

## **Perspectives of future special education teachers towards assistive technologies through the application of a competency-oriented approach**

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### **Suggested Citation:**

Tulepova, L., Namazbayeva, Z., Autaeva, A., Kulnazarova, G., & Moldabayeva, A. (2022). Perspectives of future special education teachers towards assistive technologies through the application of a competency-oriented approach. *World Journal on Educational Technology: Current Issues*. 14(4), 1179–1186. <https://doi.org/10.18844/wjet.v14i4.7709>

Received from January 26, 2020; revised from May 25, 2022; accepted from July 20, 2022.

Selection and peer review under responsibility of Prof. Dr. Servet Bayram, Yeditepe University, Turkey.

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### **Abstract**

The definition of inclusion or the concept of integrating the concept of universal education has recently become increasingly important to prepare an environment that facilitates access to information for all individuals, especially those with special needs. Technological developments provide great changes and innovations in the field of education, as well as in all areas of our age. Especially computer and internet-centred technologies are used in education and enable to be processed with efficient and different methods. The aim of this research is to address the perspectives of future special education teachers on assistive technologies with a competency-oriented approach. For this purpose, 41 senior teacher candidates studying in the special education department of education faculties of 3 universities were interviewed in the fall term of 2020–2021. In order to reach the aim of the research, three semi-structured questions prepared by the researcher by taking expert opinions were asked. As a result of the research, it has been found that assistive technologies are beneficial for both students and teachers. As a result of the examples given by the senior pre-service teachers about assistive technologies, it was concluded that they knew a limited number of assistive technologies.

Keywords: Technology, special education, competency-oriented, education;

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## 1. Introduction

The rapid development of technology has also made significant changes in education. Technology has been an important pedagogical tool in the education process (Evgin, Yıkılmış, & Özgüç, 2020). In addition to the various definitions of technology, in short, it helps people to use the gains, knowledge and skills they have acquired in the educational environment effectively with the feedback provided during and after the learning process (Knight, Spooner, Browder, Smith, & Wood, 2013; Smith, Spooner, & Wood, 2013). In addition to being an effective learning tool in the educational environment, an important contribution of technology is that it enables individuals with special needs to become independent. In this context, it is seen that the concept of assistive technology has been brought to the literature. Although there are different definitions of assistive technology in the literature, it is generally defined as all kinds of tools and equipment prepared for individuals with special needs in order to acquire the targeted skills, the skills necessary to sustain their lives and to ensure that the skills acquired will be permanent (Billingsley, Israel, & Smith, 2011; Borg, Lindstrom, & Larsson, 2009; Genc, Babieva, Zarembo, Lobanova, & Malakhova, 2021; Pettersson & Fahlstrom, 2010; Reed & Bowser, 2005; Seal, Polgar, Shaw, & Jutai, 2011). In other words, assistive technology is defined as tools used to minimise restrictions on the interaction of a person with special needs and to provide an accessible environment for people with special needs. Assistive technologies used in educational environments where individuals with special needs are educated can be considered in three categories: low, medium and high (Bozkurt, 2017; Chakmak, 2016). Low-level assistive technologies include visual cards and pen holders; intermediate assistive technologies include a reading pen, talking calculators and a talking dictionary. Tablets and smartphones can be given as examples of advanced assistive technologies (Evgin et al., 2020).

The importance of technology in education is supported by research. The person giving the education is the teacher. Therefore, the foundation for a teacher's ability to teach effectively is laid even before they enter the workforce. It is claimed that there is a positive relationship between student achievement and the quality of teacher preparation for the profession (Brownell, Ross, Colon, & McCallum, 2005). The inadequacy of applications to undergraduate courses in the special education department indicates that they may experience problems in their future professional life (Dedeoğlu, Durali, & Tanriverdi, 2004). In undergraduate courses, it is very important for future teachers to be successful in applied courses as well as theoretical courses. In the feedback received from special education teachers, 68% of the candidates answered that 'practice should accompany the lessons' (Ergül, Baydık, & Demir, 2013). The application process prepares students for the profession by providing advanced information about their future professional life. Teachers can improve their perceptions of efficacy by seeing what they can do during their professional experience and recognising the characteristics of the group they work with (Ergül et al., 2013). The high level of self-efficacy perceptions of teacher candidates can affect their professional lives positively. However, practical experience alone may not be sufficient to ensure effective teaching.

Teacher candidates also need the theoretical knowledge they have acquired in the courses in order to provide quality education. The trainings that teacher candidates receive as a part of their language education should include both theoretical lessons and practical lessons that will enable them to be successful in the teaching profession in the future (Ergenekon, Ozen, & Batu, 2008). They can use what they learn from their new experiences during their internship in the training courses in the last year of their undergraduate education. Teacher candidates' own educational experiences affect the success of their teaching practice (Ergenekon et al., 2008). In addition to the theoretical lessons that teachers take, whether they make practice in their decision to continue their professional life is also affected. 29% of non-teaching graduates leave teaching within the first 5 years of their working life (Black, Neel, & Benson, 2008).

In the literature review, there are different definitions of assistive technologies used in education. By definitions, this is generally defined as any tool (device) specially designed or adapted to facilitate, enhance and maintain the life skills of persons with disabilities (Borg et al., 2009; Fok, Polgar, Shaw, & Jutai, 2011; Pettersson & Fahlstrom, 2010; Reed & Bowser, 2005). Based on this definition, assistive technology is a comprehensive concept that includes a set of services and tools (Murugaiyan & Arulsamy, 2013). Assistive technologies are divided into three main categories such as low technology, medium technology and high technology (Çakmak, 2016b). Systems that can be

designed for private university education are being considered. A real comprehensive (Aslan, 2018; Çakmak, 2016a; Kışla, 2009) chalkboard, bookshelf etc. are low-level vehicles; voice recorder, calculator etc. are intermediate vehicles; computer software, smart whiteboard etc. are high-level assistive technology tools. It can be understood from the definition of assistive technology that it can be used to increase the competencies of people with disabilities and improve their quality of life (Lancioni, Sigafoos, O'Reilly, & Singh, 2013) and enable them to overcome difficulties they may encounter (Hersh & Johnson, 2008). It is possible to say that teaching staff make teaching possible (Aslan, 2018; Kışla, 2009). When technology applications are used together with appropriate teaching methods, it also increases the academic success of students with disabilities. In addition, assistive technology has important skill benefits such as increasing the motivation of students with disabilities, supporting learning strategies and skills, providing effective work opportunities and improving socialisation skills (Özdamar, 2016).

Assistive technologies are technologically complex. There are advanced materials in this structure. It includes high-tech or low-tech products made from cheaper, simpler and more readily available materials. Among low- and high-level assistive technologies are mid-range products (MidTech). Both low-tech and high-tech products need to be user-friendly (Bozkurt, 2017; Johnston, Beard, & Carpenter, 2007). Low-tech materials include visual maps/graphics, visual charts, pencil holders, adapted pencils and worksheets, reading magnifiers, markers and pens, adapted scissors, page turner, timers, reading pen, talking calculators, talking dictionary and speech generation tool (VOCA). Examples of complex and high-level technologies include tablets, smartphones, smart whiteboards, smart watches, virtual reality, augmented reality applications, smart personal assistants, digital books, mobile applications and computer software (Bozkurt, 2017). The opinions of special education educators against assistive technology are important.

### *1.1. Purpose of the study*

The use of assistive technology used in education is very important. Assistive technologies in special education are effective in conjunction with studies among many disability groups. The opinions of special education teacher candidates about assistive technologies are very important. For this reason, this study, which was carried out in three different universities, was to determine the opinions of final-year students studying in the special education department about assistive technologies. Within the scope of this general purpose, answers were sought for the following sub-objectives:

1. What are the benefits of technology-supported learning environments for children with special needs?
2. What are the benefits of technology-supported learning environments for teachers?
3. What are the most preferred assistive technologies?

## **2. Methods**

The overall goal of this study is to determine the opinions of recent undergraduate students in special education departments of university education departments about assistive technology. In accordance with this general goal, the qualitative method of research was preferred to explain points of view in more depth. The phenomenological design was selected from the qualitative research methods. The advantage of the phenomenological design is that it is a qualitative research design that aims to highlight participants' perceptions and experiences according to their own perspectives (Ersoy & Incebacak, 2016).

### *2.1. Universe and sampling*

The universe of this research consists of senior students studying in the special education department of the faculty of education. The sample of the study was selected using the purposive sampling method chosen by the researcher to provide data on an event or phenomenon, and the criteria were determined by the sampling method (Babbie, 2017). The criteria can be prepared by the researcher or a pre-prepared list of criteria can be used. The criterion determined for sampling in this

research is that the teachers participating in the research use game technology in their classrooms. In this context, 41 senior students studying in the special education department of the university constitute the sample of the research. Demographic information of the sample is shown in Table 1.

Table 1. Demographic characteristics of the study group

Variable	Properties	N
Gender	Female	25
	Male	16

## 2.2. Collection and analysis of data

Semi-structured interviews were conducted with the final-year students of the special education department of the faculty of education included in the study group. Only gender was asked as demographic information. As a prerequisite, their reading in the last year was taken into consideration. For the validity and reliability of the open-ended questions in the interview forms, the opinions of three academicians from the field of measurement and evaluation and computer science were taken and the comprehensibility of the questions was reviewed by making a preliminary evaluation with three students. As a result of expert opinion and preliminary practice, necessary arrangements were made on the questions and the interview forms were made ready for application. The questions in the interview form are as follows:

1. What are the benefits of technology-supported learning environments for children with special needs?
2. What are the benefits of technology-supported learning environments for teachers?
3. What are the most preferred assistive technologies?

In this study, the qualitative method was preferred for open-ended questions. The answers were analysed with the content analysis method, one of the qualitative data analysis methods. The answers of the students of the special education department of the faculty of education were made with the help of voice recorders. After the data obtained from the voice recorder were transferred to paper, it was confirmed by the students. In terms of the credibility of the research, participant confirmation was applied (Başkale, 2016).

## 3. Result

### 3.1. Benefits of technology-supported learning environments for children with special needs

Table 2. Benefits of technology-supported learning environments for children with special needs

Theme	N
Individual learning opportunity	18
Their success increases	17
Makes learning easier	15
Developing life skills	8
Provides self-confidence	4

Assistive technologies are used in all areas of education. In order to determine the opinions of the final-year students of special education teaching department about assistive technologies, the positive aspects of assistive technologies were asked. It was aimed to determine what kind of contributions he made to the students. The senior students of the special education department were asked how assistive technologies contribute to disabled students. Looking at the answers to this finding, assistive technologies offer individual learning opportunities for children in need of special education. The

success of students with disabilities also increases. It has been found that assistive technologies facilitate the learning of students with disabilities, improve their life skills and increase their self-confidence.

Some of the examples of the opinions of the student candidates are as follows:

‘Technology-supported learning environments support the eyesight, hearing, reading, writing, academic, social and communication skills of individuals with disabilities and support independent living skills. This allows people to absorb targeted information more easily, consistently and quickly’.

‘Many technological auxiliary materials appeal to many senses. This provides students with permanent learning and diversity in learning’.

### 3.2. Benefits of technology-supported learning environments for teachers

Table 3. Benefits of technology-supported learning environments for teachers

Theme	N
Provides motivation	18
Easy to monitor students’ progress	16
Professional development	10

The final-year students of the special education department of the faculty of education at the university were asked how assistive technologies benefit teachers. When the findings related to this question are examined, the students stated that it provided motivation (18), it became easier to follow the development of students (16) and their professional development increased (10).

Some of the examples of the opinions of the teacher candidates are as follows:

‘In addition to the benefits of technology-assisted learning for students, there are also benefits for teachers. For example, the teacher helps with educational planning. The materials to be used while preparing the education plan will support the teacher. As the achievement of the desired goals with assistive technologies will be faster and permanent, the success and motivation of the teacher, who realises that the success and motivation of the students increase, increases’.

‘Teaching profession means constantly having new knowledge. Diversity in learning is constantly changing. With the use of new information and technologies, teachers have the opportunity to develop themselves personally and professionally’.

### 3.3. The most preferred assistive technologies

Table 4. The most preferred assistive technologies

Theme	N
Visual cards and reading magnifiers	31
Smartphones	28
Tablet	21
Reading pens	12
Virtual reality applications	8

In addition to the benefits of assistive technologies used in education, it was asked which assistive technologies are frequently used. It has been found that among the assistive technologies frequently

used in special education, visual cards and reading magnifiers are the most low-budget technologies. It has been found that another most preferred assistive technology is smartphones and tablets. Eight students answered virtual reality applications.

Some of the examples of the opinions of the candidates are as follows:

‘While choosing assistive technologies, it is necessary to look at it from a cost perspective. The most commonly used visual cards and reading tools. Again, smart phones are among the assistive technologies used in education’.

‘I think virtual reality applications are very effective for children with disabilities. As my own idea, it was at the school where I did my internship and students achieved remarkable success. Of course, the budget is very important; there are also low-budget cards, pens, reading aloud tools’.

#### **4. Discussion and conclusion**

Assistive technologies are used in all areas of education. The positive aspects of assistive technologies were asked to determine the opinions of the final-year students of the special education teaching department about assistive technologies. When we look at the results of this finding, assistive technologies offer individual learning opportunities to children who need special education. The effects of individual learning environments on students are supported by studies. It was concluded that the success of the students increased, thanks to the assistive technologies. It has been concluded that assistive technologies facilitate the learning of students with disabilities and improve their life skills. Since the assistive technologies used in education continue to provide learning not only in the school environment but also in the outside environment, it can be concluded that it provides permanent learning on students. It is the use of any tool that allows individuals with disabilities to eliminate the difficulties they may encounter in education, professional, daily and social life, to develop their competencies and to make the most of their existing capacities (Bahceci, 2019; Bozkurt, 2017; Pettersson & Fahlström, 2010).

Assistive technologies have benefits for teachers as well as students. According to the results of the finding of how the assistive technologies benefit the final-year students of the faculty of education of the university, it was concluded that the assistive technologies provide motivation for the teachers. This year, trainings that increase the motivation of teachers and encourage teaching are important. The success and motivation of the teacher, who realises that the success and motivation of the students increase, increases as the achievement of the goals aimed with the assistive technologies will be faster and permanent. In short, it was concluded that if the success of the students increases, the motivation of the teacher increases. Evgin et al. (2020) determined the experiences and opinions of special education teachers working in special education schools on the use of assistive technology in their study. The research, which was carried out with a phenomenological design, was carried out with eight teachers in a special education vocational school. Data were collected by semi-structured interview technique. As a result of the research, assistive technologies used by teachers working in special education schools and their areas of use, the availability of assistive technologies, the effects of assistive technology use on students, teachers and families, the difficulties encountered in the use of assistive technology and the opinions of teachers on the use of assistive technology were obtained. Memet and Sentürk (2021), in their study, looked at the attitudes of special education teachers towards assistive technologies and did not find a significant difference.

However, assistive technologies seem to benefit both students and teachers. So what are these assistive technologies? In addition to the benefits of assistive technologies used in education, it was also asked which assistive technologies are used frequently. It was determined that visual cards and reading magnifiers are the lowest budget technologies among the assistive technologies frequently

used in special education. Smartphones and tablets are the other most preferred assistive technologies. A small number of pre-service teachers stated that they took part in virtual reality applications. From the answers to this question, it can be concluded that they know little about assistive technologies used in special education.

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