Teaching in Digital Age: College of Education Students and in-Service Teachers' Confidence in Integrating Information and Communication Technology (ICT) in their Educational Practice

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Abstract

The current study aims to examine college of education students' and in-service teachers' confidence in integrating information and communication technology (ICT) into their educational practice. In addition, the study examined the variations in participants'' confidence in integrating ICT into the educational practice based on a set of variables. The study followed a descriptive research design in which a questionnaire instrument was used to collect data. The questionnaire was developed based on Technology Integration Confidence Scale (TICS). Two hundred thirty-eight Kuwaiti college of education students and 85 in-service teachers completed the questionnaire. The results showed that the confidence level of college of education students and in-service teachers in integrating ICT into their educational practice is ranging between "fairly" to "quite" confident. In addition, in the favor of the students, the findings showed that there were statistically significant differences between the college of education students and in-service teachers in only one dimension out of the five dimensions of TICS which was the technology application dimension. Furthermore, the results showed there were no significant variations in the participants' confidence in integrating ICT into educational practice based on their demographic variables. A series of recommendations were presented in light of the findings.

Keywords: Confidence, Technology, Students, Teachers

1. Introduction

As ICT continues to advance, its influence and integration into various aspects of life becomes more and more pronounced. Education is no exception, as ICT has become a crucial and multi-faceted aspect of the learning process, shaping the way knowledge is acquired, distributed and evaluated. The increasing dependence on ICT worldwide has opened up a wealth of opportunities for students to engage in new and dynamic learning experiences, while also transforming the way educators deliver instruction and assess student progress. Technology has revolutionized education by making it more interactive, allowing students to actively engage with the material, and fostering a proactive approach where personalized learning experiences cater to individual needs (Raja & Nagasubramani, 2018). It has transformed the educational landscape from passive consumption of information to an active pursuit of knowledge (Raja & Nagasubramani, 2018). ICT can be used in education in different ways. Technology can act as part of the educational curriculum, the main educational delivery system, teaching aids, and tools to improve all aspects of learning. Examples of ICT tools that have potential application in education include computers, internet, learning management systems, educational software, online course platforms, video conferencing tools, interactive whiteboards educational apps, e-books and digital libraries, augmented reality, virtual reality , podcasts and audiobooks, online assessments and quizzes, cloud computing, social media, educational robotics and coding kits, artificial intelligence in education, wearable devices, online collaborative tools, language learning software and educational gamification platforms.

Teaching in the digital age has undergone significant changes in the past few decades. With the rapid advancement of ICT, teachers and students alike now have access to an array of digital tools that can make the learning experience more engaging and effective. Several interrelated

factors contribute to the increase in the applications of ICT in education; some of these factors are directly related to the characteristics of such technology in terms of providing powerful capabilities for education and learning, being easy to use, being constantly evolving, being interactive and dynamic, and getting smaller in size. Furthermore, the factors related to the diffusion of technology in education are better understood from the perspectives of different stakeholders in the education process. For students, the use of ICT can save their time (Gullen & Zimmerman, 2013), enhance their learning (Dunn & Kennedy, 2019), provide various information resources, and improve their creativity (Tang, Mao, Xing, & Naumann, 2022), For educators, the use of ICT can enhance their teaching practice (Al-Haj, 2020), allow them to use new and various teaching methods (Shyr & Chen, 2018), improve their students' motivation and engagement (Dunn & Kennedy, 2019), facilitate active learning (Shi, Yang, MacLeod, Zhang, & Yang, 2020), and facilitate collaborative learning (Zheng, Zhang, & Gyasi, 2019). For administrators, the use of ICT can facilitate administrative tasks (Al-Namlan & Al-Shnegy, 2022), facilitate different modes of instruction (Feenberg, 2019), increase access to education (Raja & Nagasubramani, 2018), enhance justice, inclusion, and digital citizenship (Miller, 2022). ICT played an integral role in the past few years after the Corona pandemic struck the world, confining students and their teachers to their homes and closing schools and universities. ICT tools were widely used to facilitate distance learning during the pandemic time. Teaching in the digital age integrates ICT into the learning process, promoting student-centered and interactive learning, with a focus on collaboration, critical thinking, and problem-solving skills.

Teachers need to continuously update their knowledge and skills in order to effectively integrate ICT into their lessons. The rapid pace of technological change means that teachers must be continuously learning and adapting in order to stay up-to-date and effectively use ICT in their classrooms. Teachers should believe in their capacity to use and apply ICT in the classroom to benefit their students in the right ways in the era of rapid development of technologies (Henriksen, Mehta, & Rosenberg, 2019). When it comes to ICT, understanding teachers' confidence concerning ICT integration in education provides several benefits for the teachers themselves and for the administrators who are responsible for the process of ICT integration in education. Knowing the degrees of the teacher's confidence concerning ICT integration in education can contribute to the development of their technological and pedagogical knowledge and skills in relation to ICT integration in education. For instance, the teachers who were identified as having low confidence concerning ICT integration in education can make a better effort to develop their performance. On the other side, the teachers, who were identified as having high confidence in technology integration in their educational practice, would reinforce and strengthen their attitudes and behaviors concerning the use and application of technology. The clarity of the degrees of ICT integration confidence of the teachers can help administrators select and develop the needed professional development intervention to enhance teachers' ICT integration confidence.

For ICT deployments to be successful, teachers must be knowledgeable, skilled, and engaged. The use of ICT should not be random. The use of ICT in education should be based on well-established technology integration standards to ensure systematic implementation of such

technology and to maximize the benefits of ICT integration in education. The implementation of ICT based on technology integration standards would involve using creative pedagogical techniques to support students' learning. The International Society for Technology in Education (ISTE) standards represent a framework that would help students to be empowered learners, digital citizens, knowledge constructors, innovative designers, computational thinkers, creative communicators, and global collaborators (ISTE, 2017A).

To ensure informed and effective decision-making regarding ICT integration in education, it is paramount for educational practitioners to undertake comprehensive assessments of both pre-service and in-service teachers' confidence in utilizing ICT as a valuable tool in their teaching practices. This evaluation should go beyond merely gauging their confidence levels and delve into a thorough examination of their proficiency in technology integration, aligning with established standards and best practices in the field. Additionally, the assessment process must consider various factors that may influence teachers' confidence, such as their prior experience with technology, training opportunities, age, academic background, and the supportive learning environment they operate in. By conducting such a multifaceted evaluation, educational stakeholders can gain valuable insights into the current state of technology integration in classrooms, identify areas for improvement, and develop targeted interventions and support mechanisms to empower educators in their ICT adoption journey. Ultimately, this holistic approach to assessing teachers' confidence in utilizing ICT will pave the way for a more impactful and successful integration of technology to enhance teaching and learning experiences.

The current study aims to examine the level of confidence in integrating ICT into their educational practice among Kuwaiti college of education students and in-service teachers. Additionally, the study explores the differences between college of education students and in-service teachers regarding their confidence in ICT integration. Moreover, the research investigates variations in the confidence levels of Kuwaiti college of education students and in-service teachers in using ICT in the classroom, considering certain demographic variables. The following section provides a brief overview of educators' technology self-efficacy and the ISTE (2017) Standards for Educators.

2. Theoretical Framework

2.1 Teachers' Confidence in Integrating Technology into Education

Teachers' confidence in integrating ICT into education is directly related to their technology integration self-efficacy (Beard, 2016). In general, the concept of self-efficacy is based on social cognitive theory (Bandura, 1997). Self-efficacy was defined "as a person's belief in his or her capability to successfully perform a particular task". (Heslin & Klehe, 2006, p.705). Two types of expectations i.e., outcome expectations and efficacy expectations as well as individual characteristics govern whether the person would engage in a specific behavior (Lenz, 2002). From the previous explanation of self-efficacy, teachers' self-efficacy does not just focus on their ideas, learning capacities how well they would perform in educational situations, but also on their capacity to put these ideas into practice by turning them into academic accomplishments (Klaeijsen, Vermeulen, & Martens, 2018). Besides the effect of teachers' self-

efficacy on their academic behaviors and tasks, teachers' self-efficacy is directly related to their level of academic performance. The literature provides several characteristics of self-efficacy, self-efficacy is a personal and social-cognitive variable (DuCharme & Brawley, 1995) it is the process of knowing and appreciating one's mental potential (Tsang, Hui, & Law, 2011) it is a developmental variable that change with time and experience (Schunk & Pajares, 2002).

The literature showed that teachers' self-efficacy is a complex concept that is related to several variables such as job satisfaction (Türkoglu, Cansoy, & Parlar, 2017), motivations for teaching (Türkoglu, Cansoy, & Parlar, 2017), and students' academic achievement (Caprara, Barbaranelli, Steca, & Malone, 2006). Technology integration self-efficacy is related to teachers' abilities to integrate ICT into their educational practice. Technology integration that works for students and teachers depends on teachers' ability to use this technology in the right ways and under the right circumstances. Teachers' beliefs about technology are directly related to the intention to integrate and the actual integration of such technology in education (Govender & Govender, 2009; Seifu, 2020). Nowadays, there are increasing numbers of ICT tools that have educational potential for teachers such as computers, internet, learning management systems, educational software, online course platforms, video conferencing tools, interactive whiteboards educational apps, e-books and digital libraries, augmented reality, virtual reality , podcasts and audiobooks, online assessments and quizzes, cloud computing, social media, educational robotics and coding kits, artificial intelligence in education, wearable devices, online collaborative tools, language learning software and educational gamification platforms. The integration of such tools needs careful planning and needs an understanding of the main stakeholders in the process i.e., teachers' confidence to use and apply such tools in their educational practice.

2.2 ISTE Standards for Educators

When it comes to the process of integrating ICT into education, what matters is how it is used—that is, by combining the right ICT tool with the right teaching approach to achieve the intended educational goal. This means that the emphasis should be on learning objectives rather than the use of ICT tools that are accessible (Alharbi, 2021). Some organizations are devoted to establishing theoretical frameworks that focus on providing students with the required competencies in the current digital era. One of these organizations is the International Society for Technology in Education (ISTE). The ISTE (2017) has four sets of standards: for students, teachers, education leaders, and couches.

The ISTE Standards provide the competencies for learning, teaching, and leading in the digital age, providing a comprehensive roadmap for the effective use of technology in schools worldwide. Grounded in learning science research and based on practitioner experience, the ISTE Standards ensure that using technology for learning can create high-impact, sustainable, scalable, and equitable learning experiences for all learners (ISTE, 2017B).

The ISTE (2017) Standards for Educators focus on using technology to teach, lead, and empower students in light of technological advancements and expanding access to the Internet inside and outside of school. The standards were formulated based on feedback from over 2,000 educators and administrators throughout the 2016–2017 academic years (Trust, 2018). The

ISTE (2017) Standards for Educators shift the focus from teaching with technology to using technology to empower learners in the educational process and enable future-ready education (Trust, 2018; Miller, 2022). The ISTE (2017) Standards for Educators include seven standards. These standards represent a guide for teachers to help them to assist pupils in becoming independent learners. These standards encourage teachers to reevaluate conventional methods, enrich their practice, foster peer collaboration, and help to prepare students to be active participants in their learning. Teachers with proper competencies with ISTE (2017) Standards for Educators would demonstrate a successful model for following teachers and students on how to use technology for personal and educational purposes. These standards are:

- Learner: Educators continually improve their practice by learning from and with others and exploring proven and promising practices that leverage technology to improve student learning.

- Leader: Educators seek out opportunities for leadership to support student empowerment and success and to improve teaching and learning.

- Citizen: Educators inspire students to positively contribute to and responsibly participate in the digital world.

- Collaborator: Educators dedicate time to collaborate with both colleagues and students to improve practice, discover and share resources and ideas, and solve problems.

- Designer: Educators design authentic, learner-driven activities and environments that recognize and accommodate learner variability.

- Facilitator: Educators facilitate learning with technology to support student achievement of the ISTE Standards for Students.

- Analyst: Educators understand and use data to drive their instruction and support students in achieving their learning goals. (ISTE, 2017C).

ISTE (2017) standards were used as a framework to develop training programs to improve teaching practices and professional leadership skills among educators (Al-Enzi, 2021) to evaluate higher education programs that involve using technology (Almoeather & Alodan, 2020) to evaluate technology education courses (Baek & Sung, 2020) evaluation of the technology textbooks (Alawneh, 2020), design learning environments (Aqel, 2021), design educational courses (Hanselman, Zou, & Liu, 2019) and formulate the future educational system in some countries (Ibrahem & Al-Nafi, 2020). The various uses of ISTE (2017) standards in education reflect the validity and importance of such standards. There increasing number of studies that examined students, teachers, faculty members, and educational leaders' achievements or competencies concerning ISTE (2017) standards (Bajabaa, 2017; Ayad & Ajrami, 2017; Miller, 2022; Gomez, Trespalacios, Hsu, & Yang, 2022). Such use of these standards would reflect their significance to guide the use of ICT tool in educational practice and serve as a theoretical framework for the research studies that examine the use of ICT in education. The current study used a data collection instrument that was developed based on

ISTE (2017) Standards for Educators. The following section provides a presentation of the previous studies that examined future teachers' and in-service teachers' confidence in integrating technology based on ISTE (2017) Standards.

2.3 Previous Studies

Worldwide, some studies examined the future and in-service teachers' confidence to integrate ICT based on ISTE (2017) standards. For instance, in the United State, Kimm, Kim, Baek, and Chen, (2020) conducted a study that aimed to investigate pre-service teachers' confidence in their ISTE (2017) technology competency. The researchers followed a descriptive research design in which 242 teacher candidates in teacher preparation programs completed a questionnaire that was developed based on the ISTE (2017) Standards for Educators. The results showed that participants did not believe that they had attained a level of technical proficiency that satisfies ISTE (2017) requirements. In addition, there were variations in their level of technology competency based on their major.

In another study in the USA, Gomez, Trespalacios, Hsu, & Yang, (2022) conducted a study that aimed to examine teachers' confidence to integrate technology in K-12 classrooms. The researchers used a descriptive research design in which 327 teachers completed a questionnaire. The questionnaire used Technology Integration Confidence Scale (TICS) version 3 which was developed based on ISTE (2017) Standards for Educators. The results showed that the participants had a fair degree of confidence in using and integrating technology ($M = 3.2$, $SD = .73$) in the classroom.

In Korea, Baek and Sung (2020) conducted a study that aimed to examine the perceptions of pre-service teachers regarding their level of technical competencies based on the ISTE (2017) technology Standards for Educators. The researchers followed a descriptive research design, in which a total of 342 students in the college of education completed a questionnaire. The results showed that the participants believed that they had a quite low level of technology competencies based on the ISTE (2017) technology Standards for Educators.

In the Arab world, some studies focused on pre and in-service teachers' use and perceptions of the use of ISTE (2017) Standards. The studies that focused on the pre-service teachers employed ISTE (2017) Standards for Students, while the studies that focused on the in-service teachers employed ISTE (2017) Standards for Educators. For instance, Hakami (2019) examined the achievement degree of ISTE (2017) Standards for Students among students at a college of education in Saudi Arabia. The researchers used a descriptive research design in which 458 students completed a questionnaire with 7 dimensions based on ISTE (2017) Standards for Students. The results showed that the degree of achievement of ISTE (2017) Standards for Students among students was intermediate and there were no differences in the degree of achievement of ISTE (2017) Standards for Students among students based on students' gender and major. However, there were differences in the degree of achievement of ISTE (2017) Standards for Students among students based on their level of education. The students in the Ph.D. program had a higher degree of achievement of ISTE (2017) Standards for Students compared to the students in the master's program.

In Palestine, Ayad & Ajrami, (2017) conducted a study that aimed to investigate the degree of implementing ISTE (2017) Standards for Educators and Students in technical education. The researcher followed a descriptive research design in which 71 teachers and 186 students completed a questionnaire. The findings indicated that teachers and students in colleges of technical education were only partially implementing ISTE (2017) Standards; the degree of implementing ISTE (2017) standards was low among teachers and students.

In Kuwait, Almisad, (2020) investigated the degree of achieving ISTE (2017) Standards for Students among pre-service teachers at a college of education in a university in Kuwait and the differences in achieving ISTE (2017) based on students' gender, age, major, academic year, technological competence, their attitudes towards the use of technology, and their extent of technology use. The researcher used a cross-sectional survey design in which 238 students completed a questionnaire. The result showed that the students believed that they had positive and high levels of achieving ISTE (2017) Standards for Students. Students' achievement of ISTE (2017) standards did not differ based on their gender, age, major, and academic year. However, students' achievement of ISTE (2017) standards differed based on their attitudes towards the use of technology, perceptions of their technological competencies, and the extent of using technology.

In another study in Kuwait, Safra and Aga (2019) investigated teachers' perceptions towards implementing ISTE (2017) Standards for Students in general education schools as well as the differences in their perceptions based on some variables. The researchers followed a descriptive research design, where three hundred and eighty-three students completed a questionnaire. The results showed that the teachers had positive and high levels of perception towards implementing ISTE (2017) Standards for Students in general education schools. In addition, the results showed that the participants' perceptions differed based on some independent variables, i.e., qualification and educational stage. In another study by the same authors, Safra and Aga (2020) investigated in-service teachers' desire to use and apply ISTE (2017) Standards for Educators in general education. A descriptive research design was used. Eight hundred and thirty-seven teachers completed a questionnaire. The findings indicated that the teachers had a medium degree (*M = 3.57, SD = 0.85*) of desire to integrate the seven standards into general education. In addition, the findings indicated that the teachers with high experience and the teachers who were teaching middle-stage students had a higher degree of desire to integrate the ISTE (2017) in general education compared to the teachers with less experience and teachers who were teaching different-stage students respectively.

The previous results showed variations in the use of ISTE (2017) standards in the educational context. The aim of the current study was similar to the aims of some previous studies in terms of examining participants' confidence to integrate ICT based on ISTE (2017) Standards for Educators (Gomez, Trespalacios, Hsu, & Yang, 2022), while the aim was different from other research studies that examined the employment of ISTE (2017) Standards for Students (Hakami, 2019; Baek & Sung, 2020; Kimm, Kim, Baek, & Chen, 2020) and teachers' desire to employ of ISTE Standards for Educators (Safra & Aga, 2020).

In addition, the current study differed from previous studies in examining the variations in their

confidence to employ ISTE (2017) Standards for Educators in their educational practice based on their gender, age, major, academic year, and experience. Some of the previous studies examined the achievement of ISTE (2017) Standards for Students among college of education students from their perspectives (Almisad, 2020) and the perspective of teachers (Safra & Aga, 2019).

The participants in the current study were the college of education students and in-service teachers in Kuwait. The participants in the current study differed from the participants in all previous studies that focused on either on pre-service teachers (Hakami, 2019; Almisad, 2020; Kimm, Kim, Baek, & Chen, 2020) or in-service teachers (Gomez, Trespalacios, Hsu, & Yang, 2022; Safra & Aga, 2020). The used research design in the current studies was similar to used research designs in the previous studies. The current study used a descriptive research design that suits the purpose of the study. The current study used the Technology Integration Confidence Scale (TICS) version 3 which was used in one of the previous studies (Gomez, Trespalacios, Hsu, & Yang, 2022).

2.4 Purpose of the Study

The current study aims to examine Kuwaiti college of education students and in-service teachers' confidence in integrating ICT into their educational practice In addition, the study examined the differences between the college of education students and in-service teachers in their level of confidence in integrating ICT into their educational practice. Furthermore, the study examined the variations in Kuwaiti college of education students' and in-service teachers' confidence in integrating technology in the classroom based on some demographic variables.

The research questions of this study were:

- Research Question 1: What is the level of Kuwaiti college of education students' confidence in integrating ICT into their educational practice?

- Research Question 2: What is the level of Kuwaiti in-service teachers' confidence in integrating ICT into their educational practice?

- Research Question 3: Is there a difference between the college of education students and in-service teachers in their level of confidence in integrating ICT into educational practice?

- Research Question 4: What are the relationships between the overall level of Kuwaiti college of education students' confidence in integrating ICT into their educational practice and their gender, age, major, and academic year?

- Research Question 5: What are the relationships between the level of Kuwaiti in-service teachers' confidence in integrating ICT into their educational practice and their age, major, and experience?

The current study used a cross-sectional, non-experimental, descriptive quantitative research methodology. A survey questionnaire was used to collect the data. Surveys help gather data from many people. The questionnaire was utilized in this study to investigate participant

characteristics and the level of their confidence in integrating technology.

3. Participants

Two groups of participants participated in the current study. Two hundred and thirty-eight students, who were studying in the college of basic education at a university in Kuwait, completed the questionnaire. In addition, eight five in-service teachers who were working in different Kuwaiti schools completed the questionnaire. The questionnaire collected the individual characteristics of the participants. From the college of education students, the questionnaire collected demographic data including gender, age, major, and academic year (Table 1). From the in-services teachers, the questionnaire collected individual characteristics that include gender, age, major, and experience, (Table 2).

Table 1. Summary of the college of education students' characteristics

	Category	Frequency	Percent
Gender	Male	40	16.8
	Female	198	83.2
Age	18-20	122	51.3
	21-25	90	37.8
	26-30	10	4.2
	31-35	5	2.1
	36 and above	11	4.6
Academic year	1	48	20.2
	2	103	43.3
	3	47	19.7
	4	37	15.5
		3	1.3
Major	Islamic education	79	33.2
	Arabic language education	36	15.1
	Physical education	32	13.4
	English language education	24	10.1
	Science education	15	6.3
	Art education	13	5.5

Home economics education	11	4.6	
Interior design education	8	3.4	
Others	20	8.4	

Table 1 shows dissimilarities in participants' gender, age, and majors. The variations in Kuwaiti college of education students' characteristics made it possible to compare the level of their confidence in integrating technology into their educational practice based on these variables.

Table 2. Summary of in-service teachers' characteristics

	Category	Frequency	Percent
Gender	Female	85	100
	Male	0	0
Age	21-25 years old	8	9.4
	26-30 years old	15	17.6
	31-35 years old	15	17.6
	36 and above years old	47	55.3
Major	Arabic language education	19	22.4
	Science	17	20
	Islamic education	10	11.8
	English language education	10	11.8
	Computer science	10	11.8
	Others	19	22.4
Experience	1-5 years	17	20.0
	6-10 years	19	22.4
	11-15 years	15	17.6
	16-20 years	18	21.2
	21-25 years	13	15.3
	26-30 years	2	2.4

Table 2 shows that all the in-service teachers, who participated in the current study, were female. However, there were variations in the participants' age, majors, and experiences. Such variations made it possible to compare the level of their confidence in integrating technology into their educational practice based on these variables.

3.1 Instrument

The used instrument to collect data in the current study was a questionnaire. The questionnaire consisted of two parts. The first part collected data regarding the participants' characteristics. The second part was the Technology Integration Confidence Scale (TICS) version 3 (Gomez, 2020) used in one of the previous studies (Gomez, Trespalacios, Hsu, & Yang, 2022). TICS was developed based on ISTE (2017) Standards for Educators. TICS's dimensions do not directly match the seven subscales of the ISTE (2017) Standards for Educators but are instead in line with the general framework for integrating technology in education (Gomez, 2020). Based on Gomez, (2020) the TICS consists of five dimensions with 25 items. The five dimensions were technology usage, technology application, technology-infused learning, technology literacy & digital citizenship, and technology-supported assessment. The definitions of each dimension, the number of items in each dimension, and an example of the questions in each dimension are presented in Table 3. The table was based on a previous study (Gomez, 2020, p.150; Gomez, Trespalacios, Hsu, & Yang, 2022, p.167). The confidence rate in the scale was measured using 6 options: 0 - Not confident at all 1 - Slightly confident 2 - Somewhat confident 3 - Fairly confident 4 - Quite confident 5 - Completely confident (Gomez, 2020, p.150). The students completed an Arabic version of the TICS. The TICS was translated into the Arabic language by the researcher.

Table 3. The Dimensions of Technology Integration Confidence Scale (TICS) version 3 (Gomez, 2020, p., 140; Gomez, Trespalacios, Hsu, & Yang, 2022, p.167).

Dimension	Definition	# of items	Example item
Technology Usage	…. confidence in utilizing and demonstrating technological devices and digital tools to facilitate student learning	7	How confident are you in facilitating and supporting student learning opportunities with technology?
Technology Application	…. confidence to incorporate technological devices in lessons, offer digital tool chances for student benefit in instruction.	5	How confident are you in using technology to create, adapt, and personalize learning experiences that foster independent learning and accommodate learner differences and needs?
Technology-infused Learning	…. confidence to adopt student-centered learning with technology effectively in classroom instruction.	5	How confident are you in using technology to support student needs through increased personalization and differentiation?
Technology Literacy & Digital Citizenship	…. confidence in using technology to enhance learning via effective communication and promoting students' aptitude for appropriate technological skills and concepts.	4	How confident are you in teaching students to think critically, be safe, and be responsible in the digital world?
Technology-supported Assessment	…. confidence in establishing an environment that integrates suitable technology for valuable assessment and feedback delivery.	4	How confident are you in using digital tools to provide immediate feedback to students?

3.2 Setting and Procedure

The study was conducted during the first semester of the academic year 2022–2023. The first group of participants consisted of students at the college of education at a university in Kuwait. Some professors from the college of education were contacted to request permission to have their students participate in the study. A group of professors gave their consent to have their students take part in the study. An electronic link for the questionnaire was posted on the website of course. The students' participation in the study was voluntary. To have in-service teachers participating in the study, the researchers contacted principals of a group of female schools to post the link of the electronic questionnaire on the social media groups of these schools. Some principals agreed to invite the teachers in their schools to complete the questionnaire on behalf of the researchers. The in-service teachers' participation in the study was voluntary. All the participants were asked to provide their consent to participate in the study.

3.3 Data Analysis

Teachers' characteristics were presented using frequency distributions. Means and standard deviations were used to answer the first and second research questions in terms of the level of Kuwaiti college of education students' confidence in integrating ICT into their educational practice. The third question regarding the difference between the college of education students and in-service teachers in their level of confidence in integrating ICT into educational practice was answered using t-tests. The fourth question was answered using the t-tests and the analysis of variance (ANOVA). To examine the variations in the level of Kuwaiti college of education students' confidence in integrating ICT into their educational practice based on their gender, t-tests were performed. To examine the variations in the level of the college of education students' confidence in integrating ICT into their educational practice based on their age, academic year, and major, the analysis of variance (ANOVA) method were performed. The fifth question regarding the variations in the level of in-service teachers' confidence in integrating ICT into their educational practice based on their age, experience, and major, was answered using the analysis of variance (ANOVA).

4. Results and Discussion

Research Question 1: What is the level of Kuwaiti college of education students' confidence in integrating ICT into their educational practice?

The results showed that Kuwaiti college of education students ranged between "fairly" to "quite" confident concerning integrating ICT into their educational practice ($M = 3.97, SD = .85$). Table 4 shows that the students responded most positively to the technology usage dimension ($M = 4.06, SD = .83$) and least positively to technology-supported assessment dimension ($M = 3.89, SD = 1.03$). The changes in teaching methods and introduction of different types of technologies in the educational process, especially in the past period that accompanied the emergence of Covid-19, might contribute to such findings related to the students' confidence in integrating technology into their educational practice. The findings did not align with the findings of some previous studies that showed that future teachers reported low to medium

levels of ICT competencies based on the ISTE (2017) technology Standards for Educators (Ayad & Ajrami, 2017; Hakami, 2019; Kimm, Kim, Baek, &Chen, 2020; Baek & Sung, 2020). However, the findings aligned with the findings of some previous studies that showed that the students believed that they had positive and high levels of achieving another form of ISTE (2017) Standards that was designated for Students (Almisad, 2020).

Table 4. Descriptive statistics of the college of education students' responses to TICS (n =238)

N	Dimension	M	SD
1.	Technology Usage	4.06	.83
2.	Technology Application	3.97	.94
3.	Technology-infused Learning	4.04	.90
4.	Technology Literacy & Digital Citizenship	3.91	1.03
5.	Technology-supported Assessment	3.89	1.03
	Total	3.97	.85

Research Question 2: What is the level of Kuwaiti in-service teachers' confidence in integrating ICT into their educational practice?

The results showed that Kuwaiti in-service teachers ranged between "fairly" to "quite" confident concerning integrating ICT into their educational practice (*M = 3.79, SD = .87*). Table 5 shows that the teachers responded most positively to the technology usage dimension (*M = 3.93, SD = .87*) and least positively to technology literacy and digital Citizenship dimension (*M = 3.70, SD = 1.02*). A similar explanation to the results of the college of education students' high level of confidence in integrating ICT into their educational practice might be applied to the current results. The findings did not align with the findings of some previous studies that showed that the teachers reported, a medium level of technology competencies based on the ISTE (2017) technology Standards for Educators (Safra & Aga, 2020; Gomez, Trespalacios, Hsu, & Yang, 2022).

Table 5. Descriptive statistics of in-service teachers' responses to TICS (n = 85)

N	Dimension	M	SD
1.	Technology Usage	3.93	.87
2.	Technology Application	3.72	.97
3.	Technology-infused Learning	3.85	.88
4.	Technology Literacy & Digital Citizenship	3.70	1.02
5.	Technology-supported Assessment	3.72	1.01
	Total	3.79	.87

Research Question 3: Is there a difference between the college of education students and in-service teachers in their level of confidence in integrating ICT into educational practice?

The mean difference indicated that college of education students were apparently more confident in integrating ICT into their educational practice compared to in-service teachers. While overall confidence levels between the two groups showed statistically insignificant variations, there were significant differences in the "technology application" dimension of confidence. In this dimension, college of education students exhibited higher confidence than in-service teachers. One possible explanation for these findings is recent exposure, college students, especially those pursuing degrees related to education or technology, are likely to have been exposed to modern teaching methods and digital tools during their studies. They may have received up-to-date training and coursework that emphasizes the importance of technology in education. Table 6 shows the results of t-tests.

Table 6. Results of t-tests that examined the differences in the college of education students and in-service teachers' confidence in integrating ICT into their educational practice

N	Outcome	t	df	Mean difference	p
1.	Technology Usage	1.25	321	.13	.21
2.	Technology Application	2.08	321	.25	.04*
3.	Technology-infused Learning	1.66	321	.19	.10
4.	Technology Literacy & Digital Citizenship	1.55	321	.20	.12
5.	Technology-supported Assessment	1.34	321	.17	.18
6.	Total	1.76	321	.19	.08

* Significant at 0.05 level.

Research Question 4: What are the relationships between the overall level of Kuwaiti college of education students' confidence in integrating ICT into their educational practice and their gender, age, major, and academic year?

The results of the t-test showed that there were no statically significant differences in the overall level of Kuwaiti college of education students' confidence in integrating ICT into their educational practice based on their gender, t (236) =-1.03, p<.05. Table 7 shows the results of the t-test.

The results showed that there were statistically insignificant differences in the overall level of Kuwaiti college of education students' confidence in integrating ICT into their educational practice based on their age, academic year, and major. Table 8 shows the findings of a one-way ANOVA that was used to compare Kuwaiti college of education students' confidence in integrating ICT into their educational practice based on their age, academic year, and major. The findings suggest that gender, age, academic year, and major has no effect of the Kuwaiti college of education students' confidence concerning integrating ICT into their educational practice.

Regardless of gender, age, academic year, or major, college of education students might receive similar exposure and training in ICT integration as part of their teacher preparation program. The curriculum might be designed to provide all students with equal opportunities to develop their technological skills and confidence. Moreover, the college of education program may foster a supportive and inclusive learning environment where all students, irrespective of their demographic characteristics, are encouraged to explore and utilize ICT in their educational practice. This supportive atmosphere can lead to consistent confidence levels across diverse student groups. Additionally, college students, regardless of their background, might belong to a generation that is generally technologically proficient. This familiarity with digital tools could

contribute to a uniform level of confidence in using ICT among all students.

Table 7. Results of t-tests and descriptive statistics of the college of education students' overall responses to TICS based on their gender (n = 238)

Outcome	Group						t	df	p
	Male			Female					
	M	SD	n	M	SD	n			
The overall response to TICS	4.1	0.83	40	3.95	0.85	198	-1.03	236	0.31

Table 8. One-Way ANOVA- college of education students' overall responses to TICS based on their age, academic year, and major (n=238)

Outcome	df	F	p
Age	4	0.95	0.26
Academic year	4	0.16	0.96
Major	8	0.52	0.68

Research Question 5: What are the relationships between the level of Kuwaiti in-service teachers' confidence in integrating ICT into their educational practice and their age, major, and experience?

The results showed that there were statistically insignificant differences in the overall level of Kuwaiti in-service teachers' confidence in integrating ICT into their educational practice based on their age, experience, and major. Table 9 shows the findings of a one-way ANOVA that was used to compare Kuwaiti in-service teachers' confidence in integrating ICT into their educational practice based on their age, experience, and major. The findings suggest that gender, age, academic year, and major has no effect of the Kuwaiti in-service teachers' confidence concerning integrating ICT into their educational practice. The combination of professional development opportunities, experience with technology, a supportive school culture, technological proficiency, growth mindset, alignment with pedagogical goals, focus on teaching skillset, and the desire for effective teaching can explain why age, academic year, and major have no significant effect on teachers' confidence in integrating ICT into their educational practice.

Table 9. One-Way ANOVA- in-service teachers' responses to TICS based on their age academic year and major (n = 85)

Outcome	df	F	p
Age	3	.420	0.74
Experience	5	0.56	0.73
Major	5	0.71	0.62

5. Conclusion and Recommendations

In conclusion, this study provided useful insights into the state of the college of education students' and in-service teachers' confidence in integrating ICT into their educational practice in Kuwait. Nowadays college of education students and in-service teachers have reasonable confidence in integrating ICT into their educational practice. College of education students had relatively higher confidence in integrating ICT into their educational practice compared to in-service teachers. Participants' confidence in integrating ICT into their educational practice did not affect by their demographic variables. There is a need to strengthen and increase college of education students' and in-service teachers' confidence. To strengthen and increase college of education students' and in-service teachers' confidence in integrating technology in education, a multifaceted approach can be adopted. First, provide comprehensive and ongoing training sessions that cover both fundamental technological skills and advanced pedagogical techniques. Organize hands-on workshops where educators can experiment with various digital tools and software, enabling them to design and implement technology-enhanced lessons. Foster supportive learning communities where teachers can collaborate, share experiences, and learn from one another's successes and challenges. Ensure access to a wide range of technology resources and establish mentoring programs where experienced technology-integrated educators can guide and support their colleagues. Recognize and celebrate educators who successfully integrate technology, offer professional development incentives, and emphasize the importance of pedagogy in technology integration. By incorporating these strategies, educational institutions can create a nurturing environment that empowers educators to embrace technology with confidence and effectiveness, ultimately enhancing the quality of teaching and enriching student learning experiences. Furthermore, the finding that college students are more confident in ICT use than in-service teachers highlights the need for ongoing professional development, collaboration, and a proactive approach to technology integration. Teachers should continuously adapt and learn to create a technology-enhanced learning environment that benefits both themselves and their students.

The present findings represent a significant stepping stone for future research in this area. To fortify and augment the depth of the discussion, it is imperative to undertake further investigation by expanding the participant pool to encompass a larger and more diverse group, reflecting a broader range of demographic characteristics. By doing so, the validity of the current findings will be reinforced, and a comprehensive understanding of the subject can be

achieved. To achieve a more comprehensive analysis, it is advisable to employ qualitative or mixed methodologies, allowing for a profound examination of Kuwaiti educators' confidence in integrating ICT into their educational practice. Such approaches would enable researchers to delve into the underlying factors that influence educators' confidence levels, leading to a more nuanced and insightful interpretation of the results. Furthermore, by engaging in this deeper exploration, we can identify potential barriers or facilitators that affect educators' confidence, shedding light on areas that may require targeted support or intervention. Additionally, exploring the specific challenges faced by educators in Kuwait when implementing ICT in their teaching practices could unveil valuable insights to enhance future educational strategies and policies. Ultimately, this concerted effort to enrich the research will contribute significantly to the advancement of the field and potentially lead to the development of more effective practices and guidelines for integrating ICT into education in Kuwait and beyond.

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