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Impact of Artificial Intelligence on the Roles of Professors from the Perspective of University Students

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Abstract
This study aims to explore the role of using artificial intelligence tools in enhancing the role of the professor in the educational process from the perspective of university students. An electronic questionnaire was distributed to 152 university students from various disciplines and universities in Algeria, and the results were analyzed using SPSS and AMOS programs. The results showed a statistically significant positive effect of using artificial intelligence tools on the role of the professor and a negative but weak effect of the level of familiarity with information and communication technology as a moderator variable on the effect of artificial intelligence tools on the professor's role.
Keywords: Artificial Intelligence, Information and Communication Technology, Professor's Role, Students' Perspectives, University Education

ملخص
تهدف هذه الدراسة إلى استكشاف دور استعمال أدوات الذكاء الاصطناعي في تعزيز دور الأستاذ في العملية التعليمية من وجهة نظر الطلاب الجامعيين، ما يساعد في تحديد مدى استعداد الأساتذة والطلاب لاستخدامه في العملية التعليمية وتحسين نتائج التعلم. حيث تم توزيع استبيان إلكتروني على 152 طالبا جامعيا من مختلف التخصصات والجامعات في الجزائر، وتم تحليل النتائج باستعمال برنامجي SPSS وAMOS. أظهرت النتائج وجود أثر إيجابي ذي دلالة إحصائية لاستعمال أدوات الذكاء الاصطناعي على دور الأستاذ، ووجود أثر سلبي ولكنه ضعيف لمستوى الإلمام بتكنولوجيا المعلومات والاتصال كمتغير مُعدِّل على أثر أدوات الذكاء الاصطناعي على دور الأستاذ.
الكلمات المفتاحية: تكنولوجيا المعلومات والاتصال، تعليم جامعي، دور الأستاذ، ذكاء اصطناعي، وجهة نظر الطلبة.

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Introduction

Artificial Intelligence (AI) has revolutionized many sectors, including education. In recent years, integrating AI tools into educational environments has become widespread globally. These tools provide many benefits, such as personalized learning experiences, improved administrative efficiency, and increased student engagement. In Algeria, adopting AI tools in higher education institutions is an emerging trend that reflects the digital transformation of education globally. Understanding how AI affects the role of professors is crucial because it directly affects teaching methods, professors' interactions with students, and overall educational outcomes.

Despite the increasing use of AI tools in education, more research needs to focus on their impact from the students' perspective, especially in higher education in Algeria. These technological advances are reshaping the traditional role of the professor, and it is vital to explore how students perceive these changes. This study aims to uncover students' perceptions of the impact of AI tools on the professor's role in the learning process.

This study highlights the potential benefits of using AI tools in higher education and the challenges that professors and students may face when adopting these tools. It also helps determine the readiness of professors and students to use technology in the educational process and improve learning outcomes. In addition, the findings can contribute to the development of interactive and effective technology-based learning strategies.

The current study aims to investigate the impact of AI tools on the role of professors in the educational process from the student's perspective and to assess how students' familiarity with Information and Communication Technology (ICT) influences the effectiveness of these AI tools in enhancing the role of the professor.

This study seeks to answer the following research questions:

Q1: How does the use of AI tools affect the role of the professor in the educational process from a student's perspective?

Q2: How does students' level of familiarity with ICT affect the effectiveness of using AI tools in enhancing the role of the professor?

Based on these questions, the following hypotheses can be formulated:

H1: Using AI tools positively impacts the professor's role in the educational process.

H2: The level of students' familiarity with ICT affects the effectiveness of using AI tools in enhancing the professor's role in the educational process.

The following model shows the relationship between the independent, dependent, and moderator variables:

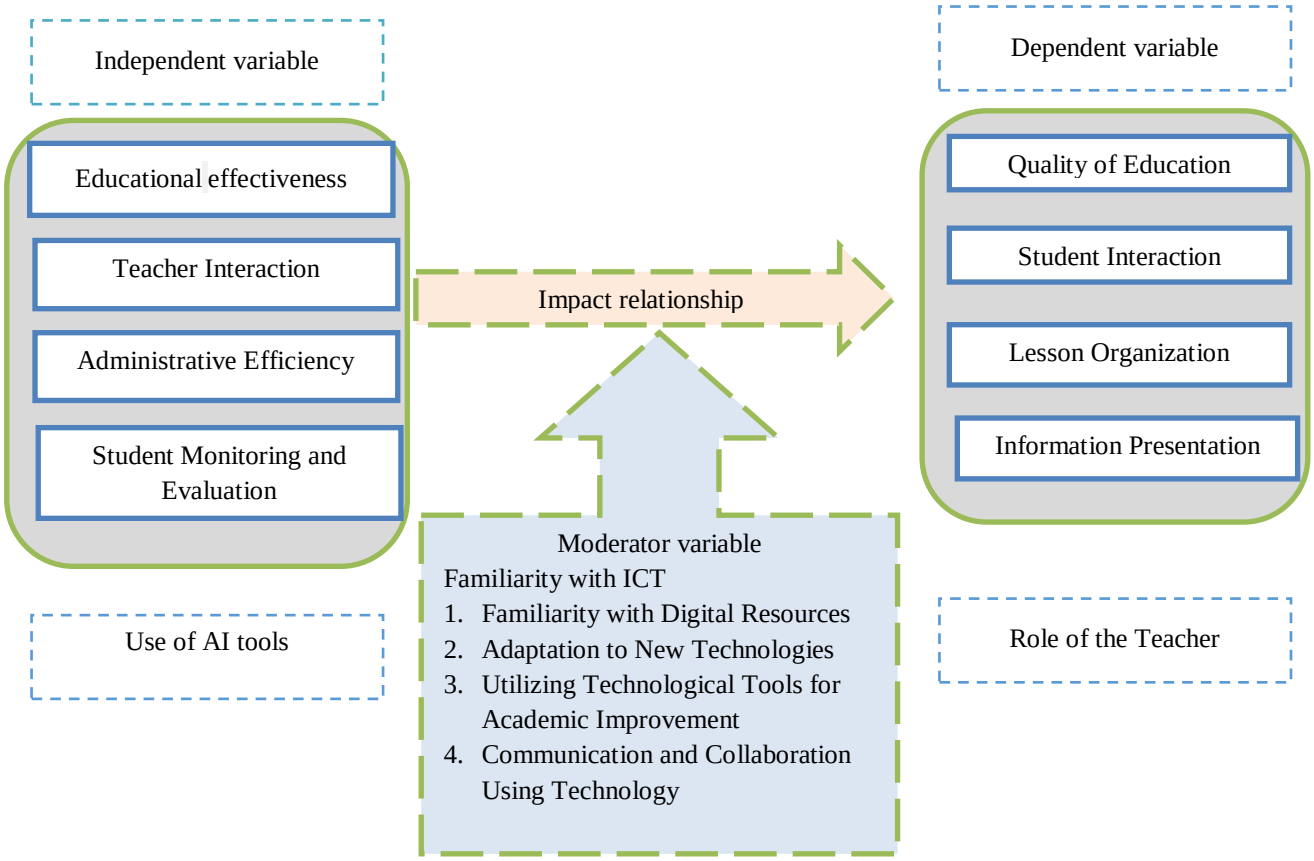

Figure 1. Model of the study

This model shows how the use of AI tools affects the teacher's role in the educational process, with the students' level of ICT literacy as a modifying factor that can affect this relationship.

Literature Review

The historical origins of AI Education (AIED) may be traced back to the early stages of AI advancement, where notable figures such as John McCarthy, Marvin Minsky, Allen Newell, and Herbert A. Simon was crucial in advancing AI and education (Doroudi, 2023; Sanabria-Navarro et al., 2023). The progression of AI in education can be categorized into different periods, marked by variety and integration, during which scholars from diverse fields investigated sophisticated learning systems and created common frameworks within the AIED community (Doroudi, 2023). Moreover, there has been a rise in critical viewpoints about the use of AI in education. These viewpoints highlight the importance of collaboration between learning, computer, and social science experts to tackle this sector's ethical concerns, commercial impacts, and policy implications (Williamson et al., 2023). Incorporating AI technologies such as ChatGPT into educational procedures is another evidence of AI's tangible uses in preparing future historians (Sanabria-Navarro et al., 2023).

AIED is using AI technologies, including machine learning and natural language processing, to enhance the learning process, customize instruction, and increase efficiency (Harry, 2023). AI in education includes personalized learning, intelligent tutoring systems, chatbots, and automated grading. It provides advantages such as improved student results, customized learning experiences, and time efficiency for instructors (Harry, 2023). Artificial General Intelligence (AGI) has the potential to enhance significantly AI's capabilities in education by seeking to imitate human intelligence. This would allow machines to perform

tasks that require intelligence comparable to humans, including reasoning, problem-solving, and comprehending emotions and social interactions (Ehsan, 2024)

Professor Traditional Roles in Higher Education

Throughout history, traditional professors have held an influential role in education, serving as the primary providers of knowledge and facilitating interaction in a classroom focused on the teacher (Davis, 2002). Their responsibilities include designing and delivering courses, conducting lectures, leading discussions, and assessing student learning. In addition, instructors provide guidance and mentorship to students, offering academic assistance, counsel, and constructive criticism to facilitate their success. In addition to their teaching responsibilities, academics actively participate in research endeavors to generate novel insights in their respective disciplines and remain up-to-date with the latest advancements. They frequently oversee graduate students' research projects, theses, and dissertations, nurturing the development of future scholars. In general, the conventional responsibility of a professor includes not only imparting knowledge but also stimulating critical thinking, cultivating intellectual curiosity, and encouraging the academic development of pupils (Macfarlane, 2011).

However, Professors in today's academic environment face multiple challenges. These include the shift towards adjunct teaching positions with little job security and low pay (Torres, 2022), the pressure to prioritize the managerial interests of universities over scholarly pursuits (Fitzgerald, 2014), the need to balance traditional academic values with external demands for accountability and quality assurance (Meyer, 2012), and the struggle to adapt to the increasing demand for online education while maintaining instructional quality within budget constraints (Valentine & Bennett, 2013). Furthermore, introducing ICT into pedagogical practices presents challenges related to faculty development and the implementation of e-learning processes. This highlights the importance of unified technical and pedagogical support at the university level (Florjančič, 2019). These challenges highlight the changing landscape of academia and the complex demands placed on traditional professors in today's educational institutions.

Previous Studies

Polak et al. (2022) found that school teachers have a favorable attitude toward AI education and are highly motivated to include AI-related content in their teaching methods, demonstrating a positive inclination. This unveiled an emerging pattern in using AI in education, emphasizing the possibility of enhanced forecasting and assessment of instructors' effectiveness (Celik et al., 2022). Lee and Perret (2022) found that teachers play an essential role in integrating AI methods into STEM classrooms by participating in professional development programs to enhance their knowledge of AI content and understanding of ethical issues related to AI bias.

Conversely, the study conducted by Fissore et al. (2022) aimed to examine the existing instructional methods employed in Italian schools concerning AI. Research indicated that teachers fail to adequately cover AI-related subjects in their classrooms despite acknowledging the significance of recognizing and comprehending AI. Similarly, Mujiono (2023) analyzed the collaboration between teachers and AI in education to enhance learning effectiveness and provide personalized learning experiences for students. The study results indicated that while AI technology can help the learning process, teachers still play an essential role in guiding and inspiring students. Salas-Pilco et al. (2022) found that teachers have a pivotal role in integrating AI tools into educational environments to ensure the smooth integration and effective use of AI-powered technologies and help guide students in interacting with AI systems, encourage

critical thinking about AI outputs, provide contextual understanding and explanations about AI mechanisms and decision-making processes to students, bridging the gap between AI technology and classroom learning and addressing misconceptions. Celik et al. (2022) found that teachers play critical roles in the development of AI; by analyzing previous research, they found that teachers have come to play a crucial role in the development and implementation of AI applications in education, providing opportunities for improved planning, implementation, and evaluation of teaching practices such as improved planning (e.g., identifying student needs), implementation (e.g., through immediate feedback and teacher intervention), and evaluation (e.g., through automated essay scoring) of their teaching. Teachers can also serve as models to train AI algorithms and participate in AI development by verifying the accuracy of automated AI assessment systems.

Kalyani's (2023) study further validates that AI technologies facilitate the customization of educational content according to the unique requirements of each student, accommodating a wide range of learning preferences. The shift towards personalized learning experiences challenges the old one-size-fits-all strategy, enabling teachers to prioritize guiding and directing students. Teachers progressively prioritize cultivating these talents rather than only transmitting information, so they alter their position in the educational domain. Baskara (2023) discovered that AI tools, like ChatGPT, transform the role of teachers from traditional approaches to more facilitative and supportive attitudes. These tools also assist teachers in transitioning to active learning models, such as blended, collaborative, and project-based learning. As a result, teachers need to adjust their teaching methods and incorporate technology integration theories and professional development models to improve their practices.

A recent study by Yolcu (2023) also discovered that teachers can enhance their application techniques of AI and problem-solving skills and continuously refine their teaching practices by receiving regular feedback and training from educational leaders and technology specialists. Acknowledging that AGI should not substitute teachers but augment their roles is crucial. To the same findings, Nur Fitria's (2023) study indicates that AI enhances teachers' roles by providing feedback, personalizing learning, automating tasks, and monitoring progress. However, AI cannot replace teachers in aspects such as character development and human values in education.

Contrary to these studies, Lee (2023) contends that AI teaching machines can exceed human teachers' cognitive faculties about learning material, instructional techniques, student attributes, and individualized guidance, potentially displacing future human teachers. The teacher-student-curriculum content nexus constitutes the fundamental framework of teaching activities. The interpretation of the role of the teacher can vary based on the concept of the interaction between the teacher and the other two components of the educational triangle. Integrating AI in education may lead to a transformation in the traditional view of teaching, which is typically based on a specific concept of the mind. This is because the dynamics of the teaching and learning process are changing.

In Algeria, there is a gap in studies that address the impact of the use of AI tools on the role of the professor, except for some studies that deal with artificial intelligence in general, such as the study of Kebdani and Badene (2021) which aimed to determine the relative importance of the use of AI applications in Algerian higher education institutions and their role in ensuring the quality of education given the recognized international standards using a questionnaire distributed to 109 university professors. It was found that the use of AI

applications in Algerian higher education institutions is considered a priority at present by more than 81% of the sample members. There is an urgent need to use these applications with all scientific and humanitarian disciplines, and the use of these applications contributes significantly to ensuring the quality of education. The study also found that there are no statistically significant differences in the importance of using these applications to ensure quality, neither in terms of academic degree, job rank, or professional experience.

Prior research indicates that teachers and students have a favorable disposition toward using AI in teaching due to its potential to enhance teacher effectiveness and evaluation. However, other research has indicated a disparity between the perceived significance of AI in the classroom by teachers and its actual application. These studies emphasize the crucial role of teachers in directing and motivating students and tailoring instructional material to meet individual student needs. Several studies indicate that there are apprehensions regarding the potential replacement of human teachers by AI in the future, owing to its sophisticated capabilities. Hence, this study aims to comprehend students' viewpoints regarding the teacher's role and to find a harmonious equilibrium between technology utilization and the human teacher's involvement. This balance is crucial to ensure the efficacy of the educational process and foster meaningful interaction between students and teachers.

Methods and Materials

The researchers used the descriptive method, which relies on studying the phenomenon in reality and describing it quantitatively to obtain data. The study tool, a questionnaire, was designed by researchers based on previous studies.

Descriptive statistics tools (frequencies, percentages) were used to show the characteristics of the sample, the arithmetic mean, and the standard deviation to know the trend of the statements and dimensions of the questionnaire. The statistical tests of inferential statistics were used to validate the hypotheses of relationship and influence.

Participants

The study community consists of university students who use social media in Algeria during the 2023-2024 academic year. Since determining the exact size of the community is not possible and there is no sampling structure, the study sample was selected in a non-probability way (non-random), so the questionnaire was distributed electronically via the Internet. The researchers asked some sample members to distribute it and spread it as widely as possible. The number of responses amounted to 152 students.

Research Instruments

The researchers used an electronic questionnaire (using a five-point Likert scale) to gather quantitative data from the students included in the study. This facilitates the acquisition of precise data that accurately reflects individuals' perspectives on the influence of AI tools on the roles of instructors. In July 2024, the questionnaires were disseminated to 152 students across different universities and academic disciplines through social media platforms such as Facebook, WhatsApp, and Telegram.

Table 1. *Dimensions and items of the questionnaire*

Section	Dimension	Number of items	Total
Use of AI Tools	Educational Effectiveness	3	12
	Teacher Interaction	3	
	Administrative Efficiency	3	
	Student Monitoring and Evaluation	3	
Role of the Teacher	Quality of Education	3	12
	Student Interaction	3	
	Lesson Organization	3	
	Information Presentation	3	
Students' Familiarity with ICT	Familiarity with Digital Resources	3	12
	Adaptation to New Technologies	3	
	Utilizing Technological Tools for Academic Improvement	3	
	Communication and Collaboration Using Technology	3	

Source. *By researchers*

The questionnaire consists of three axes that measure the study variables. Each axis contains four dimensions, each with three questions, for a total of 36 questions. We used a five-point Likert scale.

Psychometric Properties of the Instrument (Reliability and Stability)

To calculate the questionnaire's reliability, the correlation of each statement with the appropriate dimension was calculated, and they were all statistically significant at the level of 0.05. The stability of the questionnaire was verified through Cronbach's alpha coefficient, which amounted to 0.962. Thus, the questionnaire is ready for the main study.

Results

Descriptive Results of the Sample

The students participating in the study are distributed as follows:

Table 2. *Sample characteristics*

Variable	Values	Frequency	Percentage
Gender	Male	65	43%
	Female	86	57%
Age	Less than 20 years old	41	7.3%
	20 to less than 25 years old	34	22.5%
	25 to less than 30 years old	34	22.5%
	30 to less than 35 years old	29	19.2%
	Over 35 years old	43	28.5%
Level	Bachelor’s degree	50	33.1%
	Master’s degree	66	43.7%
	Doctorate	35	23.2%
Field of study	Science and technologies	55	36.4%
	Humanities and Social Sciences	96	63.6%

Source. *By researchers*

The results indicate a relative balance between male and female participants in the study, with

43% male and 57% female. This balance could contribute to the study's diversity of opinions and perspectives. There is also a diversity of ages; A small percentage of participants are under 20 (7.3%), while the most significant percentage is between the age groups of 20 to over 35. The largest age group is over 35 years old, at 28.5%. This diversity in age can enhance the understanding of age differences in participants' behaviors and opinions. In addition, most participants hold higher degrees, with 43.7% having a master's degree, 23.2% having a PhD, and 33.1% with a bachelor's degree. This indicates that the study sample is primarily composed of highly educated individuals. The results show that the majority of the participants are studying humanities and social sciences at 63.6%, while 36.4% are studying science and technology. This distribution may impact the study's results depending on the differences in educational backgrounds and specializations.

Sample's Attitudes about the Study Variables

The following results present a descriptive summary of the respondent's responses to the three study variables:

Use of AI tools

The first table (Appendix A) shows students' attitudes about using AI tools. The results indicate a positive evaluation of the use of AI tools in the educational process by students, as they reported that these tools enhance professors' ability to explain (mean=4.31, standard deviation=0.81) and help organize and manage lessons more effectively (mean=4.24, standard deviation=0.70). However, the results showed that the impact of AI on enhancing in-class interaction was less highly rated (mean=3.45, standard deviation=0.96), suggesting that there are challenges in integrating these tools into interactive classroom activities. In addition, students indicated that AI tools help improve communication between professors and students (mean=3.62, standard deviation=1.09), supporting the educational process and providing feedback more effectively. The arithmetic means of the four dimensions reflect instructional effectiveness (4.23), professor interaction (3.59), administrative efficiency (4.10), and student monitoring and evaluation (4.21), indicating a general appreciation of the role of AI in improving various aspects of the educational process.

Role of the teacher

The results of the second table (Appendix B) indicate a positive evaluation of the use of AI tools in the educational process by students, as they reported that the use of AI contributes significantly to improving lesson planning and organization (mean=4.40, standard deviation=0.65) and providing practical and realistic examples (mean=4.28, standard deviation=0.76). However, effectiveness in tracking student progress was less highly rated (mean=3.98, standard deviation=0.86), suggesting the need for greater integration between AI tools and academic tracking systems. Professors using AI were also more accurate in providing feedback (mean=4.02, standard deviation=0.84). The arithmetic means of the dimensions reflect a positive assessment of teaching quality (4.15), an improvement in students' interaction with professors (4.15), a high appreciation of lesson organization (4.31), and effectiveness in simplifying and clarifying information (4.15). Overall, the results reflect a high appreciation of the role of AI in enhancing the quality of the educational process and student engagement, with some challenges in tracking student progress.

Students' familiarity with ICT

The third table (Appendix C) indicates that the students in this study believe that they have a good level of familiarity with ICT, as the results showed that students believe that

technology helps significantly in improving group collaboration in academic projects (mean=4.52, standard deviation=0.55) and that they feel confident in using digital resources such as electronic libraries and scientific articles (mean=4.36, standard deviation=0.76). However, their ability to use new technologies without intensive training was less highly rated (mean=3.93, standard deviation=0.93), indicating the need for more support and training. The results also showed that students use technological applications to effectively organize their time and assignments (mean=4.03, standard deviation=1.04). The arithmetic means of the dimensions reflect high confidence in using digital resources (4.31), reasonable ability to adapt to new technologies (4.15), high appreciation of the role of technology in improving communication and collaboration (4.35), and effectiveness in using technological tools to organize study tasks (4.13). The overall mean of the ICT literacy assessment was 4.24 with a standard deviation of 0.45, indicating a good level of familiarity with technology and its use in the academic environment from the student's point of view.

Hypothesis Testing

H1: Using AI tools positively impacts the professor's role in the educational process. (effectiveness in explaining and organizing lessons, interactions with students, administrative efficiency, monitoring and evaluating students' progress).

The following table presents the results of the multiple regression analysis of the impact of the use of AI tools on the role of the teacher:

Table 6. *Results of the effect of the use of AI tools on the role of the teacher*

Independent variable	dependent variable	R	R^2	F	Sig.	B	T	Sig.	VIF
use of AI tools	Constant					0.473	2.217	0.028	
	Quality of Education	0.844	0.712	90.923	0.000	0.317	4.097	0.000	4.078
	Student Interaction					0.370	4.894	0.000	3.256
	Lesson Organization					0.148	1.758	0.081	3.003
	Information Presentation					0.017	0.232	0.817	3.224

Source. *SPSS results*

The table results showed that teaching quality and student interaction are the two main factors that significantly and strongly influence the role of the professor. It was found that improving the quality of instruction by one unit leads to an increase of 0.317 units, and increasing student interaction by one unit leads to an increase of 0.370 units. On the other hand, the use of AI in organizing lessons and presenting information did not have a significant effect on the role of the professor, as the statistical values indicated that there was no significant effect of these two factors. This suggests that enhancing the use of AI in improving the quality of education and encouraging student interaction could significantly improve the professor's role. The model shows that 71.2% of the variance in professor roles can be explained by the included independent variables, suggesting that additional factors contribute to explaining the overall variance in professor roles that are worthy of future study.

The regression equation for the professor's role based on the listed independent variables is as follows:

Professor's Role =0.473+0.317×Quality of Education +0.370×Student Interaction

H2: The level of students' familiarity with ICT affects the effectiveness of using AI tools in enhancing the professor's role in the educational process.

To validate this hypothesis, continuous total scores were converted into standardized scores, and a new variable was created to reflect the interaction between the independent variable and the moderator variable.

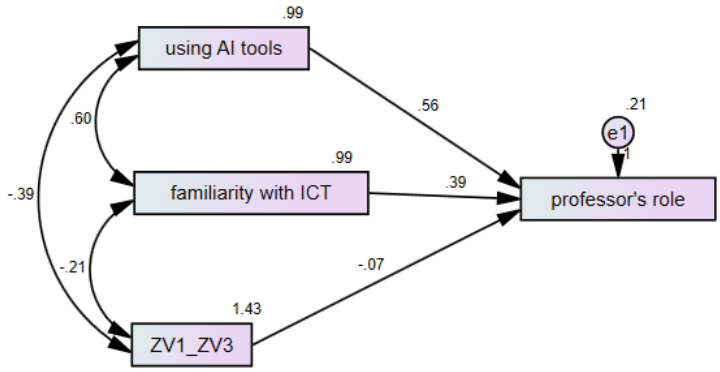

Figure 2. Results of the AMOS program on the impact of familiarity with ICT on the impact of AI on the role of the professor

Source. *AMOS results*

The results showed that there is a statistically significant positive relationship between students' ICT literacy (ZV1) and the effectiveness of using AI tools (ZV2) (β =0.564, p <0.001, β=0.564, p<0.001). The results also showed a positive relationship between students' familiarity with ICT literacy (ZV3) and the effectiveness of using AI tools (β =0.392, p <0.001 β=0.392, p<0.001). However, the analysis found that the interaction between students' ICT literacy and their level of use of AI tools harms the effectiveness of these tools (β =-0.074, p =0.024, β=-0.074, p=0.0

Discussion

The tables and regression analysis results indicate an overall positive assessment of AI tools in improving the educational process from the perspective of university students. Specifically, AI tools are seen as a significant improvement in professors' ability to explain complex concepts and organize lessons effectively. This is in line with the high means and low standard deviations for items such as "AI tools enhance the professor's ability to explain" (mean=4.31, standard deviation=0.81) and "AI tools help professors organize and manage lessons more effectively" (mean=4.24, standard deviation=0.70). These results indicate that students appreciate the importance that AI tools bring to their learning experiences and enhance the role of the professor.

Answering the Study Questions and Verifying the Hypotheses

Q1: How does the use of AI tools affect the role of the professor in the educational process from a student's perspective?

The results indicate that using AI tools positively affects the professor's role, enhancing the effectiveness of explaining and organizing lessons. This supports the validity of the first hypothesis (H1), which states that using AI tools positively impacts the professor's role in the educational process.

Q2: How does students' level of familiarity with ICT affect the effectiveness of using AI tools in enhancing the role of the professor?

The results indicate that students' familiarity with ICT negatively affects the effectiveness of using AI tools to enhance the role of the professor. This supports the second hypothesis (H2), which states that students' familiarity with ICT has a positive effect on the

effectiveness of using AI tools to enhance the role of the professor. This finding aligns with previous studies showing that a limited understanding of ICT can hinder the full effectiveness of AI tools in educational settings (Kizilcec, 2024; Mano, 2024; Sanusi et al., 2022).

These findings are similar to previous research highlighting the benefits of AI in education, such as improving the quality of instruction, the efficiency of classroom management, and providing personalized learning experiences, which is reflected in students' positive evaluation of the role of AI in explaining and organizing lessons. Studies such as those by Galindo-Domínguez et al. (2024) and Lima et al. (2024) indicated that teachers are positively inclined towards including AI-related content in their teaching methods. However, lower ratings of the role of AI in enhancing classroom interaction (mean=3.45, standard deviation=0.96) show that this area needs improvement. This may be explained by Su et al. (2023) study, which showed that teachers need to adequately cover AI topics in their classrooms, even though they recognize its importance.

The results also indicate that students' familiarity with ICT can negatively affect the effectiveness of AI tools. This is what Su et al. (2023) confirmed in their study on the adoption of generative AI among Thai university students, which confirmed that students' ICT competencies negatively affect the effectiveness of AI tools. Huang et al. (2024) explain that integrating ICT knowledge with AI tools leads to the student's self-reliance without needing the professor's role.

Pedagogical Implications

Developing new teaching strategies: AI tools can offer opportunities to develop new educational strategies that better meet the needs of students, such as providing personalized learning experiences and real-time feedback, helping to improve teaching effectiveness and increase student engagement.

Promote professional development for professors: Universities can offer programs that train professors to use AI tools effectively. They aim to improve professors' understanding of AI technology and how to use it to enhance learning and connect with students.

Improve classroom interaction: Focus on developing AI-based instructional strategies and enhancing classroom interaction to improve students' learning experiences. This can include using AI tools to encourage discussions and interaction between students and professors, fostering a more interactive and dynamic learning environment.

Conclusion

This study aims to explore the role of using artificial intelligence tools in enhancing the role of the professor in the educational process from the perspective of university students. A questionnaire was distributed to 152 university students from various disciplines and universities in Algeria. The study concludes that using AI tools in higher education enhances the role of professors in the educational process from the student's perspective. The results show that these tools contribute to improving the organization of lessons and clarifying content, which increases the effectiveness of the teaching process. They also enhance interaction between professors and students and reduce administrative burdens, allowing professors to focus more on teaching the material. However, there is a need to integrate these tools into interactive classroom activities and monitor student progress better. The importance of these tools in enhancing the quality of education and interaction between professors and students is evident, highlighting the need for integrated strategies for their successful implementation. The study also emphasized that increasing students' familiarity with ICT decreases the impact of AI

on the role of the professor in the educational process.

Recommendations

Train professors: Develop comprehensive training programs for professors to teach them how to use AI tools effectively in lessons.

Improve technology integration: Optimize the integration of AI tools into interactive activities and classrooms to ensure that students get the most out of them.

Assess progress: Establish effective mechanisms to monitor student progress and assess the extent to which AI tools are improving academic performance.

Developing learning strategies: Develop innovative AI-based learning strategies to enhance the quality of education and increase interaction between students and professors.

Supporting students: Providing the necessary support for students who face difficulties using AI tools and enhancing their ICT skills.

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Declaration of AI Use

This research paper has undergone language correction using the AI-powered tools DeepL Translate and Grammarly to address grammatical, spelling, and stylistic errors. It is acknowledged that the use of such tools may introduce standardised patterns typical of AI-generated content. Consequently, a certain percentage of content may reflect AI-generated language structures. Yet, the intellectual content and the analysis remain entirely the work of the authors.

Statement of Absence of Conflict of Interest

The authors mentioned above hereby solemnly declare that they are not and shall not be in any situation that could give rise to a conflict of interest in what concerns the findings and recommendations contained in this academic article.

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Appendices

Appendix A

Students' attitudes about using AI tools

Table 3. *Use of AI tools*

Dimension	Questions	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Std. Dev	Rank
Educational Effectiveness (Mean: 4.23 Std Dev: 0.69)	1. AI tools enhance the professor's ability to explain.	72 (47.4%)	64 (42.1%)	10 (6.6%)	4 (2.6%)	2 (1.3%)	4.31	0.81	1
	2. AI tools help professors organize and manage lessons	54 (35.5%)	86 (56.6%)	8 (5.3%)	3 (2.0%)	1 (0.7%)	4.24	0.70	4
	3. Using AI enhances the professor's interaction with	59 (38.8%)	68 (44.7%)	15 (9.9%)	8 (5.3%)	2 (1.3%)	4.14	0.89	6
Teacher Interaction (Mean: 3.59 Std Dev: 0.83)	4. I feel that professors who use AI tools are more interactive and creative in their teaching.	59 (38.8%)	73 (48%)	11 (7.2%)	7 (4.6%)	2 (1.3%)	3.69	1.07	10
	5. AI tools help improve communication between professors and students.	54 (35.5%)	72 (47.7%)	13 (8.6%)	11 (7.2%)	2 (1.3%)	3.62	1.09	11
	6. Using AI helps enhance interaction within the classroom.	40 (26.3%)	0 (0%)	102 (67.1%)	9 (5.9%)	1 (0.7%)	3.45	0.96	12
Administrative Efficiency (Mean: 4.4.10 Std Dev: 0.72)	7. AI tools contribute to reducing the administrative burdens on	59 (38.8%)	73 (48%)	11 (7.2%)	7 (4.6%)	2 (1.3%)	4.18	0.85	5
	8. Using AI improves the quality of academic assessments conducted by professors.	54 (35.5%)	72 (47.4%)	13 (8.6%)	11 (7.2%)	2 (1.3%)	4.08	0.92	7
	9. AI helps provide more time for professors to focus on teaching rather than administrative tasks.	39 (25.7%)	89 (58.6%)	14 (9.2%)	9 (5.9%)	1 (0.7%)	4.02	0.80	9
Student Monitoring and Evaluation (Mean: 4.21 Std Dev: 0.65)	10. AI tools help professors monitor individual student	67 (44.1%)	70 (46.1%)	9 (5.9%)	5 (3.3%)	1 (0.7%)	4.29	0.77	2
	11. AI tools enable professors to provide accurate and timely	45 (00%)	80 (00%)	16 (00%)	9 (00%)	2 (00%)	4.03	0.87	8
	12. Using AI helps improve lesson planning and organization.	70 (46.1%)	66 (43.4%)	8 (5.3%)	7 (4.6%)	1 (0.7%)	4.29	0.82	3

Source. *SPSS results*

Appendix B

Students' attitudes about the role of the teacher

Dimension	Questions	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Std. Dev	Rank
Quality of Education (Mean: 4.15	1. Professors who use AI can better meet students' needs.	70 (46.1%)	56 (36.8%)	16 (10.5%)	10 (6.6%)	0 (00%)	4.22	0.88	7
	2. Using AI improves the quality of education professors	54 (35.5%)	83 (54.6%)	10 (6.6%)	5 (3.3%)	0 (00%)	4.22	0.71	6

Std Dev: 0.75)	3. Professors who use AI tools are more efficient in classroom management.	54 (35.5%)	61 (40.1%)	24 (15.8%)	10 (6.6%)	3 (2%)	4.00	0.97	11
Student Interaction (Mean: 4.15 Std Dev: 0.69)	4. AI helps professors provide practical and realistic	64 (42.1%	76 (50%)	5 (3.3%)	6 (3.9%)	1 (0.7%)	4.28	0.76	2
	5. Using AI contributes to improving student interaction with professors.	59 (38.8%)	73 (48%)	10 (6.6%)	9 (5.9%)	1 (0.7%)	4.18	0.84	8
	6. AI enables professors to monitor student progress	40 (26.3%)	82 (53.9%)	19 (12.5%)	9 (5.9%)	2 (1.3%)	3.98	0.86	12
Lesson Organization (Mean: 4.31 Std Dev: 0.59)	7. Using AI contributes to improving lesson planning and	73 (48%)	71 (46.7%)	5 (3.3%)	3 (2%)	0 (00%)	4.40	0.65	1
	8. Professors who use AI can better adapt teaching methods	59 (38.8%)	77 (50.7%)	12 (7.9%)	4 (2.6%)	0 (0%)	4.25	0.71	5
	9. AI helps create an interactive and innovative	64 (42.1%)	71 (46.7%)	12 (7.9%)	5 (3.3%)	0 (0%)	4.27	0.74	3
Information Presentation (Mean: 4.15 Std Dev: 0.62)	10. Professors who use AI are more efficient in presenting	56 (36.8%)	72 (47.4%)	16 (10.5%)	8 (5.3%)	0 (0%)	4.15	0.81	9
	11. Using AI helps professors manage time better during	70 (46.1%)	59 (38.8%)	18 (11.8%)	4 (2.6%)	0.7 (00%)	4.26	0.82	4
	12. Professors who use AI are more accurate in providing	44 (28.9%)	78 (51.3%)	22 (14.5%)	6 (3.9%)	2 (1.3%)	4.02	0.84	10

Source. *SPSS results*

Appendix C

Students' attitudes about familiarity with ICT

Dimension	Questions	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Std. Dev	Rank
Familiarity with Digital Resources (Mean: 4.31 Std Dev: 0.62)	1. I feel confident using digital resources such as online libraries and scientific	78 (51.3%)	57 (37.5%)	12 (7.9%)	5 (3.3%)	0 (00%)	4.36	0.76	2
	2. I can easily access and use digital educational resources in my studies.	62 (40.8%)	74 (48.7%)	9 (5.9%)	7 (4.6%)	0 (0%)	4.25	0.76	7
	3. I can search for reliable academic information using digital tools.	68 (44.7%)	69 (45.4	9 (5.9%)	5 (3.3%)	1 (0.7%)	4.30	0.78	4
Adaptation to New Technologies (Mean: 4.15 Std Dev: 0.67)	4. I can quickly adapt to new educational technologies.	55 (36.8%)	77 (50.7%)	18 (11.8%)	1 (0.7%)	1 (0.7%)	4.21	0.72	8
	5. I feel comfortable trying new educational applications and programs.	68 (44.7%)	65 (42.8%)	15 (9.9%)	4 (2.6%)	0 (0%)	4.29	0.75	6
	6. I am capable of using new technologies without needing extensive training.	42 (27.6%)	77 (50.7%)	15 (9.9%)	17 (11.2%)	1 (00%)	3.93	0.93	12
Utilizing Technological Tools for	7. I use technological applications to organize my time and study tasks.	61 (40.1%)	58 (38.2%)	14 (9.2%)	16 (10.5%)	3 (13%)	4.03	1.04	11

Academic (Mean: 4.13 Std Dev: 0.74)	8. I find that using technology helps improve my academic performance.	59 (38.5%)	82 (53.9%)	8 (5.3%)	3 (2%)	0 (0%)	4.29	0.65	5
	9. I can use academic analysis software to track my academic progress.	59 (38.8%)	56 (36.8%)	24 (15.8%)	11 (7.2%)	2 (1.3%)	4.04	0.97	10
Communication and Collaboration Using (Mean: 0.34 Std Dev: 0.60)	10. I use technological tools to communicate effectively with my peers and professors.	70 46.1%	70 (46.1%)	9 (5.9%)	2 (1.3%)	1 (0.7%)	4.35	0.71	3
	11. I believe technology helps improve group collaboration in academic projects.	84 (55.3%)	64 (42.1%)	4 (2.6%)	0 (00%)	0 (00%)	4.52	0.55	1
	12. I am capable of participating in online educational forums and	61 (40.1%)	70 (46.1%)	13 (8.6%)	7 (4.6%)	1 (0.7%)	4.20	0.83	9

Source. *SPSS results*

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