Use of Assistive Technology for Teaching-Learning and Administrative Processes for the Visually Impaired People

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ABSTRACT
This study aims to examine how technology used in the Cyprus Turkish Blind Association assisted the teaching-learning and administrative processes for the visually impaired. Qualitative research techniques were used for data collection and analysis. This study is a case study that aims to examine how the technology used in the association facilitated the teaching-learning and administrative processes for the visually impaired people. The study also found that with the assistance of technology the participants of the study were quite motivated and could easily communicate with each other and also with people outside their organization. Yet, there is a lack of technological devices such as automatic high-speed book scanner and imported books printed in Braille that would improve the quality of life of the association members.
Keywords: visually impaired, technology, administrative processes, teaching-learning processes

INTRODUCTION

Rapid technological changes in the "digital age" necessitate reconsideration of technology use for both personal and educational purposes. According to Abner and Lahm (2002), there is an important connection between teachers' knowledge and assisted technology for the students with visual impairment. Hassel bring and Glaser (2000) argue that new computer-based technologies provide more rapid access to commerce, communication, and culture. At the same time, personal educational needs require people to follow new changes in technology to be implemented for educational purposes. Bulun, Gülnar and Güran (2004) stated the role of mobile technology in education. They specified the advantages of using mobile devices as a tool to support education. Thus, technology is included in educational programs and practices in order to foster student learning in classrooms (O'Connell, Freed and Carl, 2010). Technology is important because it affects students' education and they can easily understand the subjects and they are more confident (Zhou et al., 2011). In addition to that, game based learning allows students to learn faster and then enjoy the process and reduces their anxiety level (Bayırtepe and Tüzün, 2007).

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State of the literature

- Personal educational needs require people to follow new changes in technology to be implemented for educational purposes
- Technology is utilized in educational programs and practices to assist children with special needs in schools
- Effective leaders are also good decision-makers. They know how to choose the best decision among the alternatives, have conflict resolution skills and know the shared-decision techniques.

Contribution of this paper to the literature

- This study provides significant results showing that technology used for the visually impaired was satisfactory, and that it facilitated the teaching and learning processes in the association
- The current study aims to evaluate not only the effectiveness of the assistive technology use but also the administrative processes for blind and visually impaired people in the Cyprus Turkish Blind Association
- This study provides a significant literature review about the effective use of assistive technology to help people with special needs.

Technological improvements are crucial for disabled people. Technological advancement in the environment implies comfortable housing, safe roads and poison-avoidance conditions that have significantly decreased childhood injury and disability (Wise, 2012). Electronic media and technology also improve reading and writing skills for students with visual impairments, and increases their ability to communicate equally with others (Alves et al., 2009).

There are considerable studies on the use of technology to help disabled people (Desideri, et al. 2013; Lancioni, Singh, O'Reilly, Sigafoos, Oliva and Campodonico, 2013; Lancioni, O'Reilly, Singh, Sigafoos, Alberti, et al., 2014; Schreuer, Keter and Sachs, 2014). Individuals with multiple disabilities have problems in motor, intellectual, visual and speech conditions (Lancioni, Singh, O'Reilly, Sigafoos, Oliva and Campodonico, 2013). These researchers examined the advantages of a special telephone invented for two persons with multiple disabilities. The study showed that the participants learned quickly how to use this technology and the phone calls they made through this device improved their social-emotional interaction with their families. Another two studies proved that technology aided programmes helped people with multiple disabilities (low vision, total blindness and intellectual disabilities, etc.) become more involved in simple occupation and work activities (Lancioni, et al., 2014).

Technology is also utilized in educational programs and practices to assist children with special needs in schools. Computer-based technologies for example help children with speech, hearing impairments, blindness and physical disabilities (Hasselbring & Glasser, 2000). However, although teachers think technology provides unique educational benefits, many continue to use it only for limited purposes (Kurt & Ciftci, 2012). The lack of training of trainers is seen as an obstacle to the use of technology while teaching a lot; For this reason, technology is more distracting than a vehicle in the class (Postman, 1994, Sutton, 2011).With the approach called 'full inclusion' students with special needs should be offered new technological services to help them educate in regular classrooms (Hasselbring & Glasser, 2000). Schools now offer "technology-enabled curricula" (O'Connel, Freed, Carl, 2010, p.5) for individuals with learning and sensory or motor disabilities that cover multimedia design principles that "reduce extraneous processing, support essential processing of key facts and concepts and foster generative processing to build knowledge" (p.5).

As part of the Bologna process, children with multiple disabilities (intellectual, sensory and motor disabilities) are offered public assistive technology (AT) services (Desideri, et al., 2013). The aim is to create a standard model for AT services to increase collaboration in Europe, among its producers. The objective of the AT service is to assist children to function better in their daily communication activities and achieve their developmental and educational goals such as learning, playing, communication and personal autonomy.

Argyropoulos and Thymakis (2014) conducted an action research study on a 12-year-old girl with serious visual impairment and motor disabilities in a general educational setting. In the first action research stage of the study the fifth grader student named Cathy was taught how to use a standard keyboard in order to improve her typing fluency. It was observed that the student did not show any improvement in terms of fluency and accuracy. In the second action research stage the student was introduced to a new keyboard with the aim of improving her "typing fluency using all fingers of her right hand through a specific set of exercises." (p.165) It was observed that Cathy using her right hand improved fluency and accuracy in typing. This study helped the special education experts to reconsider the syllabus designed for students with special needs.

It is known that visually impaired students also have some difficulties in school life. They may be delayed in conceptual development and cognitive abilities of individuals, and they may fail more in skills that require particularly abstract thinking (Kizar, 2012: 8).Kelly (2009) argues that visually impaired primary and secondary students are not educated to use assistive technology in the United States. These students receive study with their sighted classmates, yet the textbooks are not designed for the needs of these students. They are not prepared in "braille, large print, or audio form" (p.470). Enhanced access to technology for students of all abilities, or its lack, does play a significant role (Wittenstein & Pardee, 1995).The study conducted by Kelly (2009) in the state of Illinois showed that nearly half the visually impaired students used assistive technology. On the other hand, between 59% and 71% of the visually impaired students did not have the opportunity to benefit from assistive technology. Kelly (2011) carried out another study on the use of assistive technology among high school students with visual impairments in the state of Illinois. The study reported that only 42% of high school students used the high-tech assistive technology. Kelly draws attention to the fact that students with visual impairments who study in non-residential schools fall behind their sighted classmates. On the other hand, students who are placed in residential schools are more likely to use assistive technology.

Zou et al. (2012) also emphasise the significance of the use of assistive technology in the training of students with visual impairment. According to the previous studies, teachers' awareness of visually impaired students is low (Ismihan & Uyanık, 2003: 77). In this country, visual impairments in students who have independent mobility is limited. Therefore, even if they are trying to integrate classes, it is very difficult to deal with those students. (Özgür, 2004: 9).The researchers investigated the skills and knowledge teachers have in the use of assistive technology. The study showed that 40.7% of the pre-service teachers and students with visual impairments were confident in teaching assistive technology, while 59.3% of the teachers reported a little confidence. The study recommends developing a course on assistive technology and including it in the training curricula.

Effectiveness in the realization of the educational needs does not rely only on the curricula, teacher performance, use of technology and so on, but also in the quality of the administration practices and administrators (Duke, 1992). Administrative effectiveness necessitates efficient implementation of the administrative processes as well. Lunenburg and Ornstein (2011) define educational administrative processes with five dimensions: motivation, leadership, decision-making, communication and organizational change. The effectiveness of one process influences the effectiveness of the other. According to the authors, school administrators should have the ability to motivate their staff if they want effectiveness in their schools. For this purpose, the administrator should have leadership skills. Leaders have the skills to encourage group members towards achievement of goals. They build close-knit and goal-oriented teams, persuade others to achieve the goals of the group and not to accomplish their own self interests. Leaders convince other people to achieve a common goal for the interest of a group (Lunenburg & Ornstein (2011).

Effective leaders are also good decision-makers. They know how to choose the best decision among the alternatives, have conflict resolution skills and know shared-decision techniques. Good decision-makers are also good communicators. They know all the informal and formal communication channels and how to overcome the barriers to effective communication. They use verbal and nonverbal communication techniques efficiently. Effective leaders are aware of the "internal and external pressures for change in schools" (Lunenburg and Ornstein, 2011, p.202). Knowing the fact that schools are open systems, leaders encourage change, know the methods to overcome resistance for change, and follow major approaches to change (Lunenburg & Ornstein, 2011).

As can be seen above, most research deals with technology use in multiple disabilities (speech, hearing impairment, blindness, physical disability) and learning, sensory or motor disabilities. There are limited studies that examine technology use only for visual impairment (Douglas, 2001; Corn & Wall, 2002; Argyropoulos, Sideridis & Katsoulis, 2008; Samuels, 2008; Kelly, 2009; Kelly 2011; Zhou, Ajuwon, Parker & Okungu, 2012). However, in Northern Cyprus there are no studies related to technology use for visually impaired individuals.

For effective coordination of resources, planning of activities, decision making, implementation of policies and programmes, budgeting, staffing, adaptation to new environments and so on, administrative processes have significant roles in organizational settings (Simon, 1997; Lunenburg & Ornstein, 2011; Ugwulashi, 2012). The researchers of the present study believed that in addition to examining technology use for visually impaired people, dealing with the administrative processes would also contribute to the effectiveness of the Cyprus Turkish Blind Association as an organization. Based on the above mentioned reasons, the researchers think that this study has an important contribution to the relevant literature.

This study aims to evaluate the effectiveness of the assistive technology use and administrative processes for blind and visually impaired people in Cyprus Turkish Blind Association. The study sought to find answers to the following research questions:

- How does technology facilitate the learning and teaching of the visually impaired people easy?
- How does technology facilitate administrative processes for the visually impaired?

METHOD

This case study was conducted in the Cyprus Turkish Blind Association in North Cyprus. The association was established in 1976 with the name of "Six-Point Solidarity Association" and registered by the Nicosia district governorate. In 1979 the association managed to become a member of the "World Blind Association." The statistics showed that the Cyprus Turkish Blind Association increased its number of members from 220 to 422 between the years 1989-2012. The association serves its members in the areas of health, education, rehabilitation, social security, employment and so on. In this association there is one administrator (director of the association), two teachers, one member of cleaning staff and nine students.

Participants

The participants of the study comprise of two teachers, two students, and one administrator. Only two of the nine students voluntarily accepted to participate in the study. Purposeful sampling was used as a sampling strategy. Bogdan and Biklen (1998) argue that researchers prefer to use purposeful sampling because particular subjects facilitate the development of the theory.

Data Collection and Analysis Procedures

In this study the data were collected through semi-structured interviews. In the interviews, which took approximately 25-30 minutes, the researchers aimed to get participants' views on what kind of technology is used in Cyprus Turkish Blind Association, what benefits and/or problems, the teachers, the administrator and the students are facing in the use of technology, how technology facilitates administrative processes (decision-making, change, motivation, leadership and communication) easy for the visually impaired people in the association. Two sets of interview schedule, one for the teachers and students and one for the administrator, were formed. Two sample questions from the schedule are as follows:

- What kind of technology is used for teaching in the organization?
- What are the benefits and/or problems that you are facing in the use of technology in the organization?

The interview schedule was revised by three experts experienced both in the area of educational technology and also in qualitative studies, from the Department of Educational Sciences in three universities of

North Cyprus. The draft interview schedule was piloted with two students studying in the case school. The instrument was revised based on the feedback received from the experts and the pilot study.

The researchers transcribed the interviews verbatim (Şimşek & Yıldırım, 2013). The interview data were analysed through content-analysis technique. The data were categorized under the themes emerged from the research questions. Coding categories for the interview schedule were created after the review of the relevant literature. New categories emerged during the interviews and the coding was revised. To assure trustworthiness of the study, two experts in qualitative research were asked to generate codes based on the interview data. The codes of the researchers and the experts were compared and matched. Intercoder reliability (Miles & Huberman, 1994) was found to be .75.

For ethical reasons the names of the participants were not given. Instead, they are coded as follows:

T: Teacher   T1: Teacher one, T2: Teacher two
A: Administrator
S: Student   S1: Student one, S2: Students two

FINDINGS

Data collected via semi-structured interview method were analysed by using "category based data display approach" of Miles and Huberman (1994) to seek answers to the research questions stated for the study.

Technology facilitates learning of the visually impaired people

To investigate the use of technology for the teaching-learning process of the visually impaired and the blind, content analysis of the responses of teachers and students was employed. All participants agreed that technology facilitates their teaching-learning process.

S1: "If technology did not exist I could have difficulty. For example I could not use computers in the past and I had to ask for help and for example in trying to use iPad without knowing VoiceOver I could only use it to play some games."

A: "Now technology if considered in relation to communication has brought great convenience.... Reading documents which used to be one of our major problems has now been resolved by reading devices..."

One of the student participants does not make extensive use of technology. He said that he used a cellular phone, computer and playstation. When he was asked how his life would be without technology his answer was "Doesn't matter!". But then he admitted that he and his teacher use the Internet at times when they both do not know the topic that they are working on.

S2: "Where we don't know and where we can't proceed we go to the Internet to look up."

Audio maps are used for geography lessons and cubes and trays are implemented in mathematics lessons of the visually impaired students. They also use audio watches to learn the time.

Technology Required Urgently

Teachers on the other hand, stressed the necessity of missing technological devices that can be used during their teaching of the visually impaired students. They emphasized that these devices should urgently be purchased by the Ministry of Education.

T1: "Even our books have arrived recently. We even did not have Braille books and they just arrived and they are the books that are used in schools of Turkey. Local books have still to be printed in Braille. The only thing that we are doing at the present is writing books in Braille. To be fast we write using a computer and take outputs from a Braille printer."

T2: "Facilities are scarce but as I said the Ministry of Education should have an online portal for the students to enter by using their passwords to listen to audio textbooks. Because Braille books are twice as thick as the normal textbooks and they are difficult to carry and read and embossed letters get erased."

Technology needed to facilitate the teaching-learning process

All participants stressed the need for technological devices for the visually impaired to make both their lives and learning easier. For example one of the teacher participants emphasized the need for devices that read books. She talked about the existence of a device purchased by the Association for the Blind that reads documents but not books.

T1: "When the books are placed in the device, the device reads the book."

She also talked about connections to some university libraries in Turkey that can provide audio books.

T1: "The president of the association has plans like that but it has not been implemented yet."

In North Cyprus public transportation is not being utilized, hence transportation is a serious problem for the visually impaired. They have to be accompanied by another person for commuting to school.

T2: "For example, a visually impaired person can take the bus and go from one place to another, but there is no public transportation."

There are many types of technological facilities that can be employed for the education of the visually impaired that urgently must be provided by the state. Some of these are very expensive but some are not and if implemented will make a great difference to the lives of the visually impaired.

Technology enhances administrative duties of the visually impaired administrators

In addition to enhancing the teaching-learning process technology has a crucial role in the administration of the organization. The president of the Cyprus Turkish Blind Association stressed that technology is like an assistant to him.

A: "Now technology is like an assistant to us. ... In terms of transportation and communication without getting any help from a second person we can do our job easily."

He stressed the convenience that technology provides in reading documents and communication with other people.

A: "Now technology if considered in relation to communication has brought great convenience.... Reading documents that used to be one of our major problems has now been resolved by reading devices... We were forced to have someone to read us even if the document was confidential or private."

He also mentioned the existence of a programmed stick for the visually impaired which could enable them to walk to places easily. Of course, he also admitted that these sticks are very expensive.

A: "You install the program of your neighbourhood and it shows you the road map, up and downs, the existence of a carob tree, and where you want to turn."

Communication with the members of the association is being done by braille system.

A: "Communication is done with normal writing, we make announcements to our members via braille system.... We now we reach them by telephone."

The administrator also mentioned that the help of the communication system, assisted by technology, motivated him and also the other staff. He also added that because the association is a very small organization with few staff, he shared his decisions with his staff not via formal channels but rather informal channels especially through face-to-face interactions.

CONCLUSIONS AND IMPLICATIONS

The results of the study showed that the technology used for the visually impaired people was satisfactory and that it facilitated the teaching and learning processes in the association. The visually impaired could communicate better and are able to use various technological devices such as audio maps, i-pad, cubes, and trays in their lessons. The American Foundation for the Blind (2015) suggest that compensatory and functional skills can be improved via concept development and learning how to use understanding, listening, speaking and organization skills. The existing curriculum for Cypriot Turkish blind people should be revised and updated by the Ministry of Education considering these issues. Other devices can be suggested especially for individuals who have low vision. For example, Large Print enlarged images to help individuals see printed materials better. Acetate Overlays placed over printed materials to increase their visibility. Optical Devices such as desk lamps, floor lamps and overhead lighting with filters (Presley & D'Andrea, 2008) can be purchased for the members of the Cyprus Turkish Blind Association. Argyropoulos and Thymakis (2014) argue that students with disabilities learn better if appropriate technology is used to improve their learning.

The study also implied a lack of some technologies in the association. The participants expressed their need not for imported books but local books printed in Braille. One teacher emphasized the lack of an automatic high-speed book scanner. This kind of device can scan up to 250 pages per minute and turns the book into electronic text which then can be converted into audio by an electronic book reader (Using technology to provide equal access and an inclusive environment for the IU community, 2015).

The students complained that in North Cyprus public transportation for visually impaired people is very difficult since they have to be accompanied by another person for commuting to school. Markiewicz and Skomorowski (2011) suggested mobile phones that have a passenger information system and GPS (Global Positioning System), GSM (Global System for Mobile Communications) and Bluetooth technologies. The authors argue that in these systems through mobile phones sound messages can be sent to blind people to assist them in communicating and finding their location.

The study also found that with the assistance of the technology the administrator and his staff members were quite motivated and could easily communicate with each other and also with people outside their organization. The administrator did not have to use the technology in sharing his decisions with his staff. He preferred informal channels for communicating his decisions.

The administrator should also be supported with more advanced assistive technology to help him improve his administrative capabilities. For example, devices such as eye gaze board, voice output devices with icon sequencing, dynamic display, and device with speech synthesis for typing can be purchased. These devices can help the administrator with augmentive communication when his spoken communication is not sufficient (Reed, 2007).

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