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Technological Leadership In Public Education Schools In The Eastern Province Of The Kingdom Of Saudi Arabia

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Abstract:

The aim of the study was to examine the extent to which technological leadership is practiced in public schools in the Eastern Province and identify the main obstacles faced by public school leaders from the point of view of educational supervisors. The study followed the descriptive-survey approach. Aquestionnaire was used to collect data from the study sample of 305 supervisors in public education offices in the Eastern Province. The results of the study showed that the degree to which public school leaders of in the Eastern Province practice technological leadership was average. The main obstacles are the lack of adequate financial support for the transition towards technological leadership, the lack of information technology infrastructure in schools, and the lack of technology skills among school leaders.

Keywords: Technological Leadership,Public Schools , Educational Supervision.

Introduction:

In light of the rapid changes in educational sectors, educational systems have become more concerned withthe process of improvement and development in order to achieve some degree of adaptation to these changes. Interest ininformation and communication technology hasincreased inthe search for best practices that contribute to meeting the needs of organizations and improving their performance, ensuring efficiency and excellence. This has led these organizations to pay attentionto enhancing the capacity of their leaders in the use of technology to ensure that they keep pace with technological developments. The Ministry of Education (MoE) is working to develop the performance of schools in line with the ambitious Saudi Vision 2030.

According toEren& Kurt (2011), although there is no clear and specific definition of the role of school leaders as technological leaders, the responsibility of school leaders to apply, promote and use technology at school cannot be ignored in response to the increasing expectations of students and parents for change in the teaching-learning process (p.630).

Dexter (2011) emphasized that technologicalleadership is all activities and practices related to technology in the school environment, including organizational decisions, policies, and technological applications at school (p.170).Raman, Don & Kasim (2014) describe it as thetechniques and methods used by educational leaders to influence and motivateteachers'use of technology in classrooms and through which the role of the educational leader is to monitor the performance of teachers within the school to ensure that they use the technology available and that students make good use of technology in a way that contributes to increasing their effectiveness and improvingtheir education (PP.30-31).

Consequently, technological leadership in schools can be defined asthe ability of the school leader to use and employ technologyin school leadership processes to ensure influencing school staff toensure that they usetechnology in a way that contributes to achieving the desired goals.

Standards of technological leadership in education:

The International Society for Educational Technology (ISTE, 2001) has established eight standards of technological leadership in education, which are listedin Williamson &Redish (2009) as follows:

1. Technologyoperations and concepts: Technological leaders demonstrate an in-depth understanding of different digital operations and processes.
2. Designing and planning of educational environments andexperiences: Educational leaders plan effective educational environments and provide models and complex experiences based on the use of technology.
3. Teaching, education, and curriculum: Technological leaders provide models, design, and disseminate plans that include methods and strategies to apply technology to maximize student learning.
4. Evaluation and assessment: Technological school leaders keep up with modern research on the use of technology to implement and adopt effective evaluation and assessment methods.
5. Productivity and professionalpractice:Technological leaders design, develop, evaluate, and model technology-based products to improve and enhance productivity and professional practice.
6. Social, ethical, legal, and human issues: Educational leaders work to communicate and collaborate with their fellow leaders, as well as parents and the surrounding community topromote student learning.
7. Procedures,policies, planning and budgeting of technology environments: Educational leaders coordinate the development and direct implementation of technological infrastructure procedures, policies, plans and budgets of the schools in which they work.
8. Vision and leadership: Educational technology leaders contribute to the development of a shared vision to integrate technology into the school environment and promote the environment and culture that will contribute to this vision(PP.25-60).

In this study, the researchers were limited to four standards for technological leadership, i.e., "designing and planning educational environments and experiences", "learning and teaching", "productivity and professional practice", and "evaluation and assessment" with regard to the technological leadership in the field of education, what the leader possesses in its implementation, and its relationship tohis main work. When examining the standards, it became clear for the researchers that the standard of"designing and planning educational environments and experiences" is similar to the standard of "vision and leadership"in that the technology leader has a long-term vision for the implementation of technology at school. This results from engaging all concerned individuals in the process of using technology.

The roles of school leaders in the light of technological leadership:

Flanagan & Jacobsen (2017) proposed a framework to clarify the responsibilities and roles of the school leader within the domains of technological leadership. Five leadership roles were developed. These roles are related to achieving the same goal of integrating ICT, as follows:

1- Leader ofLearning: By encouraging teachers to think about and develop their practicescontinuously, providing meaningful educational opportunities for all teachers, students, support staff and parents, improving the ability of students to solve problems, collaborating and using technology to support knowledge-building.

2- Leader of StudentEntitlement: The leadertakes care of important issues related to equal access to technology for all students. This includes ensuring that each teacher provides information in an equal way, appropriate for the students' age, development, and technological skills.

3. Leader of Capacity Building: School leaders build the capacity of students. This role is one of the most important rolesof the leader in the field of education.

4. Leader of Community: School leaders are community leaders, which means that school leaders have key objectives such as involving all stakeholders in society, including parents and businessmen, and achieving the goals of technological integration.

5. Leader of Resource Management: Theschool leader takes care of resource management.The leader is responsible for managing the resources needed for technology integration. This includes setting spending priorities, which directly supports the objectives of the school's technology application plan. (p.126)

Considering the importance of technological leadership in public education institutions, researchers' interest wasdirected towards the study of technological leadership in educational institutions.Aghbry and Melhem (2020) concluded that public schools leader in Al-Ahsa, Saudi Arabia, agreed to a high degree that public schools leader practice technological leadership with regard tothe standards of"learning and teaching", "productivity and professional practice", "support, management and operations", and

"evaluation and assessment", and to an average degree with regard to thestandards of"vision and leadership", and "social, legal and ethical issues".

Subaie and Shehri (2019) found that the practice of e-leadership by female government secondary school leaders in Riyadh was high. The results of the study also showed that school leaders were interested in the availability of a number of requirements necessary for the application of e-leadership in their schools, i.e., technical requirements, financial requirements, human requirements, and administrative requirements.

According to Sharman and Khattab (2018) the degree to whichhigh school principals in Amman practice technological leadership was averagefrom the point of view of teachers. There was a positive statistically significant correlation between the degree to which high school principals practice technological leadership and the degree of change leadership in their schools.

Thannimalai& Raman(2018) conducted a study at national secondary schools in Kedah Province, Malaysia. They emphasized that the level of technological leadership among Keda High School principals was high. Technology waslargely integrated into education. There was a statistically significant correlation between the technological leadership of school principals and the integration of technology in the classroom. Professional development had an important influence on the relationship between technological leadership and the integration of technology in the classroom.

Flanagan & Jacobsen (2017) showed that the role of school principals in Alberta, Canada,was crucial in ensuring fair access to technology for all. The introduction of digital technology into schools increased the responsibilities of school principals in several aspects, including the skills that principals must have and their workload inside the school.

The study of Curnyn (2013) found that the level of application of technological leadership was average in the domain of the common vision of the importance of applying technological leadership among all school personnel. School principals showed a high level in applying technological leadership to increase their leadership productivity and the productivity of other school personnel.

Based on the earlier review of studies in the field of technological leadership, it was noticed that there was a dearth of studies exploring technological leadership, particularlyregarding its practice by public schoolleaders. Therefore, thepurpose of the current study was to identify the reality of technological leadership practice in public schools In the Eastern Provincein Saudi Arabia and the main obstacles faced bypublic school leaders from the point of view of educational supervisors.

Statement of the problem:

Educational institutions face challenges and rapid changes requiring effective leadership, which has the capacity to deal with changes and challenges resulting from accelerated development in today's world.Therefore, Kor, Erbay&Engin(2016) confirmed that educational administrators must play critical roles in keeping pace with

technological development and education management, requiring practicing technological leadership in reality. Flanagan & Jacobsen (2017) also indicated that school principals have a duty to provide a vision for the implementation of technology within the school environment, as they are technologicalleaders whomust develop all sectors within the school technologically. This will increase the responsibilities of school principals in many ways, including the skills that these principals must haveand their workload inside the school. The findings of the study of Weng & Tang (2014) confirmed that the use of technological leadership would help the school system to increase productivity, improve the quality of the educational product, and increase the efficiency of the teacher, and that the focus should not be solely on obtaining technological tools, but teachers and administrators should be trained to make use of this technology in decision-making and in the search for and use of information in the educational process.

In the context of Saudi Arabia, the results of the study of Seif (2018) indicated that the capacities of public schoolleaders in Dammam and Al-Khobar in the practice and application of technological leadership standards was generallyaverage. The study of Juhani (2018) was conducted on all education directors and assistants, in addition to a purposive sample of directors of education departments in the Kingdom of Saudi Arabia, to explore the reality of the application of technological leadership in support and management, as well as productivity, professional practice and evaluation. Their responses were varied, and most of them disagree.

Therefore, spreading the technology culture within the school has become an essential requirement for leading schools at the level of leadership and teachers, as well as for the protection of students and directing them towards optimal use when dealing with technology. This corresponds the Ministry of Education's efforts towardsachieving Saudi Vision 2030 of promoting digital transformation and contributing to the development of awareness of information security in all schools by training school leaders, teachers and students.

Through reviewing theoretical literature and previous studies in the field of technological leadership, it was noted that there was a dearth of studies on technological leadership, particularly with regard to its practice by public schoolleadersand the main obstacles to its practice. Thus, this study seeks to reveal the reality of thetechnological leadershippractice in public schools in the Eastern Province and to identify the main obstacles from the point of view of educational supervisors.

Research questions:

1- To what degree do public school leaders practice technological leadership from the point of view of educational supervisors in the Eastern Province?
2- What are the main obstacles that face public school leaders when practicing technological leadership from the point of view of educational supervisors in the Eastern Province?
3- Are there statistically significant differences between the responses of the participants about the degree to whichpublic school leaders practice

technological leadership in the Eastern Province due to differences in the variables of gender and educational qualification?

Study Objectives:

1. To identify the degree to which publicschool leaders practice technological leadership from the point of view of educational supervisors in the Eastern Province.
2. To identify the main obstacles that face public school leaders in the Eastern Province when practicing technological leadership from the point of view of educational supervisors in the Eastern Province.
3. To identify statistically significant differences in the estimates of educational supervisors of the degree to whichpublic school leaders in the Eastern Province practicetechnological leadership due to variables of gender and educational qualification.

Significance of the Study:

It is hoped that the results of the study will contribute to the development of the performance of public school leaders by identifying the reality of their technological leadershippractice, enhancing strengths, avoiding flaws in the light of technological leadership standards,and providing recommendations and proposals that help to implement and activate technological leadership in public schools in the Eastern Province of SaudArabia andprovide a practical methodology that benefits educational leaders in their leadership of future schools in a way that enables them to upgrade their schools.

Limitations of the study:

Topic Limitation: The study was limited to the topic of technological leadership in four domains, i.e.,"design and planning of environments and educational experiences", "learning and teaching", "productivity and professional practice", and "evaluation and assessment".
Time Limitation: Thestudy was conducted during the second semester of the school year 2019/2020.
Space Limitation: The study was applied to the offices ofpublic education for boys and girls in theEastern Province.
Human Limitation: It was applied to all supervisors in the offices of public education in theEastern Province.

Study Terminology:

Technological leadership means procedurally: the ability of the school leader to influence the school's employees in technology use and its application in school work to ensure that the objectives are achieved.

METHODOLOGY AND PROCEDURES

Methodology: Considering the objectives ofthe study, the Descriptive Survey approach wasusedbycollecting and analyzing the data of the research problem using a questionnaire applied to the supervisors of public education offices in the EasternProvince.

Population and Sample: The population of the study consisted of all educational supervisors, male and female, in public education offices in the Eastern Province, numbered(305) according to the statistics of the Department of Educational Supervision in the General Directorate of Education in the Eastern Province for the year 2019/2020.

The instrument was distributed online to all members of the study population using the Complete Census method. The authors received (165) valid questionnaires representing (54%) of the total study population. The following table provides description of the characteristics of the participants of the study according to the primary data as follows:

Table 1 Breakdown of study individuals according to their primary data

Variables	Category	Number	Percentage
Sex	Male	79	47.9
	Female	86	52.1
AcademicQualification	Bachelor	136	82.4
	Postgraduate	29	17.6
	(5) - (10) years	65	39.4
	More than (10) years	71	43.0
Total		165	100.0

Instrument

Based on the nature of the study subject and the approach used, the authors found that the most appropriate instrument to achieve the objectives of this study is "the questionnaire."

Table 2 Breakdown of categories according to the gradient used in the study tool

Description of the Degree of Practice	Description of the Degree of Obstacle	Mean Ranges
Very high	Very high	4.21 – 5.00

High	High	3.41 – 4.20
Medium	Medium	2.61 – 3.40
Low	Low	1.81 – 2.60
Very low	Very low	1.00 – 1.80

Validity of the instrument : The questionnaire wasvalidatedthrough the following:

I. Face validity of instrument (validity of the expert panel): After finishing the construction of the instrument, itwasdistributed to a number of experts.Seven experts in educational management responded, and their view were used for guidance.

II- Internal consistency of the instrument: After confirming the facevalidity of the study tool, the authors applied it in the field to an exploratory sample of 30 individuals. The Pearson correlation coefficient was calculated to determine theinternal consistencyof the questionnaire. The correlation coefficient between the degree of each item in the questionnaireand the total degree of the domainof the itemwas calculatedas in tables 3, 4, 5, and 6:

Table 3 Correlation coefficients between the items of the first axis of "the degree of technological leadership practice in public schools in the Eastern Province"and the total score of the domain
(exploratory sample: n = 30)

Domain	S.	Correlation coefficients	S.	Correlation coefficients	S.	Correlation coefficients
Design and planning of educational environments and experiences	1	0.8563**	3	0.8324**	5	0.8601**
	2	0.9544**	4	0.9441**		
Learning and teaching	1	0.7843**	3	0.9039**	5	0.8720**
	2	0.8232**	4	0.8720**	6	0.8333**
Productivity and professional practice	1	0.8511**	3	0.8185**	5	0.8836**
	2	0.8912**	4	0.9151**	6	0.8396**
Evaluation and assessment	1	0.8980**	3	0.8981**	5	0.9144**
	2	0.9431**	4	0.9442**		

** Significant at 0.01

Table 3 shows that all the items are statistically significant at the level of (0.01). The values of the correlation coefficients for "designing and planning environments and educational experiences" ranged between (0.8324) and (0.9544). The values of the correlation coefficients for "learning and teaching"ranged between (0.7843) and (0.9039). The values of the correlation coefficients for "productivity and professional practice" ranged between (0.8185) and (0.9151). The values of the correlation coefficients for "evaluation and assessment" ranged between (0.8980) and (0.9442).

This indicatessufficient validity that can be relied on to apply the questionnaire to the study individuals.

Table 4 Correlation coefficients between the items of the first axis of"the degree of technological leadership practice in public schools in the Eastern Province"and the total score of the axis
(exploratory sample: N=30)

Design and planning of educational environments and experiences		**Learning and teaching**		**Productivity and professional practice**		**Evaluation and assessment**	
S.	Correlation coefficients	S.	Correlation coefficients	S.	Correlation coefficients	S.	Correlation coefficients
1	0.8109**	1	0.7624**	1	0.7298**	1	0. 8312**
2	0.8032**	2	0.7567**	2	0.8212**	2	0. 8510**
3	0.7497**	3	0.8043**	3	0.6796**	3	0. 8238**
4	0.8209**	4	0.8290**	4	0.8934**	4	0.8885**
5	0.7367**	5	0.7924**	5	0.8659**	5	0.8510**
		6	0.8205**	6	0.8382**		

** Significant at 0.01

Table 5 Correlation coefficients between the domains of the first axisof "the degree of technological leadership practice in public schools in the Eastern Province" and the total score of the axis
(exploratory sample: N=30)

Domain	**Correlation coefficients**
Designing and planning of educational environments and experiences	0.8777**
Learning and teaching	0.9356**
Productivity and professional practice	0.9259**
Evaluation and assessment	0.9239**

** Significant at 0.01

Tables 4 and 5 show that all items and domains are significant at the level of (0.01). The correlation coefficients for the domain of the axis of "technological leadership" ranged between (0.9356) and(0.8777). This indicates high coefficients of internal

consistencyand high validity that issufficient and can be relied on when applying the study.

Table 6 Correlation coefficients between the items of the second axis of "obstacles to the technologicalleadership practice in public schools in the Eastern Province" and the totalscore of the axis
(exploratory sample: N=30)

S.	Correlation coefficients	S.	Correlation coefficients	S.	Correlation coefficients
1	0.7664**	4	0. 7614**	7	0. 6977**
2	0.7985**	5	0. 6748**	8	0. 8248**
3	0. 8671**	6	0. 6634**	9	0. 8436**

** Significant at 0.01

Table 6 shows that all items are significant at the level of (0.01). The correlation coefficients of the axis of "obstacles to technological leadership in public schools in the Eastern Province" ranged between (0.8671) and 0.6634). This indicates high internal consistency coefficients, as well as high validity that issufficient and can be relied on when applying the study.

Consistency of the instrument

The consistency of the study tool was measured using the consistency coefficientof Cronbach's alpha. Table 7 shows the consistency coefficient of the study tool. These values were considered appropriate for the purposes of this study as indicated in the following table.

Table 7 Consistency coefficients of Cronbach's alphafor the study domain and axes
(exploratory sample: N=30)

Domain/Axis	Number of items	Consistency coefficients of Cronbach's alpha
Designing and planning of educational environments and experiences	5	0.93
Learning and teaching	6	0.92
Productivity and professional practice	6	0.93
Evaluation and assessment	5	0.95
Axis 1: The degree of technological leadership practice in public schools in the Eastern Province	22	0.97
Axis 2: Obstacles to technological leadership practice in public schools in the Eastern	9	0.91

Province		

Table7 shows that the questionnaire had statistically acceptable consistency. The value of the totalconsistency coefficient for the axis of technological leadership practice was (0.97), while the consistency coefficients for the axis of obstacles to the technological leadership practice was (0.91). All of them were good consistency coefficients that can be relied on in the application of the present study.

Results and Discussion

Answer to Question 1: To what degree do public school leaders in the Eastern Province practice technological leadership from the point of view of educational supervisors?

To answer this question, arithmetic means and standard deviation were calculated for the responses of the participants regarding the degree to which public school leaders in the Eastern Province practice technological leadership in the domains of "designing and planning of educational environments and experiences", "learning and teaching", "productivity and professional practice", and"evaluation and assessment". The following is a presentation of the results of the domains of technological leadershipordered according to the degree to which it is practiced by public school leaders in the Eastern Province, as shown in Table 8:

Table 8 Arithmetic means and order ofthe domains of technological leadership according to the degree to which it is practiced by public school leaders of in the Eastern Province from the point of view of educational supervisors

Domains	Arithmetic Mean	Standard Deviation	Order	Degree of Practice
Design and planning of educational environments and experiences	**3.11**	**0.71**	**3**	**Medium**
Learning and teaching	**3.24**	**0.63**	**1**	**Medium**
Productivity and professional practice	**3.08**	**0.70**	**4**	**Medium**
Evaluation and assessment	**3.12**	**0.76**	**2**	**Medium**
Total score of technological leadership practice	**3.14**	**0.62**	**Medium**	

Table 8 shows that all domains of the axis of technological leadership by public school leaders in the Eastern Province had an"average"scorewith an arithmetic mean of (3.14) and a standard deviation of (0.62). In the first place was the domain of "learning and teaching" with an arithmetic mean of (3.24) and a standard deviation of (0.63), followed by the domain of "evaluation and assessment" in second place with an arithmetic mean of (3.12) and a standard deviation of (0.76). In the third place was the domain of

"designing and planning of educational environments and experiences" with an arithmetic mean of (3.11) and a standard deviation of (0.71). The field of "productivity and professional practice" ranked fourth with an arithmetic mean of (3.08) and a standard deviation of (0.70). This result may be due to the absence of the concept of technological leadership among school leaders, the lack of awareness and interest among them about the importance of technology in school work and learning and teaching by employing its tools and keeping abreast of recent changes, as well as the weakness of training programs provided to them by public education offices onemploying technology and its role in the leadership process. This requires qualifying them with the skill of analyzing the current situation of the needs of teachers and students and communicating effectively with them through technology. The previous explanation partly agrees with the educational literature that technological leadership are the methods and techniquesused by educational leaders to influence and motivate teachers' use of technology inside classrooms.Here comes the role of the educational leader in following up the performance of teachers at school in order to make sure that they use the technology available and that students benefit well from this technology, thus contributing to increasing their effectiveness and improving their teaching (Raman & Don & Kasim, 2014, PP. 30-31). The results of the current study agree with the results of the study of Juhani (2018), the study ofSaif (2018), and the study of Sharman and Khattab (2018), the results of which showed that the degree of technological leadership practice wasaverage.However, the results of the current study differed with some of the results of the previous studies such as the results of the study of Aghbry and Melhem (2020), the study of Subaie and Shehri (2019), the study of Thannimalai& Raman (2018), and the study of Al-Kardam (2016), the results of which showed that the degree of technological leadership practice was high. The difference may bedue to the difference in the sample, population, and environment of the current study from the previous studies.

Answer to Question 2: What are the main obstacles that face the technological leadership of public schools in the Eastern Province from the point of view of educational supervisors?

To answer this question, the arithmetic means and the standard deviation were calculated for the responses of the study individualswith regard to the degree of the obstacles that face public school leaders in the Eastern Province when practicing technological leadership. The results are presented as in Table (9):

Table 9 Arithmetic means and standard deviation of the responses of the study individualswith regards to the degree of obstacles that facepublic school leaders in the Eastern Province when practicing technological leadership

S.	Items	Arithmetic Mean	Standard Deviation	Rank	Degree of Obstacle
1	Lack of vision and clarity among school leaders in applying the concept of technological leadership.	3.87	0.91	7	High
2	Resisting change by teachers and sticking to traditional teaching methods.	3.88	0.96	6	High

3	Lack of technology skills among school leaders.	4.01	0.87	3	High
4	Poor IT infrastructure in schools.	4.06	0.90	2	High
5	Weak professional development programsdirected towards developing school leaders in technology.	3.93	0.95	4	High
6	Lack of awareness of the importance of applying technological leadership among some school leaders.	3.75	1.04	9	High
7	Lack of adequate mate financialrial support for the transition towardstechnological leadership.	4.12	0.82	1	High
8	Poor moral support for leaders practicing technological leadership.	3.79	0.97	8	High
9	Lack of organizational culture directed towards technological leadership	3.90	0.90	5	High
Overall Mean of the Domain		**3.92**	**0.72**	**High**	

Table 9 shows that educational supervisors' estimates of the obstacles facing technological leadership in public schools in the Eastern Provincewere all "high", with an arithmetic mean of (3.92) and a standard deviation of (0.72).The three mean obstacles ranked in descending order according to the estimates of the supervisors were as follows: Item 7, i.e., "lack of adequate financialsupport for the transition towards technological leadership work", came first with an arithmetic mean of (4.12) and a standard deviation of (0.82) with a "high" degree of approval.This result may be attributed to the fact that educational supervisors agree to a high degree on the lack of financialsupportand its importance in achieving technological leadership, given that the digital transformation recently adopted by the Ministry of Education was not accompanied by the provision of financialallocations commensurate withthe requirements of this transformation.In second place came Item 4, i.e., "poor IT infrastructure in schools" with an arithmetic mean of (4.06) and a standard deviation of (0.90) with a "high" degree of approval. This confirms that the networks and technological devices are the cornerstone of digital transformation in public schools. In third place came Item 3, i.e., "lack of technology skills among school leaders" with an arithmetic mean of (4.01) and a standard deviation of (0.87) with a "high" degree of approval. This may be because the educational leader lacks skills in dealing with technology as a result of the inefficiency ofprograms aimed at developing their skills. This may agree with the previous explanation in the result of the study of Subaie and Shahri (2019), which emphasized the importance of a number of requirements for the application of e-leadership in schools, i.e., technical requirements and financial requirements. The study of Flanagan and Jacobsen (2017) also showed that the introduction of digital technology into schools increased the responsibilities of school principals in several aspects, including the required skills that these principals must have. The previous explanation partly agrees with the theoretical framework referred to by Farag and Jalal (2012) and Lilian (2014) that there are obstacles that limit the application of technological leadership within educational institutions, namely, weak

ability to plan, analyze, and predict the future, weak technology skills, weak information technology infrastructure, insufficient material support to transition towards technology leadership work. This result is consistent with the result of the study of Juhani (2018), which showed that the study individuals strongly agree that there are human, material, and training requirements that must be met to apply e-leadership, and that there are many obstacles to apply e-leadership in education departments.In the last place came Item 6, i.e. "lack of awareness of the importance of applying technological leadership among some school leaders," with an arithmetic mean of (3.75) and a standard deviation of (1.04). This indicates that there are unremitting efforts and interest from the General Directorate of Education in the Eastern Province to apply technological leadership in public schools.

Answer to Question 3: Are there statistically significant differences between the responses of the study individuals about the degree to which public school leaders in the Eastern Provincepractice technological leadership due to the variables of gender andacademic qualification?

To answer this question,thet-test was used to reveal the significance of the differences between two independent groups to identify the differences in the responses of the study individuals about the degree to which public school leaders in the Eastern Province practice technological leadership according to the variable of "gender". The Mann-Whitney test was used to reveal the significance of the differences in the responses of the study sample according to the variable of "academic qualification". The following tables show the results that were reached:

Differences in the responses of study individuals about the degree of technological leadership practice according to gender:

Table 10 t-test for the significance of the differences in the responses of the study individualsabout the degree to which public school leaders in the Eastern Province practice technological leadership according to gender

Domain	Sample Type	Number	Arithmetic Mean	Standard Deviation	t-value	Significance Level	Comment
Designing and planning of educational environments and experiences	Male	79	2.93	0.64	3.34	0.001	Significant at 0.01
	Female	86	3.28	0.72			
Learning and teaching	Male	79	2.99	0.55	5.44	0.000	Significant at 0.01
	Female	86	3.48	0.61			
Productivity and professional practice	Male	79	2.93	0.58	2.71	0.007	Significant at 0.01
	Female	86	3.22	0.78			
Evaluation and assessment	Male	79	2.96	0.63	2.60	0.010	Significant at 0.01
	Female	86	3.26	0.84			
Total score of	Male	79	2.95	0.51	3.95	0.000	Significant

technological leadership practice	Female	86	3.31	0.66			at 0.01

Table 10 shows that t-values are significant at the level of 0.01 in the domains of "designing and planning educational environments and experiences", "learning and teaching", "productivity and professional practice", and "evaluation and assessment", and in the total score of technological leadership practice. This indicates that there are statistically significant differences in the responses of the study sample about the degree to which public school leaders in the Eastern Province practice technological leadership in these domains due to the difference in the type of the sample: (male - female). Those differences were in favor of the female sample (female educational supervisors). This result may be due to females' tendency to technological skills and modern applicationsand their eagerness to practice and provide them at their own expense in their work compared to males.

Differences in the responses of the study individuals about the degree of technological leadership practice according to the different academic qualifications:

Table 11 Mann-Whitney test for the significance of differences in responses of study individualsabout the degree to which public school leaders in the Eastern Province practice technological leadership according to the different educational qualifications

Domain	Scientific Qualification	Number	Average Rank	Total Ranks	Z-value	Significance Level	Comment
Designing and planning of educational environments and experiences	Bachelor	136	85.22	11590.0	1.32	0.186	Not significant
	Postgraduate	29	72.59	2105.0			
Learning and teaching	Bachelor	136	86.68	11788.5	2.19	0.028	Significant at 0.05
	Postgraduate	29	65.74	1906.5			
Productivity and professional practice	Bachelor	136	85.21	11589.0	1.31	0.189	Not significant
	Postgraduate	29	72.62	2106.0			
Evaluation and assessment	Bachelor	136	87.03	11836.5	2.41	0.016	Significant at 0.05
	Postgraduate	29	64.09	1858.5			
Total score of technological leadership practice	Bachelor	136	86.19	11722.0	1.87	0.062	Not significant
	Postgraduate	29	68.03	1973.0			

Table 11 shows that Z-values are not significant in the domains of"designing and planning of educational environments and experiences"and "productivity and professional practice" and in the total score of technological leadership practice.

This indicates that there are no statistically significant differences in the responses of the study individuals about the degree to which public school leaders in the Eastern Province practice technological leadership in these domains due to the different educational qualifications. The study individuals may see designing, planning and communicating effectively with technology as skills associated with an educational leader. Table11 also shows that Z-values are significant at the level of 0.05 in the domains of"learning and teaching" and "evaluation and assessment". This indicates that there are statistically significant differences in the responses of study sample about the degree to which public school leaders in the Eastern Province practice technological leadership in these two domains due to the different academic qualifications of the study individuals.These differences were in favor of the study individuals with a bachelor's degree. This may be due to the interest of the study individuals of educational supervisors in public education offices in the Eastern Province during direct field visits to focus on monitoring teachers' practices inside the classroom. One of its methods is classroom visits. They see the importance of learning, teaching, evaluation, and assessment in technological skills. This is due to the fact that most of the supervisors are subject supervisors, and there fortheir efforts are focused primarily on learning, teaching and evaluation processes.

Recommendations:

Considering the above results, the authors proposed the following recommendations:

1. Improvingthe level of technological leadership in public education in the Eastern Province by holding workshops and training programs for school leaders related to the technological leadership practiceand the use of technology applications in the design of the teaching process.
2. Supporting technological leadership requirements by providing financial support, technical capabilities and internet communication networks in public schools of the Eastern Province.
3. Implementing distance training and professional development for public school staff in the Eastern Province, as well as online practice andlearning communities as part of the domain of productivity and professional practice.

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