

The Level of Awareness Among Middle School Teachers of the Role of Artificial Intelligence Applications in the Educational Process

Abdelkrim Boureguig^{1*} & Hadj Chetouane²

¹University of Tindouf, Tindouf, Algeria

²University of Oran Mohamed Ben Ahmed 2, Oran, Algeria


*Email 1 (Corresponding author): boureguig.abdelkrim@cuniv-tindouf.dz

Email 2: mohamedchetouane67@yahoo.fr

ORCID iD 1 : 0009-0007-8752-9079

ORCID iD 2 : 0009-0009-3097-6163

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Abstract

This study aims to identify the level of awareness among middle school teachers regarding the role of artificial intelligence applications in the educational process. To achieve the objectives, the study instrument was applied after verifying its validity and reliability to a sample of (71) male and female teachers from the middle school stage in Tiaret province. The results of the study revealed that the level of awareness among middle school teachers regarding the role of artificial intelligence applications in the educational process was high. The study also indicated that there were no statistically significant differences in the level of awareness among middle school teachers regarding the role of artificial intelligence applications in the educational process attributed to the variable of professional experience.

Keywords: Awareness, Teaching, Middle School, Artificial, Intelligence

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1. Introduction

Scientific and technological advancements have brought about radical changes in all fields of life, including the vital field of education, which must keep pace with these developments and transformations. Artificial intelligence (AI) applications stand out as one of the most prominent of these transformations. The advantages they possess contribute to the development and enhancement of educational practices, achieving numerous goals such as improving curricula and assessment, and the ability to meet learners' needs accurately and effectively. It has become imperative for all educational institutions to adopt this technology as a supportive and stimulating tool, enabling real changes in a sector suffering from many problems and contradictions, and advancing it in line with the requirements of modern times. Consequently, most educational systems worldwide seek to benefit from educational experiences tailored to each learner's level and needs. Therefore, AI applications are among the modern technologies that offer new learning opportunities, providing learners with direct lessons without the need for a teacher, while tracking learners' work and guiding them on how to perform or accomplish tasks, thus identifying each learner's strengths and weaknesses.

E-learning environments and artificial intelligence are considered alternative technological educational applications to the traditional educational environment, defined as a computer or network-based learning environment that can be utilized to facilitate the learning process, where the learner interacts with diverse learning sources (Hattab & Al-Sharif, 2025: 276). In this context, numerous studies and research have demonstrated the positive impact of employing AI applications and the importance of their use in the educational process. The use of AI applications provides big data analytics, develops smart models, delivers customized content for each learner, and offers intelligent teaching systems. Furthermore, AI applications now assist teachers in preparing lessons (Al-Harbi & Al-Amri, 2025: 408) and assessing students in performance tests and homework, subsequently providing them with feedback on their performance. Other applications and programs provide students with an adaptive learning environment and enable teachers to perform administrative tasks. Such applications will allow teachers to save time and effort, allocating more time to thinking about how to improve students' performance and skills, and to considering how to enhance the implementation of teaching strategies (Al-Momani, 2024: 353).

1.1. Problem Statement

The ability to keep pace with rapid developments in modern technology primarily depends on awareness of the scale of challenges and difficulties we face in all fields. The successive developments in computer and communications technologies now require perseverance and continuous effort to ensure keeping up with, interacting with, and employing them to serve society. This has been reflected in e-learning programs (Abdul Majeed & Al-Ani, 2015: 11) and their ability to assist teachers in improving the educational process, which has positively impacted student achievement. Therefore, the organized integration of technology within the classroom will create a new experience for students during their learning. AI applications are among the most effective technological applications in the educational process (Kattana, 2025). This inconsistency, coupled with a scarcity of research in the Algerian context, creates a compelling need for investigation. Therefore, this study seeks to answer the following research questions:

1. What is the level of awareness among middle school teachers in Tiaret province regarding the role of AI applications in the educational process?
2. Are there statistically significant differences in this level of awareness based on professional experience?

1.2. Study Objectives

The current study seeks to determine the level of awareness among middle school teachers of the role of AI applications in the educational process, and whether there are statistically significant differences in this level of awareness attributed to the variables of professional experience.

1.3. Significance of Study

The significance of this study lies in the following aspects:

- ✓ Highlighting the role played by AI applications in developing the educational process and enabling it to keep pace with rapid technological and scientific transformations.
- ✓ The results of this study can help review and develop training programs for teachers in line with technical developments, enabling optimal use of these applications and directing them towards efficiently serving education.
- ✓ Enhancing the awareness of educational practitioners about the importance of AI applications in improving the educational process, while clarifying the advantages they provide in supporting and enhancing educational practices.
- ✓ Opening new research horizons in the field of technical and technological development, contributing to the development of education and the enhancement of learner performance.

1.4. Study Terms

- a) Level of Awareness of the Role of AI Applications in the Educational Process: The level of middle school teachers' recognition of the importance of AI applications in the educational process, and their role in facilitating education, improving its quality, while reducing effort and saving time.
- b) Middle School Teachers: Employees assigned the task of teaching in middle school institutions affiliated with the Directorate of Education for Tiaret State, for the academic year 2025-2026.
- c) AI Applications: A set of advanced technological technologies and electronic applications employed by the middle school teacher to serve the educational process and improve its effectiveness.

1.5. Study Limitations

The researchers conducted this study within the following limits:

- Subject Limit: The level of awareness among middle school teachers of the role of AI applications in the educational process.
- Human Limit: Applied to a sample of middle school teachers in Tiaret State.
- Spatial and Temporal Limits: Middle school institutions, Directorate of Education for Tiaret State, Academic Year: 2025/2026.

2. Theoretical Framework and Previous Studies

2.1. First: Theoretical Framework

2.1.1. Artificial Intelligence Applications

The conceptual foundations of AI were laid in the mid-20th century by pioneers such as Marvin Minsky and John McCarthy, who coined the term "artificial intelligence" to describe the pursuit of creating machines capable of intelligent behavior (Al-Atoum, 2004). Since then, AI has evolved from simple rule-based systems to sophisticated models employing machine learning and neural networks, establishing itself as a pivotal force in technological advancement (Agha, 2024). AI applications are broadly defined as information technologies that simulate human cognitive functions—including learning, reasoning, and problem-solving—enabling computer systems to perform tasks that typically require human intelligence (Erol, 2024). In education, AI is seen as a tool to create personalized, flexible, and engaging learning experiences by processing data in real-time and supporting teachers in their instructional roles (Ferikoğlu & Akgün, 2022).

2.1.2. The Importance of AI Applications in Education

The integration of AI offers substantial benefits for education. These include providing personalized learning pathways, delivering immediate and tailored feedback to students, automating assessments, and facilitating the creation of adaptive learning environments. AI tools also empower teachers with detailed analytics to support student progress and can assist in curriculum development (Al-Kanaan, 2022). As noted by Shaban (2021) and Al-Al-Masrori (2024), AI enhances communication and collaboration between learners and content, expanding the possibilities for distance and blended learning.

2.1.3. Challenges Associated with Employing AI in Education

Despite its potential, the successful deployment of AI in education is hindered by several challenges. Badawi (2022) identifies key obstacles such as a shortage of trained human resources, inadequate technological infrastructure (including labs, software, and internet connectivity), a lack of specialized training programs, and an absence of a pervasive culture that supports the use of AI in pedagogical settings. These challenges are critical to understanding the gap between AI's theoretical promise and its practical implementation.

2.2. Previous Studies

A review of relevant literature reveals a growing body of research on AI in education, yet findings remain mixed. Al-Kanaan (2022) aimed to determine the level of awareness among pre-service science teachers regarding the employment of AI in science education using a mixed-methods approach. The results showed a low level of awareness among pre-service science teachers, reflecting the need to enhance teacher preparation in the field of AI. Similarly, Aliyu (2024) investigated chemistry teachers' awareness of AI in Sokoto State schools and found a low level of awareness of AI tools, though teachers held positive perceptions towards the potential benefits of AI.

Conversely, Al-Ghuwairi (2023) examined the attitudes of primary school teachers towards employing AI applications in addressing learning difficulties and found that their attitudes were high. Kattana (2025) identified that teachers' attitudes towards employing

AI applications in teaching mathematics were also high, with no significant differences attributed to years of experience.

Research on the impact of professional experience has also produced inconsistent results. Al-Juaid and Al-Sawat (2023) found an effect of years of experience on the use of AI technologies, favoring those with more than ten years of experience. Ajlouni (2025) similarly reported statistically significant differences attributed to years of experience, favoring teachers with more than ten years. In contrast, Al-Ghuwairi (2023), Agha (2024), and Kattana (2025) found no statistically significant differences based on professional experience.

Methodologically, most studies relied on the analytical descriptive method, with few employing a mixed-methods approach. This highlights the need for continued empirical investigation across diverse educational contexts. This study contributes to the literature by examining the Algerian middle school context, an area that has received limited attention in previous research.

3. Study Methodology and Procedures

3.1. Study Methodology: This study employed the analytical descriptive approach to investigate the level of awareness among middle school teachers regarding the role of artificial intelligence (AI) applications in the educational process. This method was selected for its suitability to the objectives of the current research.

3.2. Study Sample: The target population comprised all middle school teachers in Tiaret province, Algeria. A convenience sampling method was used to recruit participants. Teachers were invited to participate voluntarily through coordination with school directors, who distributed the questionnaires during staff meetings. All participants were assured of the anonymity and confidentiality of their responses, and informed consent was obtained prior to data collection. The final sample consisted of 71 teachers (31 male, 40 female) who completed the questionnaire. The distribution of the sample according to key demographic variables is presented in Table 1.

Table (1): Distribution of the Main Study Sample According to Gender, Years of Service, and Academic Qualification

Variable	Category	Frequency	Percentage	
Gender	Male	31	43.7%	
	Female	40	56.3%	
Professional Experience	1 to 5 years	27	38%	100.0%
	5 to 10 years	26	36.6%	
	10 years and above	18	25.4%	
Academic Qualification	Bachelor's Degree	41	57.7%	
	Master's Degree	30	42.3%	

3.3. Study Instrument: During the development of the measurement scale, the researchers reviewed relevant theoretical literature and previous studies on the topic, such as those by Al-Soussi and Abu Khtalah (2024), Mahboubi (2024), Hattab and Al-Sharif (2025), and Bajri (2025). The final questionnaire comprised 27 items organized into three dimensions:

- **Dimension One:** Awareness of the Nature of AI in Education (Items 1-8)
- **Dimension Two:** Awareness of the Value of Employing AI Applications in Education (Items 9-19)
- **Dimension Three:** Awareness of Challenges Associated with Employing AI in Education (Items 20-27)
- Mean scores were interpreted using the following scale: Low (1.00–2.33), Medium (2.34–3.67), High (3.68–5.00).

3.4. Psychometric Properties of the Study Instrument

3.4.1. Validity

- **Internal Consistency Validity:** Correlation coefficients between each dimension and the total scale score were statistically significant ($p < 0.01$), ranging from 0.499 to 0.880, indicating that the dimensions collectively measure the overarching construct.
- **Discriminant Validity (Extreme Groups Method):** A significant difference ($t = 10.261$, $p < 0.001$) was found between the scores of the high-scoring (top 27%) and low-scoring (bottom 27%) groups, confirming the scale's ability to discriminate between different levels of awareness.

3.4.2. Reliability

- **Cronbach's Alpha:** The reliability coefficients were 0.801, 0.876, and 0.852 for the three dimensions, and 0.896 for the total scale, indicating high internal consistency.
- **Split-Half Method:** The split-half reliability coefficient was 0.872, which, after correction using the Spearman-Brown formula, reached 0.932.

3.5. Statistical Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics (frequencies, percentages, means, standard deviations) were used to answer the first research question. A one-way Analysis of Variance (ANOVA) was used to examine differences in awareness levels based on professional experience.

4. Results

4.1. Results Related to the First Research Question: What is the level of awareness among middle school teachers regarding the role of AI applications?

Table 2 presents the overall mean scores for the three awareness dimensions and the total scale

Dimension	Mean	Std. Deviation	Rank	Level	
01	Awareness of the Nature of AI in Education	3.68	0.912	2	High
02	Awareness of the Value of Employing AI Applications in Education	3.49	0.985	3	Medium
03	Awareness of Challenges Associated with Employing AI in Education	4.07	0.817	1	High
	Total Scale	3.74	0.904		High

The results show a high overall level of awareness ($M = 3.74$). However, a deeper analysis reveals a significant variation across dimensions. While teachers demonstrated

high awareness of the nature of AI and the challenges associated with its implementation, their awareness of the practical value of employing AI applications was only moderate. Detailed item-level analysis supported this trend, with items related to personal proficiency and specific application skills frequently receiving medium scores.

4.2. Results Related to the Second Research Question: Are there statistically significant differences in the level of awareness attributed to professional experience?

A one-way ANOVA was conducted to test for differences in awareness levels among teachers with different years of professional experience. The results are presented in Table 3.

Table (3) : ANOVA Results for Differences in Awareness Based on Professional Experience

No.	Items in the Axis of Awareness of the Nature of Artificial Intelligence in Education	Arithmetic Mean	Standard Deviation	Rank	Level
1	I possess full knowledge of the basic concepts associated with artificial intelligence applications in education	3.66	0.844	5	Medium
2	I am fully aware of the characteristics and features possessed by artificial intelligence	3.70	0.885	4	High
3	I have sufficient knowledge of how to access and use artificial intelligence platforms and websites in the educational field.	3.86	0.867	1	High
4	I have knowledge of how to prepare a systematic plan for employing artificial intelligence applications in education.	3.85	0.889	2	High
5	I have full knowledge of finding development sources related to artificial intelligence applications in education.	3.63	0.914	6	Medium
6	I realize that artificial intelligence possesses behaviors similar to human intelligence, such as thinking, analysis, and decision-making.	3.32	0.982	8	Medium
7	Artificial intelligence contributes to the development of all fields and sciences with their branches	3.62	1.019	7	Medium
8	Artificial intelligence possesses superior capabilities that enable it to solve many highly complex problems	3.82	0.899	3	High
	The axis as a whole	3.68	0.912		High

The results indicate no statistically significant differences in awareness levels ($p > 0.05$ for all dimensions and the total scale) based on professional experience.

5. Discussion and Conclusion

5.1. Discussion of Findings

This study investigated the level of awareness among middle school teachers regarding the role of AI applications in education. The findings reveal a complex picture. The overall level of awareness was high ($M = 3.74$), which suggests that teachers in this sample are generally cognizant of AI's presence and its potential impact on the educational field. This positive orientation aligns with studies that have reported favorable attitudes towards AI (Al-Ghuwairi, 2023; Kattana, 2025). This general awareness may be attributed to

increasing public discourse on AI and a recognition among educators of the need to keep pace with technological change to improve student outcomes and address learning challenges (Mahboubi, 2024).

However, a more nuanced interpretation of the dimension-level findings is essential. While teachers demonstrated a high awareness of the 'challenges' ($M = 4.07$), such as the lack of training and inadequate infrastructure, and a high awareness of the 'nature' of AI ($M = 3.68$), their awareness of the 'value' of employing AI in practice was notably moderate ($M = 3.49$). This is a critical finding. It suggests a disconnect between recognizing what AI 'is' and the challenges of its implementation, on one hand, and understanding how to leverage its 'value' to directly improve teaching and learning, on the other. This supports the observations of Aghaziarati (2023), who found that teachers' high awareness of AI's potential was often not accompanied by a clear understanding of its practical application.

The moderate level on the "value" dimension likely reflects the reality of the teachers' professional environment. As noted in the high scores on the challenges dimension, teachers are acutely aware of the obstacles they face: a scarcity of training programs, a lack of an AI culture within the educational community, and their own insufficient proficiency and information. These contextual barriers, which align with the challenges outlined by Badawi (2022), directly inhibit the development of a deeper, more practical understanding of AI's value. Without exposure through training and a supportive infrastructure, theoretical knowledge of AI cannot easily translate into a practical understanding of its classroom applications.

Regarding the second research question, the ANOVA results revealed no statistically significant differences in awareness levels based on professional experience. This finding aligns with several previous studies (Al-Ghuwairi, 2023; Agha, 2024; Kattana, 2025) but contrasts with others (Al-Juaid & Al-Sawat, 2023; Ajlouni, 2025). A plausible explanation for this result is the shared professional environment. All teachers, regardless of their years of experience, face the same systemic constraints. The lack of systematic, mandatory training on AI means that a veteran teacher is not inherently more knowledgeable about this recent technology than a novice. The absence of a foundational AI culture in the educational system serves as an equalizing factor, neutralizing the potential advantage of experience.

5.2. Conclusion and Recommendations

This study concludes that while middle school teachers in Tiaret possess a high general awareness of AI, this awareness is not uniform. There is a significant gap between their understanding of AI's nature and challenges and their comprehension of its practical value in their daily professional practice. This gap is largely attributed to a lack of professional development, inadequate infrastructure, and the absence of a supportive AI culture. The lack of difference in awareness across experience levels further underscores the systemic nature of these issues.

Based on these findings, the following recommendations are proposed for policymakers and educational leaders:

1. **Develop and Implement Targeted Training Programs:** Move beyond general awareness sessions to create hands-on, practical workshops focused on the

application of specific AI tools for tasks like lesson planning, assessment, and content creation. These programs should be mandatory and ongoing.

2. **Foster a Culture of AI in Education:** Launch awareness campaigns and establish professional learning communities where teachers can safely explore, share, and discuss AI tools. This will help demystify the technology and shift perceptions from AI as a threat to a supportive teaching partner.
3. **Invest in Technological Infrastructure:** Ensure schools have the necessary hardware, reliable internet, and access to relevant AI software platforms to enable practical experimentation and use.
4. **Establish Incentive Systems:** Create motivational structures, such as recognition programs or research grants, to encourage and reward teachers who innovate and successfully integrate AI into their teaching.
5. **Conduct Further Research:** Extend this research to other educational levels and regions to compare findings. Qualitative studies, such as interviews and focus groups, are urgently needed to explore the specific reasons behind the gap between awareness and practical application identified in this study.

5.3. Limitations and Future Research

This study is limited by its reliance on a convenience sample from a single province, which restricts generalizability. The use of a self-report questionnaire may also be subject to social desirability bias. Future research should employ larger, more representative samples and incorporate qualitative methods to gain a deeper understanding of teachers' lived experiences with AI.

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Ethical approval

This study was conducted in accordance with the ethical principles governing research involving human participants. Participation was voluntary, informed consent was obtained from all participants prior to data collection, and anonymity and confidentiality of responses were assured. No personally identifiable information was collected, and the data were used solely for scientific research purposes.

Author contributions

Abdelkrim Boureguig: Conceptualization, methodology, instrument development, data collection, formal analysis, writing – original draft, and correspondence.

Hadj Chetouane: Supervision, validation, interpretation of results, and writing – review & editing.

Both authors have read and approved the final version of the manuscript.

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About the authors

Abdelkrim Boureguig is a Lecturer B at the University of Tindouf, Algeria. His academic specialization is in the didactics of English literature. His research interests include foreign language teaching and learning, teaching approaches, and languages for specific purposes. He has published several research articles in these areas and has actively participated in national and international conferences and academic events related to foreign language didactics, literature, and methodology.

Hadj Chetouane is a scholar in Psychology and Educational Sciences, specializing in Educational Psychology, from the University of Oran Mohamed Ben Ahmed 2, Algeria. His research interests focus on educational psychology and instructional practices. He has contributed to scientific research in the field, including a publication on the teaching practices of primary school teachers in light of constructivist theory, published in *Jusur Al-Maarifa*.

ORCID

Abdelkrim BOUREGUIG  <https://orcid.org/0009-0007-8752-9079>

Hadj CHETOUANE  <https://orcid.org/0009-0009-3097-6163>

Data Availability Statement

The data supporting the findings of this study are not publicly available due to privacy and confidentiality considerations relating to the participants. However, anonymized data may be made available by the corresponding author upon reasonable request.

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