

Pre-service Special Education Teachers' Knowledge and Perceptions of Using Computer Technology in Teaching from PST Perspectives

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Summary

The study aims to discover the scope of pre-service special education teachers' knowledge and perceptions of using computer technology in teaching students with disabilities from a pre-service teacher (PST) perspective in light of the gender and sub-major variables. The sample consisted of 84 MEd students/pre-service teachers at the Department of Special Education, Faculty of Education, Umm Al-Qura University. The descriptive analytical approach is used due to its relevance to the study. A survey consisting of the participant's basic information section and 12 statements was sent to a set of pre-service teachers. Findings showed that pre-service special education teachers had an overall high knowledge of using computer technology ($M=3.93$). Findings also indicated that there were no gender- or major-related statistically significant differences ($\alpha = 0.05$), in pre-service special education students' knowledge and perceptions of using computer technology.

Keywords: *pre-service special education teachers, computer technology, students with disabilities.*

1. Introduction

Today's world undergoes successive transformations in scientific knowledge, information and communication systems, and rapid developments in all scientific, educational and psychological fields. As a result, it affects ways of practically applying scientific knowledge in human life. Traditional approaches focusing on the structure of knowledge have become increasingly obsolete. The focus is shifted to ways of thinking and application of knowledge. Computer-based technology is vastly expanding and will likely lead to individual creativity in providing high quality education. Computer technology has a high potential of improving the various practical, theoretical and educational sectors. With the aim of reaching distinct levels of technological advancement, it leads to an increase in productivity in the various fields of human endeavor. Creative teaching is characterized by innovation, fluency, flexibility and originality, all of which can be enhanced by utilizing computer technology. This technology is not simply a set of educational materials that can be employed by teachers

to help them explain or add to the information they present in class. More specifically, it is an integrated system with embedded new educational visions that involve both teacher and learner (Ripat & Woodgate, 2017). In the field of special education, there is an urgent need to develop the education system for students with disabilities in a manner that takes into account their capabilities and potentials, and meets future requirements. The role of special education teachers appears significant owing to the fact they maintain direct contact with those students in terms of mentoring them and modifying their behavior. Obviously, computer technology has become a basic requirement in teaching students with disabilities, as technology provides creative solutions that enable individuals with disabilities to be more independent, productive, and integrated in society. Moreover, it enables them to overcome obstacles and challenges (Wallace & Georgina, 2014).

Computer technology is also considered one of the key educational tools used in the field of education. In recent years, interest in utilizing computer technology and applications in teaching individuals with disabilities has reached unprecedented stages. Advancement in the social, health, educational and technological fields has led to a focus on introducing quality programs in teaching students with disabilities. Computer technology is used to help these students learn, have fun, achieve independence and integrate into society (McMahon et al., 2016). As a medium of advanced technology, computers are a valuable tool in the field of learning and teaching of students with disabilities in various subjects, to the extent of becoming a widespread phenomenon that has its own implications, justifications and effects in education. A key development in the utilization of computers in education involves providing learners with educational experiences that meet their educational aptitude and capabilities.

Computer technology provides learners with opportunities to advance in their educational achievement at a pace matching their capacities. This in turn improves the quality of learning and its impact in guiding individuals and managing their education. The successful and widespread use of computers in education depends on interactively linking computers and supporting technological tools and programs to teaching strategies so that they can serve specific educational goals (Tsarinas & Xinogalos, 2019). Computer technology can also help students acquire

Moreover, computer technology plays an important role in improving students' skills, motivating them to learn, and providing them with an unbiased way of acquiring knowledge (Adam & Tatnall, 2017). It also provides full lessons while allowing learners to repeat any part of a lesson several times, and places questions and exercises at the end of each lesson (Tsarinas & Xinogalos, 2019). Using computer technology in the classroom helps teachers individualize teaching and present materials in more adaptive ways. The use of information and communications technology (ICT) also enhances the independence of learners with disabilities (LDs) and equips them with the appropriate skills that allow them to pursue their education and join the normal work environment (Adam & Tatnall, 2017).

In addition, computer technology is useful not only in providing educational content, but also in enhancing learner-computer interaction (Lewandowski et al., 2016), teachers' skills and LDs' learning processes, as well as incorporating audiovisual stimuli and encouraging learners to discipline themselves (Belson, 2003). For example, learners may use word processors to complete their tasks and manage linguistic errors (Montgomery & Marks, 2006). The application of computer technology in LD teaching also helps improve output, and enhances the teaching and learning processes in an inclusive educational environment (Michaels & McDermott, 2003; Schlosser & Wendt, 2008). However, reports indicate that only a low percentage of individuals with disabilities receive computer technology services (World Health Organization, 2015). Despite the utilization of computer technology in diverse tasks such as preparing materials, entering grades, or searching for information, (Russell et al., 2003), teachers rarely use computers for educational purposes (Lambert et al., 2008; Ma et al., 2008).

This paper aims to explore the scope of pre-service

An online survey was developed using *Google Forms* to collect the required data. The survey was e-mailed to participants, who were requested to read the consent section first and to indicate whether they would be willing

academic skills, such as reading, writing, and spelling as well as social skills by helping them adapt to society (Lewandowski et al., 2016). It can also enable teachers to have access to general curricula that motivate students to read and encourage the use of digital and supported texts in reading comprehension for learners with dyslexia, as well as increase learners' writing productivity (Russell et al., 2003).

special education teachers' knowledge and perceptions of using computer technology in LD teaching from a pre-service teacher perspective. It also seeks to determine the gender- and major-based differences in pre-service special education teachers' knowledge and perceptions of the application of computer technology in LD teaching through answering the following questions:

-To what extent are pre-service special education teachers informed of and how do they perceive the use of computer technology in LD teaching?

- Are there any gender-related statistically significant differences at ($\alpha = 0.05$) level in the pre-service special education teachers' degree of knowledge of using computer technology in LD teaching?

-Are there any sub-major-related statistically significant differences at ($\alpha = 0.05$), in the pre-service special education teachers' degree of knowledge of using computer technology in LD teaching?

2. Method

The current paper employed the descriptive analytical approach due to its relevance to the objectives of the study. The descriptive approach is defined as "Describing the phenomenon that a researcher seeks to examine and collecting accurate descriptions and information about it. The descriptive approach relies on examining reality and provides accurate qualitative and quantitative description of the phenomenon in question" (Othman, 2009, p. 84). A total of 84 pre-service special education teachers, pursuing their MEd degree at the Department of Special Education, Faculty of Education, Umm Al-Qura University, participated in the survey (See Table 1). The study population consisted of 36 males and 48 females. Based on the technology standards of the International Society for Technology in Education (ISTE) and surveys available in literature (Koc & Bakir, 201

to participate in the study. Those who agreed to participate were directed to the survey page. The survey consisted of two parts. The first part consisted of the respondents' basic data which are related to study variables; i.e. gender and

sub-major, objective of the study, and how to answer the survey. The second part comprised only a single section consisting of 12 statements to discover the scope of pre-service special education teachers' knowledge and perceptions of using computer technology. The survey made use of the five-point Likert gradation scale (strongly agree = 5, agree = 4, neutral = 3, Disagree = 2, Strongly Disagree = 1) (See Table 1). The statistical software SPSS 10 was employed to process the data for quantitative analysis. Since the main objective of this paper is the pre-service special education teachers' knowledge and perceptions of utilizing computer technology in LD teaching from PST perspective, and determining differences in relations to the gender and sub-major variables. The descriptive statistics such as frequency, percentage, mean and standard deviation were calculated to summarize the data.

Table (1): Points and limits of the range of findings criteria according to the five-point Likert scale

Point	Criteria	Range	
		from	to
5	strongly agree	4.20	5
4	agree	3.40	4.20
3	neutral	2.60	3.40
2	disagree	1.80	2.60
1	strongly disagree	1	1.80
Point	Criteria	Range	

Table (2) Distribution of the study sample by gender and sub-major

Gender	Repetition	Percentage
male	36	42.9
female	48	57.1
Sub-major	Repetition	Percentage
mental disability	52	61.9
learning difficulties	27	32.1
hearing impairment	1	1.2
early intervention	2	2.4
autism spectrum disorders	1	1.2
visual disability	0	0
behavioral disorders and autism	1	1.2
Total	84	100%

3.Findings

This paper aimed to explore the extent of pre-service special education teachers' knowledge and perceptions of using computer technology in LD teaching from a PST perspective. It also sought to determine gender- and major-based differences in pre-service special education teachers' knowledge and perceptions of utilizing computer technology in LD teaching.

To answer the first question, the researcher calculated the mean, standard deviation, and the cumulative mean of the pre-service teacher responses to the scale statements, as shown in Table(3).

Table (3):Pre-service SE Teachers' Knowledge & Perceptions of Using Computer technology in LD Teaching.

No.	Statement	Mean	Standard deviation	Ranking
1	I am comfortable with planning lessons and curriculums that involve student use of technology during instruction.	3.95	0.79	5
2	I am prepared to use technology to regularly communicate and collaborate with peers in the field of education.	4.62	0.56	1
3	I need training to learn how to integrate Computer technology into my instruction in order to enhance student learning.	3.73	1.19	8
4	I was trained at college/university in this respect, so that I consider computer technology an integral component of all aspects of teaching and learning.	3.67	1.17	10
5	I can use computers as drill-practice and tutorial tools in my instruction.	4.36	0.57	3
6	I find technology frustrating to use when I do not receive adequate support.	3.00	1.29	12
7	I can use computers to engage students in critical and higher-order thinking.	3.93	0.89	6
8	I am well prepared for using technology as a teaching tool.	4.57	0.65	2
9	In my education courses, I received adequate training on the effective use of technology as a learning tool for students.	3.48	1.09	11
10	I can develop strategies for using computer technology to individualize instruction and meet the needs of diverse learners.	3.68	0.92	9
11	As appropriate to my field, I am prepared to consider the social, ethical, and legal implications of using computer technology in my lessons.	4.25	0.66	4
12	When planning how to use Computer technology in teaching, I ensured that my selections are based on current research regarding the effectiveness of those technologies	3.90	0.97	7
overall average	3.93	0.37		

Table (3) above shows that knowledge of pre-service special education teachers of using Computer technology is generally high (M = 3.93). A high percentage of respondents strongly agree with statements 2, 8, 5, and 11 (M= 4.62, 4.57, 4.36, and 4.25), respectively. Similarly, a high percentage of respondents agree with statements 1, 7, 12, 3, 10, 4 and 9 (M = 3.95, 3.93, 3.90, 3.73, 3.68, 3.67, and 3.48), respectively. In the same vein, a high percentage of respondents are neutral to statement 6 (M = 3.00). Standard deviation ranges between (0.65, 1.29), which indicates homogeneity of the sample population.

Accordingly, the researcher believes that all participants agree with the pre-service special education teachers' knowledge and perceptions of using computer technology, (M = 3.93, SD = 0.37). These findings confirm the findings of two other researchers, Alanazy & Alrusaiyes (2021), who aimed to investigate prior experience of pre-service special education teachers in using computers applications. These findings revealed that pre-service special education teachers possessed of computer application knowledge and skills, but they lacked knowledge of integrating those techniques in teaching, which can be attributed to the fact that the curricula of pre-service teacher training programs focus heavily on theoretical aspects. Pre-service teachers have only meagre chances to apply their knowledge practically. This is confirmed by the findings of Baglama et al. (2017), which showed that special education teachers need to follow new trends and practices in technology to be able to integrate technology into education to meet the educational needs of their students. By doing so, they will be more beneficial to their students with disabilities. This finding is at odds with a study by Onivehu et al. (2017) and a study by Alkahtani (2013). Both demonstrated that teachers lacked sufficient skills and knowledge of using assistive technologies and that they needed more pre- and in-service training.

Findings related to the second research question

To answer this question, an independent samples t-test was calculated to determine the degree of gender-based difference of pre-service special education teachers' knowledge of using computer technology, as shown in Table (4) below.

Table 4 degree of gender-based difference of pre-service special education teachers' knowledge of using computer technology, as shown in Table

Gender	Number	Mean	Standard deviation	DF	(t) value	Significance Level
male	36	3.88	0.38	82	-1.04	0.82
female	48	3.96	0.36			insignificant

As demonstrated by Table (4) above, there is no evidence of statistically significant gender-based differences at (0.05) level in pre-service special education teachers' knowledge and perceptions of using computer technology. This finding is consistent with a study by Onivehu et al. (2017), which found that there was no evidence of statistically significant gender-based differences in teachers' knowledge of technological content. It also in consistence with Demirok & Baglama (2018), which showed that gender did not affect teachers' attitudes or efficiency in using assistive technologies. This finding differs from those findings of Yılmaz (2021) which demonstrated that male teachers were found to be more efficient in terms of theoretical knowledge of technology, while female teachers used their technological knowledge more effectively in the classroom, teaching and materials, as well as in communicating with both students and guardians.

Findings related to the third question

In answering this question, an ANOVA F-test was calculated to determine the scope of major-based differences in pre-service special education teachers' knowledge of using computer technology, as shown in Table (5) below.

Table (5) an ANOVA F-test

Source of variability	sum of squares	DF	Mean square	F value	Significance Level
Cross-group	0.509	5	0.102		
In-group	10.898	78	0.140		
Total	11.408	83		0.73	insignificant

The above table clearly demonstrates that there is no evidence of statistically significant major-based differences at (0.05) level in pre-service special education teachers' knowledge of using computer technology. Consequently, there are no major-based differences in the level of pre-service special education teachers' knowledge of using computer technology. This can be attributed to the fact that curricula of pre-service special education teachers' programs at Saudi universities do not differ from similar programs taught in the other disciplines, especially with regard to general courses such as the use of technology in LD teaching.

4. Discussion and Conclusion

This paper aimed to explore the extent of pre-service special education teachers' knowledge and perceptions of using computer technology in LD teaching from a PST perspective. It also sought to determine differences in pre-

service special education teachers' knowledge and perceptions of the application of computer technology based on the gender and sub-major variables. The findings demonstrate that pre-service special education teachers' knowledge of using computer technology was generally high ($M = 3.93$). Moreover, there was no evidence of statistically significant gender- or major-related differences at (0.05) level, in the views of pre-service special education teachers' regarding knowledge and perceptions of using computer technology. This paper contributes to the debate on training pre-service special education teachers to effectively utilize technology in practice and the effectiveness of pre-service teacher training programs. Additionally, the findings reveal that pre-service special education teachers possess theoretical knowledge of using computer technology in teaching students with disabilities.

This finding is consistent with a study by Alanazy & Alrusaiyes (2021), which aimed to investigate the prior experience of pre-service special education teachers in using computers, their awareness of knowledge, and their willingness to integrate computer technology into LD teaching in the Kingdom of Saudi Arabia. Findings of the study show that pre-service special education teachers possess the skills and knowledge of computer applications, but they lack knowledge of how to integrate those techniques in teaching. This can be attributed to the fact that the curricula of pre-service teacher training programs focus on the theoretical aspect, while paying little attention to the practical one. This was confirmed by Al-Hussein (2017), who indicated that the key challenges to teachers' application of computer technology in teaching students with disabilities in Saudi Arabia are in-service teacher undertraining and insufficient attention to the practical aspect. Perhaps this requires development of curricula at Saudi universities to focus on the use of technology in teaching students with disabilities. Curricula shall also incorporate the most recent innovations in the field of application of technology in LD teaching. This also requires allocating part of the special education teacher training programs for the practical application of technology in teaching LDs to bridge the gap between theory and practice. Finally, it involves conducting research at universities in the various regions of the Kingdom to examine the extent of special education teachers' knowledge and willingness to use technology in LD teaching and to determine the obstacles and challenges they face in utilizing technology in teaching.

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