The Degree of Implementing ISTE Standards in Technical Education Colleges of Palestine

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ABSTRACT
In light of this successive technological change, there has been an ongoing need for the development of technical education, so that the graduate is able to keep up with the requirements of the labor market on the one hand, and has a continuing education skills on the other. International Society for Technology in Education (ISTE) standards are considered as a vision for the development of education in general and technical education in particular in the light of these changes and requirements. The study aimed at examining the degree of implementing ISTE standards for teachers and students in technical education colleges in Gaza Strip of Palestine. The teachers' questionnaire was administered to 71 teachers of technical disciplines of engineering in four colleges of technical education in Gaza Strip. The students' questionnaire was administered to 186 students of technical disciplines of engineering in the four technical colleges. The results showed low degree of implementing ISTE standards for teachers and students in colleges of technical education, the percentages were 60.9%, 65.3% respectively. The study recommended holding scientific seminars and training courses for students and teachers in technical colleges to introduce ISTE standards, and encourage them to embrace these standards.

INTRODUCTION
The technical education is a formal education which includes educational skills, practical ability and scientific knowledge that are suitable for work requirements. It is basically aimed to prepare manpower that has skills and responsibilities of operating and maintaining industrial entities. Furthermore, it is characterized by its close association with the economic and social needs, and trends of technological development that the societies witness nowadays. This makes the new graduates of technical education programs responsible for the quick response to market needs with technical skills to achieve the society ambitions toward development and continual progress. Technical education is one which is skill-based, work focused, and prepares its recipient for the world of work by equipping them with the necessary skills, attitudes and knowledge required to fit into the workplace for today and the future (Oviawe, 2016). Technical education systems are expected to produce a new breed of competent workforce who can compete and excel in a rapidly changing environment and improve the country's economy. Technical education makes the single largest contribution in developing human resources in this age of technology. One can measure the technological development of a nation by looking at its technical education system. Technical education components are also continually generating a number of innovation and reforms in various aspects of technical education occurring at diploma and degree levels (Shamim, Aktaruzzaman & Clement, 2011). Technical education programs were designed to satisfy labour market demands in terms of making productively adequate trained personnel who are competent, nimble and highly equipped with employability skills ready for action without necessarily receiving additional training in summary, graduate employability in either self-employment or public sector has significant relationship with technical education programs. Hence, without the right skills, people are kept on the margins of society, technological progress does not translate into economic growth and countries can't compete in today's economies. It has been observed in some developing countries, the mismatch between applicants' qualification and labour market demand that reflects on the outdated skills taught by technical education institutions. The implication of the above shortfall is for the technical education institutions to adopt the key features in Globalization and Sustainability (Schleicher, 2012 cited in Bello, Shu'aibu, Saud & Buntat, 2013). Various studies and international experiments have pointed out the importance of technical education in advancing development and realizing its highest level. The development plans, regardless of their quality, cannot achieve their goals and required rates without qualified human resources scientifically and technically in all areas of work and production (Zian & Abd Al-Moneim, 2008). The basic aim of technical education centers on the achievement of socio-economic, industrial and technological objectives that will eventually manifest themselves in economic

stability, industrial harmony, technological advancement and improved standard of living for all. Therefore, the development of highly skilled workers of a country is a function of its well-placed priority on the standard of technical and vocational education (TVE) (Ben & Ashang, 2013).

In Palestine, technical education is a type of formal two-year post-secondary education, which includes educational preparation, and provision of the skills and professional knowledge, carried out by educational institutions formally in order to prepare skilled workers in various industrial, agricultural, commercial and health disciplines to equip them the ability of implementation and production. Therefore, the graduates are an important link between high technical frameworks qualified by universities and non-skilled workers who have not received any kind of formal education. The beginnings of technical education in Palestine go back to the last third of the twentieth century. In that period, lots of colleges and institutes specializing in technical programs were established. Many of the technical education colleges has been created in the last decade of the twentieth century in Gaza strip of Palestine. The most prominent of these colleges are: University College of Sciences and Technology (UCST) founded in 1990 in Khan Younis city, Palestine Technical College (PTC) founded in 1992 in Deir Al-balah city, University College of Applied Sciences (UCAS) founded in 1998 in Gaza city, Gaza Community/Training College (GCTC) founded in 2000 in Gaza city.

LITERATURE REVIEW

The most important problems encountering TVE is the lack of close connection of curricula with the reality of the profession, as well as the inadequacy of educational programs to the needs of the labor market, and thus the inability of graduates of technical education to compete with the labor force in the market (Halabi, 2012).
To prepare TVE students for the workplace, there is a need to provide them with the necessary and update skills to utilize modern technology in the service of economic and social developments and meet society needs. It is also important to link work with education through open and continuous education and society service. This imposes a reconsideration of the TVE programs and constructing their curricula and educational practices in the light of the educational technology Standards (Al-Shawabkeh, Mazahreh & Al-Kharabsheh, 2009).

Educational technology refers to the use of both physical hardware and educational theoretic. It encompasses several domains, including learning theory, computer-based training, online learning, and mobile technologies. Accordingly, there are several discrete aspects to describe the intellectual and technical development of educational technology (Babafemi, 2016):

- Educational technology as the theory and practice of educational approaches to learning.
- Educational technology as technological tools and media that assist in the communication of knowledge, and its development and exchange.
- Educational technology for Learning Management Systems (LMS), such as tools for student and curriculum management.
- Educational technology itself as an educational subject; such courses may be called "Computer Studies" or "Information and Communication Technology (ICT).

In recent decades, many scientific associations interested in producing educational technology standards for the development of learning environments and make them more effective and keep pace with technological innovations. International Society for technology in Education (ISTE) is one of the most prominent of these associations. It was established in 1979 as a non-profit organization for the purpose of functional and standardized used of educational technologies in USA. Among the most significant attempts of the institution is the National Educational Technology Standards (NETS) project started in 1993 to determine the standards that should be obeyed in educational institutions. The basic goal of this project is to improve the learning outcomes of the students by developing national standards regarding the educational use of technology. In the scope of this project, common standards for educational technologies and the related indicators were determined. These standards are intended to form a criterion for teachers, administrators and students (Kurt, Çoklar, Kilice & Yildirim, 2008).

The ISTE standards (formerly known as the NETS) are the definitive framework for successfully implementing digital strategies to positively impact learning, teaching and leading in our technology-powered world. They were developed with input from experts in the field and are widely recognized and adopted worldwide (ISTE standards at ISTE, 2015). The ISTE Standards are more than just abstract concepts. Students, educators, leaders and content creators around the globe use them as a guide in their shared mission to re-engineer education for the digital age (Standards inaction, 2016). ISTE has issued five types of standards namely: ISTE standards for administrators, ISTE standards for coaches, ISTE standards for computer science educators, ISTE standards for teachers, and ISTE standards for students. The current study focuses on the last two types. The following is a detailed presentation of them:

- ISTE standards for teachers: The version of these standards was adopted in 2008. It consists of five standards as follows (ISTE standards for teachers, 2008):
- Facilitate and inspire student learning and creativity.
- Design and develop digital age learning experiences and assessments.
- Model digital age work and learning.
- Promote and model digital citizenship and responsibility
- Engage in professional growth and leadership.
- ISTE standards for students: The version of these standards was adopted in 2007. It consists of six standards as follows (ISTE standards for students, 2007):
- Creativity and innovation.
- Communication and collaboration.
- Research and information fluency.
- Critical thinking, problem solving, and decision-making.
- Digital citizenship.
- Technology operations and concepts.

In light of the accelerating information revolution that we witness today, ISTE Standards are mainly based on the information and communication technology (ICT) which is considered today as the cornerstone of the development of the educational process in academic and technical programs in general. ICT is a diverse set of technological tools and resources used to communicate, create, disseminate, store and manage information. ICT have been flaunted as potentially powerful enabling tools for educational change and reform when appropriately used. The purpose of ICT is to increase productivity and efficiency and speed up information processing for wealth creation (Oviawe, 2016).

Ogunsola (2005) cited in Chukwuedo & Omofonmwan (2013) asserted that apart from acquisition and absorption of knowledge, ICT could offer developing countries unprecedented opportunities to change educational systems, improve policy formulation and execution, and widen the range of opportunities for business and for the poor. Kuhlemeier & Hemker (2007) cited in Tseng, Liang & Tsai (2014) emphasized that extending ICT skills has become one of the essential educational goals to better meet the needs of the digital age. Tsai (2009a) has pointed out that completing learning tasks requires an increasing involvement of students in using ICT.

ICT drives the new economy and human capital is its fuel. In fact, the ICT revolution makes knowledge a competitive resource. In this economic era, economic prosperity depends on brains rather than brawn and value is created by employing knowledge workers and continuous learning. The need for recurrent education and the changing labour market conditions, call for flexible access to TVE. Continuing education models that will meet workers' lifelong learning needs have to be relevant and flexible to provide just-in-time learning without distance (Chinien, 2003).

Chukwuedo & Omofonmwan (2013) believe that the acquisition of skills in TVE programs should be supported with sufficient ICTs in order to widen the skill-horizon of both teachers and students. Ben & Ashang (2013) show that the role of ICT in skilled manpower development through TVE among higher institutions cannot be overemphasized. In this technology-driven age, everyone needs ICT competence to survive. Chinien (2003) emphasizes that ICTs can play a crucial role in removing distance from education and in developing a lifelong learning culture in TVE. Shamim et al. (2011) found that using ICT in the teaching-learning process in TVE improves the quality of the education. The factors, stimulating the teachers of polytechnic institutions to use ICTs in teaching and learning, are as follows: they are economical, time saving, easy to prepare, attractive, easy to motivate the students, easy to administer, communication is easier, and easy to integrate. Ben & Ashang (2013) found out that ICT are playing significant role in skilled manpower development, especially in the area of engagement of technical students and strengthening technical teaching. Chukwuedo & Omofonmwan (2013) revealed that learners inescapably support their teaching-learning situation with ICTs. Therefore, the researchers concluded that ICTs are pillars of teaching and learning skills in the TVE.

Technical education is faced with the challenge of keeping up with the changes taking place in the world of work. The real of ICT is one that is growing limitlessly. It becomes imperative for technical teachers and students to focus on making technological learning part of their own lives so that it can be integrated into their instructional delivery competencies. They need to learn how to think, create, work, and collaborate with new ideas and techniques in order to properly integrate the use of ICTs into the teaching and learning process to avoid being left behind (Oviawe, 2016).

Although the interest of educators and general public in the use and integration of ICTs in education is on the increase, studies in this field are still in their infancy, especially those focusing on ICTs use in TVE (Saud et al., 2011). Here are the most important of these studies:
Oviawe (2016) concluded that ICT skills are the key things that will enable technical education graduates face the challenges of the 21st century workplace. It was recommended that government should provide enough funds to equip schools with ICT tools, equipment and facilities for better delivery of instruction.

Yasaka and Alias (2015) discussed the trend of ICT integration in teaching and learning in TVE based on a systematic review of ICT integration in post-secondary TVE. The findings showed that More effective integration is also indicated where the blended mode is adopted as compared to the fully ICT mediated mode.
Bello et al. (2013) concluded the importance of further review to explore the need for ICTs in TVE and recommended the procedures to be adopted in strengthening TVE curriculum to meet up with the global ICT skill challenges.

Virtič (2009) revealed that the students of technical education confirmed that in technical education different forms of e-learning were appropriate. A high percentage of teachers who regularly use educational portals indicate a great interest for the online social environment.

Chinien (2003) showed that there are many barriers that hinder the integration of ICTs into teaching and learning in TVE. The most significant are infrastructure, availability of suitable materials, job threat, appropriateness of the methods, and credibility of program content. Although there are some anecdotal records of successful attempts regarding the use of ICTs for teaching affective and practical skills, there is no hard evidence in support of these claims. It revealed that TVE teachers need to keep up to date in order to maintain their occupational literacy skills. Those involved in the integration of ICT-mediated learning need training in the pedagogical applications of ICTs for teaching and learning. Students also need a set of ICT literacy skills in order to succeed in ICT-mediated learning environments.

On the Arab level, there is a dearth of studies that combine between educational technology in general or ICT in particular, and technical education. Here are some of the studies, which focused on the educational domain in general:
Abu Jasser's study (2012) concluded the low educational supervisor's role in developing the international standards for technology in education for Teacher among secondary school teachers in Palestine. The study recommended the need to qualify and train teachers to employ international standards for technology in education better in the educational process.

Hinnawi's study (2010) revealed the weak role of Information Technology book of twelfth grade in Palestine to equip the students with some international standards for technology in education (Iste.S).

Al-zaboon & Ababneh's study (2010) confirmed that the teacher must possess the competences related to educational technology. The student's role should rise to become an active participant and producer of knowledge.

Abu Swawin & Abdel-jawad study's (2009) concluded that the degree of the exercise and the availability of educational technology competencies among secondary school teachers is medium, and did not meet the desired level.
Al-saif's study (2009) found that the degree of availability of the competencies of e-learning among faculty members is, in general, medium.
Al-shihry's study (2005) found that teachers' use of ICT and their application rate is generally low. The study has concluded that there is a need to develop comprehensive plans for the recruitment of technology in education.

Numerous researchers, who have studied the use of ICT in education have predominantly shown that the decisive factor for a successful implementation of ICT into education is the teacher. Teachers of technical education are in a way responsible for the competencies students acquire during their study. One of the competencies that are necessary for effective teaching is to adequately include ICT in classes and to foster information literacy among students (Virtič, 2009). Teachers need to plan thoughtfully before using ICT into educational process. for instance, they have to choose the correct ICT tools for particular learning objectives or contexts, modify existing resources or develop new learning environments to engage specific groups of learners, or decide scaffolding strategies for student-centred learning (Wang, 2008).

PROBLEM OF THE STUDY

The current study addresses a vital issue in the Palestinian environment, particularly in light of the increasing demand by students on technical education in recent years on the one hand, and the lack of studies that are interested in the link between educational technology standards and technical education at the Arab level on the other hand. So, the study aims at examining the degree of implementing ISTE standards for teachers and students at the disciplines of engineering in technical education colleges in Gaza Strip of Palestine. The researchers focused on the technical engineering disciplines for the following reasons:

- The technical engineering disciplines by their very nature require fast changing quantitative and qualitative practical knowledge. This forces teachers to continue developing their competencies in the areas of design and development of educational experiences, and handling digital tools and resources efficiently.
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- The nature of studying these disciplines concentrates on project implementation and technological problem solving. Therefore, standards of educational technology became more urgent for the students to foster thinking skills, and enable them constantly to utilize digital tools and resources productively and efficiently.

Accordingly, the researchers formulated the problem of the study in the following main question: To what degree do the colleges of technical education in Gaza Strip implement the ISTE standards? The following sub-questions emerge from the above major one:

1. What is the degree of implementing ISTE standards for teachers in technical education colleges in Gaza Strip?
2. Are there statistically significant differences in the degree of implementing ISTE standards for teachers in technical education colleges in Gaza Strip due to the college variable?
3. What is the degree of implementing ISTE standards for students in technical education colleges in Gaza Strip?
4. Are there statistically significant differences in the degree of implementing ISTE standards for students in technical education colleges in Gaza Strip due to the college variable?

RESEARCH METHODOLOGY

The researchers followed the descriptive approach in translating ISTE standards for teachers and students into Arabic, in turning them into two questionnaires, one for teachers and other for students and then distributing them to a sample of teachers and students of technical engineering disciplines which is available at the following technical colleges in Gaza Strip:

- University College of Sciences and Technology (UCST).
- Palestine Technical College (PTC).
- University College of Applied Sciences (UCAS).
- Gaza Community/Training College (GCTC).

The two questionnaires were applied on the two samples during the second semester of the academic year 2015-2016. In regard to the teacher's questionnaire, it was distributed to all teachers of technical engineering disciplines in the previous mentioned four technical education colleges, and the number of those who responded to the questionnaire was (71). In regard to the student's questionnaire, it was distributed to a random sample of students of technical engineering disciplines in the four colleges, and the number of those who responded to the questionnaire was (186). Table 1 shows this.

Table 1: Distribution of the sample of teachers and students

College	UCST	PTC	GCTC	UCAS	Total
Teachers	17	21	14	19	71
Students	49	53	45	39	186

INSTRUMENTS

- QUESTIONNAIRE OF ISTE STANDARDS FOR TEACHERS

This questionnaire consists of (5) standards and (20) performance indicators, (4) performance indicators for each standard. To ensure of the validity of the questionnaire, it was administered to a group of arbitrators in the areas of technical education and educational technology. The researchers calculated the validity of internal consistency using Pearson correlation coefficients between the total scores of each standard and the total scores of the five standards. The coefficients were as follows (0.691, 0.554, 0.509 0.618, 0.712), and all the values are statistically significant at $p=0.01$. To ensure the reliability of the questionnaire, the researchers used the split-half technique, the overall reliability coefficient was (0.84). Besides, Kuder-Richardson20 *(K-R20)* was used, the overall reliability coefficient was (0.87). Further, a confirmatory factor analysis was implemented, it summarized all performance indicators into (5) factors given by table 2.The first factor is composed of the following performance indicators: Promote, support, and model creative and innovative thinking and inventiveness;

Engage students in exploring real-world issues and solving authentic problems using digital tools and resources; Promote student reflection using collaborative tools to reveal and clarify students' conceptual understanding and thinking, planning, and creative processes; Model collaborative knowledge construction by engaging in learning with students, colleagues, and others in face-to-face and virtual environments. These performance indicators are related to the first standard, which was named facilitate and inspire student learning and creativity. The second factor is composed of the following performance indicators**:** Design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity; Develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress; Customize and personalize learning activities to address students' diverse learning styles, working strategies, and abilities using digital tools and resources; Provide students with multiple and varied formative and summative assessments aligned with content and technology standards, and use resulting data to inform learning and teaching. These performance indicators are related to the second standard, which was named design and develop digital age learning experiences and assessments. The third factor is composed of the following performance indicators**:** Demonstrate fluency in technology systems and the transfer of current knowledge to new technologies and situations; Collaborate with students, peers, parents, and community members using digital tools and resources to support student success and innovation; Communicate relevant information and ideas effectively to students, parents, and peers using a variety of digital age media and formats; Model and facilitate effective use of current and emerging digital tools to locate, analyze, evaluate, and use information resources to support research and learning. These performance indicators are related to the third standard, which was named model digital age work and learning. The fourth factor is composed of the following performance indicators**:** Advocate, model, and teach safe, legal, and ethical use of digital information and technology, including respect for copyright, intellectual property, and the appropriate documentation of sources; Address the diverse needs of all learners by using learner-centered strategies providing equitable access to appropriate digital tools and resources; Promote and model digital etiquette and responsible social interactions related to the use of technology and information; Develop and model cultural understanding and global awareness by engaging with colleagues and students of other cultures using digital age communication and collaboration tools. These performance indicators are related to the fourth standard, which was named promote and model digital citizenship and responsibility. The fifth factor is composed of the following performance indicators**:** Participate in local and global learning communities to explore creative applications of technology to improve student learning; Exhibit leadership by demonstrating a vision of technology infusion, participating in shared decision making and community building, and developing the leadership and technology skills of others; Evaluate and reflect on current research and professional practice on a regular basis to make effective use of existing and emerging digital tools and resources in support of student learning; Contribute to the effectiveness, vitality, and self-renewal of the teaching profession and of their school and community. These performance indicators are related to the fifth standard, which was named engage in professional growth and leadership.

Table 2 represents portion of each factor from the total common variance. As one may observe that about 72.7% percent of total common variance explained by these (5) factors.

Table 2: Factor analysis of performance indicators of ISTE standards for teachers

Factor name	Eigen value	Explained common variance by factor
Facilitate and inspire student learning and creativity	4.577	19.181%
Design and develop digital age learning experiences and assessments	3.991	17.323%
Model digital age work and learning	3.527	15.016%
Promote and model digital citizenship and responsibility	2.801	11.249%
Engage in professional growth and leadership	2.019	9.925%

- QUESTIONNAIRE OF ISTE STANDARDS FOR STUDENTS

This questionnaire consists of (6) standards and (24) performance indicators, (4) performance indicators for each standard. To ensure the validity of the questionnaire, it was administered to a group of arbitrators in the fields of technical education and educational technology. The researchers calculated the validity of internal consistency using Pearson correlation coefficients between the total scores of each standard and the total scores of the six standards. The coefficients were as follows (0.511., 0.499, 0.638, 0.595, 0.547, 0.612), and all the values are statistically significant at $p=0.01$. To ensure the reliability of the questionnaire, the researchers used the split-half technique, the overall reliability coefficient was (0.75). Besides, Kuder-Richardson20 *(K-R20)* was used, the overall reliability coefficient was (0.81). Further, a confirmatory factor analysis was implemented, it summarized all performance indicators into (6) factors given by table 3. The first factor is composed of the following

performance indicators: Apply existing knowledge to generate new ideas, products, or processes; Create original works as a means of personal or group expression; Use models and simulations to explore complex systems and issues; Identify trends and forecast possibilities. These performance indicators are related to the first standard, which was named creativity and innovation. The second factor is composed of the following performance indicators**:** Interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media; Communicate information and ideas effectively to multiple audiences using a variety of media and formats; Develop cultural understanding and global awareness by engaging with learners of other cultures; Contribute to project teams to produce original works or solve problems. These performance indicators are related to the second standard, which was named communication and collaboration. The third factor is composed of the following performance indicators**:** Plan strategies to guide inquiry; Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media; Evaluate and select information sources and digital tools based on the appropriateness to specific tasks; Process data and report results. These performance indicators are related to the third standard, which was named research and information fluency. The fourth factor is composed of the following performance indicators**:** Identify and define authentic problems and significant questions for investigation; Plan and manage activities to develop a solution or complete a project; Collect and analyze data to identify solutions and/or make informed decisions; Use multiple processes and diverse perspectives to explore alternative solution. These performance indicators are related to the fourth standard, which was named critical thinking, problem solving, and decision making. The fifth factor is composed of the following performance indicators**:** Advocate and practice safe, legal, and responsible use of information and technology; Exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity; Demonstrate personal responsibility for lifelong learning; Exhibit leadership for digital citizenship. These performance indicators are related to the fifth standard, which was named digital citizenship. The sixth factor is composed of the following performance indicators**:** Understand and use technology systems; Select and use applications effectively and productively; Troubleshoot systems and applications; Transfer current knowledge to learning of new technologies. These performance indicators are related to the sixth standard, which was named technology operations and concepts.

Table 3 represents portion of each factor from the total common variance. As one may observe that about 71.2% percent of total common variance explained by these (6) factors.

Table 3: Factor analysis of performance indicators of ISTE standards for students

Factor name	Eigen value	Explained common variance by factor
Creativity and innovation	4.15	20.39%
Communication and collaboration	3.29	15.46%
Research and information fluency	2.65	12.19%
Critical thinking, problem solving, and decision making	2.46	11.24%
Digital citizenship	1.53	6.22%
Technology operations and concepts	1.18	5.68%

In both questionnaires, a five–point Likert scale was used to identify the degree of implementing these standards in the colleges of technical education in Gaza Strip.

The Likert Scaling Technique

Table 4: The value of Likert scale (Five-point scale)

Responses Degree of implementation	Ranks
very high	5
high	4
Medium	3
Low	2
Very low	1

Collected data was analyzed depending on SPSS program by using the following statistical methods and techniques of analysis: Means, standard deviations and percentages; Kruskal-Wallis test; One-way analysis of variance; and Scheffe test.

The weighted average is used to represent the following criterion:

Table 5: Weighted average and its performance level

Responses Degree of implementation	Weighted Average	Percentage
very high	5≥WA>4.2	100≥WA>84%
high	4.2≥WA>3.4	84%≥WA>68%
Medium	3.4≥WA>2.6	68%≥WA>52%
Low	2.6≥WA>1.8	52%≥WA>36%
Very low	1.8≥WA≥1	36%≥WA≥20%

FINDINGS

To answer the first question, the researchers calculated the means, standard deviations, and the percentages of the responses of teachers to identify the degree of implementing each standard of ISTE standards for teachers and the five standards as a whole. Table 6 shows this.

Table 6: Degree of implementing ISTE standards for teachers

Standard	Means	SD.	Percentage
Facilitate and inspire student learning and creativity	56.94	7.11	56.9%
Design and develop digital age learning experiences and assessments	61.58	6.08	61.6%
Model digital age work and learning	62.94	5.93	62.9%
Promote and model digital citizenship and responsibility	57.47	7.55	57.5%
Engage in professional growth and leadership	63.36	6.25	63.4%
Total	60.86	6.42	60.9%

Table 6 shows that implementing ISTE standards for teachers as a whole is 60.9%, while the degree of implementing the five standards separately is 56.9%, 61.6%, 62.9%, 57.5%, 63.4% respectively. These percentages are all located in the medium level set by the researchers previously, which ranges from 52% -68%. It is clear from these results the low degree of implementing ISTE standards for teachers in the colleges of technical education in Gaza Strip.

To answer the second question, the researchers used Kruskal-Wallis test for differences in the mean scores of implementing ISTE standards for teachers due to college variable. Table 7 shows the result of this test.

Table 7: Kruskal-Wallis test

College	No.	Rank mean	FD.	Chi square
UCST	17	20.53	3	22.668*
PTC	21	29.93		
GCTC	14	45.32		
UCAS	19	49.68		

* significant at $p \leq 0.01$

It is clear from table 7 that the value of chi square test is *22.668*, which is statistically significant at $p= 0.01$, and this indicates that there are significant differences in the degree of implementing ISTE standards for teachers in the technical education colleges in Gaza Strip attributed to the variable of college. The value of the rank mean for the teachers of UCAS is greater than any other rank for teachers of the three other colleges. Therefore, the differences among the mean scores are in favor of teachers of UCAS.

To answer the third question, the researchers calculated the means, standard deviations and the percentages of the responses of students to identify the degree of implementing each standard of ISTE standards for students and the six standards as a whole. Table 8 illustrates this.

Table 8: Degree of implementing ISTE standards for students

Standard	Mean	SD.	Percentage
Creativity and innovation	77.27	9.07	64.4%
Communication and collaboration	80.33	7.52	66.9%

Research and information fluency	81.41	7.71	67.8%
Critical thinking, problem solving, and decision making	76.30	9.10	63.6%
Digital citizenship	80.15	8.77	66.8%
Technology operations and concepts	72.08	7.95	60.1%
Total	78.31	8.22	65.3%

Table 8 shows that implementing ISTE standards for students as a whole is 65.3%, while the degree of implementing the six standards separately is 64.4%, 66.9%, 67.8%, 63.6%, 66.8, 60.1 respectively. These percentages are seen at medium level set by the researchers previously which ranges from 52%-68%. It is clear from these results the low degree of implementing ISTE standards for students in the colleges of technical education in Gaza Strip.

To answer the fourth question, the researchers used one-way analysis of variance for differences in the mean scores of the implementing of ISTE standards for students due to college variable. Table 9 shows the result of this test.

Table 9: One-way analysis of variance

	Source of variance	**Total of squares**	**FD.**	**Mean of squares**	**F. value**
Degree of implementing	Between groups	1822.59	3	607.531	7.770*
	In groups	14231.32	182	78.194	
	Total	16053.91	185		

* significant at $p \leq 0.01$

As shown in table 9 the value of *(F)* is statistically significant at $p= 0.01$, and this indicates that there are significant differences in the degree of implementing ISTE standards for students due to the college variable. To identify the significant bilateral differences between groups (the four colleges of technical education) in the degree of implementing ISTE standards for students, Scheffe test was used to make post comparisons. Table 10 illustrates this.

Table 10: Results of Scheffe test of post comparisons due to college variable

College1	**College2**	**Difference between means**	**Sig. level**
GCTC	PTC	6.26080*	0.000
	UCST	3.63349	0.355
	UCAS	4.42368	0.107
UCST	PTC	2.63130	0.546
	UCAS	0.79018	0.958
	GCTC	-3.63349	0.355
UCAS	PTC	1.84712	0.794
	UCST	- 0.79018	0.958
	GCTC	- 4.42368	0.107

* significant at $p \leq 0.01$

It is clear from table 10 that there is a statistically significant difference at $p=0.01$ in the degree of implementing ISTE standards for students between GCTC and the PTC, in favor of the GCTC student.

DISCUSSION

The present study aimed at identifying the degree of implementing ISTE standards for teachers and students in technical education colleges in Gaza Strip.

In regard to the first question, the results showed a low degree of implementing ISTE standards for teachers in technical education colleges in Gaza Strip. This result agreed with those of Chinien (2003), Al-shihry (2005), Abu Swawin & Abdel-Jawad (2009), Al-saif (2009), and Abu Jasser (2012), while differed with those of Virtič (2009), and Yasaka and Alias (2015). This result could be attributed to the lack of attention on the part of the top management in these colleges toward educational technology issues in general and e-learning in particular. Meeting these standards requires these colleges to provide more hardware and software equipment related to virtual learning environments and contemporary digital tools. These educational institutions and their teachers also lacked continuous development of professional practices needed by the teachers in terms of design and development of learning experiences**,** which are based on the integration between the digital tools and resources on one hand, and using creative teaching skills for the construction of information among students in virtual and face-to-face environments on other hand. Besides, the speed of technological developments in the field of ICT

make it difficult for teachers to keep up with them, as some may create a state of reluctance to follow modern scientific studies and research related to the effective teaching through virtual learning environments.

In regard to the second question, the results showed that there are statistically significant differences at *p=0.01* in the degree of implementing ISTE standards for teachers in technical education colleges in Gaza Strip due to the college variable, and in favor of the UCAS teachers. This result may be attributed to the fact that UCAS has educational facilities and equipment more than any other technical college in Gaza Strip. It is the most prominent technical colleges that interested of blending learning which combines between classroom teaching and virtual learning, it has been recruiting learning management system (Moodle) efficiently for more than ten years. It has also a specialized technical staff that provides teachers with an acceptable level of services and advices they need in the development of teaching performance through digital media and virtual learning environments. Furthermore, UCAS requires the teacher to work with to have the necessary competence for effective teaching based on the employment of different information resources.

In regard to the third question, the results showed a low degree of implementing ISTE standards for students in the colleges of technical education in Gaza Strip. This result agreed with those of Chinien (2003), and Hinnawi (2010), while differed with those of Virtič (2009), and Yasaka and Alias (2015). It is intuitively that the low degree of implementing ISTE standards for teachers negatively effect in the degree of implementing ISTE standards for students in technical education colleges. This result also may be attributed to these standards which are, in fact, new international standards that require a relatively long time to become part of the technological culture of students in technical educational institutions. On the other hand, the technical education students are often low achievers in the secondary school certificate, which in turn makes us wonder about the seriousness of these students in understanding digital technology systems let alone employing them productively and effectively in the learning process.

In regard to the fourth question, the results showed that there are statistically significant differences at *p=0.01* in the degree of implementing ISTE standards for students in technical education colleges attributed to the college variable, and in favor of the GCTC students. This result is attributed to the fact that the GCTC is an institute run by International Relief and Works Agency, which has a privileged teaching staff that receive annually many international training courses in different educational areas notably in the educational technology field. Besides, there are also sufficient and modern educational facilities and equipment at the college, and it has a highly experienced and disciplined administrative body. These factors, no doubt, have a significant impact on attracting high school students with higher academic and intellectual levels. These factors also contribute to the development of students' competencies in the field of knowledge construction, and the recruitment of information resources and digital tools productively and effectively in the learning process.

CONCLUSION AND RECOMMENDATION

The findings of this study showed a low degree of implementing ISTE standards for teachers in colleges of technical education in Gaza Strip. Besides, there are statistically significant differences between those teachers in the degree of implementing ISTE standards attributed to the college variable, and in favor of the UCAS teachers. The findings also showed a low degree of implementing ISTE standards for students in colleges of technical education in Gaza Strip. Besides, there are statistically significant differences between those students in the degree of implementing ISTE standards attributed to the college variable**,** and in favor of the GCTC students. In order to raise the degree of implementing ISTE standards for teachers and students, it is recommended to:

- Hold scientific seminars and training courses for students and teachers in technical colleges to introduce ISTE standards, and encourage and motivate teachers and students to embrace these standards.
- Integrate ISTE standards in pre-service academic preparation programs for teachers of technical education.
- Provide technical education colleges in Gaza Strip by appropriate infrastructure in ICT field to help students and teachers in implementing ISTE standards.
- Enhance technical education teachers' awareness of the importance of utilizing digital tools and resources, and virtual learning environments in the design, development and evaluation of learning experiences in order to develop the students' specialized competencies to the utmost level.
- Work on the development of teacher professional practice and lifelong learning constantly.
- Conduct ongoing evaluation for programs and courses in technical education in the light of ISTE standards, and the rapid and extensive development of the digital information and technology.
- Study the obstacles and problems facing the application of ISTE standards in various technical disciplines.
- study the views and opinions of the leaders of technical education colleges about the extent of implementing ISTE standards in their colleges.
- Study the implementation of ISTE standards in academic programs, schools and universities in general.

LIMITATIONS OF THE STUDY

The findings of this study are constrained by some limitations, which similar studies in future should address. First, the current study only focused on the engineering disciplines, so it cannot be generalized the findings to all technical education disciplines. Second, the current study was conducted in Gaza Strip, which represents the southern provinces in Palestine, so it cannot be generalized the findings to the northern provinces. Third, to get more accurate and credible findings, it is required further research and investigation about the skills of graduates and the extent of their implementation of these standards in the labor market. Fifth, many students and teachers did not respond to the questionnaire, therefore, it is preferred in future studies to expand the sample to get more accurate findings.

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