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Reaching High Standards: Prospective Special Education Teachers Perceptions about Their Computer Competencies and the Usefulness of Computers in Teaching Students with Disabilities

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Abstract
The current study aimed at exploring prospective special education teachers perceptions about their computer competencies and the usefulness of computers in teaching students with disabilities. Sixty two prospective special education teachers were surveyed using a researcher-developed questionnaire. The results revealed distinguished and satisfactory levels of computer abilities in the areas of communication and information resources, and classroom management; and poor levels in the area of instruction and assessment. Moreover, prospective special education teachers did not seem to understand the role that can be played by computer technology in the teaching and learning of students with disabilities. Recommendations for enhancing teachers' technology preparation are also discussed.
Keywords: Special Education and Technology

1. Introduction

There is a general assumption that technology is very effective in improving students' learning and thinking kills, therefore, it is becoming a central element of educational reform(Cooper & Glen, 1997). Technology ought to be integrated into the curriculum, rather than being viewed as a separate subject matter to be taught(Duffield, 1997). As defined by the Individuals with Disabilities Education Act Amendments of 1997 (IDEA), an assistive technology device is "any piece of equipment, or product system ... that is used to increase, maintain, or improve functional capabilities of individuals with disabilities" Part A, Sec. 602(1). There are two main purposes of assistive technology: augmenting an individual's strengths, thereby counterbalancing the effects of the disability, and providing alternative forms of performing a task. (Lewis, 1998) Thus, the use of technology allows students to compensate for their disability or circumvent it entirely. . (Quenneville, 2001). For students with learning disabilities (LD), technology can be an assistive tool replacing an ability that is either missing or impaired. It provides the support needed to accomplish a task . (Quenneville, 2001)

During the past eight years, the National Council for Accreditation of Teacher Education (NCATE) in conjunction with the International Society for Technology in Education (ISTE) has develop several sets of guidelines and standards to strengthen the support for technology use and integration in professional teacher preparation programs. While each set of standards has provided further guidance to improving teacher education programs, each set has also called for a deeper commitment toward the infusion of technology by schools, colleges, and departments of education (SCDEs) Vannatta, Rachel A. (2000). Moreover, during the past decade, there has been strong support for enhancing an increasing the appropriate use of special education technology to assist learners with disabilities (Lewis, 1993; Male, 1994). Microcomputer-based technology can provide a breakthrough in education that may mean increased individualization and inclusion for all learners despite individual differences. Technologies exist today that allow individuals with disabilities to function at their fullest capacity in a non-disabled world. Langone, C.A.; Wissick, C.A. Langone, J. (1998). Using technology fosters belonging and interactive participation in general education classrooms for students with LD (Bryant & Bryant, 1998). Technology increases the frequency of assignment completion and contributes to improved motivation (Bahr, Nelson, and VanMeter, 1996). It therefore supports some of the basic objectives of inclusive education: a sense of belonging to group, shared activities with individual outcomes, and a balanced educational experience. (Quenneville, 2001).

Special needs educators must be knowledgeable about the best practices in the field to maximize the potential and ability of students with special needs to interact in a wide range of environments. Computers can play a substantial role in helping teachers accomplish these tasks. Computer competencies assume that special needs educators have a working knowledge of how to use a computer, load a program and create a file or directory. This knowledge is a prerequisite for all that follows (Beigel, 1996).

Special needs educators must be able to integrate technology use into more than one environment,

often at high levels involving cognitive processes and psychomotor activities. They must prepare plans for technology use in a variety of settings, evaluate other technologies, and develop appropriate transition plans for the learner. (Ingram, 1992). One important competency is the ability to evaluate and match software to a learner's skills and abilities. The evaluation process should include the traditional aspects of software evaluation as well as matching the software activities to a taxonomy of learning outcomes, such as Bloom's taxonomy. (Beigel, 1996). Appropriate software allows students to become active learners and reach their potential. This occurs when the special needs educator identifies the appropriate outcomes for learners and classifies them along a taxonomic continuum. The teacher must be confident that the selected software will help students achieve the desired outcomes. (Brooks & Kopp, 1989).

Another competency for special needs educators is to help students with special needs use computers as a personal productivity tool. Students with special needs can be guided to see that using a computer can improve their lives, both as students and as workers. Academically, a student with special needs may be able to use a word processor to overcome a physical problem with handwriting or a spreadsheet to improve math skills. Vocationally, the learner must be able to use the computer to maintain an equal footing with all other individuals. (Beigel, 1996). The competencies needed by special needs educators do not require a technical understanding of how the computer works or how software is written and created. Special needs educators must be able to take available technology and use it to create better learning environments for their students. These students can then reach their greatest level of independence, learning, and social interaction. (Beigel, 1996).

Regardless of the number of computers placed in classrooms, the key to how these computers are used is the teacher. For widespread classroom change to occur, teachers must accept computers as models of new processes for interpretation and abstraction of meaning and as models for investigating and knowing our complex world (Maddux, Johnson, & Willis, 1992). Although there is an increasing volume of computer hardware and software in schools, few teachers routinely use computers for instructional purposes (Yaghi, 1997).

Educators must become proactive in their technology-related professional development because teacher education programs have only recently begun addressing the technology skills of their students. This, in part, is because many teacher educators are not trained in assistive technology either, and in part because training programs are already packed with coursework addressing the many other competencies that special educators must have. Adding assistive technology to the program of studies is truly a dilemma for preservice and inservice teacher preparation programs. (Lahm, Elizabeth A.; Nickels, Beverly L., 1999)

Jonassen (1995) argues that learning should be contextualized and geared toward understanding the world. He believes that learning communities enable the learners to acquire the skills and knowledge needed for solving real world problems. He asserts that technology is needed for simulating real-world contexts and connecting communities of learners with the world. He believes that learning in schools should be active, constructive, collaborative, conversational, contextualized, and reflective. In this sense, technology should engage students in the learning process so that they can construct their own knowledge.

Personnel preparation programs in special education and related services are placing more emphasis on providing their graduates with competencies related to the infusion of special education technology. This infusion or integration of technology is important and central to the purpose of preparing teachers. A special education technology program (SET) was developed by Langone, Wissick and Langone (1998). As a basis for the program they decided that the infusion/integration of an innovation such as technology must go beyond the awareness stage of learning. They reported that to properly infuse technology, these advances should relate to Individual Education Plans (IEP) or Individual Transition Plans (ITP). For example, teachers should look carefully at IEP objectives, such as a student's need to gain skills in phonemic awareness, and then identify the technology solution that would best help the student gain these skills. The main program goal is to use technology to increase the independence of individuals with disabilities. Their program also provided opportunities for students to learn how to provide access and instruction in new technologies as they become available (Langone, Christine A.; Wissick, Cheryl A. Langone, John, 1998)

This raises the question on what should be done to help those teachers gain the proper technology competencies needed to successfully integrate technology into their classrooms. This issue motivated the International Society for Technology in Teacher Education (ISTE) to develop National Educational Technology Standards for teachers (Handler &Strudler, 1997). Those standards were adopted by the National Council for Accreditation of Teacher Education (NCATE). Consequently, schools of education seeking NCATE accreditation should adhere to these standards (Cooper & Glen, 1997).

2. Purpose of the study

The current study aims at exploring prospective special education teachers' (PSETs') perceptions about their own computer competencies and abilities, as well as their perceptions about using computers in teaching students with disabilities. More specifically, the study aims at answering the following three research questions:

- What levels of computer competencies do PSETs' at King Faisal University (KFU) have,

from their points of view?

- Are there significant differences among PSETs' computer competencies on the three competency areas?

3. Method

Participants:

The sample for the study consisted of 62 PSETs' at King Faisal University (KFU). All participants had to meet two conditions to participate in the study: (1) completion of teaching methods and educational technology courses.

Instruments:

The following instruments were used in the study:

Computer competency questionnaire (CCQ): The development of the questionnaire began with a review of the literature identifying computer competencies important for special education teachers. Those were used as the basis for writing 50 five-point Likert-type items where 1 = novice and 5 = expert. The draft questionnaire was reviewed by a group of specialized experts in the fields of educational technology and special education to test for importance and relevance.

The review resulted in a questionnaire with 23 items distributed into 3 categories: (1) instruction and assessment (10 items), (2) classroom management (7 items), and (3) communication and information resources (6 items). This version of the questionnaire was written in English. Then, it was translated into Arabic with extra care.

Cronbach's alpha was calculated for each of the three categories, and found to be .92 for instruction and assessment, .89 for classroom management, and .83 for communication and information resources. These values were considered high enough for the purpose of this study.

4. Procedure

The study was conducted at KFU toward the end of Fall 2012. The surveys were distributed to 75PSET . The return rate was 82 % (62 PSETs').

Quantitative data from CCQ were analyzed using the statistical package for social sciences (SPSS). To determine competency levels, means and standard deviations were calculated for each of the 3 competency areas and for each item in the CCQ. The following criteria were followed to determine the levels of computer competencies: distinguished if $M \geq 4$; satisfactory if $3 \leq M < 4$; unsatisfactory if $2 \leq M < 3$; and poor if $1 \leq M < 2$, where M stands for mean. To test the differences in the means among the three competency areas, the t-test was used.

5. Results

Results are presented in this section according to the research questions. The first question in this study was: what levels of computer competencies do PSETs' at KFU have? To answer this question, data collected from the CCQ were analyzed. Means and standard deviations on the three competency areas are shown in Table 1.

Table 1: Descriptive Statistics

Competency Area	M	Level	SD
Classroom Management	4.07	D	.73
Communication and Information Resources	3.86	S	.71
Instruction and Assessment	2.21	U	.84

Note: N = 62; D = distinguished, S = satisfactory, and U = unsatisfactory.

Means and standard deviations on all items in the three competency areas are shown in Tables 2, 3, and 4.

Table 2: Means and standard deviations on classroom management related competencies

	Item	M	Level	SD
15	Utilizing word processor to prepare lesson plans, class notes, correspondence, course syllabi and other written documents.	4.36	D	.62
14	Using an electronic spreadsheet program to store and report student grades.	4.18	D	.71
16	Using software programs to collect, analyze, interpret, represent, and communicate student performance data.	4.24	D	.72
13	Using software programs to create and score tests.	4.01	D	.67
12	Using presentation software to create lessons.	4.16	D	.76
17	Using computer productivity tools to complete required professional tasks.	4.25	D	.75
11	Using a database program to maintain student records and resource files.	3.52	S	0.94

Note: N = 62; D = distinguished, and S = satisfactory.

As shown in Table 2, all but one item fell in the distinguished level. The highest mean was on "Utilizing word processor to prepare lesson plans, class notes, correspondence, course syllabi and other written documents.", whereas the lowest was on "Using a database program to maintain student records and resource

files".

Table 3: Means and standard deviations on Communication and Information Resources related competencies

	Item	M	Level	SD
19	Utilizing the Internet for conducting research and communicate ideas.	4.23	D	.71
20	Designing web pages.	4.32	D	.64
18	Using electronic mail as a personal and professional tool.	4.50	D	.69
22	Evaluating the accuracy, relevance, appropriateness, comprehensiveness, and bias of electronic information resources to be used by students.	3.74	S	.80
21	Describing online sources of information dealing with instruction.	3.81	S	.70
23	Participating in online professional collaborations with peers and experts.	2.41	U	.72

Note: N = 62; D = distinguished, S = satisfactory, and U = unsatisfactory.

As shown in Table 3, three items fell in the distinguished level, two in the satisfactory level, and one in the unsatisfactory level. The highest mean was on "Utilizing the Internet for conducting research and communicate ideas", whereas the lowest was on "Participating in online professional collaborations with peers and experts".

Table 4: Means and standard deviations on Instruction and Assessment related competencies

	Item	M	Level	SD
1	Differentiating between appropriate and inappropriate uses of computer technology for teaching and learning of students with disabilities.	2.60	U	1.09
7	Evaluating effectiveness of computer-based instruction based on student achievement.	2.74	U	1.02
9	Discussing computer-based assessment and evaluation strategies.	2.61	U	.77
8	Examining multiple strategies for evaluating computer-based student products and the processes used to create those products.	2.21	U	.82
5	Using specific computer programs for teaching reading.	2.27	U	.81
10	Using computer technology to help students develop higher-order thinking skills.	1.80	P	.87
3	Using specific computer programs for teaching writing.	1.92	P	.83
6	Using specific computer programs for teaching mathematics.	1.95	P	.78
2	Using specific computer programs for teaching spelling.	1.67	P	.73
4	Using specific computer programs for teaching social skills.	1.71	P	.69

Note: N = 62; U = unsatisfactory, and P = poor.

As shown in Table 4, five competencies fell in the unsatisfactory level and the other five fell in the poor level. The highest mean was on "Differentiating between appropriate and inappropriate uses of technology for teaching and learning of students with disabilities", whereas the lowest was on "Using specific computer programs for teaching social skills."

To answer the second question, are there significant differences among PSETs' computer competencies on the three competency areas?, a Paired-Sample t-test was conducted. Results of the test are shown in Table 5.

Table 5:Paired Samples T-Test

	Paired Differences					
Pairs	M	D	Std. Error Mean	t	f	cig.
Management - Information	.243	28	.03	.89	1	001
Information - instruction	1.45	72	.09	6.35	1	001
Instruction - management	-1.72	73	.10	18.37	1	001

As shown in Table 5, the t-test revealed statistically significant differences among the means on the three competency areas ($p < .05$).

5. Discussion

This study focused on prospective special education teachers' perceptions and attitudes towards technology. It was found that PSETs have the conception that they do not have sufficient levels of technological competency that are enough to enable them to use technology in teaching students with disabilities. The reason is they only learned few computer software skills with a focus on their own usage rather than implementing those skills in instruction.

PSETs reached the satisfactory level on only two computer applications, namely, electronic mail and presentation software (i.e Power Point). This might be due to the frequent use of these two programs throughout their undergraduate courses. Electronic mail is frequently used by prospective teachers both for academic and non-academic purposes, and using computers as a presentation tool is emphasized during their programs of study

at the college level as the interviews revealed.

Results on instruction and assessment related competencies, in particular, were somewhat disappointing because they showed that PSETs were way far from being able to utilize technology for enhancing students' learning. None of the results on any of the programs weresatisfactory, furthermore, 71% of them were poor. It is certain that the PSETs involved in this study are not able to integrate technology in teaching students with disabilities effectively.

It is interesting to note that despite the fact that some applications such as Spreadsheets and data base programs are taught in the Educational Technology course, results on their use were less than satisfactory. This indicates that developing computer skills requires more than studying a course. Teacher preparation programs need to integrate technology use across several courses throughout the program in order to help prospective teachers reach the required levels of proficiency to teach students with disabilities using technology.

Generally, the frequency of use seems to have influenced prospective teachers' computer competencies. This, also, was concluded by other researchers (e.g. Smith & Necessary, 1996).

In conclusion, Teacher professional development programs that prepare special education teachers need to be implemented to fulfill international standards. Those programs need to ensure that special education teachers demonstrate competence at integrating technology into their teaching, and that they demonstrate the ability to teach for higher order thinking. Furthermore, support is needed for beginning special education teachers to remedy their preparation weaknesses. In fact, those teachers should be provided high quality mentoring on how to use technology in teaching in the early stages of their careers, so that they can enhance their students' learning.

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