

Teachers' attitudes towards the use of ICT in the educational process of people with special educational needs

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Abstract

The purpose of this article is to investigate the teachers' attitudes towards the use of new technologies in the educational process of children with special educational needs. The above aim is achieved through the bibliographic review of empirical and theoretical studies that have explored this subject. This article highlights the significant benefits of new technologies for pupils with special educational needs as well as the direct interdependence of teachers' attitudes towards ICT and their use by them. Teachers' positive attitudes towards ICT result in their extensive use and vice versa. However, as concluded in this article, there is a variety of obstacles that prevent teachers from using ICT in the educational process of children with special needs despite their positive attitudes.

Keywords: new technologies, special education, attitudes, teachers

Introduction

Several researches (Fernández-López et al., 2013; Edyburn, 2014; Hubbard et al., 2016; Sharples & Spikol, 2017;) have reached the conclusion that new technologies in education (ICT) help pupils with special educational needs to be able to engage creatively in knowledge as they enable them to visualize the teaching subject. The integration of ICT into education is considered to be fundamental as it offers tools that can greatly enrich the learning experience of pupils with special educational needs and they facilitate their participation in learning and social inclusion. However, the use of ICT in the educational process of people with special educational needs depends on teachers' attitudes towards ICT. This article deals with this issue.

The aim of this research article is to investigate teachers' attitudes towards the use of new technologies in the educational process of children with special educational needs. The teachers under research work in primary education schools in urban centers are permanent general education teachers, men and women, with a basic degree in education, ranging from 35 to 60 years of age.

Referring to children with special educational needs this article will focus on pupils with learning disabilities (e.g. dyslexia), pupils with physical disabilities and also pupils with autism spectrum disorder.

New technologies and pupils with special educational needs

This section introduces the three most commonly used technologies for pupils with special educational needs. These technologies have been used quite a long time to date as they have been investigated for the positive effects on learning of pupils with special educational needs (Boyd et al., 2013; Edyburn, 2013; Richards & Armstrong, 2015; Norburn et al., 2016).

The Makaton method

Makaton is a language program that uses movements, signs, and symbols to help people communicate. It was designed and built to support spoken language by children presenting a wide range of developmental difficulties in communication and speech (Norburn et al., 2016). With Makaton, children with learning and other difficulties have the ability to develop and cultivate communication skills in a simple but very functional way so that they can participate

in social life, be happy, have choices and to claim their rights (Hornby et al., 2013). At the beginning, children acquire basic communication and language skills and at a higher level, they acquire reading and writing skills.

The Makaton program is extremely flexible as it can be adapted to each student's needs and used at a level appropriate to them. In particular, it may be used for: expressing thoughts, choices and feelings, naming real objects, images, photographs and positions, participating in games and songs, listening, reading and narrating stories (Richards & Armstrong, 2015).

A basic principle for the value of virtual learning environments (VE) in education is that it encourages self-directed activity and gives to the student control over the learning process (Istenic Starcic & Bagon, 2014). Self-directed activity is a priority in the theories of Bruner (1968), Vygotsky (1978) and Piaget (Wood 1988). The development of perception is an essential contribution to self-directed activity (Kuegel, 2014).

The value of the self-directed activity is even greater for people with learning disabilities. As with all people with disabilities, children with learning disabilities have less control over things than other children and have a passive role all the time (Kuegel, 2014). This is often described as underdeveloped autonomy and self-determination. As a result, children have difficulty making conscious choices, for example, on health care issues. Approximately 20 people out of 1000 have mild or moderate learning difficulties, and about three or four out of 1000 have severe learning difficulties and need frequent support in some aspect of their everyday lives. The use of virtual learning environments may be appropriate in developing the skills of these students (Hornby et al., 2013).

The research of Istenic Starcic & Bagon (2014) investigated whether the use of virtual learning environments promotes self-directed activity in students with severe learning difficulties using the Makaton sign language. Eighteen students with severe learning difficulties and their teachers were filmed using a virtual learning environment. Teachers' activities were encoded in eight categories (for example, instructions, suggestions, guidelines) and the students' in three (for example, movements in a three-dimensional space). The results showed that the students made more self-directed actions as the lessons went on. The increase in students' activity was in 3 dimensional movements as well as in 3 non-dimensional movements, indicating that students exploit the features of virtual environments that distinguish them from other interactive packages. Teachers did not do much in the lessons, however, this decrease was not as great as the increase in students' behavior rates. This is due to the fact that some behaviors (both categories of teaching, teacher's movement, physical guidance) were decreased more rapidly, while others (suggestions, guidelines) have remained almost the same. This interpretation could mean that teachers are not just feeling tired, but selectively, abandon most teaching behaviors and the control of behavior. The above can be explained by reference to the term "scaffold" defined by Pampoulou (2017) as one of the teaching functions. When a beginner student starts learning an activity, the help (scaffold) is provided to the beginner to make progress by controlling the activity elements that are initially beyond his or her abilities. As the novice becomes more and more familiar with the elements of the task and develops the ability to perform more and more things independently, the teacher's intervention is minimized and slowly fends off. Another function of the teacher based on Pampoulou (2017) is to keep the student's interest and motivation undiminished.

Makaton's Design and Development Vocabulary is a widely used communication system designed for people with disabilities in speech and communication. It enables teachers to teach students how to communicate alternatively by choosing and combining visual representations, symbols, words, sounds and gestures. Deliyannis' analysis (2012) has shown various difficulties in the implementation manual of the above system, when it has to be adapted to the needs of each student, presenting a complex and time-consuming task for the teacher. Deliyannis (2012) presented the development of a new communicational

environment that allows students to use the Makaton method through an open media, easily adapted to the expandable interactive multimedia application. He focused on children with Down's syndrome in primary education, who had already used an alternative method of communication in the learning process. Deliyannis's system was used in two groups that used alternative representations of knowledge in the same class. A set of ten concepts was divided into two random groups of five people and each group was taught five concepts through the new system and five in the traditional way. The evaluation of the learning process revealed that the audiovisual environment was more attractive than the traditional teaching method and the students preferred to use it as it was perceived as a game. Although the overall learning speed is not greatly influenced, the quality of teaching has improved significantly. In this sense, students were able to describe and use new concepts with increased self-confidence, which was not observed in the group that used the application manual of the method.

The PECS method

The Picture Exchange Communication System (PECS) is suitable for children in the autism spectrum (Edyburn, 2013). Howlin (2014) assessed the effectiveness of the experts' training and counseling for teachers of autistic children with regard to the use of the PECS system. The survey included 84 children in primary education, with an average age of 6.8 years. The results of the survey indicated a moderate effectiveness of PECS in the training of teachers / counselors. However, students' movements and the use of symbols in the classroom increased, although there was no sign of improvement in other areas of communication. Also, this improvement was not sustained as soon as the active intervention was ceased. The study by Carr & Felce (2007) investigated the influence of the Picture Exchange Communication System (PECS) for phase III on the communication of children with autism. Children between 3 and 7 years old created a PECS intervention team and a non-intervention control group. The intervention team attended 15 hours of teaching with PECS over 5 weeks. They recorded communication between the children and their teachers after six hours of observation. In particular, observations were made: six weeks before teaching, during the week just before the class, during the week right after the class. For the control group, two observation hours were divided over a 5-week interval without PECS teaching. The results of the survey showed that communication initiations and binary interactions increased significantly among children and the teachers in the PECS group but not in the control group.

The TEACCH method

The TEACCH method (Treatment and Education of Autistic and Related Communication-Disabled Children) refers to a method based on structured teaching and is suitable for children in the autism spectrum. The children in this teaching method learn through images. Children with disorders in the autism spectrum need individualized and structured teaching to be able to predict, self-test and gradually become independent (Boyd et al., 2013). According to Boyd et al. (2014) with TEACCH method the maladaptive behavior of the children is reduced and their functional capacity is increased.

Other supporting tools

Virtual Learning Environments

A Virtual Learning Environment is a set of teaching and learning tools designed to enhance the learning experience by incorporating computers and the Internet into the learning process (Williams et al., 2006). Virtual learning environments offer users the opportunity to explore social situations and test different behavioral responses to a variety of simulated social interactions (Kerr et al., 2002). Virtual learning environments are particularly useful for people with autism and can be the ideal method for social skills training. One of the challenges for

developers of virtual learning environments is how to allow freedom of exploration and flexibility in interactive behavior without the risk of users intentionally or unintentionally missing important learning goals (Williams et al., 2006).

The “scaffold” embedded in the software can help users learning in different environments, such as individual or group learning situations (scaffold learning refers to structured activities with organized materials, clear instructions and a hierarchical prompt system) (Williams et al., 2006). Kerr et al. (2002) described two scenarios of virtual user learning environments developed in the context of an interactive project in relation to Asperger’s syndrome and present observational results from initial tests conducted. Virtual learning environments were developed to promote social skills learning in adolescents with Asperger’s syndrome: the first takes place in a virtual coffee shop and the second in a virtual bus. In both scenarios, the task of the user was to find a seat and sit down. According to the results of the observation, the users successfully performed their task.

Augmentative and Alternative Communication (AAC) Systems

Augmentative and Alternative Communication (AAC) systems include ICT applications, such as speech synthesis, as well as print sources such as books and symbols, pictures, and word charts. Many children who have little or no functional speech face many obstacles in communicating and developing relationships, so it is important for AAC systems to help them. There is little understanding of the interaction characteristics between children using AAC and their peers (Williams et al., 2006). Clarke and Kirton (2003) report results from an analysis of interactions between 12 children with physical disabilities using AAC systems and their school peers. The results showed that the functions most frequently used by children using AAC systems were confirmation/denial (38.2%) and self-expression (30.9%). Children who used AAC systems made fewer manifestations (speaking first) and provided more responses than their interlocutors, but there was no significant difference in the frequency of alternations received by children using AAC systems and their interlocutors.

Primary Education Teachers' attitudes towards ICT

Ajzen (2015) describes “attitude” as a predisposition to respond positively or negatively to an object, person, or event. The strong relationship between computer-related behavior and computer use in education has been highlighted in many studies (Aldunate & Nussbaum, 2013; Pynoo & van Braak, 2014 in Flanders, Hermans et al., 2008) in Germany and Belgium, Chai k.á., 2009 in Singapore and Taiwan, Van Braak & Valcke, 2008) in Flanders). The attitude towards the use of computers can affect teacher’s acceptance for the usefulness of technology, but can also influence whether teachers will integrate ICT into their classroom (Huang & Liaw, 2005; Passey & Samways, 2015).

The use of ICT in class by teachers depends on a variety of teachers' internal variables. Taking into account the available data from the research of Aldunate & Nussbaum (2013), an integrated model can be developed that interconnects these internal variables to explain and predict the use of ICT in the classroom.

- a. The interdependence between teachers’ beliefs and perceptions has been substantiated by the argument that teachers' beliefs influence their perceptions and decisions (Aldunate & Nussbaum, 2013).
- b. Teachers' beliefs tend to be linked to the inclusion of ICT in their classroom teaching. For example, Hermans et al. (2008) in Germany and Belgium found a positive influence of constructivist beliefs on the use of computers in the classroom. Becker (2001) also reports that constructivist teachers are more likely to use ICT in more challenging ways.
- c. On the basis of the Fishbein’s and Ajzen’s (1975, Zarkogianni, 2016) model, beliefs are placed as precursors of the attitudes towards ICT in education. Hewand Brush (2007) reports that although attitudes and beliefs are two separate constructions

that are inextricably linked, beliefs mainly determine the attitude of a person (Bodur, Brinberg, & Coupe, 2000). A number of studies has already examined and supported the impact of teachers' perceptions on their behavior towards the computer (eg, Chai et al., 2009 in Singapore and Taiwan; Ertmer, 2005).

- d. The direct impact of beliefs on the supportive use of ICT has also been documented by Becker (2001), who argues that constructivist beliefs promote the use of ICT in education.
- e. Arbore et al. (2014) focus on computer motivation. Their research was conducted in Milan, Italy. They argued that the primary motivation for adopting the computer is the belief in the outcome of use or the perceptions of the usefulness of the technology. The interdependence between beliefs and motivations is confirmed by Maruping et al. (2017) by defining internal incentives as a state of beliefs influencing one's decision-making.
- f. The influence of the perceptions of the school policy about ICT on the integration of ICT in educational practice has been confirmed in the research by Tondeur, VanKeer, Van Braak and Valcke (2008) in Flanders. They argue that this is the real level of awareness among teachers: ICT policy determines the integration of ICT into educational use.
- g. Researchers emphasize the impact of Malaysian teachers' incentives on promoting excellence in ICT teaching (Abdullah, Abidin, SuLuan & Atan, 2006). Highly motivated teachers in North America reflect higher levels of ICT usage in their class (Karsenti, Villeneuve, & Goyer, 2006).
- h. There is a correlation between teachers' attitudes towards ICT and ICT classes (Aldunate & Nussbaum, 2013).
- i. An indirect correlation between teachers' attitudes towards computers and the supportive use of ICT has been reported by van Braaket al. (2004). A positive attitude towards computers is also important as it leads to an increase in computer capacity (Ertmer 2005; Chaietal, 2009;).
- j. The supportive use of ICT can be considered as an important predictor of the use of ICT in the classroom (Wozney et al, 2006). The former argues that teachers who are already regular ICT users have confidence in the use of ICT in their teaching.

The role of the teacher in the successful integration of supportive technologies into the learning of children with special educational needs cannot be overcome (Yusuf & Fakomogbon, 2008). As UNESCO (2001) stated, "human rights and government policies can set educational goals but it is the teachers who may or may not achieve effective education" (p. 33). UNESCO (2001) further noted that teachers may have a negative view of the use of ICT in special education. Yusuf & Fakomogbon's (2008) study reveals the state of technology and teachers' knowledge of using ICT to provide quality education to students with disabilities in special schools in Kwara State, Nigeria. According to the study, not all schools have basic ICT equipment and specific ICT aids that may be important in providing access to quality education to students with disabilities. The majority of teachers in special schools do not know basic and supporting ICTs that can help them teach students with disabilities. Most teachers have a positive attitude towards the use of ICT aids.

These findings provide empirical information on the use of ICTs for special education in the Nigerian school system. This study confirms the ICT gap between the developed world and sub-Saharan Africa. The study highlights the possibilities of using ICTs to provide access to education for people with disabilities through the provision of relevant equipment, teacher awareness and capacity building in the field of ICTs for teachers. This is due to the fact that the majority of teachers have a positive attitude towards the use of ICT aids.

Tabata & Johnsrud (2008) agree that teachers' attitudes towards the use of technology in

classrooms are a key factor for successful technology integration. Voogt (2010) found that teachers who use technology extensively in their lessons tend to have a high level of confidence in pedagogical technology skills and to focus on a learner-based approach. They are more involved in professional development activities and work with colleagues who do not use technology very often to help them.

Some factors must be taken into account when analyzing teachers' negative attitudes towards technology integration. In the US, some of the important factors identified by Christensen (2002) include computer stress, the perceived importance of computers, computer enjoyment, and the commitment to time to learn new technology and teach it to students. The experience of using technology influences teachers' anxiety and attitude, and in particular, the greater the frequency of these experiences, the more it affects anxiety and stress (Takayama, 1993). Teachers' fears of being replaced by technology also create negative perceptions (Qing, 2007). While most teachers believe that technology integration in the classroom will help students learn, the training they receive to exploit the new technology is inadequate and the technology available in schools is limited (Kazu, 2011).

Training in technology is often offered at unavailable hours or computers other than those used in the classroom (Hixon & Buckenmyer, 2009). Although training experiences do not directly influence teachers' stress and attitudes toward technology, they have indirect effects on stress and attitudes through the mediation of other factors such as daily use of computers as a result of training (Takayama, 1993). Schrum and Levin (2013) examined successful career development models for technology integration from eight exemplary schools. Through observations and interviews, they identified four critical factors for successful technology training. These include formal regional activities, opportunities for summer labs, informal career development (e.g. peer support) and individual teacher development (e.g. postgraduate courses and creation of professional learning communities).

In addition, research shows that teachers' pedagogical beliefs (e.g. teaching and learning philosophies) are related to their technological integration (Kim et al., 2013). In order to change teachers' beliefs, schools need to develop strong leadership.

Primary education teachers' attitudes towards ICTs influence their use

According to Tsokolata (2011), schools encourage the use of educational technology without taking into account the attitudes of teachers. Research by Tondeuret al. (2008b) showed that successful ICT integration is much more likely when teachers share the values expressed in school policy and understand their implications. However, the effective use of New Technologies by teachers has some problems. One of the main problems faced by countries regarding the use of new technologies in special education is that there is no stable support framework for pupils, parents and teachers. There is no clear policy on new technologies in special education, so there are no corresponding resources to support them – apply them.

There is also doubt as to whether ICT can actually upgrade the education provided in special education. It is a fact that their simple presence at school is not a guarantee for proper and constructive use (European Agency, 2001). For example, tools and their related applications need to be tested first before they are introduced to children. (Simatos, 1995)

Special education teachers need to be trained, the lack of training creates teachers with low self-confidence and difficulty in using ICT due to the absence of significant skills. In order for ICT to meet the needs of students, it is primarily legitimate for teachers to understand their educational value. (European Agency in Special Needs Education, 2003). According to this way and with their training in new technologies, they will be able to perceive - recognize the appropriate utility of special technology, which will cover the cognitive need of the student.

Even today, however, where the multiple advantages of new technologies have been recognized, there are specialized accounting and special tools and applications that could solve the problem of many students with special learning difficulties, but remain unused and not applied in schools. The reason for not using them is the above-mentioned lack of training and the absence of infrastructure in special schools. Therefore, while the necessity of pedagogical exploitation of new technologies in Special Education is recognized, its practical application is aborted.

In economic terms, it is essential to have equal opportunities of access to new technologies for all students. Access to various forms of ICT is a reality for several pupils but not for all of them (European Agency in Special Needs Education, 2003).

All the above-mentioned create a negative attitude to the teachers regarding the use of ICT in teaching pupils with special educational needs, thus ignoring their benefits and not using them.

On the contrary, when teachers' attitudes towards ICTs are positive, they adopt them in their daily use and pupils with special educational needs enjoy the multiple benefits of utilizing New Technologies, providing them with support in physical, learning-cognitive and general educational level (Tsikolatas, 2011). With interactive technology, students with physical disabilities can minimize any learning disabilities using assistive technology, such as using switches triggered by eye movement or other communicational devices that replace speech. Additionally, the use of online technology contributes to the teacher himself, as it contributes to positive feedback and interaction with his or her students.

In general, students with the help of digital technology become more active, take responsibility for their learning, and their possible inability does not become a hindrance to building knowledge (Raptis and Rapti, 2013). Therefore, there are new perspectives for this particular group of pupils with learning disabilities and special education. (Earl, 2004). The introduction of the computer into special education contributes to the achievement of basic pedagogical and educational objectives referring both to the purely educational function and to the daily living and professional progress of people with special educational needs (Jendron, et al., 2008)

Conclusion

The use, method and intent are the basic characteristics that constitute an act, phenomenon or event, and accordingly translate it into an effective and useful instrument, tool, obstacle or danger. Technology on its own does not have will (Tsikolatas, 2011). So, the way by which the special education teachers will use it (and the responsibility that the whole task brings) will reveal the benefits or harmful effects on its students (Aldunate & Nussbaum, 2013).

If the state and administrative mechanisms of schools ensure that new technologies find suitable ground in schools, and especially in special education schools, teachers will have more opportunities to make good use of it (Sharples & Spikol, 2017). Since teachers refuse to use it and stop the development and progress of technology in the important field of special education, the burden and responsibility fall on teachers in terms of proper and balanced use of technology (Aldunate & Nussbaum, 2013). Proper exploitation of new technologies and the improvement of the quality of life is a duty of all mankind and can only be achieved through the connection, intelligence and responsibility of all (Tsikolatas, 2011).

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