

# The Use of Artificial Intelligence Tools and Its Relationship to The Level of Digital Competence Among Secondary School Teachers in The Triangle Region

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## Abstract

*This study aims to identify the reality of teachers' use of artificial intelligence (AI) tools and to assess their level of digital competence in secondary schools in the Triangle area. It also seeks to examine differences in these variables according to gender, academic qualification, years of experience, and specialization, as well as to explore the nature of the relationship between the use of AI tools and digital competence. The study employed the descriptive correlational method, and an electronic questionnaire consisting of 42 items was administered to a sample of 111 male and female teachers. The findings revealed that teachers' use of AI tools was at a moderate level, with relatively higher use of tools for generating explanations and designing activities, and lower use of tools related to analyzing students' performance. The results also showed that teachers' digital competence was at a moderate to high level, with digital safety scoring the highest and digital problem-solving being the lowest among the measured domains. Moreover, the study found no statistically significant differences in the use of AI tools or in digital competence attributable to gender, academic qualification, years of experience, or specialization, indicating a general consistency across teacher groups. The results further demonstrated a strong positive correlation between the use of AI tools and digital competence ( $r = 0.61$ ), suggesting that higher levels of digital competence enhance teachers' ability to effectively adopt AI tools in educational practices.*

**Keywords:** Artificial Intelligence Tools, Digital Competence, Secondary School Teachers.

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## Introduction to the Study

The contemporary world is witnessing rapid digital transformations that have brought about a radical change in the nature of education and in the ways knowledge is constructed and learning practices are managed within

schools. Technology has become a central element in the educational process, and the spread of artificial intelligence tools and digital platforms has contributed to reshaping the teacher's role and the learning environment, alongside the emergence of a need for new skills that keep pace with this profound transformation.

International literature has confirmed that artificial intelligence has become one of the fundamental components of modern educational systems, due to its capabilities in analyzing large-scale educational data, personalizing learning, and providing immediate feedback that enhances the quality of learning and improves the effectiveness of educational decisions (Holmes, 2019; Luckin, 2021). UNESCO reports also indicate that integrating artificial intelligence is no longer a technical option, but rather a strategic direction to enhance educational equity and develop learning content and methods (UNESCO, 2023).

Recent literature suggests that the successful employment of artificial intelligence tools in education depends largely on teachers' ability to engage with them within advanced digital learning environments. Several researchers have pointed out that possessing advanced digital skills enables teachers to understand the potential of intelligent tools and direct them in ways that serve teaching objectives, in addition to their ability to interpret the educational data generated by these tools and benefit from it in improving learning (Krumsvik, 2020; Redecker, 2017). Recent European reports also emphasize that teachers in modern digital environments are no longer required merely to use technology, but to integrate it into lesson design and educational decision-making in ways that enhance the quality of educational practices (European Commission, 2022).

In the Arab context, recent studies indicate clear disparities in the level of teachers' digital competencies and in their ability to effectively integrate technology into teaching. Al-Esami (2023) clarified that Arab educational systems still require systematic training programs that enhance teachers' advanced digital skills. Kashmiri (2024) also showed that the use of artificial intelligence in Arab schools faces challenges related to infrastructure, lack of training, and variations in technical readiness. Hassanein (2023) pointed out that the successful use of intelligent tools requires higher analytical capabilities among teachers, especially in classroom environments that rely on digital data.

In light of these considerations, there is an urgent need to examine the reality of digital competence and the use of artificial intelligence tools within the local context of secondary schools in the Triangle region. This is an educational environment where opportunities for digital transformation intersect with challenges related to differences in professional experience, diversity of teachers' academic backgrounds, and varying levels of exposure to technology. Secondary schools, in particular, are more closely associated with assessment processes and advanced examinations, which makes the level of

teachers' digital readiness a critical factor influencing the quality of education and its responsiveness to technological developments. Hence, the importance of this study lies in its aim to reveal the level of use of artificial intelligence tools, measure teachers' digital competence, analyze differences associated with a set of demographic and professional variables, and examine the relationship between the use of intelligent tools and the level of digital competence within this rapidly evolving local context.

In the field of Arab studies, Al-Saad and Al-Sous (2026) conducted a study aimed at identifying the level of digital competence among public school teachers in the Qabatiya Directorate of Education and their attitudes toward integrating artificial intelligence in education, as well as the relationship between them. The two researchers used the descriptive correlational approach and employed a questionnaire to collect data. The study sample included (234) male and female teachers. The results showed that the level of digital competence among school teachers ranged between moderate and weak. It also revealed that their attitudes toward the use of artificial intelligence in education were moderate to low. The results further indicated a weak relationship between digital competence and teachers' attitudes toward the use of artificial intelligence in education. Additionally, the findings showed no differences in the level of digital competence attributable to variables such as gender, specialization, and academic qualification.

Kashmiri (2024) conducted a study aimed at examining the reality of the use of artificial intelligence technologies in Arab education, by investigating the degree to which these tools are employed in educational practices and identifying the main challenges that teachers face in this field. The study adopted the descriptive analytical approach, as it is suitable for analyzing educational phenomena and interpreting them in light of field data.

The study included a sample of teachers from several Arab countries, allowing for a comprehensive picture of the reality of artificial intelligence use in the Arab educational context. Data were collected using an electronic questionnaire designed to measure the level of integration of artificial intelligence tools, teachers' awareness of their importance, and the challenges associated with their use. The results showed that the level of integration of artificial intelligence tools in Arab education is still low, despite teachers' awareness of their importance and role in improving the quality of education and developing teaching methods. The findings also indicated that this low level is attributed to a number of obstacles, most notably weak digital infrastructure, a lack of specialized training programs, and insufficient

technical and support services.

Al-Esami (2023) sought to develop a proposed framework for enhancing digital competencies among secondary school teachers by diagnosing the current state of these competencies and identifying the training needs associated with them in light of the requirements of digital transformation in education. To achieve this, the descriptive survey method was used. The study population consisted of secondary school teachers in Gharbia Governorate, and data were collected from a sample of teachers who responded to a prepared questionnaire that included domains measuring the level of digital competencies in multiple areas such as the use of educational technologies, digital content production, and data handling. The results showed that the level of digital competencies among teachers was moderate. The findings also indicated a need to design systematic and continuous training programs focusing on developing digital content production skills and enhancing the ability to analyze educational data and employ it to improve teaching and learning processes.

Hassanein (2023) conducted a study aimed at identifying the attitudes of Arabic language teachers toward employing artificial intelligence tools in teaching, in light of modern trends toward integrating intelligent technologies in the educational process. The study adopted the descriptive method, as it is suitable for exploring teachers' attitudes and analyzing their positions toward the use of these tools. The study sample consisted of (330) secondary school Arabic language teachers. Data were collected using a structured questionnaire that included domains measuring teachers' attitudes toward artificial intelligence and the extent of their actual use of these tools in their teaching practices. The results showed that teachers' attitudes toward the use of artificial intelligence tools were positive, and that they recognize their importance in improving the quality of teaching and developing methods of presenting educational content. However, the results also indicated that the level of actual use of these tools was moderate, reflecting a gap between positive attitudes and practical application.

Al-Arwi (2022) aimed to identify the level of professional digital competence among intermediate school female teachers in Al-Madinah Al-Munawarah by examining the extent to which they possess the necessary digital skills. The study adopted the descriptive survey method. The study population included all intermediate school female teachers in Al-Madinah, and a sample of (336) teachers was selected. Data were collected using a questionnaire measuring the dimensions of professional digital competence. The results showed that the level of digital competence among the teachers was moderate,

with variation in the possession of skills related to the use of educational technologies and their application in the educational process. The findings also revealed several obstacles limiting the development of digital competence, most notably the lack of specialized training programs, the high workload, and weak professional incentives provided to teachers.

Al-Zahrani (2021) conducted a study aimed at identifying the level of digital competence among secondary school teachers in light of the requirements of digital transformation, by examining the extent to which they possess the necessary digital skills to employ modern technologies in the educational process. The study adopted the descriptive survey method. The study population consisted of secondary school teachers in public schools, and a sample of (210) male and female teachers was selected. A questionnaire was distributed to them, designed to measure different dimensions of digital competence, including four dimensions: the use of educational technologies, management of digital resources, and their application in educational situations. The results showed that the level of digital competence among teachers was moderate. The findings also revealed statistically significant differences attributable to the variables of years of experience and specialization.

In a study conducted by Basilotta-Gómez-Pablos et al. (2026), which aimed to develop a framework for digital competence and artificial intelligence for in-service teachers in Korea, the study was based on national policies, global competency standards, and the theory of teachers' professional development stages. Accordingly, an initial set of competency indicators was prepared and then validated using a two-round modified Delphi method, with the participation of (44) teachers. To ensure the accuracy of the items, content validity, level of agreement among experts, and degree of convergence were used. Analysis of variance (ANOVA) and the Scheffé test were also employed to identify differences in the importance of these competencies according to teachers' professional experience stages. The results showed that all indicators had a high degree of validity, and that there was agreement among teachers regardless of experts. The study also revealed significant differences in (9) competencies, where teachers at the بداية of their careers focused on basics such as knowledge and ethics, while more experienced teachers focused on curriculum innovation, learning data analysis, and digital leadership. Ultimately, the study reached a model framework that can be used to evaluate and develop teachers' competence in the field of artificial intelligence and digital technologies.

In a study conducted by Aimicheva (2025), which aimed to explore enhancing digital competence among in-service

teachers within an artificial intelligence-supported learning environment, a program was designed to enhance professional modeling skills and create interactive educational content based on augmented reality. A training program was implemented involving (916) in-service male and female teachers from secondary schools in Kazakhstan. Data were collected through two questionnaires to assess changes in digital competence and the level of readiness to integrate artificial intelligence and augmented reality tools into educational practices. The results showed high levels of interest and engagement, with (96%) of participants expressing readiness to continue learning, (86%) reporting satisfaction with the course content, and (84%) demonstrating maturity in employing newly acquired technologies within their teaching processes. These findings highlight the significant potential of AI-supported professional development in enhancing teachers' ability to design interactive learning environments, support equity and quality in digital education, and improve student engagement.

In a study conducted by Suzer and Koc (2024), which aimed to examine the relationship between the level of teachers' digital competence and their use of artificial intelligence tools in the educational process, the descriptive correlational method was used. A sample of (368) male and female teachers from Turkish schools was selected. Questionnaires were distributed to measure the level of digital competence among teachers and the degree of use of artificial intelligence tools in teaching practices. The results showed a statistically significant positive correlation between digital competence and the level of use of artificial intelligence tools, indicating that teachers with higher digital skills are more capable and willing to adopt and employ these tools in teaching. The findings also showed that digital competence is not limited to basic technical skills but also includes the ability to select appropriate tools, adapt them in line with educational objectives, and use them to enhance student interaction and improve learning outcomes.

The study by Lucas et al. (2024) aimed to examine the effect of both digital competence and the level of trust in artificial intelligence technologies on the degree of teachers' use of intelligent tools in the educational process. The study adopted the descriptive survey method, and the sample consisted of (211) male and female teachers working within the K–12 education system. Data were collected using a structured questionnaire that included domains related to digital competence, level of trust in artificial intelligence, and patterns of using intelligent tools in teaching. The results showed that digital competence is the most influential

factor in predicting the actual use of artificial intelligence tools compared to other variables, indicating that teachers' possession of the necessary digital skills directly enhances their ability to employ these technologies in their educational practices. The findings also revealed a positive relationship between the level of trust in artificial intelligence and its use, although this relationship was less influential than digital competence, confirming that building digital skills is the primary entry point for enhancing the adoption of artificial intelligence technologies in education.

Zhang and Aslan (2024) aimed to analyze the level of digital competence among K–12 teachers and its relationship with their use of artificial intelligence tools in classroom environments. The study adopted the descriptive correlational method and included a sample of (397) male and female teachers. The results showed a significant positive relationship between teachers' level of digital competence and their use of artificial intelligence tools, as teachers with higher digital competence were more capable of integrating AI applications into lesson planning, designing interactive activities, and personalizing learning for students. The study also confirmed that continuous professional training plays a central role in enhancing teachers' digital skills and, consequently, raising their readiness to effectively use artificial intelligence technologies in education.

Akgün and Albayrak (2024) aimed to analyze teachers' readiness to use artificial intelligence tools in teaching by measuring digital competence, attitudes toward artificial intelligence, and the level of actual use of intelligent tools. To achieve this, the descriptive correlational method was used, and the study sample consisted of (412) male and female teachers in general education schools. The results showed that digital competence is the strongest predictor of the extent of artificial intelligence use, and that teachers who possess higher technical and pedagogical skills are more capable of integrating artificial intelligence into lesson planning and assessment. The study also emphasized the importance of continuous training and institutional support in enhancing the effective adoption of intelligent tools.

Rahimi and Bahrami (2023) sought to understand teachers' acceptance of artificial intelligence technologies in teaching and learning and its relationship with digital competence. The researchers adopted the Technology Acceptance Model (TAM) in analyzing data from a sample of (367) male and female teachers. The results showed that digital competence significantly influences positive attitudes toward artificial intelligence and behavioral intentions to use it in teaching. It was also found that a lack of technical experience reduces the

likelihood of integrating artificial intelligence into planning, teaching, and assessment, confirming the need for targeted teacher training in this field.

Redecker (2017) analyzed the European digital competence framework for teachers using a documentary analytical approach based on reviewing and analyzing a set of official documents issued by European bodies related to digital education. The study relied on an in-depth analysis of European digital competence policy documents, focusing on defining the digital skills required for teachers and how to employ them in different educational environments. The results showed that digital competence is a central element in the success of digital transformation in educational institutions, as it is not limited to mastering the use of digital tools but extends to integrating technologies into the educational process, designing effective digital learning activities, and managing digital educational resources efficiently. The study also indicated that the digital competence framework for teachers includes several main domains, most notably: digital professional engagement, digital teaching design, assessment of student learning using technology, empowering learners digitally, and continuous professional development.

In a study conducted by Wayne Holmes (2019), which aimed to explore the role of artificial intelligence in improving educational practices through a review of relevant scientific literature, the study focused on analyzing educational applications of artificial intelligence and their contribution to developing teaching and learning practices. The results showed that artificial intelligence tools significantly enhance the quality of educational practices through their ability to personalize learning according to each learner's needs and individual characteristics, in addition to accurately analyzing student data, enabling teachers to understand learning patterns and identify strengths and weaknesses. The study also indicated that these tools provide immediate feedback that supports educational decision-making at both the teacher and institutional levels.

It is evident from the review of previous Arab and foreign studies that interest in the topics of using artificial intelligence tools and teachers' digital competence is still in a formative stage within the educational literature, particularly in the Arab context. Most studies have focused on describing the level of digital competence or identifying the obstacles to integrating intelligent tools, without delving deeply into analyzing the interaction between the two variables or examining the mechanisms through which one influences the other. Arab studies have also revealed that the levels of teachers' digital competence often range between low and moderate, and

that structural challenges and the lack of specialized training constitute the main barrier to the effective use of intelligent technologies in the classroom.

In contrast, foreign studies have shown a more mature trend in analyzing the relationship between digital competence and the use of artificial intelligence. Their findings confirmed the existence of a positive relationship between teachers' possession of a high level of digital competence and their ability to integrate intelligent tools into educational practices, despite the diversity of educational contexts in which these studies were conducted. This disparity between the Arab and foreign contexts indicates a clear research gap represented in the limited number of Arab studies that have addressed both variables within a single framework, as well as the scarcity of studies that have examined differences in light of demographic and professional variables.

Based on this review, the need emerges for an in-depth study that contributes to bridging this gap by revealing the reality of the use of artificial intelligence tools and the level of digital competence among teachers in secondary schools in the Triangle region, analyzing differences related to their characteristics, and examining the nature of the relationship between the two variables within a local context experiencing rapid digital transformation.

### **Research Problem and Questions:**

Secondary education in schools in the Triangle region is witnessing a rapid shift toward adopting digital tools and artificial intelligence. However, educational indicators and field observations point to clear disparities among teachers in their level of use of these tools and in their digital readiness. Despite the availability of basic digital infrastructure in a number of schools, the extent to which teachers employ artificial intelligence tools still varies from one teacher to another, whether at the level of actual use in lesson planning, implementation, and student assessment, or in their ability to analyze the data provided by these tools and utilize it to support educational decision-making.

On the other hand, digital competence is considered one of the most important professional requirements for teachers in light of digital transformation. However, Arab and international studies indicate that the level of teachers' digital competence remains uneven, and that possessing technical skills does not necessarily imply the ability to effectively integrate artificial intelligence into classroom practices. The literature also shows that teachers' digital competence may be influenced by demographic and professional variables such as gender, academic qualification, years of experience, and

specialization, which may, in turn, affect the level of use of intelligent tools and create differences among teachers in their application.

In light of these considerations, there is a need for a scientific study that analyzes the reality of teachers' use of artificial intelligence tools and determines their level of digital competence. Accordingly, the research problem is represented in answering the following questions:

1. What is the reality of teachers' use of artificial intelligence tools in secondary schools in the Triangle region?
2. What is the level of teachers' digital competence in secondary schools in the Triangle region?
3. Are there statistically significant differences in the reality of secondary school teachers' use of artificial intelligence tools in the Triangle region attributable to variables such as gender, academic qualification, years of experience, and specialization?
4. Are there statistically significant differences in the level of teachers' digital competence in secondary schools in the Triangle region attributable to variables such as gender, academic qualification, years of experience, and specialization?
5. Is there a statistically significant relationship between teachers' use of artificial intelligence tools and their level of digital competence in secondary schools in the Triangle region?

#### Study Hypotheses:

1. There are no statistically significant differences at the significance level ( $\alpha \leq 0.05$ ) in the reality of secondary school teachers' use of artificial intelligence tools in the Triangle region attributable to variables such as gender, academic qualification, years of experience, and specialization.
2. There are no statistically significant differences at the significance level ( $\alpha \leq 0.05$ ) in the level of teachers' digital competence in secondary schools in the Triangle region attributable to variables such as gender, academic qualification, years of experience, and specialization.
3. There is no statistically significant relationship at the significance level ( $\alpha \leq 0.05$ ) between the reality of teachers' use of artificial intelligence

tools and their level of digital competence in secondary schools in the Triangle region.

#### Study Objectives

This study aims to achieve the following objectives:

1. To identify the level of use of artificial intelligence tools among secondary school teachers in the Triangle region.
2. To identify the level of digital competence among secondary school teachers in the Triangle region.
3. To determine the role of certain variables such as (gender, academic qualification, years of experience, specialization) on the level of use of artificial intelligence tools among secondary school teachers in the Triangle region.
4. To determine the role of certain variables such as (gender, academic qualification, years of experience, specialization) on the level of digital competence among secondary school teachers in the Triangle region.
5. To examine the nature of the relationship between teachers' use of artificial intelligence tools and their level of digital competence in secondary schools in the Triangle region.

#### Significance of the Study

##### First: Theoretical Significance

The theoretical importance of this study stems from addressing a contemporary topic that aligns with the rapid digital transformations in educational systems and the global trend toward integrating artificial intelligence tools into educational practices. This study represents a qualitative addition to the Arab educational literature, as it seeks to provide an in-depth scientific understanding of the reality of teachers' use of artificial intelligence tools and its relationship with their level of digital competence, which remains a relatively underexplored area in the Arab context compared to the growing international interest.

The study also contributes to clarifying the theoretical frameworks that explain the factors influencing the use of intelligent tools in the classroom and highlights the central role of digital competence in enabling teachers to effectively employ modern educational technologies. The expected results are anticipated to enrich the scientific discussion on the integration of technology and teachers' professional skills and to provide a theoretical foundation for future research exploring new variables or different

contexts for integrating artificial intelligence in education.

### Second: Practical Significance

From a practical perspective, this study contributes to providing a realistic picture of the level of use of artificial intelligence tools in secondary schools in the Triangle region and the extent to which teachers possess the digital competence that enables them to effectively employ these tools in education. The expected results may help school administrations and educational supervisors identify strengths and weaknesses among teachers in digital use and technical readiness, thereby supporting the design of training programs based on actual needs.

The findings may also benefit educational decision-makers in developing plans and policies that support the pedagogically responsible integration of artificial intelligence, enhance digital infrastructure, and provide learning environments that enable optimal use of intelligent tools. Furthermore, this study provides a database that can be relied upon when developing digital transformation initiatives in schools and directing efforts toward raising the level of digital competence, which positively reflects on the quality of education in the local context.

### Study Limitations

- **Temporal boundaries:** The temporal scope of this study is limited to the first semester of the 2025/2026 academic year.
- **Spatial boundaries:** This study is limited to Arab secondary schools in the Triangle region within the Green Line in Palestine.
- **Human boundaries:** The human scope of this study is limited to male and female secondary school teachers in the Triangle region who are currently working and teaching at the secondary level.

### Study Terminology

#### Artificial Intelligence Tools:

Artificial intelligence tools are defined conceptually as systems and software that rely on machine learning algorithms and data processing to support learning processes, analyze educational data, and provide recommendations or feedback that contribute to improving educational decision-making (Holmes, 2019).

Operationally in this study, the reality of using artificial

intelligence tools is defined as the level of employment of artificial intelligence applications and technologies by secondary school teachers in their teaching practices, measured through the total score obtained by the teacher on the instrument used in this study, reflecting the extent of their use of these tools in lesson planning, implementation, student assessment, and the development of educational content.

#### Digital Competence:

Al-Deeb (2020: 40) defines digital competence as “a set of technical abilities and knowledge that vary according to programs and tasks, including skills in using technology, developing content, and applying systematic thinking principles to solve problems, along with awareness of the ethical and professional foundations for dealing with advanced digital tools.”

Operationally in this study, digital competence is defined as the level at which a teacher possesses the knowledge and skills necessary to use digital technologies efficiently in performing educational tasks, measured through the total score obtained on the instrument used in this study.

### Study Methodology

The study adopted the descriptive correlational method, as it is appropriate for the nature of the research objectives, which aim to describe the level of teachers' use of artificial intelligence tools and their level of digital competence, in addition to analyzing the correlational relationship between the two main variables without researcher intervention. This method is considered suitable for educational studies that aim to diagnose reality as it is, while also analyzing the nature of relationships between variables, as noted by Creswell (2018) and Cohen et al. (2018) in their description of this type of research.

### Study Population and Sample

The study population consists of all secondary school teachers in the Triangle region within the Palestinian <sup>الداخل</sup> during the first semester of the 2025–2026 academic year. The population includes teachers from different specializations (scientific and humanities), with varying levels of experience and qualifications.

The researchers selected a sample consisting of (111) male and female teachers from secondary schools in the Triangle region by distributing an electronic questionnaire (Google Forms). The questionnaire link was distributed to all secondary school teachers in the Triangle region. Table (1) shows the distribution of the sample according to variables of gender, age, academic qualification, years of

experience, and specialization.

**Table (1): Distribution of the Study Sample According to Gender, Age, Academic Qualification, and Years of Experience**

| Variable                      | Level              | Number | Percentage % |
|-------------------------------|--------------------|--------|--------------|
| <b>Gender</b>                 | Male               | 22     |              |
|                               | Female             | 89     |              |
| <b>Academic Qualification</b> | Bachelor's Degree  | 46     |              |
|                               | Master's Degree    | 59     |              |
|                               | Doctorate          | 6      |              |
| <b>Years of Experience</b>    | Less than 5 years  | 18     |              |
|                               | 5 to 10 years      | 20     |              |
|                               | 11 to 15 years     | 27     |              |
|                               | More than 15 years | 46     |              |
| <b>Specialization</b>         | Humanities         | 40     |              |
|                               | Scientific         | 71     |              |

### Study Instrument

The study instrument was developed in light of the study objectives and questions, based on a review of educational literature and previous studies related to the use of artificial intelligence tools and teachers' digital competence, with the aim of constructing an accurate tool to measure the study variables. The instrument was designed in the form of a questionnaire directed at secondary school teachers in the Triangle region.

In constructing the instrument, the researchers relied on the European framework for teachers' digital competence (Redecker, 2017), Holmes et al. (2019) in the areas of artificial intelligence use in education, and Lucas et al. (2024) regarding the relationship between digital competence and the use of artificial intelligence tools. In addition, Arab studies such as Al-Zahrani (2021), Al-Arwi (2022), Hassanein (2023), and Al-Esami (2023) were utilized. The nature of the Arab educational environment and the requirements of digital transformation were also taken into account in building the instrument.

The questionnaire consisted of (42) items distributed across two domains and six dimensions, with (3) dimensions for each domain and (7) items for each

dimension. These included: the use of artificial intelligence tools in teaching, requirements for using artificial intelligence tools, obstacles to using artificial intelligence, technical competence, digital safety and security, problem-solving, and computational thinking. It also included demographic data such as gender, academic qualification, years of experience, and specialization.

### Validity of the Study Instrument:

To verify the validity of the instrument, it was presented in its initial form to a panel of experts consisting of (10) reviewers holding doctoral degrees. They were asked to judge the items in terms of their suitability for the study objectives, their relevance to the dimensions, clarity of wording, and comprehensiveness in covering the intended dimensions, using a three-point rating scale (essential – useful but not essential – not necessary).

To quantitatively establish content validity, the Content Validity Ratio (CVR) was calculated using Lawshe's formula. The CVR values for the items ranged between (0.80–1.00), all of which exceed the minimum acceptable threshold of (0.75) based on the number of experts, indicating that the items possess an appropriate level of relevance and importance.

The overall Content Validity Index (CVI) for the instrument was also calculated, with an average value of (0.91). This result indicates that the instrument has an adequate level of validity and is suitable for achieving the purposes of the study.

### Reliability of the Instrument

To determine the reliability coefficient of the study instrument, reliability was calculated using Cronbach's Alpha coefficient and the split-half method with the Spearman–Brown formula, based on the data of the main sample consisting of (111) participants. The following table presents the reliability coefficients for each domain of the instrument:

**Table (2): Reliability Coefficients of the Study Instrument Using Cronbach's Alpha, Split-Half Method, and Spearman–Brown Formula**

| Domain / Field     | Number of Items                                    | Cronbach's Alpha | Split-Half | Spearman–Brown |
|--------------------|----------------------------------------------------|------------------|------------|----------------|
| Use of AI Tools    | AI and Teaching                                    | 7                | 0.94       | 0.84           |
|                    | AI and Requirements                                | 7                | 0.95       | 0.89           |
|                    | AI Obstacles and Challenges                        | 7                | 0.89       | 0.78           |
|                    | Total Score                                        | 21               | 0.94       | 0.81           |
| Digital Competence | Technical Competence                               | 7                | 0.94       | 0.85           |
|                    | Technical Security and Safety                      | 7                | 0.90       | 0.78           |
|                    | Digital Problem Solving and Computational Thinking | 7                | 0.95       | 0.86           |
|                    | Total Score                                        | 21               | 0.96       | 0.84           |

The data presented in the previous table show that the reliability coefficients, calculated using multiple methods, ranged between (0.89–0.96) for Cronbach's Alpha, which are acceptable values and indicate a good level of internal consistency among the instrument items, as they exceed the acceptable threshold in educational and psychological research (0.70 or higher).

It is also observed that the reliability coefficients using the split-half method and the predictive Spearman–Brown formula ranged between (0.78–0.94), and all these values are appropriate and meet the purposes of the study.

### Statistical Treatments

The researchers analyzed the study data using the Statistical Package for the Social Sciences (SPSS) by employing a set of statistical methods appropriate to the nature of the study questions and hypotheses. They used means and standard deviations, and also employed Four-Way Analysis of Variance (Four-Way ANOVA) to measure differences related to variables such as gender, academic qualification, years of experience, and

specialization. To examine the nature of the relationship between the use of artificial intelligence tools and digital competence, the researchers used Pearson's correlation coefficient.

## Results and Discussion of the Study

### First: Results Related to the Study Questions

#### 1. Answer to the first question:

What is the level of use of artificial intelligence tools among secondary school teachers in the Triangle region?

To answer this question, means and standard deviations were calculated for the items of each domain related to the reality of using artificial intelligence tools among secondary school teachers in the Triangle region, as follows:

#### Domain: Use of Artificial Intelligence Tools in Teaching

**Table (3): Means and Standard Deviations of the Reality of Secondary School Teachers' Use of Artificial Intelligence Tools in the Triangle Region for the Domain of Using AI Tools in Teaching, Ranked in Descending Order**

| Item No.           | Item                                                                               | Mean        | Std. Dev.   | Rank | Level           |
|--------------------|------------------------------------------------------------------------------------|-------------|-------------|------|-----------------|
| 3                  | I benefit from AI tools in designing diverse learning activities                   | 3.33        | 1.15        | 1    | Moderate        |
| 4                  | I use AI applications to generate additional examples or explanations for students | 3.20        | 1.12        | 2    | Moderate        |
| 5                  | I use AI to produce multimedia educational resources                               | 3.12        | 1.16        | 3    | Moderate        |
| 6                  | I use AI to adapt content to suit students' levels                                 | 3.11        | 1.17        | 4    | Moderate        |
| 1                  | I use AI tools to explain educational concepts to students                         | 3.08        | 1.11        | 5    | Moderate        |
| 2                  | I employ AI in planning daily lessons                                              | 2.77        | 1.13        | 6    | Moderate        |
| 7                  | I use AI tools to analyze students' performance during lessons                     | 2.57        | 1.23        | 7    | Moderate        |
| <b>Total Score</b> |                                                                                    | <b>3.03</b> | <b>0.98</b> |      | <b>Moderate</b> |

The results in the table show that the level of use of artificial intelligence tools among secondary school teachers in the Triangle region across all items of the domain "use of AI tools in teaching" was moderate. The means ranged between (3.33–2.57).

Regarding the total score of this domain, it was also at a moderate level, with a mean of (3.03). This result indicates that the overall level of using artificial intelligence tools in teaching among secondary school teachers in the Triangle region is moderate.

This may be attributed to the availability of AI applications and their relative ease of use, as well as teachers' willingness to adopt innovative and interactive

teaching methods that support students' understanding.

The lower mean in item (7), which relates to analyzing students' performance using AI, can be explained by the fact that this type of use requires more advanced technical and analytical skills. In addition, it is not yet sufficiently supported within school work environments.

In general, the results indicate that the integration of artificial intelligence is still in its early stages and requires further training and technical support to maximize its benefits.

#### **Domain: Requirements for Employing Artificial Intelligence Tools**

**Table (4): Means and Standard Deviations of the Reality of Secondary School Teachers' Use of Artificial Intelligence Tools in the Triangle Region for the Domain of Requirements for Employing AI Tools, Ranked in Descending Order**

| Item No. | Item                                                                   | Mean | Std. Dev. | Rank | Level    |
|----------|------------------------------------------------------------------------|------|-----------|------|----------|
| 1        | I possess the basic knowledge that enables me to use AI tools          | 3.34 | 1.00      | 1    | Moderate |
| 2        | I have the ability to select appropriate AI tools for the lesson topic | 3.33 | 1.06      | 2    | Moderate |
| 5        | I possess sufficient technical skills to deal with AI applications     | 3.32 | 1.04      | 3    | Moderate |
| 4        | I can integrate AI tools into classroom activities without difficulty  | 3.29 | 0.99      | 4    | Moderate |

|                    |                                                                     |             |             |                 |          |
|--------------------|---------------------------------------------------------------------|-------------|-------------|-----------------|----------|
| 6                  | I can distinguish between effective and ineffective use of AI tools | 3.28        | 1.05        | 5               | Moderate |
| 3                  | I can evaluate the quality of AI-generated educational outputs      | 3.21        | 1.05        | 6               | Moderate |
| 7                  | I can manage learning when students use AI tools                    | 3.20        | 1.05        | 7               | Moderate |
| <b>Total Score</b> |                                                                     | <b>3.28</b> | <b>0.91</b> | <b>Moderate</b> |          |

The results in the table show that the level of use of artificial intelligence tools among secondary school teachers in the Triangle region across all items of the domain “requirements for employing AI tools” was moderate, with mean scores ranging between (3.34–3.21).

Regarding the total score for this domain, it was also moderate, with a mean of (3.28). This indicates that the level of teachers’ readiness and capability to employ artificial intelligence tools in teaching is at a moderate level.

This result can be attributed to several overlapping factors associated with the transitional phase of digital transformation. These tools are still relatively new, which

limits their advanced use. In addition, there is a lack of specialized training and variation in teachers’ digital competence.

Furthermore, technical and institutional challenges—such as weak infrastructure, lack of supportive policies, professional hesitation, and ethical concerns—also constrain the effective use of these tools. Thus, this moderate level reflects a growing awareness of the importance of artificial intelligence, alongside the persistence of challenges that limit its advanced implementation.

#### **Domain: Obstacles and Challenges in Using Artificial Intelligence Tools**

**Table (5): Means and Standard Deviations of the Reality of Secondary School Teachers’ Use of Artificial Intelligence Tools in the Triangle Region for the Domain of Obstacles and Challenges, Ranked in Descending Order**

| Item No.           | Item                                                                        | Mean        | Std. Dev.   | Rank            | Level    |
|--------------------|-----------------------------------------------------------------------------|-------------|-------------|-----------------|----------|
| 5                  | I suffer from weak technical infrastructure in the school                   | 2.76        | 1.26        | 1               | Moderate |
| 6                  | Technical problems appear when using AI applications during lessons         | 2.74        | 1.15        | 2               | Moderate |
| 3                  | I find it difficult to employ AI with all groups of students                | 2.68        | 1.05        | 3               | Moderate |
| 4                  | I find that time is insufficient to learn AI tools                          | 2.68        | 1.13        | 4               | Moderate |
| 1                  | I have faced a lack of training on the use of AI tools                      | 2.64        | 1.03        | 5               | Moderate |
| 2                  | I find it difficult to choose the appropriate tool among available AI tools | 2.61        | 1.01        | 6               | Moderate |
| 7                  | Lack of clear school policies affects my use of AI tools                    | 2.48        | 1.06        | 7               | Moderate |
| <b>Total Score</b> |                                                                             | <b>2.66</b> | <b>0.87</b> | <b>Moderate</b> |          |

The results in the table indicate that the level of use of artificial intelligence tools among secondary school teachers in the Triangle region across all items related to the domain of obstacles and challenges was moderate, with mean scores ranging between (2.76–2.48).

The total score for this domain was also moderate, with a mean of (2.66). This suggests that the level of challenges associated with the use of artificial intelligence tools is at a moderate level.

This may be attributed to the fact that teachers have begun to use and become familiar with artificial intelligence tools; however, they still face several obstacles such as limited experience in using these tools, insufficient practical training, and, at times, some hesitation or concern about fully adopting them.

At the same time, these challenges are not severe enough to completely prevent their use, but rather limit the extent and depth of their application.

**Answer to the Second Question:**

What is the level of digital competence among secondary school teachers in the Triangle region?

To answer this question, means and standard deviations

were calculated for each domain of digital competence, as shown below:

**Domain: Technical Competence (Information – Content Creation – Communication)**

**Table (6): Means and Standard Deviations of the Level of Digital Competence among Secondary School Teachers in the Triangle Region in the Domain of Technical Competence (Information – Content Creation – Communication), Ranked in Descending Order**

| Item No.           | Item                                                                              | Mean        | Std. Dev.   | Rank | Level           |
|--------------------|-----------------------------------------------------------------------------------|-------------|-------------|------|-----------------|
| 5                  | I use the internet to search for reliable educational resources                   | 3.61        | 1.02        | 1    | Moderate        |
| 3                  | I can handle and organize digital files effectively                               | 3.29        | 1.04        | 2    | Moderate        |
| 6                  | I can integrate multimedia into lessons                                           | 3.26        | 0.95        | 3    | Moderate        |
| 7                  | I can create interactive digital educational resources                            | 3.25        | 0.99        | 4    | Moderate        |
| 2                  | I create digital content (materials, presentations, videos) of acceptable quality | 3.23        | 1.08        | 5    | Moderate        |
| 1                  | I can use digital learning platforms easily                                       | 3.22        | 1.05        | 6    | Moderate        |
| 4                  | I use digital tools to communicate effectively with my students                   | 2.99        | 1.03        | 7    | Moderate        |
| <b>Total Score</b> |                                                                                   | <b>2.99</b> | <b>0.59</b> |      | <b>Moderate</b> |

The results in Table (6) indicate that the level of digital competence among secondary school teachers in the Triangle region in the domain of technical competence (information, content creation, and communication) was at a moderate level, with mean scores ranging between (3.61–2.99).

The overall score for this domain was also moderate, with a mean of (2.99), indicating that teachers' digital competence in this area is Moderate.

The item related to using the internet to search for reliable educational resources obtained the highest mean (3.61), indicating that teachers possess moderate skills in digital search and accessing educational resources.

In contrast, items related to creating interactive digital resources and producing digital content recorded relatively lower means, suggesting that the more advanced, productive aspects of digital competence still require additional support and training among secondary school teachers in the Triangle region.

Overall, this result reflects that teachers possess a moderate digital foundation, alongside a clear need to enhance advanced applied skills related to digital production and interactive teaching.

**Domain: Digital Security and Safety**

**Table (7): Means and Standard Deviations of the Level of Digital Competence among Secondary School Teachers in the Triangle Region in the Domain of Digital Security and Safety, Ranked in Descending Order**

| Item No. | Item                                                                  | Mean | Std. Dev. | Rank | Level    |
|----------|-----------------------------------------------------------------------|------|-----------|------|----------|
| 5        | I am aware of the risks of viruses and digital breaches               | 3.61 | 1.09      | 1    | Moderate |
| 4        | I adhere to data protection policies when sharing educational content | 3.42 | 1.01      | 2    | Moderate |
| 7        | I can manage passwords and digital security effectively               | 3.41 | 0.99      | 3    | Moderate |

|                    |                                                                |             |             |                 |          |
|--------------------|----------------------------------------------------------------|-------------|-------------|-----------------|----------|
| 1                  | I apply digital privacy protection rules when using technology | 3.32        | 1.04        | 4               | Moderate |
| 3                  | I guide students toward safe and responsible use of technology | 3.29        | 1.07        | 5               | Moderate |
| 6                  | I can verify the reliability of websites and digital resources | 3.22        | 0.99        | 6               | Moderate |
| 2                  | I can protect my devices from malicious software               | 3.02        | 1.04        | 7               | Moderate |
| <b>Total Score</b> |                                                                | <b>3.33</b> | <b>0.83</b> | <b>Moderate</b> |          |

The results in Table (7) indicate that the level of digital competence among secondary school teachers in the Triangle region in the domain of digital security and safety was at a moderate level, with mean scores ranging between (3.61–3.02).

The overall score for this domain was also moderate, with a mean of (3.33), indicating that teachers' digital competence in digital security and safety is at a moderate level.

This result confirms that secondary school teachers in the Triangle region possess a moderate level of skills related

to digital security and safety. It reflects a basic awareness of safe digital practices, such as data protection, password management, and cautious handling of digital resources.

However, this awareness does not reach the level of mastery or advanced practice. The moderate level may also indicate a gap between theoretical knowledge and practical application, where teachers may have general awareness of digital security concepts but lack advanced skills or systematic practices in this field.

#### **Domain: Digital Problem Solving and Computational Thinking**

**Table (8): Means and Standard Deviations of the Level of Digital Competence among Secondary School Teachers in the Triangle Region in the Domain of Digital Problem Solving and Computational Thinking, Ranked in Descending Order**

| Item No.           | Item                                                                         | Mean        | Std. Dev.   | Rank            | Level    |
|--------------------|------------------------------------------------------------------------------|-------------|-------------|-----------------|----------|
| 6                  | I learn new digital skills when needed                                       | 3.37        | 1.02        | 1               | Moderate |
| 2                  | I can select the appropriate digital tool based on the educational objective | 3.36        | 0.92        | 2               | Moderate |
| 7                  | I can adapt different digital tools to suit a teaching method                | 3.28        | 1.02        | 3               | Moderate |
| 5                  | I use logical thinking to solve digital problems                             | 3.27        | 0.96        | 4               | Moderate |
| 1                  | I can solve simple technical problems that arise during lessons              | 3.20        | 0.99        | 5               | Moderate |
| 4                  | I can identify common errors when using educational software                 | 3.05        | 1.01        | 6               | Moderate |
| 3                  | I deal with technical malfunctions quickly without disrupting the lesson     | 3.04        | 1.04        | 7               | Moderate |
| <b>Total Score</b> |                                                                              | <b>3.22</b> | <b>0.87</b> | <b>Moderate</b> |          |

The results in Table (8) indicate that the level of digital competence among secondary school teachers in the Triangle region in the domain of digital problem solving and computational thinking was at a moderate level, with mean scores ranging between (3.37–3.04).

The overall score for this domain was also moderate, with a mean of (3.22), indicating that teachers' competence in digital problem solving and computational thinking is at a

moderate level.

This result may be attributed to the fact that teachers possess basic capabilities that enable them to handle simple technical problems, such as platform malfunctions or device settings, without reaching a level of mastery in dealing with complex problems or systematically applying computational thinking in educational contexts.

It also reflects a gap between use and depth, where teachers are able to operate digital tools but may face difficulty in diagnosing the causes of technical issues, selecting the most appropriate solutions, and employing technologies to address more complex educational problems.

### Results Related to the Study Hypotheses

#### Results Related to the First Hypothesis:

**Table (9): Results of Four-Way ANOVA for Differences in the Reality of Secondary School Teachers' Use of Artificial Intelligence Tools in the Triangle Region According to Gender, Academic Qualification, Years of Experience, and Specialization**

| Domain          | Variable               | Sum of Squares | df    | Mean Square | F-value | Sig. |
|-----------------|------------------------|----------------|-------|-------------|---------|------|
| Use of AI tools | Gender                 | 0.16           | 1.00  | 0.16        | 0.53    | 0.47 |
|                 | Academic Qualification | 1.16           | 2.00  | 0.58        | 1.90    | 0.16 |
|                 | Years of Experience    | 2.18           | 3.00  | 0.73        | 2.37    | 0.08 |
|                 | Specialization         | 0.27           | 1.00  | 0.27        | 0.89    | 0.35 |
|                 | Error                  | 8.33           | 25.00 | 0.33        | 1.09    | 0.38 |
|                 | Total                  | 23.93          | 78.00 | 0.31        |         |      |

The data presented in the table indicate that there are no statistically significant differences at the significance level ( $\alpha \leq 0.05$ ) in the reality of secondary school teachers' use of artificial intelligence tools in the Triangle region attributable to the variables of gender, academic qualification, years of experience, and specialization. The significance values ranged between (0.08–0.47), all of which are greater than the significance level (0.05), indicating that these variables do not have a significant effect on the level of teachers' use of artificial intelligence tools.

Accordingly, the null hypothesis related to these variables is accepted.

This result indicates that the use of artificial intelligence tools among teachers is relatively similar across different groups, regardless of their demographic and professional characteristics. This may be attributed to the widespread availability of these tools and the ease of access to them, in addition to the similarity of work and training

There are no statistically significant differences at the significance level ( $\alpha \leq 0.05$ ) in the reality of secondary school teachers' use of artificial intelligence tools in the Triangle region attributable to variables such as gender, academic qualification, years of experience, and specialization.”

To test this hypothesis, a Four-Way ANOVA was conducted for the variables of gender, academic qualification, years of experience, and specialization. The results are presented in the following table:

environments within schools, which provide comparable opportunities for all teachers.

It is also possible that reliance on relatively simple tools that do not require advanced technical expertise has contributed to reducing differences among teachers in their level of use.

#### Results Related to the Second Hypothesis

“There are no statistically significant differences at the significance level ( $\alpha \leq 0.05$ ) in the level of digital competence among secondary school teachers in the Triangle region attributable to variables such as gender, academic qualification, years of experience, and specialization.”

To test this hypothesis, a Four-Way ANOVA was conducted for the variables of gender, academic qualification, years of experience, and specialization. The results are presented in the following table:

**Table (10): Results of Four-Way ANOVA for Differences in the Level of Digital Competence among Secondary School Teachers in the Triangle Region According to Gender, Academic Qualification, Years of Experience, and Specialization**

| Domain | Variable | Sum of Squares | df | Mean Square | F-value | Sig. |
|--------|----------|----------------|----|-------------|---------|------|
|--------|----------|----------------|----|-------------|---------|------|

|                          |                        |       |    |      |      |      |
|--------------------------|------------------------|-------|----|------|------|------|
| Digital Competence Level | Gender                 | 0.14  | 1  | 0.14 | 0.25 | 0.62 |
|                          | Academic Qualification | 3.17  | 2  | 1.59 | 2.90 | 0.06 |
|                          | Years of Experience    | 3.92  | 3  | 1.31 | 2.39 | 0.08 |
|                          | Specialization         | 0.90  | 1  | 0.90 | 1.64 | 0.20 |
|                          | Error                  | 9.84  | 25 | 0.39 | 0.72 | 0.82 |
|                          | Total                  | 42.69 | 78 | 0.55 |      |      |

The results presented in the table indicate that there are no statistically significant differences at the significance level ( $\alpha \leq 0.05$ ) in the level of digital competence among secondary school teachers attributable to gender, academic qualification, years of experience, and specialization. All significance values are greater than (0.05), specifically (0.62) for gender, (0.06) for academic qualification, (0.08) for years of experience, and (0.20) for specialization.

This indicates that the level of digital competence among teachers is relatively similar across different groups, regardless of variations in their personal and professional characteristics, suggesting a degree of homogeneity in the possession of digital skills within the studied educational environment.

This may be attributed to the similarity of training and professional development opportunities provided to teachers, in addition to the widespread use of digital technologies in the educational environment, which has

allowed all teachers relatively equal opportunities to acquire digital competence.

Furthermore, reliance on unified educational tools and technologies within schools may have contributed to reducing differences among teachers in this domain.

### Results Related to the Third Hypothesis

“There is no statistically significant relationship at the significance level ( $\alpha \leq 0.05$ ) between the reality of using artificial intelligence tools and the level of digital competence among secondary school teachers in the Triangle region.”

To test this hypothesis, Pearson’s correlation coefficient was used to measure the nature of the relationship between the two variables: the use of artificial intelligence tools and digital competence.

**Table (11): Correlation Coefficient between the Use of Artificial Intelligence Tools and the Level of Digital Competence among Secondary School Teachers in the Triangle Region**

| Variables                            | Correlation Coefficient | Sig. Value | Significance              |
|--------------------------------------|-------------------------|------------|---------------------------|
| Use of AI tools × Digital competence | 0.65                    | 0.001      | Statistically significant |

The results shown in the table indicate a moderately strong positive correlation between the use of artificial intelligence tools and digital competence among secondary school teachers, with a correlation coefficient of (0.65). This value indicates a statistically significant relationship, as the significance level (Sig = 0.001) is less than ( $\alpha \leq 0.05$ ), confirming that the relationship is not due to chance.

This means that as teachers’ level of digital competence increases, their ability to use artificial intelligence tools in the educational process also increases, and vice versa. This finding confirms that digital competence is a fundamental factor in adopting and effectively employing

these technologies.

This result can be explained by the fact that teachers with higher digital skills are more capable of dealing with intelligent applications, understanding how they function, and utilizing them to improve their teaching practices.

It also highlights the importance of investing in the development of teachers’ digital competence as a key entry point for enhancing the use of artificial intelligence tools and maximizing their benefits in improving the educational process.

### Recommendations

In light of the previous results, the researchers presented the following recommendations:

1. Launch specialized national training programs to develop teachers' digital competence, with a focus on generative artificial intelligence applications in education and linking them to continuous professional development and job evaluation.
2. Develop a clear national framework for digital competence that defines the required skill levels for teachers at different stages of their professional careers.
3. Provide integrated digital infrastructure within schools, including strong networks, modern devices, and educational platforms that support artificial intelligence applications.
4. Enhance technical support within schools through specialized teams that contribute to solving technical problems quickly and support teachers during the educational process.
5. Organize continuous practical training workshops focusing on the practical use of artificial intelligence tools in planning, assessment, and personalized learning.
6. Encourage teachers to develop their digital skills independently and benefit from artificial intelligence tools in designing interactive educational content that considers individual differences, while adhering to digital security principles.
7. Develop pre-service teacher preparation programs to include skills in analyzing educational data, digital problem solving, and computational thinking.
8. Conduct future experimental and qualitative studies to examine the impact of digital training and psychological variables on the use of artificial intelligence tools, and expand research to include different educational contexts.

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