

## Training Needs for Primary School Principals in Light of Digitization and Technological Transformations

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### Abstract:

This paper elucidates the extent of technology and digitization integration among primary school principals. It quantifies differences linked to gender, professional tenure, and academic qualifications. Employing a descriptive method, a 15-item questionnaire was administered to a cohort of 55 principals within the primary educational institutions of Saïda and El Bayadh. Findings reveal a moderate engagement with digital tools among the subjects, with no statistically significant gender or tenure-related differences. However, differences related to academic qualifications were observed.

**Keywords:** Training Needs, Technology and digitization, primary Schools Principals.

### Introduction:

The incursion of technology and digitization has profoundly transformed the educational landscape, transitioning from traditional pedagogical methods to modern, technologically enriched environments. This shift has expanded learning opportunities and enhanced educational processes. Moreover, the technological revolution has been pivotal in addressing systemic educational challenges, facilitating advancements through the strategic deployment of new technologies by adeptly trained educational leaders. This paradigm shift necessitates

that leaders continually adapt and refine their technological prowess to foster educational quality and efficiency.

### **Research Problem:**

Algeria's educational system is experiencing a distinctive transformation driven by rapid advancements in science, technology, and knowledge. This shift poses challenges for educators as they navigate the digital transformation of educational frameworks and strive to identify effective adaptation strategies. The integration of technology and digitization across all educational dimensions has garnered significant attention for its role in enhancing operational quality and increasing systemic efficacy. Mastery of these digital tools has become an essential skill for educational institutions, as it streamlines processes and reduces both time and effort required for administrative and educational tasks.

The effective integration of technology largely depends on the capability of school principals, who assume the role of institutional leaders. The responsibilities of a principal are substantial, often necessitating considerable financial resources to acquire necessary technological tools and infrastructure. According to **Lindqvist and Pettersson (2019)**, the complexity of a school leader's role intensifies with the integration of digital technologies. This raises a critical question: how can we ensure that educational leaders are adequately supported with the resources and time needed to enhance their institutions? (Lindqvist, Pettersson, 2019).

Furthermore, it is crucial for school principals to possess robust technological skills to fulfill their leadership roles effectively. **Mert's** study (2021) characterizes school principals as technological leaders who not only implement but also sustain and advance technological integration within their schools (Pinar Mert, 2021). Consequently, comprehensive training in these technologies becomes one of the most critical developmental needs for educational leaders, enabling them to provide relevant training for their faculty and staff.

Notably, the effective use of technology positively impacts educational settings by enhancing the competencies of principals and aiding teachers in their instructional roles when applied appropriately. **Beni Said (2021)** supports this, suggesting that the successful implementation of educational technologies necessitates that principals have a thorough understanding and proficiency in these tools to achieve optimal educational outcomes (**Beni Said, 2021**).

In this context, technology and digitization offer new perspectives on educational advancement and future prospects, leading to the emergence of 'digital leadership.' It is imperative that educational institutions align with this technological progression and adapt accordingly. Taylor et al. (2021) emphasize that the prevalence of technology and artificial intelligence in schools necessitates a new generation of educators who are proficient in these areas (Taylor et al. 2021).

This study aims to identify the training needs concerning digitization and technology among primary school leaders, to facilitate their integration with technological advancements and encourage the development of their professional skills. This leads to the primary research question: **What is the extent of technology and digitization usage among primary school principals?**

#### **Research Sub-Questions:**

1. Are there statistically significant differences in technology and digitization usage among primary school principals based on gender?
2. Are there statistically significant differences in technology and digitization usage based on professional tenure?
3. Are there statistically significant differences in technology and digitization usage based on academic qualifications?

#### **Hypotheses:**

##### **General Hypothesis:**

The level of technology and digitization usage among primary school principals is moderate.

##### **Specific Hypotheses:**

1. There are gender- related statistically significant differences in technology usage among principals, with a bias towards males.
2. There are statistically significant differences in technology usage favoring principals with ten or more years of professional tenure.
3. There are statistically significant differences in technology usage favoring principals with doctoral degrees.

### **Research Objectives:**

- To quantify the level of technology and digitization usage among primary school principals.
- To determine if there are significant gender-based differences in the usage of technology and digitization.
- To determine if there are significant differences in technology and digitization usage among primary school principals based on professional tenure.
- To leverage study findings to propose targeted training programs for primary school principals.
- To determine if there are significant differences in technology and digitization usage among primary school principals based on academic qualifications.

### **Research Significance:**

- Leverage the study's findings to design training programs that enhance technological competencies and address the actual needs of primary school principals.
- Emphasize the importance of adopting and mastering foundational technological skills.
- Provide clear, data-driven insights to policymakers on the training needs of school principals within the context of technology and digitization.
- Raise awareness among school principals about the critical role of technology and digitization in modern education.

### **Operational Definitions**

- **Training Needs:** The gap between current and desired performance levels, identified as a fundamental step in the training process. It is measured based on the principals' responses to the questionnaire.
- **Technology and Digitization:** Technology encompasses the tools, techniques, and software that facilitate various tasks, while digitization refers to the conversion of paper-based information into electronic formats. The extent of their use is assessed through the principals' questionnaire responses, with scores ranging between 3 and 45.

- **Primary School Principal:** A professional with a specified academic qualification and at least five years of experience who has passed the competitive exam for a primary school principal position.

## I. Theoretical Framework

Technology, as defined by Donald Bell, involves the systematic organization of human experience through logical, efficient methods, harnessing environmental forces for human benefit.

Principals can employ technology in two primary domains: administration and educational supervision (Al-Amayreh, 2015).

Administrative Domain:	Supervisory Educational Domain
<ul style="list-style-type: none"><li>• Managing student affairs and ensuring effective administrative processes.</li><li>• Overseeing the organization and development of teaching staff and other personnel.</li><li>• Structuring and optimizing educational communication and interaction.</li><li>• Strengthening professional relationships among members of the educational team to foster collaboration and cohesion.</li></ul>	<ul style="list-style-type: none"><li>• Establishing an efficient system for monitoring and evaluation.</li><li>• Facilitating the professional development and training of teachers.</li><li>• Enhancing and enriching the curriculum to align with educational goals.</li><li>• Implementing continuous and effective staff performance evaluations within the school.</li></ul>

## II. Field Study Procedures

This section outlines the methodology, sample, research instrument, and statistical methods used to test the study's hypotheses.

### Methodology:

The study adopts a **descriptive research design**, appropriate for achieving the objectives and addressing the nature of the investigation.

**Study Population and Sample:**  
The research sample consisted of 55 principals (male and female) from primary schools in the

wilayas of Saïda and El Bayadh. A simple random sampling technique was adopted to ensure representativeness of the sample, which is detailed in the subsequent distribution table.

**Table 1: Sample Distribution by Gender, Professional Seniority, and Academic Qualification**

Study Variables	Categories	Frequency	Percentage
Gender	Males	42	76.36%
	Females	13	23.63%
Professional Tenure	0–5 years	4	7.27%
	6–10 years	2	3.63%
	More than 10 years	49	89.09%
Academic Qualification	Bachelor's Degree	41	74.54%
	Master's Degree	12	21.81%
	Doctorate	2	3.63%
Total		55	100%

Table 1 indicates that male principals constitute 76.36% of the sample (42 individuals), while female principals account for 23.63% (13 individuals), illustrating a significant gender disparity in favor of males. Furthermore, the breakdown of professional tenure reveals that a small minority, 7.27%, have 0-5 years of experience (4 individuals), 3.63% have 6-10 years of experience (2 individuals), and a predominant 89.09% possess more than ten years of experience (49 individuals).

### **Research Instrument Description:**

The questionnaire, developed based on the researchers' expertise and a review of relevant literature, consisted of 15 positively formulated items. The response scale was structured as follows: 1 (to a great extent), 2 (to a moderate extent), and 3 (to a slight extent).

### **Psychometric Properties of the Instrument:**

#### **1. Content**

#### **Validity:**

The instrument was evaluated by a panel of five experts (professors and specialized inspectors) to ensure the appropriateness of the items in measuring the targeted

constructs and their clarity. Based on their feedback, minor linguistic adjustments were made. The consensus of 90% of the experts affirmed the validity of the instrument.

## 2. Internal

## Consistency:

Pearson's correlation coefficient was used to examine the internal consistency of the instrument, measuring the correlation between each item and the total score. The results are detailed in Table 2.

**Table 2: Pearson Correlation Coefficients Between Items and Total Score**

Item Number	Correlation Coefficient	Significance Level (p-value)
01	0.088	Not significant (NS)
02	0.400	0.05*
03	0.536	0.01**
04	0.466	0.01**
05	0.717	0.01**
06	0.611	0.01**
07	0.327	0.05*
08	0.293	Not significant (NS)
09	0.696	0.01**
10	0.600	0.01**
11	-0.17	Not significant (NS)
12	0.312	0.05*
13	0.369	0.05*
14	0.344	0.05*
15	0.304	0.05*
16	0.643	0.01**
17	0.490	0.01**
18	0.263	Not significant (NS)
19	0.107	Not significant (NS)
20	0.515	0.01**

**Key:**

- **NS:** Not Significant
- **\***: Significant at  $p < 0.05$
- **\*\***: Highly significant at  $p < 0.01$

Items 01, 08, 11, 18, and 19 did not reach statistical significance and were thus excluded from further analysis, while the remaining items demonstrated significant correlations.

### **Instrument**

Reliability was tested using Cronbach's alpha coefficient.

### **Reliability:**

**Table 3: Cronbach's Alpha for Instrument Reliability**

<b>Number of Items</b>	<b>Cronbach's Alpha</b>
15	0.786

The Cronbach's alpha score of 0.786 indicates satisfactory reliability, making the instrument suitable for this study.

### **Implementation Procedures and Data Analysis**

Upon the validation of the instrument's reliability and validity, the questionnaire was distributed to a sample of primary school principals in the Saïda and El Bayadh wilayas. Out of 67 distributed questionnaires, 55 were successfully retrieved and subjected to statistical analysis using SPSS version 22.

### **Statistical Methods:**

The study employed quantitative analytical techniques to explore the hypotheses, using calculations of arithmetic means and standard deviations, and performing inferential statistics such as the independent samples t-test and one-way ANOVA to evaluate the significance of observed differences.

### Results and Discussion:

The central hypothesis of the study posited that the usage level of technology and digitization among primary school principals is moderate. This hypothesis was examined by calculating the arithmetic means and standard deviations for responses related to the use of contemporary technologies and digital tools. The results are presented in scaled categories, reflecting the intensity of usage:

- [0.66-1.00]: Low usage
- [1.67-2.33]: Moderate usage
- [2.34-3.00]: High usage

**Table 4: Descriptive Statistics for Questionnaire Items**

Item No.	Questionnaire Item Description	Mean	Standard Deviation	Usage Level
01	Encouragement of technological tool use in educational processes	1.68	0.429	Moderate
02	Identification of school needs through computer applications	1.70	0.660	Moderate
03	Communication with teachers and parents via email	2.16	0.714	Moderate
04	Provision of modern technologies to school administration	1.69	0.717	Moderate
05	Electronic management of student data	2.67	0.546	Low
06	Availability of data projection devices in the school	2.07	0.900	Moderate
07	Learning basic principles of artificial intelligence	1.95	0.780	Moderate
08	Hosting meetings via platforms such as Zoom or Google Meet.	2.34	0.678	Low
09	Use of technology for educational sector updates	1.81	0.584	Moderate

10	Applying technology in managing and organizing school finances.	2.53	0.766	Low
11	Mastering the use of antivirus software for computers.	1.76	0.816	Moderate
12	Implementation of surveillance cameras in school	2.93	0.378	Low
13	Provision of internet access across school classrooms.	2.25	0.775	Moderate
14	Establishment of a tech-equipped facility for students with special needs	2.65	0.673	Low
15	Application of ChatGPT for translating significant communications	2.62	0.707	Low
<b>Overall Instrument Score:</b>		<b>32.81</b>	<b>10.123</b>	Moderate

The average score across the instrument was 32.81 with a standard deviation of 10.123, indicating a spectrum of moderate to low technology and digitization usage among the principals. The low usage levels in certain areas may reflect a scarcity of technological resources and infrastructure in Algerian primary schools. Principals reported a critical need for autonomous budgeting and reduced reliance on municipal services to enhance the provision of technological resources. Conversely, moderate ratings in several areas underscore the principals' efforts to adopt and integrate technological advancements, recognizing their significant role in enhancing educational processes and faculty communication.

These results align with Al-Anzi's (2022) findings, which noted a moderate degree of technology integration in Kuwaiti school administration as perceived by educators. However, they diverge from Bakri's (2024) findings, which indicated higher levels of information technology usage from teachers' perspectives.

### **Presentation and Discussion of the First Hypothesis:**

The first hypothesis posits that there are statistically significant differences in the use of technology and digitization among primary school principals based on gender. The results of the t-test are presented in Table 05.

**Table 05: T-test Results for Gender Differences in Technology and Digitization Use**

Gender	Sample Size	Mean	Standard Deviation	T-value	Degrees of Freedom	Significance (p-value)	Significance Level
Males	42	31.76	5.131	0.883	53	0.381	0.05
Females	13	30.31	5.376				

The mean score for males is 31.76 with a standard deviation of 5.131, while the mean for females is 30.31 with a standard deviation of 5.376. The t-value of 0.883, with 53 degrees of freedom, and a significance level of 0.381 ( $p > 0.05$ ), indicates no statistically significant differences in the use of technology and digitization between male and female principals.

This result implies that both male and female principals employ technology and digitization within the limits of the resources available to them. Consequently, it is essential for policymakers to provide the necessary tools and resources to support principals in their responsibilities. The respondents highlighted that implementing modern systems in schools requires significant time and financial investment, which places a considerable burden on the state budget, particularly when aiming to extend these technologies across all Algerian schools. Algeria remains behind in scientific and technological advancements, especially with the emergence of artificial intelligence, which has permeated various fields. Therefore, equipping school leaders with the appropriate technological skills is crucial for improving educational outcomes.

This finding is consistent with the study by Beni Said (2022), which found no statistically significant gender differences in principals' competencies in educational technology from the perspective of teachers. However, it contrasts with the study by Afouna and Jalad (2021), which identified statistically significant differences in the role of school principals in implementing digitization policies based on gender.

### **Presentation and Discussion of the Second Hypothesis:**

The second hypothesis asserts that there are statistically significant differences in the use of technology and digitization among primary school principals based on professional tenure. The one-way ANOVA results for this hypothesis are shown in Table 06.

**Table 06: One-way ANOVA Results for Professional Seniority Differences in Technology and Digitization Use**

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F-value	Significance (p-value)	Significance Level
Between Groups	80.423	2	40.211	1.530	0.226	0.05
Within Groups	1366.959	52	26.288			
Total	1447.382	54				

The analysis of variance (ANOVA) revealed an F-value of 1.530 with a significance level (p-value) of 0.226. The sum of squares between groups was 80.423, while within-group variance was 1366.959, with 54 degrees of freedom. Since the p-value (0.226) is greater than the significance threshold of 0.05, we accept the null hypothesis, indicating no statistically significant differences in the use of technology and digitization among primary school principals based on professional tenure.

This result signifies that tenure does not markedly influence the implementation of digitization and technological initiatives. Both seasoned and newly appointed principals demonstrate comparable engagement with these modern technologies, endeavoring to enhance and advocate their use within their scope of expertise. Nevertheless, they face substantial barriers, including insufficient financial incentives, underdeveloped infrastructure, technical challenges, and a lack of proficiency in computer and network management. Therefore, it is crucial for principals to prioritize technological education and digitization to bolster institutional support and streamline operational processes, thereby fostering leadership and growth both personally and within the educational sector.

This finding aligns with the research conducted by Ben Khalid (2023), which observed no significant differences in the use of technological innovations among principals, attributed to

varying levels of professional experience. Additionally, the study by Sukkar and Abu Haya (2021) corroborates this outcome, noting no significant differences in the application of digital leadership standards by UNRWA school principals in Gaza, as perceived by teachers, relative to their years of service.

### **Presentation and Discussion of the Third Hypothesis:**

The third hypothesis states that there are statistically significant differences in the use of technology and digitization among primary school principals based on their academic qualifications. The one-way ANOVA results for this hypothesis are presented in Table 07.

**Table 07: One-way ANOVA Results for Academic Qualification Differences in Technology and Digitization Use**

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F-value	Significance (p-value)	Significance Level
Between Groups	309.504	2	154.754	7.072	0.002	0.05
Within Groups	1137.878	52	21.882			
Total	1447.382	54				

The analysis of the data reveals an F-statistic of 7.072 with an associated p-value of 0.002, which falls significantly below the conventional significance threshold of 0.05. This result indicates that differences in the use of technology and digitization among primary school principals are statistically significant, with educational qualifications playing a critical role. The between-groups sum of squares totaled 309.504, whereas the within-groups sum of squares registered at 1137.878, distributed over 54 degrees of freedom. The statistically significant result, particularly favoring those principals holding a bachelor's degree, points to a notable difference based on educational attainment. To further explore the direction and magnitude of these differences, a Scheffé post-hoc analysis was performed. The findings from this test are detailed in the subsequent table, providing a clearer understanding of the comparative impact of different educational qualifications on technology use in educational leadership.

**Table 08: Scheffe Post-Hoc Test for Academic Qualification Differences in Technology and Digitization Use**

Significance value)	(p-value)	Standard Error	Mean Difference	Academic Qualification	Total Score
0.009	0.006	1.535	4.183*	Bachelor's - Master's	Bachelor
		3.387	9.683*		
0.009	0.130	1.535	-4.183*	Bachelor's - Doctorate	Master
		3.573	5.500		
0.006	0.130	3.387	-9.683*	Doctorate - Master's	PhD
		3.573	-5.500		

The post-hoc analysis using Scheffe’s test indicates significant differences in technology and digitization use among primary school principals based on their educational qualifications, favoring those with a bachelor's degree. The results suggest that principals with a bachelor's degree demonstrate a more effective understanding and application of digital tools compared to their counterparts with a master's or doctoral degree.

These findings emphasize the critical role of educational qualifications in shaping the technological competencies of school leaders. Principals with bachelor's degrees appear more adept at using digital technologies. However, the results also highlight the need for more structured guidance and support in integrating technology across all educational levels, as efforts by the Ministry to provide comprehensive training have been insufficient in fully addressing the challenges of effective digitization within schools.

These results align with the findings of Abu Rabie (2015), who identified statistically significant differences in principals' awareness of the importance of educational technology, based on their academic qualifications. Conversely, the findings diverge from those of Ahmed (2020), which reported no significant differences in the role of school administration in promoting the use of educational technology in public schools based on academic qualifications.

**Conclusion:**

The study concludes that the use of technology and digitization among primary school principals is generally moderate. Furthermore, no statistically significant differences were found in technology use based on gender or professional tenure. However, significant differences were identified based on academic qualifications, with bachelor's degree holders demonstrating higher proficiency. These findings highlight the critical role of school principals in the success of educational processes, as well as the importance of providing them with effective training and development opportunities to keep pace with technological advancements. The integration of modern technologies can significantly enhance principals' competencies, thereby contributing to improvements in their overall performance and advancing educational quality.

### **Recommendations:**

- Empower school principals with the skills needed to effectively implement technology in educational settings.
- Advocate for the allocation of resources to keep up with technological advancements and integrate modern tools to enhance the education sector.
- Develop targeted training programs that encourage principals to adopt and use technology in their leadership roles.
- Integrate IT specialists into Algerian schools to address technological issues and improve digital infrastructure.
- Strengthen school infrastructure to support the implementation of modern technologies.
- Ensure the provision of essential technological equipment, including internet access, in primary schools.
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