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Article

Training Needs of University Faculty for Performing Teaching Tasks Using Artificial Intelligence

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Abstract

Amid the fourth wave of the industrial revolution, artificial intelligence (AI) is emerging as a transformative force in higher education—not merely as a supplementary tool but as a key agent reshaping the roles and dynamics among professors, students, and educational content. Yet, this shift does not inherently ensure professors' readiness or mastery of the requisite skills for such a transition. Consequently, this study seeks to identify the training needs of university professors to effectively integrate AI into their teaching practices.

Data were collected via a questionnaire administered to 44 professors at the Faculty of Social Sciences and Humanities, University of Oum El Bouaghi, after validating its psychometric properties. The findings revealed that, across the three examined factors, most respondents lacked profi-

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ciency in AI-related skills. The option "Not proficient in using it." scored the highest percentages for each factor: (42.89%), (55.9%), and (78.41%), supported by mean scores of (2.22), (2.44), and (2.76), respectively.

Overall,the predominant response was "Not proficient in using it." (59.06%), followed by "Somewhat" (31.38%),and "Proficient in using it." (9.43%).These results align with the questionnaire's total mean score (2.47), which lies between "Somewhat" and "Not proficient in using it."

Keywords: Training needs, Artificial intelligence, University professor, Higher education.

Les besoins en formation des enseignants universitaires pour accomplir des tâches pédagogiques à l'aide de l'intelligence artificielle

Resumé

Dans le contexte de la quatrième vague de la révolution industrielle, l'intelligence artificielle se présente comme une force transformatrice majeure au sein de l'enseignement supérieur. Elle ne saurait être perçue comme un simple outil auxiliaire, mais bien comme un agent de reconfiguration profonde des rôles et des dynamiques entre l'enseignant-chercheur, l'étudiant et le savoir transmis. Toutefois, cette mutation structurelle ne présume en rien de la disponibilité ni de la maîtrise, chez les enseignants, des compétences indispensables à une telle transition. Dès lors, la présente étude s'attache à cerner avec précision les besoins en formation des enseignants universitaires, afin de permettre une intégration lucide et efficiente de l'intelligence artificielle dans leurs pratiques pédagogiques.

Les données empiriques ont été recueillies à l'aide d'un questionnaire administré à 44 enseignants de la Faculté des Sciences Sociales et Humaines de l'Université d'Oum El Bouaghi, et ce, après validation rigoureuse de ses propriétés psychométriques.

Les résultats mettent en lumière une insuffisance manifeste des répondants en matière de compétences liées à l'intelligence artificielle, et ce, à travers les trois dimensions analysées. L'item « Ne maîtrise pas son usage » enregistre les fréquences les plus élevées pour chacun des axes examinés : 42,89 %, 55,9 % et 78,41 %, accompagnées de moyennes respectives de 2,22 ; 2,44 ; et 2,76.

Globalement, la modalité « Ne maîtrise pas son usage » prédomine (59,06 %), devant « Moyennement » (31,38 %) et « Maîtrise son usage » (9,43 %). Ces résultats convergent avec la moyenne globale du questionnaire (2,47), positionnée entre les modalités « Moyennement » et « Ne maîtrise pas son usage ».

Mots-clés : Besoins en formation. Intelligence artificielle. Enseignement supérieur. Enseignant supérieur.

Introduction

The contemporary world is witnessing rapid and accelerating advancements in the use of artificial intelligence (AI) systems, software, and applications across various fields. This trend is not confined to the manufacturing or service sectors alone but has extended to efforts aimed at enhancing and developing education—its methods, approaches, and curricula. As a result, education has become one of the foremost domains experiencing a surge in AI adoption, with vast prospects for future application and refinement (As the valuation of the global educational technology (EdTech) market reached $121 billion in 2023, it is expected to double, reaching $348 billion by early 2031, with an annual growth rate of 19.1%. Similarly, the AI education market was valued at approximately $4 billion in 2022, with projected CAGR growth of 10% from early 2023 until 2030. Moreover, the size of the e-learning technology (EdTech) market is anticipated to reach $696 billion by early 2028.) (Markets&Markets, 2023, p. 3).

These figures underscore how AI has emerged as a pivotal tool reshaping education, particularly higher education. AI enhances and streamlines teaching tasks for educators, improves administrative efficiency, and supports scientific research. A key focus of AI researchers has been refining university-level instruction, as it plays a critical role in equipping the labor market with competent graduates.

AI's integration into education has also elevated student performance and facilitated active learning. For instance, professors can now prepare lectures and instructional materials more swiftly, with reduced effort and greater precision, by applying the principle of Personalized Learning wich an approach that analyzes student data to tailor educational experiences to individual needs(Holmes et al., 2021, p. 15). Furthermore, AI enables educators to deliver lessons through interactive and engaging methods, thereby improving comprehension (Zawacki-Richter et al., 2019, p. 11). In assessment, AI facilitates automated evaluation (e.g., grading assignments and exams), alleviating the burden on instructors while providing students with immediate feedback (Luckin et al., 2016, p. 26).

Given these global advancements and the inevitability of AI-driven transformation across all sectors, especially higher education, professors now face novel demands in their teaching roles. This necessitates training as a vital mechanism to equip educators with the knowledge, skills, and adaptive mindsets required to navigate this evolution (UNESCO, 2021, p. 32).Like professionals in any organization, university professors require ongoing training, particularly as their roles evolve.

Today, they are expected to proficiently utilize AI tools across all stages of instruction: preparation, delivery, and assessment.

The core objective of training is to enrich trainees' minds and broaden their horizons by addressing competency gaps through enhanced knowledge, perspectives, and skills related to emerging technologies or role expectations. These gaps, known as training needs, must first be identified to design effective programs. Without a clear and demonstrable need, training initiatives lack justification. Thus, determining whether university professors require training in AI-driven teaching methodologies is foundational to the entire process.

This raises the study's central research question:

What are the training needs of university professors in light of the competencies required to teach using artificial intelligence?

The question branches into the following sub-questions:

-What are the training needs of university professors regarding the use of AI for preparing educational content?

-What are the training needs of university professors regarding the use of AI for delivering educational content?

-What are the training needs of university professors regarding the use of AI for assessing educational content?

1. Research Objectives:

✓ To identify the necessary skills for university professors to use artificial intelligence in the three stages of the educational process: preparing, delivering, and assessing educational content.

✓ To present these necessary skills: Preparing educational content, presenting educational content, evaluating educational content to professors at the Faculty of Social and Human Sciences at Oum El Bouaghi University, in order to determine which skills they master, somewhat master, or do not master.

✓ To rank the skills that university professors do not master in using artificial intelligence across the three stages of the educational process—preparing, delivering, and assessing educational content—based on the degree of non-mastery, using the obtained percentages and averages for each skill.

2. Research Significance

University education is the primary driver of societal development, as it plays a crucial role in supplying human capital capable of enhancing both economic and social functions. Therefore, it is essential to ensure its continuous advancement to meet contemporary demands, with artificial

intelligence (AI) being one of the most recent developments in this regard. The increasing inevitability of AI integration by university professors in the educational process necessitates structured training, as it equips them with the essential skills required for effective implementation. This underscores the significance of the present research, as identifying training needs constitutes the first step in the training process.

The current study serves as a foundational framework and a fertile ground

for developing a training program for university professors, tailored to the identified needs related to AI-assisted teaching.

This research aims to enhance the competencies of university professors by providing them with a comprehensive understanding of the skills required for AI-integrated teaching. By doing so, it raises awareness of the necessity of mastering, acquiring, and effectively utilizing these competencies.

Additionally, this study serves as a valuable reference that can support efforts to persuade relevant authorities of the urgent need to train university professors in AI-based teaching methodologies.

Finally, this study contributes to the growing body of research on the integration of artificial intelligence in higher education, particularly given the novelty of the subject and the relative scarcity of existing studies in this field.

3. Definition of Research Concepts: Theoretical Background

The following concepts were used in the current research:

3.1 Training Needs

Terminologically: Training needs refer to the knowledge, skills, behaviors, and attitudes that employees must develop due to organizational or technical changes, identified eaknesses in the capabilities of employees and managers, the need to adapt to organizational advancements, promotions, transfers, or to address actual or potential challenges .(Al-Ajlouni, 2020, p. 45)

Operationally:in this study, these are all the modifications required in a university professor's teaching performance—through training—to enable them to effectively carry out their teaching tasks across all stages (preparation, delivery, and assessment) using artificial intelligence.

3.**2**The Algerian University Professor

Terminologically: The Algerian university professor is the cornerstone of the higher education and scientific research system, fulfilling two primary roles: teaching and scientific research, alongside participation in university administration and community service. Algerian law regulates their duties and academic ranks through specific legislation .(People's Democratic Republic of Algeria, 2008, p. 4).

. Thus, they are considered faculty members, holding advanced academic qualifications (a Ph.D. or equivalent) and are responsible for knowledge transfer, developing research skills, and contributing to the advancement of the university and society.(People's Democratic Republic of Algeria, 2008, p. 6).

Operationally: They are professors from the Faculty of Social Sciences and Humanities at the University of Oum El Bouaghi (Algeria) who are engaged in teaching and have responded to the provided questionnaire. The questionnaire aims to identify their training needs for performing teaching tasks across all stages (preparation, delivery, and assessment) using artificial intelligence.

3.3 Artificial Intelligence in the Teaching Process

Terminologically: Artificial intelligence (AI) is a system based on algorithms and databases capable of analyzing learning patterns, providing personalized recommendations, and simulating human interaction through intelligent interfaces .(Russell & Norvig, 2021, p. 28).

In our study: these are AI-based systems and applications designed to assist university professors in: lesson preparation, delivery, and student performance assessment with greater accuracy and efficiency. These programs enable:

- Smart content preparation by generating lesson plans, presentations, and test questions.
- Interactive lesson delivery using intelligent engagement tools.
- AI-powered assessment and analytics, allowing professors to grade exams, track student progress, and provide instant feedback to enhance the learning process.

4. Literature Review

Previous studies serve as the foundation for scientific research, and in our study, we relied on a set of studies that aimed to identify the training needs of university professors in integrating artificial intelligence into teaching.

The first study we examined was conducted by Smith et al. (2020), which aimed to assess the technical and pedagogical competencies of faculty members at American universities. A questionnaire was administered to 150 professors from five American universities using a descriptive approach. The study found that 68% of participants lacked teaching skills using artificial intelligence tools and recommended the necessity of training university professors (Smith, J., Brown, T., & Davis, R., 2020, P45–60).

The second study, conducted by Alvarez et al. (2021), sought to evaluate gaps in AI knowledge among European university professors. Using a descriptive approach, an online survey with Likert-scale questions was distributed to a sample of 300 faculty members from Spain, Germany, and France. The results indicated that 65% of respondents required training in AI-driven analytics.

The third study, conducted by Al-Mansoori (2022), aimed to identify the challenges associated with adopting artificial intelligence among university professors in the Middle East. A descriptive approach was employed, and interviews were conducted with 45 professors from universities in the United Arab Emirates. The study found that 60% of participants encountered difficulties in using AI-based assessment tools and emphasized the need for training programs (Al-Mansoori, R., 2022, P33–50).

The fourth study, by Chen and Wang (2023), explored cultural barriers to the adoption of artificial intelligence among Asian faculty members. Using a descriptive approach, interviews were conducted with 25 professors from universities in China and Japan. The study concluded that resistance to artificial intelligence was prevalent due to concerns over its potential to dehumanize education (Chen, L., & Wang, H., 2023, P75).

The fifth study, conducted by Müller and Schmidt (2023), assessed the impact of generative artificial intelligence (such as GPT-4) on educational practices in European universities. A descriptive approach was used, and semi-structured interviews (lasting 15–30 minutes each) were conducted with 35 professors from Germany, France, and Sweden. The interview protocol was designed based on grounded theory principles, and the study found that 85% of professors required training in prompt engineering, while 78% highlighted the need for ethical AI training (Müller, F., & Schmidt, K., 2023, P112–130).

The final study reviewed was conducted by Al-Hassan and Lee (2024), which aimed to identify gaps in AI knowledge and technical skills among university professors in the Middle East. A descriptive approach was applied, utilizing a bilingual (Arabic/English) questionnaire consisting of 25 Likert-scale items and open-ended questions. The instrument was validated through a pilot test (Cronbach's $\alpha = 0.87$) and refined based on expert feedback. The questionnaire was administered to 180 professors from Saudi Arabia, the United Arab Emirates, and Qatar. The study found that 72% of participants lacked the required proficiency to use AI tools (such as ChatGPT and AutoML), while 65% expressed the need for training programs (Al-Hassan, M., & Lee, Y., 2024, P45–62).

By reviewing and incorporating the above-mentioned studies into our research (given their strong relevance to our topic, which aims to identify the training needs of university professors specifically in their teaching tasks using AI-based programs) we observed a common conclusion: there is an urgent need for training, as university professors generally lack sufficient skills to effectively utilize AI in the teaching process. This finding has significantly contributed to both understanding our research subject and developing our research instrument.

5. Field Research Procedures

5.1. Research Methodology

Since this research aims to identify the training needs of university professors for performing teaching tasks using artificial intelligence, the descriptive approach was adopted. This methodology is appropriate as it examines phenomena as they exist in reality, providing a precise qualitative and quantitative depiction of the phenomenon.

5.2. Spatial and Temporal Boundaries of the Research

The field study was conducted at the Faculty of Social Sciences and Humanities at the University of Oum El Bouaghi, Algeria, between February 9, 2025, and March 20, 2025.

5.3. Research Population and Sample

The study population consisted of 142 professors from the Faculty of Social Sciences and Humanities, including 88 professors from the Department of Humanities and 52 from the Department of Social Sciences. The questionnaire was designed electronically and distributed via email to all members of the population. A total of 44 valid responses were retrieved, representing 30.98% of the original population.

5.4. Data Collection Tools

5.4.1. Questionnaire Construction:

We developed the questionnaire titled "Training Needs of University Professors for Teaching with Artificial Intelligence" by reviewing previous studies that addressed these training needs on one hand and by examining the teaching responsibilities of university professors as outlined in official government publications and theoretical literature on the other.

The key factors of the questionnaire were identified based on the main stages of the teaching process (preparation, delivery, and assessment). We then examined the AI-based programs and applications used at each stage of university teaching. The questionnaire items were formulated in a way that ensures each item measures a specific objective.

To pilot-test the initial version of the questionnaire, it was administered to four professors. Based on their feedback on the questionnaire's content, it became evident that there was ambiguity regarding the response options ("I frequently use them" and "I rarely use them"). As a result, the five-point scale was reduced to three alternatives: (I am proficient in using them, Somewhat proficient, Not proficient). Additionally, the professors agreed that some items were misaligned with the research objectives.

5.4.2. Psychometric Properties of the Questionnaire

Validity of the Questionnaire Scores

To ensure the validity of the questionnaire scores, the following validation methods were employed:

Internal Consistency validity

First Factor: Lesson Preparation Using Artificial Intelligence

To verify the validity of the first factor (Lesson Preparation Using Artificial Intelligence), Pearson's correlation coefficient was calculated between each item score within the factor and its total score. The results are presented in the following table:

Table 1.Correlation Between the Items of the First Factor and Its Total Score

Items	Correlation Coefficient
Formulation measurable objectives using AI tools such as (ChatGPT, DeepSeek)	0.645**
Identifying learning content for each lesson using AI tools such as (ChatGPT, DeepSeek)	0.773**
Preparing lesson plans using AI tools such as (lessonplans.ai)	0.760**
Designing lessons using artificial intelligence	0.866**
Adapting lesson content to align with students' cognitive levels using artificial intelligence	0.760**
Generating diverse and interactive question banks using artificial intelligence	0.827**
Utilizing AI-powered tools (PowerPoint, Canva) in lesson preparation	0.521**
Preparing lecture presentations containing multimedia elements (texts, images, videos, etc.) using AI programs	0.699**
Preparing lessons using artificial intelligence	1
**Significant at the 0.01 level	

From Table (01), we observe that the correlation coefficients for each item within the first factor (Preparing Lessons Using Artificial Intelligence) and the total factor score ranged between 0.52 and 0.86, all of which were statistically significant at the 0.01 significance level. This indicates that the first factor demonstrates high validity, making its results reliable.

Second Factor: Delivering Lessons Using Artificial Intelligence

To assess the validity of the second factor (Delivering Lessons Using Artificial Intelligence), Pearson's correlation coefficient was calculated between each item's score and the total factor score. The results are presented in the following table:

Table 2Correlation of the Second Factor's Items with the Total Factor Score

Items	Correlation Coefficient

Using tools such as *Quizlet* or *Kahoot* to create interactive quizzes that make lessons more engaging	0.598**
Using educational games to enhance student participation with artificial intelligence programs.	0.655**
Utilizing artificial intelligence tools such as Pictory and Synthesia (which include AI-generated educational content) to create animated characters.	0.580**
Using AI programs to find (book reviews, articles, videos, or links to educational sites) to deepen lesson comprehension.	0.706**
Utilizing artificial intelligence tools such as Pictory and Synthesia (which include AI-generated educational content) to create animated characters.	0.704**
Using artificial intelligence to propose interactive activities that enhance students' comprehension of lesson	0.805**
Integrating AI communication platforms (Zoom, Microsoft Teams) to facilitate discussions with students.	0.738**
Transforming lessons into interactive content that students can access at any time using AI programs.	0.551**
Preparing lessons using artificial intelligence	1
**Significant at the 0.01 level	

From Table (02), it is evident that the correlation coefficients for each item of the second factor (Delivering Lessons Using Artificial Intelligence) with the total factor score ranged between 0.51 and 0.85, all of which were statistically significant at the 0.01 significance level. Therefore, it can be concluded that the second factor exhibits.

Third Factor: Student Assessment Using Artificial Intelligence

To ensure the validity of the third factor (Student Assessment Using Artificial Intelligence), Pearson's correlation coefficient was calculated between the score of each item within the factor and its total score. The results are presented in the following table:

Table 3 Correlation of the Third Factor's Items with the Factor's Total Score

Items	Corrélation Coefficient
Analyzing student responses and generating immediate assessment reports using artificial intelligence.	0.816**
Using tools such as (Kahoot, Quizlet) to create interactive quizzes.	0.597**

Utilizing artificial intelligence to predict students' success rates in academic tasks.	0.801**
Correcting structured response items (multiple-choice questions) using artificial intelligence.	0.800**
Correcting open-ended response items (short answers/essays) using artificial intelligence.	0.569**
Using tools such as (Turnitin, Gradescope) for grading assignments.	0.687**
Employing artificial intelligence to analyze students' responses to identify areas requiring improvement.	0.815**
Using artificial intelligence for automated grading of student assessments	0.761**
Translating assessment materials (rubrics, academic writing assessment) using artificial intelligence.	0.807**
Employing platforms such as (CodeGrade) to assess programming assignments.	0.784**
Using artificial intelligence in oral and audio-based assessment.	0.720**
Evaluating students' academic performance based on their learning patterns using artificial intelligence.	0.768**
Using artificial intelligence to generate individualized assessments and exam questions.	0.684**
Employing artificial intelligence to analyze students' academic profiles to personalize learning pathways.	0.843**
Using (Gradescope) to grade quizzes and assignments.	0.818**
Using (Turnitin) to assess students' assignments and detect plagiarism.	0.628**
Using (Quizlet) to create and grade quizzes automatically	0.528**
Employing (CodeGrade) to assess programming assignments and provide feedback.	0.768**
Using (Socrative) for peer assessment	0.744**
Assessing students using artificial intelligence	1
**Significant at the significance level0.01	

From Table (03), it can be observed that the correlation coefficients for each item of the third factor (Student Assessment Using Artificial Intelligence) with the factor's total score ranged between 0.62 and 0.87, all of which were statistically significant at the 0.01 significance level. Thus, we conclude that the third factor exhibits strong validity evidence, and its results can be considered reliable.

Overall Instrument Validity:

To verify the overall validity of the instrument, Pearson's correlation coefficient was calculated between the factors of the Artificial Intelligence Usage Questionnaire and its total score. The results are presented in the following table:

Table 4 Correlation Coefficients Between the Total Questionnaire Score and Its Component Factors

Dimensions	Overall Score
Preparing Lessons Using Artificial Intelligence	0.911**
Delivering Lessons Using Artificial Intelligence	0.965**
Assessing Students Using Artificial Intelligence	0.745**
Overall Score	1
Significant at the 0.01 level	

From Table (04), we observe that Pearson's correlation coefficients between each factor of the Artificial Intelligence Usage Questionnaire and its total score ranged from 0.74 to 0.87. These coefficients were statistically significant at the 0.01 significance level. This finding indicates that the instrument demonstrates strong validity and can be reliably used for data analysis.

Extreme Groups Validity

To assess the validity of the questionnaire scores, discriminant validity was evaluated by administering the questionnaire to 37 faculty members from the Faculty of Social and Human Sciences at the University of Oum El Bouaghi. After ranking the participants' scores in descending and ascending order, the top 27% and bottom 27% of the scores were selected (corresponding to 10 individuals in the high-score group and 10 in the low-score group). The arithmetic means and standard deviations for each group were then calculated, and differences between the two groups were analyzed using an independent samples t-test.

The statistical analyses were conducted using SPSS (version 22), and the test results can be summarized as follows:

Table5T-test for the Significance of Differences Between the Upper and Lower Extreme Groups

	Extreme Group	N	Arithmetic Mean	Standard Deviation	T	Significance Level	Statistical Significance
S	Lower Scores	10	2.08	0.24	10.94	0.000	Significant

cores	Higher Score	0	2.94	0.06			

The results shown in Table (5) indicate that the T-value for the differences between the two groups is 10.94, with a significance level (Sig.) of 0.000, which is below the 0.05 threshold. This confirms that the differences are statistically significant at the 0.01 level, thus demonstrating that the questionnaire exhibits discriminant validity. In other words, it is capable of effectively distinguishing between high-performing and low-performing teachers.

Reliability of the Questionnaire Scores

To assess the reliability of the instrument, Cronbach's Alpha was calculated for the entire questionnaire as well as for its individual factors, yielding the following results:

Table 6Reliability of the Questionnaire and Its Components

Dimensions	Number of Items	Alpha Coefficient
Preparing Lessons Using Artificial Intelligence	8	0.88
Delivering Lessons Using Artificial Intelligence	8	0.82
Assessing Students Using Artificial Intelligence	20	0.95
Overall Score	36	0.95

As shown in Table (6), the Cronbach's Alpha coefficient for the overall questionnaire reached 0.95, while the coefficients for individual factors ranged between 0.82 and 0.90, indicating strong reliability. These results confirm that the instrument exhibits a high degree of reliability across its subcomponents, allowing us to confidently rely on the findings derived from this tool.

5.5 Presentation of Research Findings in Light of the Research Questions

5.5.1 Findings Related to the First Research Question

What are the training needs of university faculty members in relation to the requirements for preparing educational content using artificial intelligence?

The requirements for utilizing artificial intelligence in the preparation of educational content by university faculty members are presented in the following table, which illustrates the corresponding percentages.

Table 07Results of the sample members' responses to the items of the factor related to preparing educational content using artificial intelligence

	Items	Alternatives						Mean	Standard Deviation
		Proficient in using it		Somewhat		Not proficient in using it			
		Freq	%	Freq	%	Freq	%		
1	Setting measurable goals using AI tools (e.g., ChatGPT, DeepSeek)	1	2.3	27	61.4	16	36.4	2.35	0.52
2	Determining educational content for each lesson using AI tools (e.g., ChatGPT, DeepSeek)	5	11.4	19	43.2	20	45.5	2.34	0.68
3	Preparing a training plan using AI tools (e.g., lessonplans.ai)	6	13.6	16	36.4	22	50	2.48	0.68
4	Designing lesson structure using AI tools	6	13.6	16	36.4	22	50	2.36	0.71
5	Selecting educational content suitable for different levels using AI tools	7	15.9	17	38.6	20	45.5	2.30	0.74
6	Designing diverse and interactive educational content using AI tools	6	13.6	15	34.1	23	52.3	2.39	0.72
7	Designing lessons using AI tools along with digital tools (e.g., PowerPoint, Canva)	13	29.5	17	38.6	14	31.8	2.02	0.79
8	Creating lecture summaries containing visual and video-based content using AI tools	11	25	19	43.5	14	31.8	2.07	0.75
First Factor		55	15.62	146	41.47	151	42.89	2.22	0.6

From Table (07), it is evident that the arithmetic mean values associated with the alternative (lack of proficiency) ranged between (2.48 and 2.02). The third item ranked highest in terms of lack of skill proficiency, with 50% of the sample members indicating so, registering the highest mean (2.48) and a standard deviation of (0.68). This was followed by the sixth item, with 52.3% of the sample reporting lack of proficiency, a mean of (2.39), and a standard deviation of (0.72). The

fourth item came next, with 50% of the sample lacking proficiency, a mean of (2.36), and a standard deviation of (0.71). Then came the first item, with 61.4% of the sample lacking proficiency, a mean of (2.35), and a standard deviation of (0.52).The second item followed, with 45.5% reporting lack of proficiency, a mean of (2.34), and a standard deviation of (0.68). Similarly, the fifth item showed 45.5% lacking proficiency, a mean of (2.30), and a standard deviation of (0.71). The eighth item recorded 43.2% lack of proficiency, a mean of (2.07), and a standard deviation of (0.75). Finally, the seventh item came last, with 38.6% reporting lack of proficiency, a mean of (2.02), and a standard deviation of (0.79).

Based on the overall results of this factor, it is clear that the majority of the sample tend toward the alternative indicating lack of proficiency in the skills of preparing lessons using artificial intelligence, with a percentage of (42.89%). This was followed by the alternative somewhat, at (41.47%), and finally the alternative Proficient in using it, which received the lowest percentage (15.62%). The overall mean was (2.22), indicating that responses leaned between the two alternatives (not proficient in using it, somewhat). The standard deviation of (0.69) suggests the absence of outlier values

5.5.2 Presentation of Research Results in Light of the Second Question:

What are the training needs of university professors in view of the requirements necessary for performing the task of delivering educational content using artificial intelligence?

The skill of using artificial intelligence to deliver educational content among university professors received the percentages shown in the following table:

Table 8 Results of Faculty Members' Responses Regarding the Factor of Delivering Educational Content Using Artificial Intelligence

	Items	Alternatives						Mean	Standard Deviation
		proficient in using it		somewhat		Not proficient in using it			
		Freq	%	Freq	%	Freq	%		
1	Using tools such as (Kahoot or Quizlet) to create interactive quizzes that make lessons more engaging	1	2.3	11	25	32	72.2	2.7	0.5
2	Using educational games to enhance student participation through artificial intelligence.	00	00	11	25	33	75	2.75	0.43

3	Using AI-powered tools like Synthesia to develop educational content with animated characters (Pictory, AI-generated avatars, or motion graphics).	2	4.5	7	15.9	35	79.5	2.75	0.53
4	Using artificial intelligence to create interactive presentations with videos, links to educational websites, and additional resources to facilitate students' understanding.	11	25	19	43.2	14	31.8	2.07	0.75
5	Using artificial intelligence (ChatGPT, DeepSeek) to generate and answer questions, as well as to provide further explanations	8	18.2	21	47.7	15	31.8	2.06	0.71
6	Using artificial intelligence to suggest additional activities to enhance students' understanding.	4	9.1	20	45.5	20	45.5	2.36	0.65
7	Using communication platforms such as Zoom, Microsoft Teams, and AI-powered assistants to facilitate interactions with students.	9	20.5	16	36.4	19	43.2	2.23	0.77
8	Converting text-based content into an interactive format that allows students to access it more easily using AI-powered tools.	2	4.5	12	27.3	30	68.2	2.64	0.57
Second Factor		37	10.51	117	33.25	198	55.9	2.44	0.61

From Table (08), it is clear that the arithmetic mean values related to the "Lack of Proficiency" alternative ranged between (2.75 and 2.06). Item 3 ranked highest in terms of lack of proficiency, with 79.5% of the sample indicating non-proficiency, recording the highest mean (2.75) and a standard deviation of (0.53). It was followed by Item 2, with 75% of the sample reporting lack of proficiency, a mean of (2.75), and a standard deviation of (0.43). Then came Item 1, with 72.2% lacking the skill, a mean of (2.70), and a standard deviation of (0.50). Item 8followed, with 68.2% of the sample lacking the skill, a mean of (2.64), and a standard deviation of (0.57). Item 6 came next, with 45.5% lacking the skill, a mean of (2.36), and a standard deviation of (0.65). Item 7 followed, with 43.2% lacking the skill, a mean of (2.23), and a standard deviation of (0.77). Item 5 came next, with 31.8% lacking the skill, a mean of (2.06), and a standard deviation of (0.71). Finally, Item 4

recorded the same percentage of lack of proficiency at 31.8%, with a mean of (2.07) and a standard deviation of (0.75).

Based on the overall results of the second factor, it is evident that the majority of the sample tended toward the "Lack of Proficiency" alternative in skills related to delivering lessons using artificial intelligence, with a percentage of (55.9%). This was followed by the "Somewhat" alternative at (33.25%), and lastly, the "Proficient" alternative at the lowest percentage of (10.51%). The overall mean was (2.44), indicating a trend between the two alternatives ("Not proficient" and "Somewhat "), with a standard deviation of (0.61), suggesting no extreme values.

5.5.3. Presentation of Research Results in Light of the Third Question:

What are the training needs of university faculty in light of the requirements for performing the task of evaluating educational content using artificial intelligence?

The skill of using artificial intelligence in evaluating educational content by university faculty members achieved the percentages shown in the following table:

Table 9 Results of Faculty Members' Responses Regarding the Factor of Evaluating Educational Content Using Artificial Intelligence

	Items	Alternatives						Mean	Standard Deviation
		proficient in using it		somewhat		Not proficient in using it			
		Freq	%	Freq	%	Freq	%		
1	Analyzing student responses and converting them into instant reports about their performance using AI programs	0	0	9	20.5	35	79.5	2.8	0.40
2	Using tools like Quizlet and Kahoot to create engaging interactive quizzes.	0	0	5	11.4	39	88.6	2.89	0.321
3	Identifying areas where students need improvement using AI programs	1	2.3	12	27.3	31	70.5	2.68	0.51
4	Designing customized learning activities for students' weak points using AI programs	1	2.3	09	20.5	34	77.3	2.75	0.488

5	Grading fixed-answer tests (e.g., multiple choice, true/false) using AI programs	3	6.8	09	20.5	32	72.7	2.66	0.6
6	Using tools like Turnitin and Gradescope for grading essay assignments	2	4.5	8	18.2	34	77.3	2.73	0.54
7	AI can analyze student results to identify areas needing improvement	1	2.3	9	20.5	34	77.3	2.75	0.488
8	Track student progress usingAI programs.	0	0	8	18.2	36	81.8	2.82	0.39
9	Artificial intelligence can provide instant feedback to students upon completing tests or activities.	0	0	8	18.2	36	81.8	2.82	0.39
0	Evaluation of practical tasks (programming, design, creative writing, etc.) using AI tools such as (CodeGrade).	1	2.3	6	13.6	37	84.1	2.82	0.44
1	Assessment of students' presentations using AI (speech and image recognition technologies).	3	6.8	9	20.5	32	72.7	2.66	0.60
2	Tracking student interaction with educational materials through AI.	0	0	13	29.5	31	70.5	2.70	0.46
3	Expecting students' future performance based on their current and past achievements using AI.	0	0	10	22.7	34	77.3	2.77	0.42
4	Identifying students who may face academic difficulties and suggesting early interventions.	1	2.3	13	29.5	30	68.2	2.66	0.52
5	AI can analyze students' behavior in class or on educational platforms to assess their social and emotional skills.	0	0	10	22.7	34	77.3	2.77	0.42
6	Using (Gradescope) to automatically grade exams and assignments.	1	2.3	5	11.4	38	86.4	2.84	0.42

7	Using (Turnitin) to evaluate essay-based assignments and detect plagiarism.	4	9.1	11	25	29	65.9	2.57	0.661
8	Using (Quizlet) to create interactive quizzes and automatically grade them.	1	2.3	6	13.6	37	84.1	2.82	0.44
9	Using (CodeGrade) to assess programming tasks.	0	0	5	11.4	39	88.6	2.89	0.32
0	Using (Socrative) for real-time student assessment.	0	0	6	13.6	38	86.4	2.86	0.34
Third Factor		6	2.16	33	19.4	181	78.4	2.763	0.45

From Table (09), it is evident to us that the arithmetic mean values related to the alternative "Lack of Proficiency" ranged between (2.89 and 2.57), where items 19 and 2 ranked highest in terms of lack of skill proficiency with 88.6% of the sample members and the highest mean (2.89) and standard deviation (0.32), followed by item 20 with lack of skill proficiency by 86.4% of the sample members with a mean (2.86) and standard deviation (0.34), then item 16 with lack of skill proficiency by 84.1% of the sample members with a mean (2.84) and standard deviation (0.42), then items 18and 10 with lack of skill proficiency by 84.1% of the sample members with a mean (2.82) and standard deviation (0.44), then items 9 and 8 with lack of skill proficiency by 81.8% of the sample members with a mean (2.82) and standard deviation (0.39), then item 1 with lack of skill proficiency by 79.5% of the sample members with a mean (2.80) and standard deviation (0.40), then items 15 and 13 with lack of skill proficiency by 77.3% of the sample members with a mean (2.77) and standard deviation (0.42), then items 7 and 4 with lack of skill proficiency by 77.3% of the sample members with a mean (2.75) and standard deviation (0.48), then item 6 with lack of skill proficiency by 77.3% of the sample members with a mean (2.73) and standard deviation (0.54), then items 11 and 5 with lack of skill proficiency by 72.7% of the sample members with a mean (2.66) and standard deviation (0.60), then item 12 with lack of skill proficiency by 70.5% of the sample members with a mean (2.70) and standard deviation (0.46), then item 3 with lack of skill proficiency by 70.5% of the sample members with a mean (2.68) and standard deviation (0.51), then item 14 with lack of skill proficiency by 68.2% of the sample members with a mean (2.66) and standard deviation (0.52), and finally item 17 with lack of skill proficiency by 65.9% of the sample members with a mean (2.57) and standard deviation (0.66).

Through the results related to the third factor as a whole, it becomes clear to us that the largest percentage of sample members tend towards the alternative related to lack of proficiency in skills of evaluating students using artificial intelligence with a percentage (78.41), followed by the alternative "Somewhat" with a percentage (19.44), then followed by the alternative "I am proficient

in using it" with the lowest percentage (2.16), with a mean (2.16) meaning it is between the two alternatives ("I am not proficient in using it", "Somewhat"), and a standard deviation (0.95) indicates the absence of extreme values.

5.5.4 Presentation of research results in light of the main question:

What are the training needs of university faculty members in light of the requirements necessary to perform the teaching task using artificial intelligence?

Presentation of overall results:The requirements for using artificial intelligence in the teaching task across its three stages among university faculty members received the percentages shown in the following table:

Table10 Results of University Faculty Members' Responses to the Questionnaire on Training Needs in Light of the Requirements for Performing the Teaching Task Using Artificial Intelligence

Factors	Alternatives						Mean	Standard Deviation
	proficient in using it		somewhat		Not proficient in using it			
	Freq	%	Freq	%	Freq	%		
Delivering lessons using artificial intelligence	55	15.62	146	41.47	151	42.89	2.228	0.69
Preparing lessons using artificial intelligence	37	10.51	117	33.25	198	55.9	2.44	0.61
Assessing students using artificial intelligence	6	2.16	33	19.44	181	78.41	2.76	0.45
Total	98	9.43	296	31.38	530	59.06	2.47	0.58

Ranking of Training Needs for University Faculty in Light of the Requirements for Performing the Teaching Task Using Artificial Intelligence

The ranking of training needs for university faculty in light of the requirements for performing the teaching task using artificial intelligence can be presented based on lack of proficiency as follows:

Table 11 Ranking of University Faculty's Training Needs for AI-Based Teaching According to Lack of Proficiency

First factor			Second Factor			Third Factor		
Item	Freq	%	Item	Freq	%	Item	Freq	%
6	23	52.3	3	35	79.5	2	39	88.6
4	22	50	2	33	75	19	39	88.6
3	22	50	1	32	72.2	16	38	86.4
5	20	45.5	8	30	68.2	20	38	86.4

2	20	45.5	6	20	45.5	10	37	84.1
1	16	36.4	7	19	43.2	18	37	84.1
8	14	31.8	5	15	31.8	8	36	81.8
7	14	31.8	4	14	31.8	9	36	81.8
						1	35	79.5
						4	34	77.3
						6	34	77.3
						7	34	77.3
						13	34	77.3
						15	34	77.3
						5	32	72.7
						11	32	72.7
						3	31	70.5
						12	31	70.5
						14	30	68.5
						17	29	65.9

Based on Tables (10) and (11), it is clear that most respondents expressed a need for training regarding the requirements for teaching using artificial intelligence, as reflected in their self-reported lack of proficiency. The “Lack of Proficiency” option received the highest percentage (59.06%), followed by «Somewhat» (13.80%), and finally «Proficient» with the lowest percentage (9.43%). The mean score (2.47) falls between «Not Proficient» and «Somewhat» with a standard deviation of (0.58), indicating the absence of extreme values. Training needs were ranked within each factor of the questionnaire according to the severity of lack of proficiency, thereby reflecting the priority level for training.

6. Discussion of Research Results:

The results related to the first factor of the questionnaire showed that the largest percentage of sample members in all items without exception tended towards the third alternative, which means their lack of proficiency in skills related to using artificial intelligence in the first stage of the educational process, which is preparing educational content. The skill of "preparing diverse assessment questions for the lesson using AI programs" came first, followed by the skills of "designing the lesson structure using AI programs" and "preparing the lesson plan using AI programs like lessonplans.ai", then the skills of "determining educational content for each lesson using AI programs like ChatGPT, DeepSeek" and "selecting educational content appropriate to students' levels

relying on AI programs", then the skill of "formulating measurable objectives using AI programs like ChatGPT, DeepSeek", then the skill of "creating presentations for lectures containing supports (texts, images, and videos...) using AI programs", and finally the skill of "designing lessons using tools like PowerPoint, Canva with AI features".

The results of our research through the results of this factor agreed with the study of Al-Hassan and Lee (2024), which concluded that 72% of the sample members lacked the required competence to use AI tools (such as ChatGPT and AutoML).

The results related to the second factor of the questionnaire also showed that the third alternative occupied the largest percentage in all items of this factor, which indicates the lack of proficiency of the sample members in skills related to using artificial intelligence in the stage of delivering educational content. The skill of "using AI tools like Synthesia, Pictory to deliver educational content" came first, followed by the skill of "using virtual characters or animations", then the skill of "using educational games to enhance student engagement using AI programs", then the skill of "using tools like Quizlet or Kahoot to create interactive tests that make the lesson more exciting", then the skill of "converting lessons into interactive digital content that students can access anytime using AI programs", then the skill of "using AI to suggest additional activities to enhance students' understanding", then the skill of "using communication platforms Zoom, Microsoft Teams with AI features to facilitate interaction with students", then the skill of "using AI programs (ChatGPT, DeepSeek) to answer questions and provide additional explanations", and finally the skill of "using AI programs to find references (books, articles, videos, or links to educational websites) to deepen students' understanding".

The results of our research through the results of this factor agreed with the study of Smith et al. (2020), which concluded through the evaluation of technical and educational competencies of faculty members in American universities that 68% of them lacked teaching skills using AI tools, and the study recommended the necessity of training university professors.

The results related to the third factor of the questionnaire also showed that the third alternative occupied the largest percentage in all items of this factor, which indicates the lack of proficiency of the sample members in skills related to using artificial intelligence in the stage of evaluating educational content. The skill of "using the program (CodeGrade) to evaluate educational content, using tools like Quizlet, Kahoot to create exciting interactive tests" came first, followed by the skill of "using the program (Socrative) to evaluate students instantly", then the skill of "using the program (Gradescope) to automatically correct tests and assignments", then the skill of "evaluating practical tasks (programming, design, creative writing...) using AI tools like (CodeGrade)", using the program (Quizlet) to create interactive tests and correct them automatically, then the skill of "AI

being able to provide immediate feedback to students after completing tests or activities, tracking student progress using AI programs", then the skill of "analyzing student answers and converting them into instant reports about their performance using AI programs", then the skills of "expecting students' future performance based on their current and past performance using AI, AI being able to analyze student behaviors in class or through educational platforms to assess their social and emotional skills", then the skills of "AI being able to analyze student results to identify areas they need to improve in, determining educational activities specific to students' weak points using AI programs", then the skill of "using tools like Turnitin, Gradescope to correct essay assignments", then the skills of "correcting tests with fixed answers (such as multiple choice, true/false), evaluating student presentations using AI (voice and image recognition techniques) using AI programs", then the skill of "tracking student interaction with educational materials using AI", then the skill of "identifying areas where students need to improve their weaknesses using AI programs", then the skill of "identifying students who may face academic difficulties and suggesting early interventions", and finally the skill of "using the program (Turnitin) to evaluate essay assignments and detect plagiarism".

The results of our research through the results of this factor agreed with the study ofAl-Mansoori (2022), which concluded that 60% of the sample members faced difficulties in using AI-based assessment tools, and they emphasized the need for training programs, and also agreed with the study of Al-Hassan and Lee (2024), which concluded that 72% of the sample members lacked the required competence to use AI tools.

Through the results of the questionnaire as a whole, the need for training in the skills included in the three stages of the educational process became clear to us, where the skills related to the stage of evaluating educational content using AI came first, followed by the skills related to the stage of delivering educational content using AI, then the skills related to the stage of preparing educational content using AI.

In general, it can be said that the inability of professors to master the necessary skills to use AI in the educational process may be attributed to the rapid developments in AI technologies that were met with a lack or absence of training on them in university institutions. The integration of AI in university teaching is inevitable, but its success depends on empowering professors with the necessary skills to navigate this transformation ethically and effectively, giving them priority in training to eliminate AI illiteracy so they can prepare students for a world where human-AI collaboration will be embodied in all professional courses.

7. Conclusion and Recommendations:

From the perspective that the university professor is the effective element in the formative process, and is capable of creating an effective outcome which can keep pace with developments occurring at the professional level, where technology and software will be the most important features, this matter imposes fundamental transformations in the roles and skills of university professors. Through our current research, we sought to reveal the existing training gap among university professors by comparing the skills necessary to practice the educational process using AI with what the professor possesses within these skills. The results demonstrated the urgent need for training through the high percentage of sample members who do not master the use of these skills in all stages of the educational process (preparation, delivery, evaluation). In this regard, we offer the following recommendations:

- Building a training program in light of the needs that have been reached.

Establishing specialized research laboratories in educational technologies at Algerian universities.

- Activating the role of bodies responsible for training professors at universities, and allocating budgets to finance training programs and purchase modern technological tools (such as adaptive AI platforms).

- Creating technical support units within universities to guide professors in using AI technologies on one hand, and guide them on AI ethics such as managing algorithmic biases and ensuring student data privacy.

- Establishing partnerships between universities and technology companies to design AI tools that meet local educational needs.

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