi-square	9.760	2	0.008	Significant

#### 4.5.5. Students' English Proficiency and their Attitudes toward AI

A statically significant association was found between English proficiency and students' attitudes toward AI ( $\chi^2 = 12.340$ ,  $df=4$ ,  $p\text{-value}=0.015$ ). Therefore,  $H_{05}$  was rejected, and  $H_{15}$  was accepted.

**Table 9:** English proficiency and learners' attitudes toward the role of AI

Variable	Test	$\chi^2$	Df	p-value	Interpretation
English proficiency	Chi-square	12.340	4	0.015	Significant

### 5. Discussion

This study set out to investigate students' perceptions of the role and importance of AI in higher education at MU, Libya, with a particular focus on perceived benefits, technical challenges, social and ethical concerns, and the influence of selected variables. The discussion presented in this section is grounded explicitly in the empirical findings and aligned with the study's research objectives and hypotheses. The findings reveal that students hold generally positive attitudes toward the role and importance of AI in the educational experience. High mean scores across most perception items indicate strong agreement regarding AI's contribution on flexible learning, time efficiency, access to diverse learning resources, and personalized education experience.

More specifically, the highest levels of agreement were associated with AI's ability to facilitate learning at anytime and anywhere, as well as to reduce time required to complete learning tasks. These results consistent with previous studies [29,30,31], which report that AI technologies enhance learning autonomy, engagement and accessibility in higher education context. Consequently, the findings suggest that students at MU are receptive to AI-based learning environment to improve the quality and efficiency of learning. However, despite this overall positive outlook, the finding indicate that students do perceive several technical challenges that hinder the effective integration of AI in the educational process. Specifically, inadequate technological infrastructure and insufficient technological knowledge were identified as the most critical barriers.

In fact, these challenges reflect structural and capacity related limitations commonly reported in developing educational systems. Interestingly, difficulty in accessing AI platforms received relatively low mean score, which suggests that access itself is not perceived as a major obstacle. Rather, the findings emphasize that infrastructure quality and user competence represent the primary technical concerns. This aligns with earlier research highlighting that successful AI adoption depends not only on availability but also on institutional digital readiness and technical support [29,31,32]. In addition to technical challenges, the results demonstrate a moderate level of concern regarding the social and ethical implication of AI in education. Students expressed notable concern about the potential for AI to widen the educational gap between students with unequal access to technological resources, as well as concerns related to reduced social interaction in learning environments.

On the other hand, lower levels of concerns were observed regarding the accuracy of AI-generated information and the potential reduction in independent thinking. This variation suggests that students differentiate between ethical risks and do not perceive all AI-related concerns with equal intensity. The findings are in line with prior research emphasizing that student prioritize human agency and practical

utility over technical transparency, and that ethical perceptions are shaped by contextual factors such as technology proficiency, infostrealism and cultural norm [29,30,32].

Turning now to the factors influencing students' attitudes, the hypothesis testing results provide future insight. First, no statistically significant association were found between students' attitudes and either age or gender, indicating that perceptions of AI are relatively uniform across these demographic categories. This suggests that acceptance of AI technologies is not limited to specific age groups or gender, likely reflecting widespread exposure digital technologies to among university students. In contrast, IT efficiency demonstrates a statistically significant moderate positive correlation with students' attitudes toward AI, meaning that students with high technological competence tend to exhibit more favorable perceptions.

This finding reinforces the importance of digital literacy as a key determinant of AI acceptance and corroborates previous studies emphasizing technological readiness as a critical factor in AI adoption [29,30]. Furthermore, statistically significant association were identified between students' attitudes toward AI and both academic discipline and English Language proficiency. More specifically, students from scientific disciplines and those with higher English proficiency reported mor positive attitudes toward AI, which is likely due greater exposure to technical content and English-based AI tools. These findings highlight the role of academic context and English language competence in shaping students' engagement with emerging educational technologies.

In summary, the findings indicate that while students at MU demonstrate strong acceptance of AI in higher education, successful and equitable integration requires addressing technical capacity gap and ethical concerns. Moreover, the influence of IT efficiency, academic discipline, and English language proficiency underscores the need for targeted training initiatives, and context-sensitive implementation strategies, rather uniform adoption approaches. Ultimately, these insights provide a foundation for policymakers and educators to develop informed strategies of AI that maximize the benefits while mitigating its potential risks in the Libyan higher education context.

## 6. Conclusion

This study successfully investigated the perceptions of students at MU, Libya regarding the integration of AI into the educational process, thereby contributing crucial empirical evidence to the limited body of research within the Libyan context. The finding univocally demonstrates a high degree of readiness and positive anticipation toward AI, viewing it as powerful tool for enhancing learning flexibility and resource accessibility. However, this optimism tempered by significant infrastructure and human capital challenges.

The analysis highlighted most crucial barriers to adoption are inadequate technological infrastructure and insufficient technological knowledge, training underscoring clear need for strategic institutional investment. Furthermore, the study revealed pressing social and ethical concern, with potential to increase the educational gap emerging as the foremost worry, alongside concern privacy data and preservation of human interaction. Crucially, the research established that students' attitudes are not uniform, but significantly moderated by IT efficiency, English language proficiency, and academic discipline. This suggests that successful AI integration requires targeted discipline-specific programs rather than one-size fits-approach.

In conclusion, while AI hold immense promise to revolutionize the educational landscape in Libya by supporting personalized and efficient learning, its effective and quitable deployment necessities a dual pronged-strategy, robust infrastructure development and the establishment of clear ethical and regulatory frameworks to mitigate social risks. Policymakers should prioritize infrastructure development, digital literacy programs, and inclusive strategies to maximize the benefits of AI while minimizing its risks.

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