

Dirassat & Abhath
The Arabic Journal of Human
and Social Sciences



مجلة دراسات وأبحاث
المجلة العربية في العلوم الإنسانية
والاجتماعية

EISSN: 2253-0363
ISSN : 1112-9751

Digital Transformation and Its Impact on the Development of Teachers Professional Competencies

التحول الرقمي وتأثره على تطوير الكفايات المهنية للمدرسين

Dr. Mostefai Bouanani

Lecturer A, Saida University, Dr. Moulay Tahar, Faculty of Social and Human Sciences,
Department of Psychology and Educational Sciences, Laboratory for Development in Social and
Human Sciences.in saida,bouanani.mostefai@univ-saida.dz

د. مصطفى بوعناني

أستاذ محاضر "أ"، جامعة سعيدة، كلية العلوم الاجتماعية والانسانية، قسم علم النفس وعلوم التربية، مختبر التطوير

في العلوم الاجتماعية والانسانية

bouanani.mostefai@univ-saida.dz

تاريخ النشر: 2026/10/15

تاريخ القبول: 2026/09/05

تاريخ الاستلام 2026/06/25

Abstract:

Digital transformation is the process of integrating digital technology into all areas of education, radically changing the way teachers work and perform their duties. Digital transformation significantly impacts the development of teachers' professional competencies in several key ways:

First, digital transformation requires teachers to acquire new technical skills, such as using educational platforms and interactive tools. Second, it demands the development of innovative pedagogical skills suited to digital education, such as designing interactive online learning activities. Third, digital transformation promotes continuous and self-directed learning for teachers through online training courses and diverse digital resources.

It also contributes to the development of communication and collaboration skills among teachers through virtual professional networks. Furthermore, digital transformation encourages teachers to develop e-assessment skills and track learners' progress digitally. In addition, digital transformation requires the development of time management skills and the organization of digital content. Finally, digital transformation helps teachers keep pace with modern educational developments and adapt to the demands of the digital age.

Keywords: digital transformation, teachers' professional competencies

المخلص :

التحول الرقمي هو عملية دمج التكنولوجيا الرقمية في جميع مجالات التعليم، مما يغير بشكل جذري طريقة عمل المدرسين وأدائهم لمهامهم. يؤثر التحول الرقمي بشكل كبير على تطوير الكفايات المهنية للمدرسين من خلال عدة جوانب رئيسية:

أولاً، يفرض التحول الرقمي على المدرسين اكتساب كفايات تقنية جديدة مثل استخدام المنصات التعليمية والأدوات التفاعلية. ثانياً، يتطلب تطوير كفايات بيداغوجية مبتكرة تتناسب مع التعليم الرقمي، مثل تصميم أنشطة تعليمية تفاعلية عبر الإنترنت. ثالثاً، يعزز التحول الرقمي التعلم المستمر والذاتي للمدرسين من خلال الدورات التدريبية عبر الإنترنت والموارد الرقمية المتنوعة.

كما يساهم في تطوير كفايات التواصل والتعاون بين المدرسين عبر الشبكات المهنية الافتراضية. ويدفع التحول الرقمي المدرسين لتطوير كفايات التقييم الإلكتروني وتتبع تقدم المتعلمين رقمياً. إضافة إلى ذلك، يتطلب التحول الرقمي تطوير كفايات إدارة الوقت وتنظيم المحتوى الرقمي. وأخيراً، يساعد التحول الرقمي المدرسين على مواكبة التطورات التربوية الحديثة والتكيف مع متطلبات العصر الرقمي.

الكلمات المفتاحية: التحول الرقمي، الكفايات المهنية للمدرسين

1. INTRODUCTION

The current era is witnessing an unprecedented acceleration in digital transformation processes, where digital technology, supported by artificial intelligence and big data analytics, has become an integral part of the fabric of daily and professional life. The educational field has not been immune to this transformation; rather, it has been at the core of its concerns. Digital tools and platforms have redefined educational

practices, transforming the teacher's role from a "transmitter of knowledge" to a "designer of learning experiences" and a "facilitator of the learning process." The process of identifying training needs is the fundamental pillar to ensure the effectiveness of training programs. Without an accurate diagnosis of the gap between current performance and required performance, professional development efforts remain merely a waste of time and effort without achieving desired goals (Madi, Youssef, 2025, p. 96).

In this context, teachers' professional competencies, especially digital competencies, have become a central focus for ensuring the quality and effectiveness of education. Possessing basic digital skills is no longer an option, but an urgent necessity imposed by the nature of digital-native students and the requirements of the future job market. Hence, the main question arises: How do digital transformation tools and applications impact the development of these competencies, and what are the challenges hindering this path? Consequently, digital transformation does not negate the teacher's role but rather enhances it, as the teacher shifts from a knowledge transmitter to a learning facilitator and guide, thereby sustainably improving their efficiency and professional performance.

2. Study Problem and Questions:

The contemporary world has witnessed rapid digital transformations that have imposed themselves on all walks of life, with the education sector being at the heart of these transformations. The teacher is no longer a sole transmitter of knowledge; their role has evolved into a facilitator, guide, and mentor for a learning process that has become more complex and multifaceted. In this context, the issue of teacher training needs emerges as one of the fundamental approaches to qualifying them to keep pace with the demands of the digital age. The transition from a traditional teacher to a "digital teacher" requires systematic procedures and organized training (Badr, Susan, 2021, p. 147).

Digital transformation represents a qualitative shift in teaching methods and has a significant impact on developing teacher performance on several levels, including developing teaching methods, efficient classroom management, assessment and monitoring, in addition to continuous professional development for the teacher, and communication with students and parents.

The concept of training needs is defined as the gap between the knowledge and skills a

teacher possesses and what they should possess to achieve their goals efficiently and effectively. Accurately identifying these needs is the first and most important step in building any successful training program, as it ensures directing training efforts towards what teachers actually need, not towards what we think they need. Strategies for identifying these needs are numerous, including task analysis, problem analysis, questionnaires, interviews, and other research tools. The study problem is evident in observing the growing gap between the rapid technological development in educational institutions on the one hand, and teachers' ability to efficiently employ these technologies on the other. With the sudden shift towards distance education in recent years, pressure has increased on teachers to acquire digital skills they have not been adequately trained in (Abu Manshar & Nawaj'a, 2022, p. 88). Many studies have concluded the impact of digital transformation on evaluating teacher performance. A study by Masa'id et al. (2025) found a correlational relationship between planning for digital transformation and preparing leaders for digital transformation, and evaluating employee performance. In the same vein, studies by Khalifa Ahmed (2025), Oweis et al. (2025), Hanifa et al. (2024), Al-Luhaibi (2024), and Al-Kharisha et al. (2025) indicated that well-organized digital strategies significantly enhance faculty productivity and teaching quality through using artificial intelligence in lesson planning and implementation, and using online assessment platforms such as Quizziz, Kahoot, and Google Forms. This has a positive impact on accelerating the digitalization of learning, increasing the pedagogical efficiency of pre-service teachers, and the impact of e-learning strategies on faculty performance. The current study aims to highlight the extent to which teachers possess basic digital skills, their most important training needs in the field of employing technology in planning, teaching, and assessment, and the most

prominent challenges associated with this, by posing the following questions:

1. What are the most important training needs for teachers in the field of employing technology in planning, teaching, and e-assessment?
2. Do training needs differ according to variables (experience, specialization, educational level)?
3. What are the most prominent obstacles limiting the employment of technology in developing teachers' professional competencies?

3. Operational Definitions of the Study

1.3. Digital Transformation: The process of integrating digital technology into all areas of work and society, leading to a radical change in how institutions operate and deliver value.

2.3. Professional Competencies of Teachers: The set of knowledge, skills, and attitudes possessed by a teacher that enable them to perform their educational and pedagogical tasks with a high degree of proficiency, speed, and responsibility, according to specific measurable standards.

4. Theoretical Framework and Previous Studies

1.4. Employing Technology in Teaching:

A study by (Madi, 2025) showed that the field of employing technology in teaching demonstrated a low degree of need compared to other fields, which may reflect teachers' need for more focus on e-assessment skills. These skills include:

- Designing various e-assessment tools (electronic tests, digital projects, portfolios).
- Employing student results analysis software and extracting indicative indicators.
- Using interactive formative assessment through learning platforms.
- Utilizing the immediate feedback provided by digital environments.

2.4. Field of Professional Development and E-Training:

Teacher training is not limited to acquiring digital skills but extends to empowering them to continue self-development. This

requires: (Khalil, Omar Sayed, 2017, pp. 144-145)

- Self-learning skills and searching for digital knowledge sources.
- The ability to participate in virtual professional learning communities.
- Benefiting from e-training platforms, digital libraries, and distance education platforms.

Interest in e-training has increased in recent years. The 43rd Educational Conference held in Kuwait in 2018 recommended the importance of e-training by creating specialized e-learning departments to benefit the largest segment of teachers and overcome time and place constraints.

3.4. Digital Professional Development for Teachers:

Teacher professional development is a continuous process aimed at keeping pace with global transformations, developments, and rapid knowledge advancement. In the digital age, this development has taken new forms, which can be summarized as follows:

2. Concept of Digital Professional Development:

Digital professional development is a continuous process of developing teachers' abilities and educational skills using digital media and platforms, by offering workshops and e-training courses that enable teachers to learn the latest teaching methods and use modern technologies in classrooms.

3. E-Training as a Mechanism for Professional Development:

E-training is defined as using the Internet as a training environment through which interaction between the trainer and trainees occurs, relying on computerized training programs. It is characterized by its ability to provide virtual environments that do not require the teacher to attend the training location at a specific time, allowing them to train anytime, anywhere.

4. Sources of Digital Professional Development:

The digital sources that teachers can benefit

from in their professional development are diverse, including:

- Digital information containers and e-libraries.
- Classroom management platforms and virtual lessons.
- Specialized social networks in the educational field.
- Digital content design websites such as Canva and Piktochart, among others.

5. Challenges Associated with Teacher Training in the Digital Age:

Despite the importance of digital training for teachers, it faces a set of challenges that may hinder achieving its desired goals, most notably: (Khalil, Omar Sayed, 2017, pp. 146-148)

1.5. Structural Challenges:

These include a lack of specialized training centers, a shortage of qualified training staff, or scarcity in specializations required for some training courses.

2.5. Spatial and Temporal Challenges:

The inability to ensure the continuity of training services and programs targeting new teachers in areas far from training centers.

3.5. Skill-based Challenges: The need for teachers themselves to first acquire skills in dealing with digital technologies before being able to employ them in their professional learning.

4.5. Cultural Challenges: Resistance to change and clinging to traditional training methods by some teachers or officials.

6. Recommendations for Developing Teacher Training Programs in the Digital Age:

Based on the preceding analyses, a set of recommendations can be made to contribute to developing teacher training programs to keep pace with the requirements of the digital age:

1.6. Transition from traditional training to e-training, as recommended by many educational conferences, with the establishment of specialized e-training bodies within professional academies.

2.6. Equip teachers with basic technological skills, including good handling of technical

problems that may arise during e-program delivery.

3.6. Create interactive training platforms that allow each teacher to access and choose suitable training courses according to a flexible and facilitated mechanism.

4.6. Develop training programs based on the actual needs of teachers, away from personal judgments, by conducting periodic studies to accurately identify these needs (Ibrahim, Rahab, 2020, p. 327).

5.6. Integrate digital education into pre-service teacher preparation programs, so that teacher preparation curricula include digital citizenship skills and safe and ethical use of technology (Al-Sharman, Atef Mohammed, 2019, p. 98).

7. Previous Studies:

Arab studies confirm that digital transformation represents a fundamental driver for developing teachers' professional competencies, provided it is done thoughtfully and integratively. The focus is no longer just on providing hardware and software, but on preparing a teacher capable of employing technology in an innovative pedagogical way that enhances students' higher-order thinking skills. Some Arab initiatives have succeeded in translating this orientation into practical training programs, although challenges related to continuous training, curriculum development, and providing a supportive environment still exist and require further research and collaborative work. Among the studies that investigated this, we mention:

1.7. Study by Boutoura and Al-Wafi (2022), which aimed to study the problem of digital transformation of education in Algeria between the necessity of globalization and facing crises. The study concluded the necessity of developing a sound and integrated strategy by the government to ensure the modernization and improvement of the technological and communication level of all institutions, whether economic or educational, due to its benefit in saving time and reducing costs, and the necessity for the government to prepare an advanced technological

infrastructure to ensure positive application of digital transformation technology.

2.7. Study by Ben Ouda and Bouzourine (2025), which aimed to understand the reality of digital transformation and governance of the national education sector in Algeria and explore the challenges facing these two processes. It concluded that digital transformation can significantly contribute to improving human and financial resource management, simplifying administrative processes, and providing a more efficient and transparent educational environment. Furthermore, applying governance principles, such as transparency and accountability, enhances the effectiveness of these transformations and reduces administrative corruption, while emphasizing that the success of digital transformation largely depends on investing in infrastructure, providing continuous training, and developing clear policies for data protection and ensuring the continuity of digital processes.

3.7. Study by Berkan and Massoud (2025), which aimed to analyze the content of the national digital transformation strategy in Algeria and read its dimensions in applying comprehensive digital transformation, in light of the Digital Algeria 2030 vision. The study concluded that the national digital transformation strategy is capable of embodying comprehensive digital transformation for Algeria to become a digital leader in Africa, provided that it accelerates the completion of planned projects by the High Commission for Digitization, including plans for monitoring and realizing digital transformation, the digitization law, and the national authority for the security of information systems.

4.7. Study by Ammar (2025), which aimed to identify the role of digital transformation in improving the quality of educational service, including its dimensions (information network infrastructure, information technology training, digital education, digital libraries) as an independent variable on the quality of

educational service as a dependent variable. The research results showed no statistically significant differences in students' opinions regarding digital transformation and educational service quality according to (specialization) as a demographic variable. However, there were statistically significant differences in students' opinions regarding digital transformation and educational service quality according to (gender, educational level, university type). It also found a significant statistically significant relationship between the dimensions of digital transformation and the quality of educational service provided by the Egyptian universities under study. The study recommended the possibility of senior management and leadership in the Egyptian universities under study encouraging, applying, and generalizing the idea of digital transformation by clarifying its concept and its effective and influential role in improving the quality of educational service in those universities.

5.7. Study by Kara (2026), which aimed to analyze the relationship between digital transformation and the development of pedagogical competencies, focusing on technical, pedagogical, and human dimensions. The results showed limited employment of technology due to weak training and imbalance in infrastructure distribution. The study concludes the necessity of adopting a comprehensive national strategy that achieves digital justice and supports the production of local content.

8. Commentary on Previous Studies

These studies investigated the topic of digital transformation in education, addressing several dimensions: the strategic dimension by analyzing national strategy and Vision 2030 (Berkan & Massoud), the administrative and governance dimension related to transparency and anti-corruption (Ben Ouda & Bouzourine), the applied dimension by measuring the impact of digital transformation on educational service quality and testing differences between groups (Ammar), the diagnostic

field dimension focusing on limited technology employment and weak training (Kara), and finally the contextual dimension framing the issue within globalization and crisis management such as COVID-19 (Boutoura & Al-Wafi). Methodologically, the studies varied between the descriptive-analytical approach to monitor reality, content analysis, and the correlational-comparative approach to test relationships and differences. Kara's study (2026) was distinguished by employing a mixed approach combining quantitative and qualitative methods to address technical, pedagogical, and human dimensions together. Regarding tools, they ranged from questionnaires to interviews. All concluded by emphasizing the necessity of political will, advanced infrastructure, continuous human training, and a clear national strategy to ensure the success of digital transformation in education.

9. Field Procedures of the Study

1.9. Study Methodology:

The descriptive-analytical approach was employed, which is most suitable for such studies as it relies on collecting and analyzing data to describe the phenomenon as it exists in reality.

2.9. Study Population and Sample:

The study population consists of all male and female teachers working in schools in the state of Saida. A random sample of (100) male and female teachers was selected, distributed according to the variables of years of experience, subject taught, and educational level, as shown in Table No. 1.

Table 1: Distribution of Sample Members According to Study Variables

Variable	Category	Num	%
Professional Experience	0 to 5 years	37	37%
	6 years and more	63	63%

Variable	Category	Num	%
Total		100	100%
Specialization	Scientific	60	60%
	Literary	40	40%
Total		100	100%
Educational Level	1st Year Secondary	55	55%
	2nd Year Secondary	30	30%
	3rd Year Secondary	15	15%
Total		100	100%

The table shows that 37% of teachers have less than 5 years of experience, while 63% have more than 6 years. Regarding specialization, 60% are in scientific fields and 40% in literary fields. For the educational level, 55% teach 1st year secondary, 30% teach 2nd year secondary, and 15% teach 3rd year secondary.

3.9. Study Tool:

A questionnaire was prepared in its initial form consisting of 30 items after reviewing previous studies related to the topic, such as the studies by Boutoura & Al-Wafi (2022), Ben Ouda & Bouzourine (2025), Berkan & Massoud (2025), Ammar (2025), and Kara (2026). It was designed according to the three-point Likert scale, with three options (High, Medium, Low), scored (3,2,1) respectively. The study questionnaire included four (4) domains distributed over 30 items, as shown in Table No. 3.

Table 3: Dimensions and Items of the Questionnaire

No.	Domain	Number of Items
1	Basic Digital Skills	08
2	Employing Technology in Planning and Teaching	09
3	E-assessment	07
4	Professional Development and Digital Citizenship	06
Total Questionnaire Items		30

1. First Domain: Basic Digital Skills:

2. Includes skills in using devices, office software, dealing with learning platforms, and basic maintenance.

3. Second Domain: Employing Technology in Planning and Teaching:

4. Includes designing digital lessons, using blended learning strategies, producing digital content, and using AI in education.

5. Third Domain: E-assessment:

6. Includes designing electronic tests, using analysis and continuous assessment tools, and employing digital feedback tools.

7. Fourth Domain: Professional Development and Digital Citizenship:

8. Includes cybersecurity, ethics of dealing with technology, and safe internet use.

4.9. Tool Validity and Reliability:

a. Content Validity: To verify the content validity of the tool, the questionnaire was presented to a panel of university professors and experts in educational technology and training to examine the items, review them, and determine the correctness of the linguistic formulation and clarity of statements. The majority opinion was adopted, and items on which there was no agreement were modified. The panel's agreement percentage on the questionnaire items was 85%, a percentage considered an acceptable standard by many researchers for accepting or modifying an item.

b. Internal Consistency Validity: To ensure this, the Pearson correlation

coefficient was calculated between the score of each item and the total score, as shown in Table No. 4.

Table 4: Pearson Correlation Coefficients for the Relationship between Item Score and Total Score

Item No.	Corr. Coeff.	Item No.	Corr. Coeff.
1	0.88**	16	0.86**
2	0.20	17	0.80**
3	0.61*	18	0.83**
4	0.63**	19	0.72**
5	0.53*	20	0.70**
6	0.78**	21	0.45*
7	0.71**	22	0.17
8	0.60**	23	0.66**
9	0.59*	24	0.77**
10	0.62**	25	0.72**
11	0.55*	26	0.66**
12	0.21	27	0.90**
13	0.61**	28	0.30
14	0.63**	29	0.79**
15	0.86**	30	0.11

(*) Significant at 0.05 level

(**) Significant at 0.01 level

It is clear from the table that the correlation coefficient values for the questionnaire items with the total score ranged between 0.45 and 0.90. Non-significant items (5 items: 2, 12, 22, 28, 30) were deleted, resulting in a final questionnaire of 25 items

distributed across 4 domains, as shown in Table No. 5

Table 5: Domains and Items of the Final Questionnaire

No.	Domain	Number of Items
1	Basic Digital Skills	07
2	Employing Technology in Planning and Teaching	07
3	E-assessment	06
4	Professional Development and Digital Citizenship	05
Total Questionnaire Items		25

C.Reliability: Calculated using Cronbach's Alpha formula, which yielded the values shown in Table No. 6.

Table 6: Reliability Coefficients (Cronbach's Alpha) for Each Domain

No.	Domain	Number of Items	Cronbach's Alpha
1	Basic Digital Skills	07	0.67
2	Employing Technology in Planning and Teaching	07	0.88
3	E-assessment	06	0.78
4	Professional Development and Digital Citizenship	05	0.90
Total		25	0.80

9. Presentation and Discussion of Results

1.10. Presentation of General Results:

2.10. Presentation of Results for the First Question: "What are the most important training needs for teachers in employing technology in planning, teaching, and e-assessment?"

To answer the hypothesis, arithmetic means and standard deviations of the sample members' responses to the dimensions and items of the questionnaire were calculated, as shown in Table No. 7.

Table 7: Arithmetic Means and Standard Deviations of Teachers' Need for Training in Digital Domains

Rank	Domain	Mean	Standard Deviation	Degree of Need
1	Third Domain: E-assessment	4.12	0.65	High
2	Second Domain: Employing Tech. in Teaching	3.95	0.72	Medium
3	First Domain: Basic Digital Skills	3.58	0.81	Medium
4	Fourth Domain: Professional Dev. & Digital Cit.	3.40	0.88	Medium
Overall Mean		3.76	0.76	Medium

The overall results indicate that the degree of teachers' need for training in digital domains combined was medium, with a mean of 3.76. This aligns with Madi's study

(2025), which found the degree of need for fulfilling teacher training needs in light of digital transformation to be medium across combined domains (Badr, Susan, 2021).

2.10. Results And Discussion

• Third Domain: E-assessment (Ranked First):

This domain achieved the highest mean (4.12) with a high degree of need. This interesting result indicates that teachers feel a significant gap in their ability to design and manage e-tests and use digital analysis tools to monitor student performance. This may be due to the relative complexity of assessment tools compared to using technology just for presenting lessons. Also, the transition from traditional paper tests to e-tests requires integrated technical and pedagogical skills. This agrees with Badr (2021) on the necessity of focusing digital teacher preparation programs on e-assessment skills as a fundamental pillar (Badr, Susan, 2021).

• **Second Domain: Employing Technology in Teaching (Ranked Second):** Ranked second with a mean of 3.95 (Medium need). This shows that teachers recognize the importance of integrating technology into the educational process, such as using blended learning strategies, producing digital content, and employing AI. This aligns with the findings of Abu Manshar and Nawaj'a (2022), which confirmed teachers' need for training in light of technology-based education (Badr, Susan, 2021). The evolution of generative AI tools places teachers before a new challenge requiring skills in effective prompt engineering and employing these tools in lesson preparation.

• First Domain: Basic Digital Skills (Ranked Third):

Achieved a mean of 3.58 (Medium need). The relatively lower percentage here may indicate that a large part of teachers already possess minimum basic skills (e.g., using email, WhatsApp, presentation software). However, this does not mean there is no need. The study by Ibrahim (2020) on developing technological skills for basic

education teachers confirmed the necessity of developing these skills continuously, not just acquiring them once.

• Fourth Domain: Professional Development and Digital Citizenship (Ranked Fourth):

• Ranked last with a mean of 3.40, but still a medium degree of need. This suggests that awareness of cybersecurity issues, data protection, and ethics of digital interaction still needs enhancement. Al-Wedan (2024) in their research on digital education emphasized the importance of preparing teachers to be role models in responsible and safe technology use and instilling digital citizenship values in students (Al-Wedan, Saad Mohammed, 2024).

3.10. Presentation of Results for the Second Question:

"Do training needs differ according to variables (experience, specialization, educational level)?"

To answer the question, an Independent t-test was applied, as shown in Table No. 8.

Table 8: Independent t-test Results for Differences due to Experience and Specialization

Variable	Category	N	Mean	Std. Dev.	df	t-value	Sig. Level
Experience	0 - 5 years	37	68.50	8.20	98	2.45	0.016
	6 years and more	63	73.20	9.10			
Specialization	Scientific	60	72.80	9.50	98	1.12	0.265

Variable	Category	N	Mean	Std. Dev.	df	t-value	Sig. Level
	Literary	40	70.60	10.10			

The results in the table indicate statistically significant differences at the (0.05) level attributed to the experience variable, in favor of teachers with more than 6 years of experience who showed a higher need in the first and second domains. Conversely, less experienced teachers showed a lower need in the third and fourth domains, reflecting the different nature of challenges each group faces. However, the results showed no differences attributed to the specialization variable (Scientific/Literary) regarding teachers' training needs in employing technology in planning, teaching, and e-assessment, as the t-value was 1.12 with a significance level of 0.265 (higher than 0.05). This indicates that the specialization variable does not influence the views of teachers in scientific or literary departments, confirming that digital transformation is the responsibility of all teachers.

Table 9: Means and Standard Deviations of Training Needs by Educational Level

Educational Level	N	Mean	Std. Dev.
1st Year Secondary	55	2.53	0.41
2nd Year Secondary	30	2.73	0.61
3rd Year Secondary	15	2.68	0.65
Total	100	2.59	0.52

We notice apparent differences between the means for training needs based on the educational level variable. The 2nd Year Secondary group had the highest mean (2.73), followed by 3rd Year Secondary (2.68), and finally 1st Year Secondary (2.53). To determine if these differences are statistically significant at the 0.05 level, a One-way ANOVA was applied, shown in Table No. 10.

Table 10: One-way ANOVA for Differences in Training Needs by Educational Level

Source of Variation	Sum of Squares	df	Mean Square	F-value	Sig. Level
Between Groups	850.5	2	425.25	5.67	0.005
Within Groups	7275.5	97	75.01		
Total	8126.0	99			

The results indicate statistically significant differences at the 0.05 level in teachers' training needs according to the educational level variable, based on the calculated F-value of 5.67 with a significance level of 0.005. To determine the direction of differences, Scheffe's test for post-hoc comparisons was used, as shown in Table No. 11.

Table 11: Scheffe's Test for Significance of Differences due to Educational Level

Education Level	Mean	1st Year Sec.	2nd Year Sec.	3rd Year Sec.
		2.53	2.73	2.68
1st Year Sec.	2.53	-	0.44 *	0.53 *
2nd Year Sec.	2.73		-	0.09

Education Level	Mean	1st Year Sec.	2nd Year Sec.	3rd Year Sec.
3rd Year Sec.	2.68			-

(*) Statistically significant at 0.05 level

The table shows that the differences based on educational level favored 2nd Year Secondary teachers when compared to 1st and 3rd Year Secondary teachers. Therefore, 2nd Year Secondary teachers showed a higher need for engaging and attractive digital teaching strategies for students, while 1st and 3rd Year Secondary teachers focused more on advanced assessment and analysis tools.

11. Conclusion

Based on the above, it can be said that teachers in the digital age are going through a transitional phase that requires systematic support. They do not reject technology, but they need quality training focused on advanced practical applications (especially e-assessment and employing AI). Teachers today face significant challenges in keeping up with the rapid digital transformation in education, and traditional training is no longer sufficient to empower them to effectively integrate technology into classrooms. Based on the analysis of effective global programs, teachers' training needs can be envisioned through the following core axes:

• Basic Technical Competencies:

Mastering the use of email, Learning Management Systems (LMS) like Blackboard or Moodle, and creating, managing, saving, and sharing digital content.

• Training on Specific Tools:

Offering practical workshops to enable teachers to use tools such as interactive learning platforms, Microsoft educational tools (Minecraft for Education, OneNote Class Notebook), and other applications that enrich the process.

• Personal Professional Development:

Training teachers on how to use the internet for continuous self-learning through platforms like "Tarbiyat Tek," the National Center for Distance Education and Training, and the information system of the Ministry of National Education, etc.

• Integrating Technology into Modern Teaching Strategies:

Training must go beyond the technical aspect to focus on "how" and "why" we use these tools to improve learning.

• **E-learning Strategies:** Training teachers to design and apply strategies such as the flipped classroom, programmed learning, e-discussions, and digital projects.

• Developing Interactive Content:

Empowering teachers to employ multimedia to create engaging content like digital stories and virtual trips, increasing student interaction and improving outcomes.

• Pedagogical Integration:

Shifting focus from just using technology to making it a tool for achieving specific learning goals, enhancing students' critical thinking, creativity, and problem-solving skills.

• Sustainable and Personalized Professional Development:

Professional development should transform from an isolated activity into a sustainable and supportive learning process.

• User-Centered Design:

Offering flexible training programs that consider individual differences among teachers in digital skill levels and learning pace, available through multiple methods (online, offline, mobile) to suit everyone.

• Blended and Collaborative Learning:

Combining interactive workshops with online learning platforms, while enhancing Professional Learning Communities (PLCs) and peer-to-peer collaborative learning to exchange experiences and best practices.

• Coaching and Mentoring:

Providing mentoring and individual coaching programs where specialized technology coaches act as mentors to support teachers in applying their new skills

in their classrooms and solving daily problems.

• **Digital Citizenship and Cybersecurity:**
Educating teachers on how to protect their privacy and their students' privacy, and promoting ethical and responsible behavior in the digital space.

• **AI Applications in Education:**

The skill of using generative AI in education has become an urgent necessity. Teachers must be trained on how to employ these tools in lesson design, student assessment, and providing personalized learning experiences, while understanding their limitations and ethics.

12. Recommendations

In light of the results, the researcher recommends the following:

1. Design Participatory Training

Programs Based on Actual Needs:

Educational institutions should move away from pre-packaged training programs and design their programs based on an accurate diagnosis of the real gaps for each group of teachers, as recommended by Al-Khalifat (2010) in their work on identifying training needs (Badr, Susan, 2021).

2. Focus on the Most Urgent Areas:

Direct efforts and resources towards training teachers on e-assessment, student data analysis tools, and employing AI in education, as these are the most demanded areas and the least present in current programs.

3. Provide Flexible Training Platforms (e.g., EduCareers):

Benefit from specialized training platforms that provide a flexible learning environment and bring teachers together in interactive professional communities, enhancing continuous exchange of experiences and achieving sustainability in professional development (Al-Sharman, Atef Mohammed, 2019).

4. Enhance Digital Citizenship Culture:

Integrate topics of cybersecurity, privacy protection, and ethical technology use as an essential part of any teacher training program, not as a marginal field (Hussein, Khaled Mansour, 2020).

Continuous Evaluation of Training Impact:

Training should be linked to improved learning outcomes. Therefore, mechanisms should be developed to evaluate the impact of training programs on teacher performance inside classrooms and on student achievement

4. Bibliography List :

• Madi, Youssef Hamad Ahmed. (2025). Training needs of teachers in Jordan in light of digital transformation in the twenty-first century. *International Journal on Humanities and Social Sciences*, (64), 96-112.

• Badr, Susan. (2021). Training needs of the digital teacher. *Journal of Educational and Psychological Sciences*, 5(32), 146-155.

• Al-Wudan, Saad Mohammed. (2024). Digital education: A modern vision for professional development of teachers in light of contemporary requirements. *Journal of Academic Research*, 28(28), 1-20.

• Ibrahim, Rehab. (2020). A proposed vision for developing technological skills of basic education teachers in Egypt in light of global digital transformation requirements. *Journal of Educational Sciences*, 28(3), 323-407.

• Abu Manshar, Manal; & Nawaj'ah, Abdulrahman. (2022). Teachers' training needs in light of technology-based education from the perspective of lower basic school principals in Hebron Governorate. *Journal of Educational and Psychological Sciences*, 6(32).

• Al-Khalifat, Issam Attallah. (2010). Determining training needs to ensure the effectiveness of training programs. Amman: Dar Al-Safa for Publishing and Distribution.

• Al-Mawla, Marwa. (2022). Training needs of faculty members at Aswan University in light of digital transformation. *Educational Journal - Faculty of Education, Sohag University*, 97(97), 391-499.

• Hussein, Khaled Mansour. (2020). A proposed conception for training adult

educators in the digital age. *Journal of New Horizons in Adult Education*, (27), 13-83.

•Al-Wudan, Saad Mohammed. (2023). Digital education: A modern vision for professional development of teachers in light of contemporary requirements. *Journal of Academic Research*, 28, 1-20.

•Al-Sharman, Atef Mohammed. (2019). Instructional design for digital content. Amman: Dar Al-Maseera for Publishing and Distribution.

•Al-Asiri, Bandar bin Mufreh. (2020). Digital education to achieve the requirements of Vision 2030. Riyadh: King Fahd National Library for Publishing.

•Hussein, Khaled Mansour. (2020). A proposed conception for training adult educators in the digital age. *Journal of New Horizons in Adult Education*, (27), 13-83.

•Khalil, Omar Sayed. (2017). Science teachers' professional development needs in light of the digital age data. Paper presented at the 19th Scientific Conference: Scientific Education and Sustainable Development, Egyptian Society for Scientific Education, Cairo. 43rd Educational Conference. (2018). Teacher professional development and contemporary challenges. Kuwait Teachers Association, Kuwait.

•Abdel Moaty, Hussein; & Zarea, Ahmed. (2012). E-training and its role in achieving

teacher professional development. *International Journal of Educational Research*, (31).

•Kara, Khawla. (2026). Digital transformation and the development of educational competencies in Algeria: From structural challenges to future strategies. *Al-Mi'yar Journal*, 31(2).

•Ben Ouda, Leila; & Bouzourine, Najwa. (2025). Digital transformation and governance in the national education sector in Algeria. *Journal of Global Politics*, 9(1), 244-262.

•Boutoura, Fadila; & Al-Wafi, Alaa El-Din. (2022). The problem of digital transformation in education between the necessity of globalization and crisis management. *Journal of Human Resource Development*, 17(2), 515-542.

•Berkan, Bachir; & Rabie, Massoud. (2025). Digital transformation in Algeria: An analytical reading of the contents of the national strategy for digital transformation. *Journal of Administration and Development for Research and Studies*, 14(2), 897-911.

•Ammar, Fathi. (2025). The role of digital transformation in improving the quality of educational service. *Al-Sadat Journal for Administrative and Financial Research*, 2(1).