The Degree of Achieving ISTE Standards among Pre-Service Teachers at "the Public Authority for Applied Education and Training" (PAAET) in Kuwait from Their Point of Views

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Abstract

The aim of the study was twofold; first, to examine the degree of achieving International Society for Technology in Education (ISTE) standards among pre-service teachers at the college of basic education at the Public Authority for Applied Education and Training (PAAET) from their point of views and second, to examine differences in the pre-service teachers' point of views of the degree of achieving ISTE standards based on their gender, age, major, academic year, their technological competence, their attitudes towards the use of technology, and their extent of technology use. A cross-sectional design was used; questionnaire instrument was designed and developed to collect data from the participants. The participants were student teachers enrolled in different classes in the summer semester in the academic year of 2018/2019 at the college of basic education at "the Public Authority for Applied Education and Training" (PAAET) in Kuwait. Two hundreds and eighty three pre-service teachers completed the questionnaire. The results showed that the participants expressed positive perceptions of achieving ISTE standards. The results showed insignificant variations in pre-service teachers' perceptions of the achievement of ISTE standards based on their gender, age, major, and academic year. Furthermore, the results showed that pre-service teachers' perceptions of the achievement of ISTE standards had significant relationships with pre-service teachers' attitudes towards the use of technology, pre-service teachers' perceptions of their technological competences, and pre-service teachers' extent of using technology. Based on the findings, set of recommendations for practice and for future research were provided.

Keywords: ISTE, pre-service-teachers, Kuwait, PAAET

1. Introduction

Nowadays, educational systems have increased their reliance on Information and Communication Technology (ICT) to achieve their goals. The technological developments provided the teachers with wide variety of options to integrate ICT in their educational practice. Therefore, the K12 educational systems need qualified teachers who can employ ICT effectively and efficiently in their educational practice. Teacher education programs have the responsibilities to qualify these teachers for the proper integration of ICT in their educational practice. For instance, Kirschner, Wubbels, and Brekelmans, (2008) stated that, "teacher education programs should stimulate the pedagogical use of ICT to improve existing teaching practice and contribute to the development of new, innovative teaching practices" (p. 435). It is clear that the current educational systems are expected from their teachers to integrate ICT in their educational practice. However, it is uncertain if they have the knowledge and skills to do so and if the university education programs have developed their pedagogical and technical competencies needed to integrate ICT in the educational practice.

Different organizations have paid attention to the need to provide students and teachers with guidelines on how to use and integrate technology in their education. One of these organizations is the International Society for Technology in Education (ISTE) that has the following mission: "ISTE inspires educators worldwide to use technology to innovate teaching and learning, accelerate good practice and solve tough problems in education by providing community, knowledge and the ISTE Standards, a framework for rethinking education and empowering learners" (ISTE, 2018a). The ISTE provides different types standards that were defined as "a framework for students, educators, administrators, coaches and computer science educators to rethink education and create innovative learning environments" (ISTE, 2018b). The standards for students are "Empowered Learner", "Digital Citizen", "Knowledge Constructor", "Innovative Designer", "Computational Thinker", "Creative Communicator", and "Global Collaborator" (ISTE, 2018b). The ISTE standards can be used to guide and evaluate the integration of technology in teacher education programs. The ISTE standards have applications in the accreditation and quality assurance process of teacher education university programs. These standards promote and encourage pre-service teachers to take part in the digital age and they represent practical measures of students' involvements with technology (Dondlinger, McLeod, & Vasinda, 2016).

Developing countries are looking to integrate ICT in their educational systems in order to contribute in reforming and enhancing their educational systems (Bhasin, 2012). Kuwait is a developing country that showed great interest in the applications of ICT in its educational systems, such interest is evident in several initiatives and projects. For instance the Kuwaiti Ministry of Education has implemented the use of computer in secondary schools since 1987 through having introductory course in computing in their curriculum (Alharbi, 2014). In more recent tendency towards openness to the integration of ICT in Kuwaiti schools, the Kuwaiti Ministry of Education and the National Center for Educational Development of Kuwait in association with some international organizations developed the National Curriculum and Standards (NCT) for ICT in primary education (Mohammad et al., 2016). The NCT "highlights the ways in which ICT is connected to other subjects of the national curriculum, contributing, all together, to the full development and personal growth of the students to the level of achievement established in the national curriculum for the end of primary education" (Mohammad et al., 2016, p.7). Furthermore, the Kuwaiti Ministry of Education and the Kuwaiti Central Agency for Information Technology signed a memorandum of understanding that aimed to enhance the use of technology in schools and the development of information infrastructure (Academia newspaper, 2016).

Similar to the Kuwaiti stakeholders' interest in integrating ICT in the K12 educational system, the Kuwaiti higher education stakeholders' has showed interest in the adoption of ICT in educational practice. For instance, Kuwait universities provide several electronic administrative and educational services for students and faculty members. Examples of these services include Office 365, Learning Management Systems (LMSs) e.g., Blackboard and Moodle, online training systems, email services, and students' registration systems (Kuwait University, 2018; PAAET, 2018). Furthermore, the statistics showed that 94% of the Kuwaiti educational institutions had access to the internet and 99.6% of the educational institutions offer Computer Assisted Instruction (CAI) and 77% provide Internet Assisted Instruction (IAI) (Al-Shatti, 2016).

Considering the high interest of the integration of ICT in education, the integral role of teachers in facilitating such integration, and the need for technical and pedagogical guidance for the integration of ICT, the aim of the study was to examine the degree of achieving ISTE standards among pre-service teachers at the college of basic education at the Public Authority for Applied Education and Training (PAAET) from their point of view. Achieving ISTE standards among pre-service teachers might be influenced by their demographic factors. The current study examine differences in the pre-service teachers' point of view of achieving ISTE standards based on some of their demographic variables that include gender, age, major, and academic year. In addition, the current study examined differences in the pre-service teachers' point of view of achieving ISTE standards based on some technology-related variables that include their technological competence, attitudes towards the use of technology, and extent of technology use.

This research would contribute in understanding the status of achieving ISTE standards among pre-service teachers as well as the various factors that would affect the achievement of these standards. The findings of the current might benefit higher education stakeholders who are responsible of integrating technology in university education in terms of guiding and evaluation higher education programs. The results of the current study might be used to modify higher education's lesson and curriculum in order to achieve meaningful and effective technology integration. In addition, training sessions might be designed and developed for faculty members and students in order to enhance the quality of their use of digital tools.

2. Previous Studies

In Kuwait, the great majority of current research into the use of ICT in education has focused on examining the extent of the students and instructors' use of ICT in their educational practice (Alharbi, 2014; Alanzi, 2016), examining students and instructors' perceptions of and attitudes toward the use of ICT for educational purposes (Almisad, 2015; Al-Hunaiyyan, Alhajri, & Al-Sharhan, 2016; Al-Sharef, Anderson, & Strivens, 2016; Meerza & Beauchamp, 2017), identifying the factors that would affect students and instructors' use and perceptions of ICT in their education (Almisad, 2015; Al-Hunaiyyan, Alhajri, & Al-Sharhan, 2016), and investigating students and instructors' skills in using ICT (Buarki, 2016). The general findings of these research studies showed that the students and their instructors had the fundamental or technical knowledge and skills to successfully integrate ICT in their educational practice. They had relatively positive perceptions of and attitudes toward the use of ICT for educational purposes. Furthermore, the research have identified several factors that might affect students and instructors' attitudes toward and use of ICT for educational purposes; some of these factors were demographic variables (Alharbi, 2014; Alanzi, 2016), others were related ICT ease of use and ICT support (Meerza & Beauchamp, 2017;), and social and cultural factors (Al-Hunaiyyan, Alhajri, & Al-Sharhan, 2016). However, the investigation of effective implementation of ICT in the educational practice in Kuwaiti higher education is still limited (Alharbi, 2014; Al-Sharef, Anderson, & Strivens, 2016; Ali, 2017).

In Kuwait, there is lack of research studies that focused on the pedagogy associated with the use of ICT for educational purpose. ISTE provides set of standards represent framework that can be used to guide the integration of technology in education. In addition, these standards offer outline for pre-service teachers and teachers to identify and rate their accomplishments in effective integrating ICT in their educational practice. These standards were used in some research studies as indicators of the quantity and quality of the integration of ICT in education. For instance, Ayad and Ajrami (2017) conducted a study that investigated the extent of employment of ISTE standards in technical education colleges in Gaza Strip of Palestine. The sample for the study consisted of 71 teachers and 186 students in these colleges. The researchers used a cross-sectional study design in which the participants completed a questionnaire. The results showed that the teachers and students believed that the degree of employment of ISTE standards in the colleges was low.

In another study, Bajabaa (2017) conducted a study that examined the extent that the technology integration practices of faculty members in a college of education at a university in Saudi Arabia were aligned with a previous version of ISTE standards called the National Educational Technology Standards for Teachers (NETS•T) and the factors that would predict the faculty members' technology integration practices. The sample for the study consisted of 170 faculty members. The researchers used a cross-sectional study design in which the participants completed an electronic questionnaire. The results showed that the faculty members' integration of technology practices highly matched NETS•T. Furthermore, the regression analysis showed that 43% of the variance of the faculty members' integration of technology practices can be accounted for by its linear relationship with the independent variables (attitudes towards technology use, pedagogical beliefs, technical skills, workload, professional development, technology access, technical support, and leadership support). In addition, the results showed that among the examined factors, only faculty members' attitudes towards technology use and their technical skills had statistically significant positive relationships with faculty members' technology integration practices.

In USA, Lewis, (2015) examined pre-service teachers' familiarity with NETS•T. The sample consisted of 62 students registered in the teachers college preparation programs. Most of the participants had experience in teaching through participating in student teaching practicum. The researcher used a cross-sectional study design in which the participants identified their level of awareness of each NETS•T. In addition, follow-up individual interviews were conducted with 15 participants. The results showed that the participants had a minimum knowledge awareness of the examined standards, where they were at the "Literacy Lvel". The results indicated that the participants "can use technology skills when prompted and explore technology independently" (p.235). In another study that focused on pre-service teachers' NETS•T performance, Banister and Vannatta, (2012) examined the proficiencies of final year student teachers in relationship to the NETS•T using Wayfind Teacher Assessment (WTA) (Learning.com, 2012). The sample for the study consisted of 194 teacher candidates in their final year of study. The researchers used a cross-sectional study design in which the participants completed an online WTA. The results showed that the participants were proficient in each indicators that include, student learning and creativity, digital age learning experiences and assessments, digital age work and learning, digital citizenship and responsibility, and professional growth and leadership. However, the participants mean score in the digital citizenship and responsibility indicator was the lowest.

Most of the studies that used ISTE standards focused on pre-service teachers and teachers' familiarity and competences regarding ISTE standards (Banister & Vannatta, 2012; Lewis, 2015; Ayad & Ajrami, 2017). The studies showed mixed results regarding pre-service teachers and teachers' abilities regarding ISTE standards. The current research was among the first of its kind that address the extent of achieving the ISTE standards among student teachers at Kuwaiti higher educational system, where it can be considered a baseline in relation to the use of ISTE standards in education in the Kuwaiti educational system. The aim of the study was two-fold; first, to examine the degree of achieving ISTE standards among students at college of education in a university in Kuwait from their point of views and second, to examine differences in the students' point of views of achieving ISTE standards based on their gender, age, major, academic year, their technological competence, their attitudes towards the use of technology, and their extent of technology use.

3. Methodology

This study used a quantitative research method approach in which data was collected using a questionnaire instrument. The questionnaire instrument was designed to examine student teachers' views of the degree of achieving ISTE standards and the independent variables that include their gender, age, major, academic year, their technological competence, their attitudes towards the use of technology, and their extent of technology use.

3.1 Study Population and Sample

The study population was all the students at the college of basic education at the Public Authority for Applied Education and Training (PAAET). The sample consisted form the students who were enrolled in different courses in the college in the summer semester in the academic year of 2018/2019. The participating courses were selected based on faculty members' readiness to participate in the study. Two hundred and eight three students participated in the study. The questionnaire instrument collected demographic data on the participants. Table 1 shows descriptive summary of participants' demographic data. The collected demographic data include participants' gender, age, major, and academic year.

Table 1. Descriptive Summary of Participants' Demographic Data

	Category	Frequency	Percent
Gender	Male	219	77.4
	Female	64	22.6
Age	18-20	29	10.2
	21-25	199	70.3
	26-30	25	8.8
	31-35	12	4.2
	36-40	14	4.9
	>40	4	1.4
Major	Computer Education	60	21.2
	Physical Education	25	8.8
	Special Education	25	8.8
	Arabic Language Education	24	8.5
	Islamic Education	23	8.1
	Electrical Education	18	6.4
	English Language education	17	6.0
	Science Education	17	6.0
	Math Education	16	5.7
	Art Education	14	4.9
	Music Education	8	2.8
	French Language Education	8	2.8
	Others	28	9
Academic year	1	7	2.5
	2	9	3.2
	3	82	29.0
	4	131	46.3
	5	54	19.1

3.2 Data Collection Instrument

The use of questionnaires to collect data is very common in social studies. Gall, Gall, and Borg, (2003) reported that the questionnaires are commonly used to collect data about incidents that were not directly visible, such as point of views and perceptions. Questionnaires are considered as cost and time effective tools to collect data from large number of respondents compared with other data collocation methods (Gall, Gall, & Borg, 2003). The instrument consisted of five parts. The first part collected data regarding pre-service teachers' demographic data such as gender, age, major, and academic year. The second part collected date regarding pre-service teachers' achievement of ISTE standards. The third, fourth, and fifth parts addressed pre-service teachers' attitudes towards the use of technology, their technological competence, and their extent of technology use, respectively. The second, fourth, and fifth parts of the used instrument used five-point Likert-type scale. The third part used eight answer options ranged from many times a day to never. The researcher developed the instrument based on examined literature. Table 2 shows samples of the items in the used questionnaire instrument.

Table 2. Examples of the Items in the Used Questionnaire Instrument

Examples of the Items in the Used Questionnaire Instrument		
First scale	**Demographic data**	
	Age, gender, major, academic year	
Second Scale	**Pre-service teachers' perceptions of the achievement of ISTE standards**	
	Empowered learner	I use technology to define and achieve my educational goals.
	Digital citizen	I use the Internet and social networking sites in a positive, legal and ethical way.
	Knowledge constructor	I use technology to search for information that contributes in my intellectual and creative growth.
	Innovative designer	I use technology in the design processes that aim to generate new ideas, test theories, develop works of art, and solve real problems.
	Computational thinker	I use technology to solve practical problems through data analysis, modeling and computational thinking.
	Creative communicator	I use a variety of technologies (visual instruments, models and simulations) to communicate complex ideas to others clearly and effectively.
	Global collaborator	I use digital tools to communicate with learners from different backgrounds and cultures to exchange experiences and understand them.
Third scale	**Pre-service teachers' attitudes towards the use of technology**	
	I like using technology in the university education process.	
	I believe that using technology in university education is a good idea.	
Fourth scale	**Pre-service teachers' perceptions of their technological competence**	
	I have basic computer knowledge and skills.	
	I can describe 5 programs or electronic applications that I would like to use in the learning process.	
Fifth scale	**Pre-service teachers' perceptions of their extent of technology use**	
	I use the internet.....	
	I use the social media.....	

To improve data analysis and comparability, items addressing pre-service teachers' extent of technology use were re-coded. Table 3 shows new codes for answers to the questions related to pre-service teachers' extent of technology use.

Table 3. New Codes for Answers to the Questions Related to Pre-service teachers' Extent of Technology Use

Options	New code
Many times a day	Always
2-3 times a day	
Once a day,	Often
2-6 times a week	
Once a week	Rarely
2-3 times a month	
Once a month	Seldom
Never	Never

The validity of the questionnaire instrument was verified through asking group of expert to review the instrument. The reliability of the questionnaire instrument was verified through determining the Cronbach's alpha coefficients (Table 4). The values of Cronbach's Alpha indicated good internal consistency of the items in the scales (Aron, Aron, & Coups, 2005).

Table 4. Summary of Reliability Analysis (N=283)

Scale	Number of Scale Items	Cronbach's Alpha
Empowered learner	4	.705
Digital citizen	4	.744
Knowledge constructor	4	.761
Innovative designer	4	.805
Computational thinker	4	.768
Creative communicator	4	.807
Global collaborator	4	.850
Overall achievement of ISTE standards scale	28	.939
Attitudes towards the use of technology scale	5	.925
Technological competence scale	13	.924
* Extent of technology use scale	11	.692

1 = "Strongly Disagree", 2 = "Disagree", 3 = "Neutral", 4 = "Agree", 5 = "Strongly Agree".

*1= "Never", 2= "Seldom", 3= "Rarely """, 4= "Often". 5 = "Always".

3.3 Data Collection Procedure

The data was collected over one round within the first few weeks in in the summer semester in the academic year of 2018/2019. Based on faculty members' readiness to participate in the study, classes participated in the current study. The pre-service teachers were asked to complete the online questionnaires in the class in order to increase the response rate. The pre-service teachers used their smartphones to complete the questionnaire.

3.4 Data Analysis

Data was analyzed using SPSS 25.0. Frequency distributions were calculated for participants' demographic data. Descriptive statistics that include means and standard deviations were used to illustrate pre-service teachers' point of views of achieving ISTE standards, their technological competence, their attitudes towards the use of technology, and extent of technology use. Independent sample t-tests conducted to examine the differences in pre-service teachers' point of view of achieving ISTE standards based on their gender. Analysis of Variance (ANOVA) were conducted to examine the differences in pre-service teachers' point of view of achieving ISTE standards based on their age, major, academic year. Correlation and regression analysis were used to examine relationships between the independent variables (pre-service teachers' attitudes towards the use of technology, pre-service teachers' perceptions of their technological competences, and pre-service teachers' extent of using technology) and the dependent variable (pre-service teachers' perceptions of the achievement of ISTE standards).

The interpretation for the mean scores has been modified to describe the levels of pre-service teachers' achievements

of ISTE standards, their technological competence, their attitudes towards the use of technology, and their extent of using technology. Table 5 shows the description of the levels of the mean scores on 5-point Likert scale.

Table 5. The Description of the Levels of the Mean Scores of 5-point Likert Scale

Mean scores	Level
1 to 2.33	low
2.34 to 3.66	Moderate
3.66 to 5	High

4. Results

4.1 The Degree of Achieving ISTE Standards

The results regarding pre-service teachers' views of the degree of achieving ISTE standards suggest that the pre-service teachers had positive views of achieving ISTE standards. In addition, the participants had positive attitudes towards the use of technology, perceptions of their technological competences and extent of using technology. Table 6 shows the means, standard deviations, and the levels of participants' views of achieving of each ISTE standard, the overall achievement of ISTE standards, participants' attitudes towards the use of technology, participants' perceptions of their technological competence, and participants' perceptions of the extent of using technology.

Table 6. Descriptive Statistics of Participants' Responses to Achieving ISTE Standards, Attitudes towards the Use of Technology, Technological Competence, and Extent of Technology Use Scales

Scales	M	SD	Level
Empowered learner	4.25	.51	High
Digital citizen	4.42	.52	High
Knowledge constructor	4.12	.60	High
Innovative designer	4.03	.64	High
Computational thinker	3.95	.65	High
Creative communicator	4.13	.62	High
Global collaborator	4.03	.69	High
*Overall achievement of ISTE standards scale	4.13	.48	High
*Attitudes towards the use of technology scale	4.26	.67	High
*Technological competence scale	4.30	.53	High
**Extent of technology use scale	4.35	.50	High

* 1 = "Strongly Disagree", 2 = "Disagree", 3 = "Neutral", 4 = "Agree", 5 = "Strongly Agree".
**1= "Never", 2= "Seldom", 3= "Rarely """, 4= "Often". 5 = "Always".

The student teachers' agreement of the achievement of ISTE standards were between "agree" and "strongly agree" (*M = 4.35, SD = .50*) at high level. Student teachers' responses to ISTE standards showed that they had high level of the achievement of ISTE standards. The results showed that the student teachers' believed that they achieved "Digital citizen standard" the most (*M=4.42, SD=.52*), while they achieved "Computational thinker standard" the least (*M=3.95, SD=.65*). The participants' attitudes towards the use of technology were between "positive" and "strongly positive" (*M = 4.26, SD = .67*). The participants' perceptions of their technological competence between "agree" and "strongly agree" (*M = 4.30, SD = .53*). The participants' perceptions of the extent of using technology were between "Often" and "Always". (*M = 4.35, SD = .50*).

4.2 The Degree of Achieving ISTE Standards and Gender

Student teachers' responses to the achievement of ISTE standards were compared based on their gender through t-tests. Table 7 shows the results of descriptive statistics and t-tests for the the achievement of ISTE standards by gender. The results showed insignificant variations between female and male pre-service teachers on their achievement of each ISTE standard and the overall achievement of ISTE standards. The male and female student teachers' believed that they achieved ISTE standard and the overall of ISTE standards more almost at the same level.

Table 7. The Results of t-tests and Descriptive Statistics for the Achievement of ISTE Standards by Gender

| Outcome | Group | | | | | | | | |
| | Male | | | Female | | | | | |
	M	SD	n	M	SD	n	t	df	p
Empowered learner	4.36	.44	64	4.22	.52	219	-1.87	281	.06
Digital citizen	4.49	.53	64	4.40	.52	219	-1.23	281	.22
Knowledge constructor	4.17	.65	64	4.11	.59	219	-.77	281	.44
Innovative designer	4.07	.71	64	4.02	.61	219	-.55	281	.58
Computational thinker	4.07	.64	64	3.92	.65	219	-1.69	281	.09
Creative communicator	4.25	.57	64	4.10	.63	219	-1.78	281	.08
Global collaborator	4.14	.73	64	4.00	.68	219	-1.47	281	.14
*Overall achievement of ISTE standards scale	4.22	.47	64	4.11	.48	219	-1.68	281	.09

4.3 The Degree of Achieving ISTE Standards and Age

A one-way ANOVA was used to compare pre-service teachers' responses to the achievement of ISTE standards based on their age (Table 8). The results showed that student teachers' views of achieving ISTE standards did not differ based on their age.

Table 8. One-Way ANOVA- pre-service Teachers' Responses to the Achievement of ISTE Standards for Age

Outcome	df	F	p	η^2
Empowered learner	5	1.33	.25	.023
Digital citizen	5	1.94	.09	.034
Knowledge constructor	5	.52	.76	.009
Innovative designer	5	.72	.61	.013
Computational thinker	5	1.63	.15	.029
Creative communicator	5	.57	.73	.010
Global collaborator	5	.71	.62	.013
*Overall achievement of ISTE standards scale	5	.98	.43	.017

Note. 1 = "18-20", 2 = "20-25", 3 = "26-30", 4 = "31-35", 5 = "36-40", 6 = "More than 40".

4.4 The Degree of Achieving ISTE Standards and Major

A one-way ANOVA was used to compare pre-service teachers' responses to the achievement of ISTE standards based on their major (Table 9). The results showed that student teachers' views of achieving ISTE standards did not differ based on their major.

Table 9. One-Way ANOVA- student Teachers' Responses to the Achievement of ISTE Standards for Major

Outcome	df	F	p	η^2
Empowered learner	5	1.38	.17	.058
Digital citizen	5	1.18	.30	.050
Knowledge constructor	5	.95	.50	.040
Innovative designer	5	.65	.80	.028
Computational thinker	5	.76	.69	.033
Creative communicator	5	.59	.85	.025
Global collaborator	5	.95	.50	.040
*Overall achievement of ISTE standards scale	5	.84	.60	.036

4.5 The Degree of Achieving ISTE Standards and Academic Year

A one-way ANOVA was used to compare student teachers' responses to the achievement of ISTE standards based on their academic year (Table 10). The results showed that student teachers' views of achieving ISTE standards did not differ based on their academic year.

Table 10. One-Way ANOVA-student Teachers' Responses to the Achievement of ISTE Standards for Academic Year

Outcome	df	F	p	η^2
Empowered learner	5	.72	.58	.010
Digital citizen	5	1.75	.14	.025
Knowledge constructor	5	2.19	.07	.030
Innovative designer	5	.99	.41	.014
Computational thinker	5	1.02	.40	.014
Creative communicator	5	2.08	.08	.029
Global collaborator	5	1.29	.27	.018
*Overall achievement of ISTE standards scale	5	1.62	.17	.023

Note. 1 = "First academic year", 2 = "Second academic year", 3 = "Third academic year", 4 = "Fourth academic year", 5 = "Fifth academic year".

4.6 The Association of Achieving ISTE Standards and the Three Variables: Attitudes towards the Use of Technology, Technological Competence, and extent of Technology Use

The correlation tests were conducted to evaluate the strength of relationship between the dependant variable: overall pre-service teachers' perceptions of the achievement of ISTE standards and the independent variables: pre-service teachers' attitudes towards the use of technology, pre-service teachers' perceptions of their technological competences, and pre-service teachers' extent of using technology. Table 11 shows the results of the correlation tests.

Table 11. Bivariate Correlations among the Dependant Variable and the Independent Variables

	Overall achievement of ISTE standards scale	Overall attitudes towards the use of technology scale	Overall technological competence scale
Overall achievement of ISTE standards scale	1		
Overall attitudes towards the use of technology scale	.48**	1	
Overall technological competence scale	.54**	55**	1
Overall extent of technology use scale	.36**	32**	38**

The correlation tests demonstrated that there were significant associations among the dependent variable and the independent variables. The results showed that the strongest association was between dependant variable: overall pre-service teachers' perceptions of the achievement of ISTE standards and the independent variable: pre-service teachers' perceptions of their technological competences r = .54, p < .05. Regression analysis was carried out to examine the strength of relationships between the dependant variable and the independent variables. (Table 12).

Table 12. Multiple Regression on Dependent Variable (Achievement of ISTE Standards)

	B	SE B	Beta	
(Constant)	1.405	.234		.000
Overall attitudes towards the use of technology scale	.175	.041	.244	.000
Overall technological competence scale	.316	.053	.351	.000
Overall extent of technology use scale	.145	.050	.151	.004

The results of the regression analysis indicated that the three predictors pre-service teachers' attitudes towards the use of technology, pre-service teachers' perceptions of their technological competences, and pre-service teachers' extent of using technology explained 36% of overall pre-service teachers' perceptions of the achievement of ISTE

standards variance ($R=.603$, $F(2,279)=53.01$, $p<.05$). In order to inspect the strength of the effect of each independent variable on the dependent variable, the size of standardized coefficients (Beta) were examined. The results showed that pre-service teachers' perceptions of their technological competences had the most significant contribution in predicting overall pre-service teachers' perceptions of the achievement of ISTE standards ($\beta = .351$, $p<.05$) followed by pre-service teachers' attitudes towards the use of technology ($\beta = .244$, $p<.05$), then pre-service teachers' extent of using technology ($\beta = .151$, $p<.05$).

5. Discussion

The integration of technology is an integral part of teaching and learning process. The integration of technology in teacher education programs has been investigated over the past few decades in order to apply and formulate best practices for integration of technology in the preparation of pre-service teachers. In Kuwait, the vast majority of the research that related to the use of technology in education focused on students' and instructors' perceptions of, use of, and attitudes toward the use of technology in education (Almisad, 2015; Buarki, 2016; Meerza, & Beauchamp, 2017). The current study focused on the extent of achieving the ISTE standards among student teachers at Kuwaiti higher educational system and the factors that would influence the extent of achieving these standards.

Most participants expressed positive perceptions of achieving ISTE standards. They believed that they had high level of achievement of each of ISTE standard and of the overall achievement of the standards. The results showed that the student teachers' believed that they achieved "digital citizen standard" the most, while they achieved "computational thinker standard" the least. Students' positive and high level of agreement for achieving "digital citizen standard" might be explained by the traditional values participants that focused on protecting of privacy. For instance, Abokhodair, Abbar, Vieweg, & Mejova (2016) stated that:

The concept of privacy is held within high regard among citizens of the Gulf Cooperation Council......They all have a majority Muslim population who adhere to a conservative interpretation of religious texts, follow societal norms that are dictated by a patriarchal system, and follow Islamic—or Sharia—law.(p.66)

A possible explanation of low perceptions of the achievement "computational thinker standard" is that teaching computational thinking and problem solving skills were not common in higher educational systems (Czerkawski & Lyman, 2015).

This finding related to the students' positive perceptions of the achievement of ISTE standards is aligned with similar research studies that showed that that the faculty members' integration of technology practices highly matched technology-integration standards in the college of education (Bajabaa, 2017) and that college of education students were familiar technology-integration standards (Banister & Vannatta, 2012; Lewis, 2015).While the finding did not align with other research studies that found that the teachers and students believed that the degree of employment of ISTE standards in colleges of education was low (Ayad & Ajrami, 2017).

The results showed insignificant variations in students' perceptions of the achievement of ISTE standards based on their gender, age, major, and academic year. Furthermore, the results showed that students' perceptions of the achievement of ISTE standards had significant relationships with students' attitudes towards the use of technology, students' perceptions of their technological competences, and students' extent of using technology. However, the low value of R-squared indicated that there were more factors rather than attitudes, competences, and uses that would explain students' perceptions of the achievement of ISTE standards. The results regarding significant relationships between students' perceptions of the achievement of ISTE standards and students' attitudes towards the use of technology, students' perceptions of their technological competences, and students' extent of using technology aligned with the findings of similar research studies (e.g., Bajabaa, 2017).

6. Conclusion and Recommendations

ISTE standards have provided important guidance on how to integrate technology in education. ISTE standards plays integral role in evaluating the ways of integrating technology in education. Pre-service teachers would be responsible on effective use of technology education. The current research focuses pre-service teachers' views of achieving ISTE standards and the factors that might affect the achievement of these standards. Some of these factors were related to the demographic characteristics of the student teachers' i.e., gender, age, major, and academic year, while the other factors were related student teachers' perceptions and attitudes toward technology i.e., attitudes towards the use of technology, technological competence, and extent of technology use. Student teachers' responses to ISTE standards showed that they had high level of the achievement of ISTE standards. The results showed that student teachers'

views of achieving ISTE standards did not differ based on their gender, age, major, and academic year. But there were significant variations in their views of achieving ISTE standards based on their attitudes towards the use of technology, perceptions of technological competence, and their extent of technology use. Based on the findings it can be concluded that achieving ISTE standards is not depend on gender, age, major, and academic year variable and attitudes towards the use of technology, perceptions of technological competence, and their extent of technology use had important roles in achieving ISTE standards.

Due to the importance of ISTE standards in guiding and evaluating the integration of technology in education as well as the important roles teachers in the academic process, there is need to enhance the achievement of ISTE standards among pre-service teachers through providing specialized training sessions that aim to enhance pre-service teachers' knowledge and skills of achieving ISTE standards, that specifically true for the standards that scored the lowest e.g., computational thinker standard. In terms of the relationship between pre-service teachers' views of achieving ISTE standards and the examined variables, finding suggest that to enhance pre-service teachers' achievement of ISTE standards there is a need to enhance their attitudes towards the use of technology, technological competence, and the extent of their use of technology.

Achieving ISTE standards among university students and teachers needs more attention, research and scrutiny in the Arab world in general and in Kuwait in particular. There is limited number of research related to the achievement of ISTE standards in Arab world in general and in Kuwait in particular. Future research can examine the achievement of ISTE standards among university faculty members, university students, and in-service teachers. Future research can examine other factors that would affect the achievement of ISTE standards among various stakeholders. Various research methods e.g., qualitative and mixed that employ and various data collections methods e.g., questioners, interviews and observations can be used in future research to examine, in depth, the achievement of ISTE standards and the factors that might affect such achievement. There is a need to conduct large scale research that involves various stakeholders in order to verify the compliance with ISTE standards on the level of educational institutions e.g., schools and universities. Furthermore, topics that might be discussed in future research may include the designing training workshop based on ISTE standards and academic accreditation and ISTE standard.

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