Deanship of Scientific Research

The Degree of Practicing Technological Competencies by School Principals in Jordan in the Light of the Standards of the International Society for Technology in Education (ISTE) and its Relation to the Organizational Creativity from their Point of View

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Abstract

Objectives: This study aims to investigate the extent to which school principals in Jordan practice technological competencies in light of the International Society for Technology in Education (ISTE) standards, and to explore their organizational creativity from their perspective. Additionally, the study examined the relationship between technological competencies and organizational creativity.

Methods: Descriptive and correlational methodologies were employed to address the study's questions. The study tools were applied after verifying their validity and reliability on a sample of 331 school principals in Jordan.

Results: The study's results revealed that the degree of practicing technological competencies and organizational creativity was high among the study sample. There was a statistically significant relationship between the practice of technological competencies and organizational creativity, with a Pearson correlation coefficient of (.627), considered moderate.

Conclusions: The study recommends that school principals enhance and develop their technological competencies in accordance with the ISTE standards, as it contributes to improving their organizational creativity, leadership capabilities, and the empowerment of schools, connecting them to the digital world. The study's findings open up avenues for further research on the impact of suggested variables, such as the number of technology-related training courses and the learning environment, whether governmental or private, on the relationship between technological competencies and organizational creativity.

Keywords: Technological Competencies, ISTE Standards, School Principals, Organizational Creativity, Jordan.

درجة ممارسة مديري المدارس في الأردنّ للكفايات التّكنولوجية في ضوء معايير الجمعية الدولية للتكنولوجيا في التعليم (ISTE) وعلاقتها بالإبداع التنظيمي من وجهة نظرهم

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ملخّص

الأهداف: هدفت هذه الدراسة إلى التعرف إلى درجة ممارسة مديري المدارس في الأردن للكفايات التكنولوجية في ضوء معايير الجمعية الدولية للتكنولوجيا في التعليم (ISTE)، ودرجة إبداعهم التنظيمي من وجهة نظرهم. بالإضافة لذلك بحثت في العلاقة بين الكفايات التكنولوجية والإبداع التنظيمي.

المنهجية: تم استخدام المنهجين الوصفي والارتباطي للإجابة عن أسئلة الدراسة. طُبقت أداتي الدراسة بعد التحقق من صدقهما وثباتهما على عينة مكونة من (331) من مديري المدارس في الأردن.

النتائج: أظهرت نتائج الدراسة أن درجة ممارسة الكفايات التكنولوجية كانت مرتفعة، وكذلك درجة الإبداع التنظيمي لعينة الدراسة. وأن هناك علاقة ذات دلالة إحصائية بين ممارسة الكفايات التكنولوجية والإبداع التنظيمي، حيث بلغ معامل الارتباط بيرسون (627.) واعتبر متوسطًا.

الخلاصة: توصي الدراسة مديري المدارس بتعزيز وتطوير كفاياتهم التكنولوجية في ضوء معايير الجمعية الدولية للتكنولوجيا في التعليم (ISTE)، حيث إنها تساهم في تحسين إبداعهم التنظيمي، وكذلك قدراتهم القيادية وتمكين المدارس وربطها بالعالم الرقمي. تفتح نتائج الدراسة المجال لمزيد من الأبحاث حول تأثير المتغيرات المقترحة الآتية: عدد الدورات التدريبية في مجال التكنولوجيا، والقطاع التعلمي سواء الحكومي أو الخاص، على العلاقة بين الكفايات التكنولوجية والإبداع التنظيمي.

الكلمات الدالة: الكفايات التكنولوجية، معايير الجمعية الدولية للتكنولوجيا في التعليم (ISTE)، مديروا المدارس، الإبداع التنظيمي، الأردن.

1 Introduction and Litreature Background

Educational organizations are like other organizations need a leader who can lead the organization with clear vision and dealing with this complicated, dynamic and changeable organization in the digital age, as the success of an organization is influenced and affected by its leader. Living in the 21st century has impacted all our lives and ensuring the effectiveness of the schools is affected by their leadership.

Achieving effective digital transformation cannot take place without the presence of digital leaders and technologists who have a clear vision. They are participants in the transformation process. They lead change, instill digital culture in the organization, and enhance creativity. Reconsidering leadership is one of the most important requirements of the digital age because of its impact on bringing about change (Kazim, 2019). Schools in the 21st century are different from schools that had come before. Given the increase in digitalization, the exponential advances in technology overall, the impact of global economy and the diverse of student body, schools and their principals are facing new demands and challenges. Schools in the 21st century need leaders who can effectively and efficiently lead the change process (Glanz, 2022; Soud, 2021)

The successful deployment of technological projects in schools has also been found to depend on strong school leadership. Introducing and integrating technology into schools for management and/or instruction is a significant responsibility of school principals (Laouni,2023). School Leaders have the capacity to develop a learning environment that is technology-rich to improve student learning through their leadership role as change agents. Information and communication technologies (ICT) integration into K–12 schools can be facilitated by a principal's technology leadership (TL) practices, together with a significant shift in teachers' organizational performance to support this process of technological and cultural transformation (Banoğlu, Vanderlinde, Çetin & Aesaert, 2023).

The effectiveness of the education system and our daily activities have changed as a result of the advancements in internet, communication, and information technology (ICT). These developments have an impact on teaching, learning, and practice and go beyond the management of schools. ICT is a key factor in determining how well a school manages, leads, and teaches its students. ICT has given school administrators the ability to strengthen their crucial role as technical leaders—which is seen as essential to running their institution—through this significant decision (Mohd Tahir, Shi Ping, Atan, Ali & Mohd Yusof, 2021).

According to Okeke (2019), the role of principals has included technology leadership. Principals need to understand their position in promoting technological progress in their schools. Moore (2018) believes that the change in the educational systems is needed to match changes in the labor market, that schools have to work to prepare students with necessary skills that suit these changes, such as problem-solving, critical thinking, communication, cooperation, creativity, and digital innovation, and Moore pointed out the positive impact of digital applications on educational organizations, which is represented in promoting cooperative learning, self-learning, supporting communication between all parties, and improving social relations.

It is required to put in more effort than ever to meet the demands of students because of the quick changes that occur in the political, social, and economic spheres of our globe. Only qualified experts who support schools in continuously adjusting to environmental changes can handle such difficulties. To ensure that students receive an enhanced education and that it remains at the necessary level, educational leaders should be properly trained and assigned to their respective institutions. Along with other resources, schools must have qualified and well-trained leaders in order to fulfill their responsibility to provide students with a high-quality education (Mamo, 2023).

1.1 International Society for Technology in Education (ISTE) standards

International Society for Technology in Education (ISTE) standards are considered as an international vision for the development of education in general, and technical education in the light of these changes and requirements in technology in the digital age (ISTE, 2022). Ayed and Ajrami (2017) stated that the ISTE standards are mostly based on the information and communication technology (ICT) which is considered today as the foundation stone of the development of the educational process in academic and technical programs in general. Given the increasing number of educational institutions all over the

world, well-defined standards are needed as a framework for guiding teaching and learning in the digital age.

The ISTE (2022) Standards provide a thorough road map for the efficient use of technology in classrooms across the world and offer competencies for teaching, learning, and leading with technology in the digital age. The ISTE Standards ensure that using technology for learning can create high-impact, sustainable, scalable, and equitable learning experiences for all learners. The ISTE Standards guarantee that employing technology for learning produces high-impact, sustainable, scalable, and equitable learning experiences for all learners. They are founded on learning science research and built on practitioner experience. Based on the previous discussion, keeping up with the digital transformation for educational institutions is a necessity, which imposes many requirements in today's technological age. To attain sustainability in education, school leaders should possess the ability and know-how to make the best use of digital technology (Jakubik, & Berazhny, 2017; Karakose, Polat & Papadakis, 2021).

The ISTE standards for education leaders as provided by ISTE (2022) is a framework to target the knowledge and behaviors for school leaders (principals) required to guide the learning in the digital age. There are five main standards: the first, equity and citizenship advocate that focus on the use technology to increase equity, inclusion, and digital citizenship practices by modelling digital citizenship and enshrining that both teachers and students have access to the technology ethically and safely. The second, visionary planner that focuses on leaders' role in engaging others in establishing a vision, strategic plan, and ongoing evaluation cycle for transforming learning with technology. The third, empowering leader that focuses on how leaders create a culture where teachers and learners are empowered to use technology in innovative ways to enrich teaching and learning. The fourth, systems designer leaders build teams and systems to implement, sustain and continually improve the use of technology to support learning. The fifth, connected learner which means that the leader model and promote continuous professional learning for themselves and others to remain up to date with the emerging technologies to lead the continuous improvement on how technology can improve learning.

1.2 Organizational Creativity

Organizational creativity is crucial for optimal performance, impacting new idea production and innovation activities, and is increasingly a concern for stakeholders (Ferreira, Coelho & Moutinho, 2020). Organizational creativity plays a very important role in the process of organizational change, process effectiveness and ability to survive and competition. Organizational changes including improvements and enhancements (changes from what has been done) are the true outcomes of organizational creativity. Without creativity, organizations may struggle to respond to changes that occur both inside and outside of their walls (Rumanti, Rizana & Achmad, 2023).

Organizational creativity can be defined as the development of innovative ideas, products, services, methods, or processes that are valuable and advantageous for an organization (Sutanto, 2017). Organizational creativity is essential for survival and growth in a rapidly changing environment, encompassing individual and collective activities, environment, and knowledge creation (Rumanti, Rizana, & Achmad, 2023).

Also, Organizational creativity is known as an organized way to perform tasks, whether it is inside or outside the institution, and it is bringing about change and improvement in the practices of the institution and its management, where new methods are implemented and applied to organize the routine and procedures necessary for the workflow, and it ensures the implementation of new practices to improve work and exchange knowledge. It is the process that results in the emergence of a new idea or practice that can be adopted by individuals, and it entails bringing about some kind of change in the foundation or operations and resources of the institution (Meroño-Cerdan & López-Nicolas, 2013). The ability to inspire employee creativity is a defining characteristic of modern leadership given the dynamic environment that today's organizations must operate in. As a result, those trying to conceptualize and empirically define what it means to lead in a creativity context have given leading for creativity more attention in their organizations (Zhou & Shalley, 2019).

Organizations need creativity and how to activate it to ensure their success, development, and continuity. Following are the domains of creativity: (Shively, 2011): Fluency means the ability to find many alternatives, solutions, ideas, or uses when researching a specific topic, and the individual can find these suggestions quickly and easily. Originality means the production of what is unfamiliar, what is far-reaching, and intelligent responses, as the idea is not original and new unless

it had no previous precedent and was unusual, far-reaching, and with distant and intelligent connections. A common measure of an original idea is that it is socially beneficial.

Flexibility means the ability to find new, innovative and unique ideas that result in unexpected solutions to the problem, the ability to innovate and change the way of thinking according to what the situation calls for, and flexibility is the opposite of the term mental rigidity, which depends on a previously defined mental pattern, and does not allow it to be changed as needed, and there are several forms. Flexibility includes automatic flexibility and adaptive flexibility.

Sensitivity to problems means feeling the existence of the problem, or discovering the elements of weakness in the environment, which indicates that some individuals can sense the problem, notice it, and verify its existence more quickly than others, and discovering the problem is the first step in thinking and searching for a solution to the problem, then adding new ideas or switching or make adjustments to existing knowledge and ideas. So, adapting and following world-wide standards for leading the schools in 21st century is becoming of high mportance to unify the way schools are working and the way they are developing and adapting to the digital age rapid changes in which communication, creativity, ethics, planning with clear vision and professional development are needed.

1.3   Jordan's Focus on Technology in Education

The Ministry of Education in Jordan has a website where it includes a lot of services provided online by its website as per the following: Jordanian Learning Platform - Jolearn.jo, open EMIS Educational Information Management System, education support portal for students with disabilities in private schools, sitting cards for the General Secondary School Certificate Examination, school calendar services by the examination administration, services page that provides salary statement, creation of government email account for employees, student registration service for first grade in public schools, supervised by the department of public education, job advertising platform, information requests management system (MOE website, 2023). The school principals in Jordan have accessibility to these services and to use it as needed.

Further, Queen Rania Teacher Academy (QRTA) has a list of specialized programed in education that are online where a participant can enroll for free through its learning management system. The following are two of the QRTA programs for leadership: Innovation and Entrepreneurship in Education that aimed at raising the efficiency of participants in enhancing innovation skills and leadership in education. The Advanced Instructional Leadership Professional Diploma (AILPD) that is awarded by the University of Jordan and has been developed in collaboration with the University of Connecticut (UCONN). The diploma aims at making notable changes in leadership practices through including the best international practices in instructional leadership.

The leadership diploma learning outcomes are enhancing intellectual awareness of instructional leadership to communicate an organization's goal and direct learning toward realizing it. Creating improvement plans for schools by closely examining teacher development, culture, and school organization as well as curriculum, instruction, and assessment techniques. Directly putting new knowledge to use at work in the school and establishing a networked improvement community for self-reflection and sharing constructive feedback. From 2020 all QRTA programs are delivered online via Google Classroom platforms. (QRTA website, 2023) The leadership diploma is given for free for the public schools' principals in Jordan, and it is paid for private sector. The leadership diploma is delivered online using google classroom platform and google meet where learning and teaching is performed through technology.

The rapid spread of information and communication technology is significantly impacting Jordan's educational institutions, necessitating consistent adaptation and development. Therefore, a new generation of school principals is needed to lead the digital age.

As a starting point for development of the principal's technological practices in Jordan, there is a need to figure out the current degree of the practicing technological competencies by school principals in Jordan in the light of the standards of the International Society for Technology in Education, and therefore this study will inquire in this important issue and its relation to the organizational creativity as it is very crucial in the process of organizational change, process effectiveness, ability to survive, and competition, in the digital age.

1.4 Previous Studies

The objectives of the previous studies were divided into two areas as follows: The first field: studies that investigated technological competences either by considering ISTE standards or not for school principals.

Al-Shorman and Kattab (2018) study aimed at identifying the degree of secondary school principals' technological leadership practice and its relationship to the degree of change leadership in their schools from teachers' points of view in Amman the capital. A proportional stratified random sample was selected from private and public schools, consisting of (370) male and female teachers. Two instruments were utilized: the first was used to measure the degree of secondary school principals' technological leadership practice, while the second was to measure the degree of principals' change leadership. The results of the study showed that the degree of secondary school principals' technological leadership practice was moderate, while their change leadership practice was high. The results revealed a significant positive relationship at ($\alpha \leq 0.05$) between the degree of secondary school principals' technological leadership practice and the degree of change leadership in schools.

Bass (2019) study used a custom survey instrument based on the ISTE Standards for Education Leaders, high school principals in the state of South Dakota were surveyed. The Qualtrics survey gathered the high school principals' level of comfort with the sub-standards of the ISTE Standards for Education Leaders as well as the level of importance high school principals placed on those sub-standards in their positions in their school districts. The data collected from the 35 high school principals' responses were analyzed to identify the sub-standards of each of the five ISTE Standards for Education Leaders. The data was also analyzed to examine correlations between the level of comfort and the level of importance among the sub-standards of the ISTE Standards for Education Leaders. The analysis of the data revealed two statistically significant relationships in the sub-standards of the Connected Learner and Empowering Leader standards.

Karakose, et al. (2021) study investigates the perspectives and experiences of teachers about their school principal's digital leadership roles and technology capabilities during the COVID-19 pandemic. It was conducted using a case study-based qualitative approach, and with a study group consisting of 89 teachers holding a master's degree, using purposive sampling methods, and the data obtained from the research were analyzed through content analysis. The five main themes determined based on the beliefs and experiences of the participants are listed as: "Digital technology usage, support for the digital transformation, support for technology-based professional development, support for digital learning culture, and digital leadership skills." The results of the research revealed that the level of useing digital technologies by school principals during the COVID-19 pandemic was perceived as adequate by teachers. In addition, it was determined that school principals support digital transformation and technology-based professional development in schools.

The study of Raman, Thannimalai, and Ismail. (2019) aimed to identify the effect of Principals' Technology Leadership on Teachers' Technology Integration in Malaysian secondary schools. Random sampling was carried out to select 47 principals and 375 teachers from National Secondary Schools in the northern region of Kedah, Malaysia. Two questionnaires were used: Principals Technology Leadership Assessment (PTLA), which is based on the International Society for Technology in Education (ISTE)- Standards for Administrators (2014) was administered to principals, while the Learning with ICT: Measuring ICT Use in the Curriculum Instrument was administered to the teachers from the same schools as the principals, the findings showed that the levels of Technology Leadership; the five constructs of ISTE (2014), and Teachers' Technology Integration were at high levels but, there was no significant relationship between Principals' Technology Leadership and Teachers' Technology Integration in the selected schools. Principals' preparatory programs should emphasize leadership based on technology to enhance the integration of technology in classrooms. Further research on professional development for principals is recommended.

The study of Al-Matri and Al-Rasebeah (2021) aimed to identify the degree of availability of the standards of the International Society for Technology in Education (ISTE, 2018) among the principals of the schools of the second cycle of basic education in in the Sultanate of Oman in the light of some variables using a questionnaire consisted of (5) criteria and (24) indicators of its availability. The study sample consisted of (53) principals from among the principals of the second cycle of basic education schools in the Governorate of South Al Sharqiyah in the Sultanate of Oman. The results

showed that the total degree of availability of the standards of the ISTE among the principals of the schools was high, the study recommended the necessity of enhancing the availability of standards for principals and urging their use in their educational practices. Sa'adeh and Hamzeh (2021) study aimed at exploring the degree of practicing technological leadership (TL) among primary school principals at Amman governorate considering the Corona pandemic from the teachers' point of view. The study used a descriptive survey-based approach. The sample consists of (406) female and male teachers who were chosen randomly and a questionnaire of 40 items divided into 5 do-mains: (leadership and vision, culture of learning during the digital age, excellence in professional practices, ongoing development and improvement and ethical, legal, and social issues) was developed to collect data. The findings showed that the degree of practicing TL among primary school principals was high in the total average and in all domains.

The second field: studies that investigated organizational creativity. Aljahran (2020) study aimed at investigating the relationship between the degree of occupational enrichment practice and its relation to organizational creativity among principals of basic schools in Amman from the assistant's point of view. And knowing the different views according to the different variables (gender, scientific qualification, and years of service). The relational descriptive research approach was used. Data was collected using a questionnaire, and the study sample reached (378) assistants, it consisted of (34) items for the occupational enrichment tool, and (24) items for the organizational creativity tool. The degree of government primary school principal's practice of occupational enrichment was high and the level of practice of organizational creativity was also high. And that there is a statistically significant relationship between occupational enrichment, and organizational creativity.

Al-Rasheedi (2020) study aimed at finding out the reality of organizational creativity among administrators in Kuwaiti Higher Education Institutions in light of contemporary global trends, the study used a questionnaire that distributed to a sample of 185 administrators. The study results show that the degree of appreciation and the reality of organizational creativity are medium (3.35 out of 5).

The study of Tbeishat (2020) aimed at analyzing the concept of organizational creativity and explaining how it is applied in the development of public organizations, as well as identifying the elements and constraints of organizational creativity, and what are the areas of benefiting from organizational creativity in developing Jordanian autonomous public institutions. The study population consisted of (212) from the administrative leaderships in the Jordanian public organizations, and the leadership groups were at the level of the chairman, directors, general managers, supervisors, managers, and even department heads. The study used a questionnaire to collect its data. It concluded that creativity organizational contribute greatly to the development of autonomous public institutions of Jordan, the study showed that innovation organization plays a distinct role in the development of public organizations. The study recommended the necessity of increasing the awareness of administrative leaders about the role of organizational creativity in the process of developing organizations.

In conclusion, after reviewing previous studies, this study is distinguished in terms of its objective, as it combined the technological competencies of the school principals in light of the ISTE standards with the organizational creativity and the correlation between them. Further, it is distinguished in terms of the place it was conducted, as it is the first study – as far as the researchers are aware – to be held on the relationship between technological competences and the organizational creativity. The study includes education directorates in Jordan in the north, central, and south. Furthermore, it is distinguished as it is investigating the organization creativity in schools not other organizations, as the participants are principals in Jordanian schools from both public and private sectors.

1.5 Study problem and questions

Educators and policymakers in the 21st century agree that effective leadership and collaborative efforts are crucial for improving education quality in the 21st century, empowering teachers and extending leadership to others for desired changes (Kiral, 2020), taking into consideration being in the digital age, leaders of educational institutions need to possess leadership competency related to educational technologies in order to prepare competent teachers, given the ever-changing

expectation of technology itself, so school leaders (principals) must be educational leaders in a technological environment the way they are in a non-technological environment (Shepherd & Taylor, 2019).

Furthermore, the investigation of principals' technological leadership in Jordan was of sudden importance due to (COVID-19) pandemic, not as an important issue that we must tackle in this digital age and not due to being in any pandemic or crises only where using technology is the one and only solution. Awadallah (2022) study conducted in Jordan during (Covid-19) pandemic, results reveal that strategic and technology leadership styles are crucial for leading digital transformation, with technology leadership style predicting digital transformation implementation level, highlighting the current situation in Jordan. So, this study came to figure out what is the current situation in Jordan in terms of applying ISTE education leaders' standards as well-known standards. This study comes to fill the gaps in the educational leadership research in Jordan, taking into consideration the importance of having international standards for technological competences of their principals and how is this important in assuring gaining the proper direction to be reflected on students' teaching and learning. Connecting the competencies with the organizational creativity as encouraging creativity in the workplace can help boost organization success, creative thinking allows individuals to develop new or innovative ideas and challenge norms or old ways of thinking. These behaviors can help organizations create products, services and other offerings that differentiate themselves from other organizations. In addition, study of Tbeishat (2020) that was conducted in Jordan recommended the necessity of increasing the awareness of administrative leaders about the role of organizational creativity in the process of developing organizations. The study of Makhareez, Al- Bado , Malahim, and Atieh (2021) suggests that in order to improve school principals' leadeship performance, they should be trained in the use of creative work approaches in handling administrative responsibilities. Having the above discussion, the current study aims to respond to the following questions:

1.   What is the degree of practicing technological competencies by schools' principals in Jordan in the light of ISTE from their point of view?

2.   What is the degree of the organizational creativity of the schools' principals from their point of view?

3.   Is there any significant correlation at the significance level of ($\alpha \leq 0.05$) between the degree of practicing of technological competencies by schools' principals in Jordan in the light of the standards of the ISTE and the degree of organizational creativity from their point of view?

1.6   *Procedural definitions of study terms*

In this study, there are many terms that need to be defined procedurally, as follows:

ISTE education leader standards: a set of items derived from the 5 main ISTE standards for education leaders that will be given to the Jordanian school principals to respond to them.

The degree of practicing technological competences: the total results of the study sample on the questionnaire measuring the degree of practicing technological competencies by school principals in Jordan in the light of the standards of the ISTE by responding to the items related to it, and it is measured by the degree obtained by the principals of the study sample after conducting it.

The degree of organizational creativity: the total results of the study sample on the questionnaire measuring the degree of organizational creativity by responding to the items related to it, and it is measured by the degree obtained by the principals of the study sample after conducting it.

1.7   *Study limits and determinants*

This study is determined by the following:

1.   Time limit: This study was implemented in the period from May 2023 to September 2023.

2.   Human limits: This study sample is principals in both public and private Jordanian schools.

3.   Subject limit: Finding the degree of availability of the ISTE education leader standards from their own point of view and its relation to their degree in organizational creativity.

The credibility of the results is determined by the objectivity of the study sample and the nature of the study instrument (questionnaires).

2 Method and Procedures

2.1 Study Design

The study is using quantitative method. It applied the quantitative descriptive approach to answer questions one and two. Also, the relational descriptive approach was applied to answer question three. Data was collected using electronic questionnaires done by Google Forms, as this approach is appropriate with the nature and objectives of the current study.

2.2 Population and Sampling

The research population consisted of all schools' education principals in Jordan both in public and private sectors from May 2023 to September 2023. The total number of schools' principals in Jordan was (7317) as per the statistics provided by Queen Rania Al-Abdullah Center for Education and Information Technology on May 2023. The study consisted of (331) principals who were selected randomly covering the northern directorate of education, central, and southern Jordan.

2.3 Study Instruments

This study used two instruments to collect its data. The first instrument: ISTE questionnaire based on the 5 standards of ISTE for education: equity and citizenship advocate, visionary planner, empowering leader, systems designer, and connected learner (ISTE,2022). It was designed and build to examine the degree of practicing technological competencies by school principals in Jordan in the light of the standards of ISTE from their point of view. The five ISTE education leader standards formed the domains and the final version of it consists of 35 items. The second instrument: organizational creativity questionnaire was developed for measuring the degree of the organizational creativity of the principals, and designed based on the literature review and AlJahran (2020) study. It is final version consisted of 26 items distributed on 4 domains: sensitivity to problem, organizational fluency, organizational flexibility, organizational originality. For the two questionnaires five- Likert scale "Very high degree" = 5, "High degree" =4, "Medium degree" =3, "Low degree" =2 and "Very low degree" =1 was applied for all the items.

2.4 Validity of the Study Instruments

To ensure the content validity of the questionnaires, each one of the questionnaires was presented to a group of reviewers. Their feedback and notes were taken into consideration for improvements and amendments of the questionnaire as per agreement ratio equals to 70%. The construction validity of both questionnaires was calculated by applying them on an exploratory sample of principals outside the study sample which consisted of (37) principals, then Pearson's correlation factor between each one of the questionnaire domains of the instrument and with the total score of each questionnaire was calculated as shown in tables (1) and (2). Pearson's correlation coefficients for the domains of the two questionnaires were above 70%, and this ratio is acceptable for the current study.

Table 1. Pearson's correlation coefficients for each domain of ISTE questionnaire with the total score of the ISTE questionnaire

Domain	Pearson Correlation Coefficient with Total Score
Equity and citizenship advocate	.843**
Visionary planner	.962**
Empowering leader	.930**
Systems designer	.927**
Connected learner	.724**

** Correlation is significant at the 0.01 level (2-tailed)

Table 2. Pearson's correlation coefficients for each domain of organizational creativity questionnaire with the total score of the organizational creativity questionnaire

Domain	Pearson Correlation Coefficient with Total Score
Sensitivity to problems	.859**
Organizational fluency	.931**
Organizational flexibility	.896**
Organizational originality	.834**

** Correlation is significant at the 0.01 level (2-tailed)

2.5 Reliability of the study instruments

Both questionnaires applied on the same exploratory sample consisted of (37) principals outside the study sample, and Cronbach's Alpha coefficient for each questionnaire was checked for each questionnaire to determine the reliability of the instruments before applying the questionnaires on the actual sample of school principals in Jordan. Cronbach's Alpha coefficient was (0.969) for the ISTE technological competences questionnaire and (0.958) for the organizational creativity questionnaire, and the reliability is high for both the instruments and acceptable for the current study.

2.6 Instrument correction

For the current research as 5 Likert scale was used and to determine the degree of principals' technological competences and organizational creativity based on the means as follows: the lowest degree was subtracted from the highest degree and divided by 3 to calculate the range of each degree. (5-1) ÷3 = 1.33, so mean values ranged from1 to 2.33 is considered low degree, from 2.34 to 3.67 is considered medium degree, and from 3.68 to 5 is considered high degree.

2.7 Statistical treatment

The current study used The Statistical Package for Social Sciences (SPSS) version (22) software to analyze research data and accomplish the following statistical treatments:

1. Pearson's correlation coefficients between each one of the questionnaire domains of the instrument and with the total score of each questionnaire to determine the validity of the instruments.
2. Cronbach's Alpha coefficients for each one of the instruments to verify their reliability.
3. Means and standard deviations were calculated to answer the first question /second question.
4. Pearson Correlations were used to answer the third question.

3 Study Results and Discussion

The following are the results and discussion of the three study questions.

3.1 The First Question

Means and standard deviations were used to answer the first question: What is the degree of practicing technological competencies by schools' principals in Jordan in the light of ISTE from their point of view? The study results are shown in Table (3).

Table (3) indicated that the Mean of practicing technological competences by schools' principals in Jordan in the light of the standards of the ISTE was (3.76) and its Standard Deviation was (0.55), which is considered high degree. On the other hand, the highest Mean among all the ISTE for education leaders' domains was (3.87) for the "Connected Leaner" and its Standard Deviation was (0.63). In the second order comes the "Systems Designer" as the Mean was (3.82) and its Standard Deviation was (0.64). The third order was "Empowering Leader" as its Mean was (3.79) and its Standard Deviation was (0.60). In the fourth order comes "Equity and Citizenship Advocate" as its Mean was (3.75) and its Standard Deviation was (0.58). While in the last and fifth order comes the "Visionary Planner" as its Mean was (3.66) and

Standard Deviation was (0.63). All the domains of the ISTE of education leaders were of high degree except for the "Visionary Planner". The researchers attribute the high degree in practicing technological competences by school principals to the increasing interest of Jordanian governance and intention to implement the idea of electronic transactions and digital transformation that is represented in the e-government program. The Ministry of Education provides several electronic services through its electronic website (MOE website, 2023) including: Jordanian learning platform (Jolearn.jo), open (EMIS) educational information management system, employees' services and the school principals provided through the website online.

After COVID-19 pandemic, schools showed tendency toward using technology in schools in performing many tasks and processes. For example, there are a lot of official correspondence carried out using social networking sites and emails. Many schools have Facebook pages to communicate with students, teachers, and parents. Also, the Open EMS system for dealing with the students' portfolios. Furthermore, many training courses for the principals' professional development held using elelctronic educational and training platforms, in addition to field training in schools in which technology is used, such as QRTA courses and leadership diploma (QRTA website, 2022).

The researchers interpret the high degree of the ISTE domain "Connected Learner", due to digital transformation in Jordan, as it has been undergoing a process of digital transformation in education. This transformation has likely encouraged school principals to become more connected and integrate technology into their professional practices. Also, over the past few years, there might have been increased access to technological tools, platforms, and resources for educators and administrators in Jordan, facilitating their connectedness, especially during and after COVID-19 pandemic that forced educational institutions worldwide to adapt quickly to remote and online learning scenarios. This sudden shift might have propelled school principals in Jordan, like many other countries, to become more connected by using online platforms and tools. The high degree of the "Systems Designer" might be related to professional development by the Ministry of Education that emphasizes a systems approach to school management, curriculum integration, and technology incorporation. Furthermore, the education strategic plan (MOE, 2023) might influence the schools principals to lead the school's teams collaboratively and to create systems in their schools to implement the strategic plan. As education globally moves towards more collaborative and student-centered approaches, Jordanian school principals might recognize the importance of empowering teachers to be innovative and take ownership of their roles. Principals might prioritize empowerment of leadership to drive continuous improvement in their schools as empowerment is related to building the confidence among the teachers to improve their performance, therefore the degree of the "Empowering Leader" domain was high. The high degree for school principals in "Equity and Citizenship Advocate" could be related to the integration of technology in education, there's a need to ensure equitable access and responsible use of digital tools. So, principals might be actively working towards creating an environment where technology is accessible and used responsibly by all students. Jordanian culture and values emphasize community, mutual respect, and assistance. These values might naturally translate into educational leaders prioritizing equity and responsible citizenship. The researchers interpret the medium degree of the ISTE domain "Visionary Planner" due to facing challenges in partnerships with stakeholders to be able to develop a shared vision on how to use technology to improve student performance, further there may be challenges related to assessing the impact of using technology and to measure the progress of the strategic plans that leads to adjusting the plan. Furthermore, maybe there is a lack of professional development or lack exposure to the benefits of visionary planning or insufficient training opportunities focusing specifically on this domain.

The current study results agree with Al-Matri and Al-Rasebeah (2021) for the degree of the ISTE standards, and for the 4 domains with high degree, while it disagrees with the degree of "Visionary Planner" as it was medium in the current study and high in Al-Matri and Al-Rasebeah study. The result also agrees with Sa'adeh Hamzeh (2021) study that indicated a high level of technological leadership and with the results of Raman, et al. (2019) study as the degree of the technology leadership of school principals was high.

Table 3. Means and standard deviations for the ISTE questionare domains and the total score of the questionare

Domain No.	Domains	Mean	Standard deviation	Order	Degree
5	Connected learner	3.87	0.63	1	High
4	Systems Designer	3.82	0.64	2	High
3	Empowering Leader	3.79	0.60	3	High
1	Equity and Citizenship Advocate	3.75	0.58	4	High
2	Visionary Planner	3.66	0.64	5	Medium
Total		3.76	0.55		High

3.2 The Second Question

Means and standard deviations were calculated to answer the first question: What is the degree of the organizational creativity of the schools' principals from their point of view? The study results as shown in Table (4) indicate that the degree of organizational creativity of schools' principals in Jordan was high as the Mean was (4.15) and its Standard Deviation was (0.54). The highest Mean among the organizational creativity domain was (4.22) for "Organizational Flexibility" and its Standards Deviation was (0.60). In the second order comes the "Organizational Originality" as its Mean was (4.15) and its Standard Deviation was (0.61). While in the third order comes "Organizational Fluency" as its Mean was (4.12) and its Standard Deviation was (0.61). In the fourth order come "Sensitivity to problems" as its Mean was (4.09) and its Standard Deviation was (0.54). It's noticeable that the Mean values for all the domains of the organizational creativity are very close to each other, and all of organizational creativity domains were of high degree.

This result may be due to cultural emphasis on education as there has been a consistent push for educational reforms and advancements in the past years, especially after the COVID-19 pandemic. This can encourage principals to be more creative in their leadership approaches. Further, Jordan has invested in training programs and workshops for school leaders, focusing on modern leadership techniques, technological integration, and other aspects of educational management. Furthermore, large number of school principals in Jordan obtained their advanced professional educational leadership diploma from Queen Ranaia Teachers Academy (QRTA), this continuous professional growth can foster creativity. Schools in Jordan are facing challenges that including resource constraints, supporting safe learning environments, including for children with disabilities. Principals might have to think out of the box to address certain challenges, leading to creative solutions. The current study result doesn't agree with Al-Rasheedi (2020) study.

Table 4. Means and standard deviations for the organizational creativity questionare domains and the total score of the questionare

Domain No.	Domains	Mean	Standard deviation	Order	Degree
3	Organizational Flexibility	4.22	0.60	1	High
4	Organizational Originality	4.15	0.61	2	High
2	Organizational Fluency	4.12	0.60	3	High
1	Sensitivity to Problems	4.09	0.56	4	High
Total		4.15	0.54		High

3.3 The Third Question

Pearson correlation coefficient was calculated to answer the third question: Is there any significant correlation at the significance level of ($\alpha \leq 0.05$) between the degree of practicing of technological competencies by schools' principals in Jordan in the light of the standards of the ISTE and the degree of organizational creativity from their point of view? The Pearson correlation between practicing technological competencies and organizational creativity in school principals is high (0.627) as considerd meduim degree as shown in Table 5. It is statistically significant at at the 0.01 level (2-tailed), also R-Squared (R^2) was (0.39) which means,39% of variance explained by these competencies in light to ISTE standards.

Table 5: Pearson correlation coefficients between the degree of practicing technological competence in light of the standards of the ISTE and the degree of organizational creativity

Correlation		Organizational Creativity
Technological competences (ISTE)	Person Correlation coefficient	0.620**
	Significance	0.000

** Correlation is significant at the 0.01 level (2-tailed)

The International Society for Technology in Education (ISTE, 2023) standards provide a framework for educators, students, and administrators to effectively use technology in education. These standards encourage the use of technology to enhance student learning, foster innovation, and promote digital communication and collaboration. They emphasize problem-solving, decision-making, and critical thinking, fostering trust and open communication. By adopting ISTE standards, leaders serve as role models, encouraging others to experiment with new technologies and teaching methods, ultimately boosting organizational creativity.

In essence, adhering to ISTE standards by educational leaders not only promotes the effective integration of technology but also fosters an environment that is conducive to creativity, innovation, and continuous growth. There were no studies - within the limits of the researchers' knowledge that investigated the relation between practicing technological competences for school principals in light of the ISTE and organizational creativity. As Aljahran (2020) study aimed at investigating the relationship between the degree of occupational enrichment practice and its relation to organizational creativity among principals of basic schools in Amman from the assistant's point of view, the relationship was of high degree.

4 Conclusion and Recommendations

The main purpose of this study was to investigate the relationship of practicing technological competences of school principals in light of the ISTE standards for education leaders and organizational creativity. The main findings indicated that there was a statistically significant relationship between the technological competences and the organizational creativity of school principals. Based on the results school principals are encouraged to enhance their technological competences and refer to the ISTE standards for education leaders as it can improve the organizational creativity as well and their abilities to lead, empower, connect the schools with the digital word.

The study's findings open the door to more investigation into the effect of these suggested variables: number of technological courses taken by the principal, the sector either if it is public of private, on the relationship between the technological competences ISTE standards and organizational creativity. Further, finding the practicing technological competences by universities presidents in light ISTE standard for education leaders. Furthermore, studies related to the relationship of practicing technological competences and other variables, for example leading the change may be considered for future research.

REFERENCES

AlJahran, H. (2020). *The Degree of Occupational Enrichment Practice and its Relation to Organizational Creativity among Principals of Basic Schools in Amman from the Principal Assistant Point of View.* Unpublished Master Thesis, Middle East University, Jordan.

Al-Matri, A. & Al-Rasebeah, A. (2021). The degree of availability of the standards of the International Society for Technology in Education (ISTE-2018) among principals of the second cycle of basic education in the Governorate of South Al Sharqiyah in the Sultanate of Oman. *International Journal of Educational & Psychological Studies (EPS)*, 10(3), 592-613.

Al-Rasheedi, F. (2020). The Reality of the Organizational Creativity among Administrators in Kuwaiti Higher Education Institution in Light of Contemporary Global Trends-A Field study on the workers in Kuwaiti higher education Institution

Kuwait. *Journal of Educational and Psychological Sciences*, 4(20), 106-117. Retrieved from http://search.mandumah.com/Record/1101278.

Al-Shorman, A. & Kattab, E. (2018). The Degree of Secondary School Pricipals' Technological Leadership Practice and its Relations to the Degree of Change Leadership in Schools from Teachers' Viewpoint in Amman. *Dirasat, Educational Sciences*, 45(4), 557-579.

Awadallah, Hanan. A. (2022). *The Role of Educational Leadership Styles in Leading the Digital Transformation Across Amman's Private Schools: Administrative Perspectives. Unpublished Master Thesis*, Middle East University, Jordan. Retrieved from https://www.meu.edu.jo/libraryTheses November 18, 2022.

Ayad, F. I. & Ajrami, S. J. (2017). The Degree of Implementing ISTE Standards in Technical Education Colleges of Palestine. *The Turkish Online Journal of Educational Technology*, 16(2), 107-118.

Banoğlu, K., Vanderlinde, R., Çetin, M., & Aesaert, K. (2023). Role of School Principals' Technology Leadership Practices in Building a Learning Organization Culture in Public K-12 Schools. *Journal of School Leadership*, 33(1), 66–91. https://doi.org/10.1177/10526846221134010.

Bass, E. (2019). *International Society of Technology in Education Standards for Education Leaders and Educational Technology Leadership among South Dakota High School Principals*. Order No. 27548347, University of South Dakota, United States - South Dakota.

Ferreira, J., Coelho, A., & Moutinho, L. (2020). Dynamic capabilities, creativity and innovation capability and their impact on competitive advantage and firm performance: The moderating role of entrepreneurial orientation. *Technovation*, 92-93, 102061. doi:10.1016/j.technovation.2018.11.004.

Glanz, J. (2022). *Managing today's schools: New skills for school leaders in the 21st century*. Rowman & Littlefield.

International Society for Technology in Education (ISTE). (2022). *ISTE standards for education leaders*. Retrieved from https://www.iste.org/standards October 25, 2022.

Jakubik, M. & Berazhny, I. (2017). Rethinking Leadership and It´s Practices in the Digital Era. In Suzana Laporšek; Sedmak Suzana and Doris Gomezelj Omerzel (eds.): Managing the Global Economy. *Proceedings of the Management International Conference, Monastier di Treviso, Italy, 24– 27 May*, 471–483.

Jordanian Ministry of Education (MoE) (2022), *Ministry of Education Strategic Plan (2018-2022)*, retrieved from https://moe.gov.jo/sites/default/files/esp_english_final.pdf.

Jordanian Ministry of Education Website (MoE) (2023). Retrieved from https://moe.gov.jo/.

Karakose, T., Polat, H. & Papadakis, S. (2021). Examining Teachers' Perspectives on School Principals' Digital Leadership Roles and Technology Capabilities during the COVID-19 Pandemic. *Sustainability*, 13, 13448.

Kazim, F. (2019). Digital Transformation and Leadership Style a Multiple Case Study, *ISM Journal*, 3(1), 24- 33.

Kiral, Erkan (2020). Excellent Leadership Theory in Education, *Journal of Educational Leadership and Policy Studies*, 4(1), 1-30.

Laouni, N. (2023). School Principals' Self-Efficacy beliefs and Level of Technology Integration in Moroccan Public Schools. *International Journal of Educational Leadership and Management*. 11 (1),25-61. doi: 10.17583/ijelm.2023.9154.

Makhareez, L., Al- Bado, E., Malahim, S. & Atieh, M. (2021). The Extent of Principals' Practice of Creative Management in Mafraq Governorate. *Dirasat: Educational Sciences*, 48(1), 389–399. Retrieved from https://dsr.ju.edu.jo/djournals/index.php/Edu/article/view/2605.

Mamo, D. (2023). The Nexus between School Leadership Preparation and Student Achievement. *International Journal of Educational Leadership and Management*, 11(2), 167-188. http://dx.doi.org/10.17583/ijelm.10237.

Meroño-Cerdan, A. L. & López-Nicolas, C. (2013). Understanding the drivers of organizational innovations. *The Service Industries Journal*, 33(13-14), 1312-1325. doi:10.1080/02642069.2013.815736.

Mohd Tahir, L., Shi Ping, C., Atan, N. A., Ali, M. F., & Mohd Yusof, S. (2021). Evaluating the Practice of ICT-Based E-Leadership: The Experiences of Private-Based Secondary Teachers. *International Journal of Emerging Technologies in Learning (iJET)*, *16*(23), pp. 74–85. https://doi.org/10.3991/ijet.v16i23.27437.

Moore, K. (2018). *Teachers' Perceptions of Principal Digital Leadership Behaviors That Impact Technology Use in the*

Classroom. Unpublished Ph.D. Dissertation. Dallas Baptist University, Texas

Okeke, N. L. (2019). School Technology Leadership: A New Concept. *International Journal of Innovative Development and Policy Studies*, 7(2), 50-56.

Queen Rania Teacher Academy (QRTA). (2023). In *Programs that transform education into a spark of creativity, free-thought, and imagination.* Retrieved from https://qrta.edu.jo/en/programs.

Raman, A., Thannimalai, R., & Ismail, S. N. (2019). Principals' Technology Leadership and its Effect on Teachers' Technology Integration in 21st Century Classrooms. *International Journal of Instruction*, 12(4), 423-442.

Rumanti, A. A., Rizana, A. F., & Achmad, F. (2023). Exploring the role of organizational creativity and open innovation in enhancing SMEs performance. *Journal of Open Innovation: Technology, Market, and Complexity*, 9(2), 100045. doi:10.1016/j.joitmc.2023.100045.

Sa'adeh, Nancy, Hamzeh, Mohammad AbdelWahab. (2022). The Degree of Practicing Technological Leadership Among Primary School Principals at Amman Governorate during the Corona pandemic from the Teachers' Point of View, *Journal of the Association of Arab Universities for Research in Higher Education*, 42(2), Article 7.

Shepherd, Andrew C., Taylor, Rosemarye T. (2019). An Analysis of Factors Which Influence High School Administrators' Readiness and Confidence to Provide Digital Instructional Leadership, *International Journal of Educational Leadership Preparation*, 14(1), 52-76.

Shively, C. H. (2011). Grow Creativity. *Learning & Leading with Technology*, 38(7), 10-15.

Soud, H. (2021). The Impact of Developing Educational Administration on Improving the Educational and Instructional System. *Dirasat: Educational Sciences*, 48(4), 1–8. Retrieved from https://dsr.ju.edu.jo/djournals/index.php/Edu/article/view/2917.

Sutanto, E. M. (2017). The influence of organizational learning capability and organizational creativity on organizational innovation of universities in East Java, Indonesia. *Asia Pacific Management Review*, 22(3), 128-135. doi:10.1016/j.apmrv.2016.11.002.

Tbeishat, N. (2020). Role of Organizational Creativity in the Development of Public Organizations, with the Application of Autonomous Public Institutions in the Hashemite Kingdome of Jordan. *Arab Journal of Management*.40 (3). 81-112. doi:10.21608/aja.2020.111809.

Zhou, J. & Shalley, C. E. (2019). *Handbook of organizational creativity*. Psychology Press.