Speech therapy technologies to overcome dyslexia in primary school students

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Abstract

The aim of this study is to determine the importance of technology in the education of children with dyslexia. In this general purpose study, primary schoolteachers who use technology in their education were asked about the benefits of technology on children with dyslexia. Dyslexic students were asked if there were changes in their learning, thanks to technology. The research group of this study consists of classroom teachers and students with dyslexia. The sample of the study consists of 15 teachers and 18 students working in primary education. The aim of this study is to determine the effectiveness of technology on students with dyslexia in the classrooms of primary schoolteachers. For this purpose, separate interviews were conducted with teachers and students. Three computer teachers, two special education teachers and one language and speech therapist assisted in the preparation of the research questions and the final form was given. Interviews of teachers and students were recorded, which was later approved. Content analysis was used in the analysis of the data collected in the study. As a result of the research, it was concluded that the use of technology in the special education process is beneficial. It can be said that students who have difficulty learning under learning disabilities find it easier to learn, thanks to technology.

Keywords: Technology, dyslexia, teacher's opinion, student's opinion, qualitative research, learning disability;

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1. Introduction

Permanent changes in behaviour as a result of repetitions or experiences are called learning. Individual characteristics affect learning speed, interest and attention spans related to learning and permanence of learning. However, individual differences occur with the effect of both heredity and environmental factors (Küçük & Yıldırım, 2022). The greatest impact on individuals' participation in social life is provided by education. Education is very important for the individual to continue his/her life, to adapt to the society, to have a profession and to be accepted in the society. Education has the same effect for each individual (Yeşilyurt, 2021).

Learning is a process that takes place in the human brain, thanks to external stimuli. These stimuli can be audible, visual, written or tactile stimuli. In the brain, some of these stimuli are eliminated and some are processed because if the human brain takes into account millions of stimuli coming at the same time, an incredible mess will occur. Failure to receive the necessary stimuli indicates that there are problems at this stage of learning. For example, a child who has trouble perceiving visual stimuli may confuse the letters b and d and the numbers 6 and 9. As can be understood from this example, learning occurs at the end of a complex process and deficiencies in different areas cause different learning problems (Koç & Korkmaz, 2016). One of the cornerstones of education is students. There are students with special needs as well as students with typical development in educational environments (Elbir & Sarı, 2017).

A specific learning disability does not reveal a single characteristic or symptom for everyone. One of the most basic symptoms of a special learning disability are delays in reaching certain developmental milestones or inability to perform behaviours that are considered normal for an individual's age. Therefore, students with SLD form a heterogeneous group. These students are a wide variety of individuals who present potential challenges in many different areas. These potential difficulties are considered as problems experienced in academic fields (reading, writing and mathematics) (Birol & Zor, 2018; Pierangelo & Giuliani, 2008). Learning disabilities affect a child's academic growth and development. Persistence in mistakes, failure and inability to express, listening, reading, writing, reasoning and calculation affect their academic development. Lack of awareness among parents and teachers makes the situation worse for these students (Thapliyal & Ahuja, 2021).

In the literature, it is seen that some researchers prefer different terms such as learning disorder and learning disability instead of the term specific learning disability. 'Learning disability' has long been defined as the UK's preferred term (Walmsley & Johnson, 2003). It begins before adulthood with lasting effects on development to refer to individuals with significantly reduced ability to understand new or complex information, learn new skills and reduced ability to cope independently (Cluley, 2018). While other terms have been available for more than 20 years and may be preferred by certain groups, as with 'learning disability' among some researchers (Goodley, 2011), 'learning disability' is a common and accepted usage among people with and without learning disabilities (Gates & Mafuba, 2016). Taner (2007) and Doğangün (2008) define learning disability as having difficulty in one or more of the skills such as reading, writing, speaking and mathematics, although there is no physical or mental disability (Aslan, 2016). In the definition of Culatta and Tompkins (1999), who prefer the term learning disability instead of specific learning disability, learning disability is a condition such as speaking or writing language, reading, mathematics and spatial orientation, unlike sensory, motor, intelligence, affective impairment or not being ready to learn or the difference between the expected success and real success in many areas, as well as the child's need for special education due to disorders in basic learning processes.

It is difficult to classify learning disabilities because some researchers (Clark, 1990; Myers & Hammill, 1946, cited in Korkmazlar, 2003) state that each child's problem may be in different areas and at different levels, and argue that learning disability cannot be classified. 'Learning difficulties' in DSM-IV have been defined as reading difficulties (dyslexia), computational difficulties (dyscalculia), writing difficulties (dysgraphia) and learning disabilities not otherwise specified (American Psychiatric Association: DSM-IV, 1998).

1.1. Dyscalculia

Computational difficulty (dyscalculia) is (1) difficulty in naming and understanding mathematical terms and concepts; (2) inability to turn written problems into mathematical problems; (3) inability to recognise numbers and symbols in writing negativity and size perceptual skills; (4) inability to copy figures; (5) forgetting to add numbers with hand; (6) failure to add single-digit numbers; (7) failure to sequence mathematical steps, reorganise operator signs and use lines to separate parts of a problem; (8) failure to count objects, remember and use the multiplication table to learn and use multiplication and division numbers; (9) failure to carry numbers; and (10) failure to distinguish special sequence features of multi-digit numbers (Ercan, 2001).

1.2. Dysgraphia

Dysgraphia is a specific learning disorder that causes difficulties in reproducing both alphabetic and numeric signs and syntactic rules and self-correction due to frequent difficulties with not only graphics but also indirect typing and re-reading. Children with signs of dysgraphia write irregularly; their hands barely flow on a writing surface; the handle of the writing media is often incorrect; their body positions are in most cases inadequate; their elbows are not placed on the table; and their trunks are extremely curved (Dimauro, Bevilacqua, Colizzi, & Di Pierro, 2020).

1.3. Dyslexia

Dyslexia screening, assessment, identification and treatment take place at the local, state and federal level at the United States level and internationally. In the United States, advocacy groups have successfully lobbied for the creation and implementation of dyslexia-specific education to diagnose and treat students with dyslexia in at least 42 states (Petscher et al., 2019). However, the processes specific to this condition are also associated with significant differences in definition and practice, with children at risk for or identified with dyslexia. This diversity in practice and advocacy often reflects misunderstandings (Miciak & Fletcher, 2020). The basic nature of dyslexia includes (a) descriptive variability and definitions derived from empirically validated scientific data and classifications (Cassidy, 2019; Elliott & Grigorenko, 2014) and (b) the neurobiological and environmental basis of dyslexia, especially the role of reading education (Cassidy, 2019).

Dyslexia refers to an unexpected difficulty in reading for a person with intelligence who will become a much better reader, most commonly due to a phonological difficulty with processing (evaluation of individual sounds of speech). Language, reading and spelling affects the individual's ability to speak (Cassidy, 2019).

The characteristics frequently seen in dyslexic students are as follows:
• Late learning of letters and reading from their peers in the first grade;
• Inability to learn letters and related sounds adequately;
• Skipping letters in written, reversed or alternating writing;
• Difficulty in memorising numbers;
• Being late in learning and speaking;
• Reading slowly and in a hurry make many mistakes, if any;
• Writing the same essay very slowly and have illegible handwriting, despite the student's best efforts;
• Students often write a written essay; they do it poorly and waste a lot of time;
• Frequent grammar, punctuation and spelling mistakes;
• Weakly expressing himself/herself orally and in writing;
• Trouble learning a foreign language for life (Bingöl, 2003; Salman, Özdemir, Salman, & Özdemir, 2016).

In recent years, the concept of computer technology has been used in the education of children who need special education. The medical model of disability focuses on an individual in need of correction, requiring therapy, medication, surgery or special treatment. On the other hand, a child with severe multiple disorders can be provided with comprehensive support services, school and

technological communication help to minimise their dysfunction to a great extent (Mercer, 2017; Peters, 2003).

The use of computer technology activates children with special needs to more successfully explore the world around them, communicate with others for their own needs and make choices about their lives. Computer applications serve as an equaliser so that a child with special needs and a normal child can do similar activities (Hutinger, 1996; Mercer, 2017). In support of this, Demirkıran (2005) stated that educational technology has started to be used increasingly in the education of students who need special education, as in every field of education; she also stated that educational technology has an important place in increasing the experience of children with special education needs, facilitating their learning and providing the individualised education that these children, who are quite different from each other.

1.4. Purpose of the study

The aim of this research is to investigate the contribution of technology use to education in students with dyslexia under the type of learning disability in primary school students. In order to achieve this general aim, answers to the following questions were sought:

1. What are the advantages and disadvantages of using technology in special education students?
2. What is a learning disability?
3. What behaviours do you observe in children with dyslexia?

1.5. The importance of research

Learning disability is a possible obstacle to be identified at primary school age. Primary school students who have difficulty learning should have a variety of methods and techniques necessary for their education to take place. Along with the inclusion of technology in education, technological tools are often used in special education. The rates of use of technological means are very diverse. The effectiveness of technological tools in learning is very important for students with reading difficulties.

2. Methods

In this study, the method of qualitative research was implemented. The qualitative inquiry approach was used in cases of scientific research. The reason why 'phenomenology' is that they prefer to research the information, events, information or opinions in the review in depth by providing a collection of accurate and detailed information from the participants (Ishtiaq, 2019). In case studies, data are usually available through face-to-face interviews (Creswell & Poth, 2018).

2.1. Universe and sampling

The universe of this research consists of classroom teachers and students working in primary education. The sample of the study was selected from the purposeful sampling method chosen by the researcher in order to provide data about an event or phenomenon (Ary, Jacobs, Irvine, & Walker, 2014). The criteria can be prepared by the researcher or a pre-prepared criteria list can be used (Yıldırım & Şimşek, 2016). The criteria determined for sampling in this study are that the classroom teachers participating in the study use technologies in their classrooms. The selected students are those who have difficulty in reading. In this context, the sample of the research consists of 15 teachers and 18 students working in primary education. Demographic information about the sample is shown in Table 1.

Table 1. Demographic characteristics of the study group

Variable	Properties	*N*
Student		18
Gender		

		Female	12
		Male	6
Class			
		First year	10
		Second year	5
Teacher			15
Gender			
		Female	10
		Male	5

2.2. Data collection tools

The aim of the research is to determine the effectiveness of technology on students with dyslexia in the classroom of primary schoolteachers. For this purpose, separate interviews were conducted with teachers and students. Three computer teachers, two special education teachers and one language and speech therapist were assisted in preparing the research questions and the final form was given. Interviews of teachers and students were recorded, which were later confirmed.

3. Result

3.1. Benefits and disadvantages of using technology in special education students

Table 2. Benefit and disadvantage of using technology

	N		*f*
Student			18
Positive	16		
		Permanent learning	10
		Fun and entertaining content	10
		Confidence	3
		Increased communication	2
Negative	2	Not interested	2
Teacher			15
Positive	14	Facilitates students' learning	11
		Provide easy measurement	3

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Negative	1	Difficulty implementing the activity	1

The effects of using technological tools in special education have been determined by the studies. Most of the teachers and most of the students stated that they were advantageous from the findings on the relationship between classroom teachers and students regarding the positive and negative aspects of technology use in the education of special education students. Students' learning is permanent as a positive aspect of using technology in their lessons (10). Moreover, the opinions of the students that they provide learning with entertaining content (10) emerged, thanks to technological tools. They stated that the negative findings obtained from the students did not attract their attention to technological tools. As a result of the interviews with the teachers, they stated that the technology enables the students to learn in the education of the students with dyslexia. In the same way, they stated that they made easy measurements in the measurement and evaluation section. As a negative, some teachers mentioned the difficulty of implementation.

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

'When using the technological tool in education, my self-confidence increases. I have fun while learning'.

'It definitely has an effect. I can easily apply what I have learned with technology'.

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

'As far as I have observed on students, permanent learning is provided for students thanks to technology-based techniques. When I add technology and explain the subject, students pay more attention to me. They have fun while learning'.

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3.2. What is a learning disability?

Table 3. What is a learning disability?

Theme	Student (*f*)	Teacher (*f*)
Inability to learn	11	1
Difficult learning	10	9
Not understanding what you read or write	7	8

In order to determine the knowledge of teachers and students about learning disability, they were asked, what is a learning disability? Looking at the answers given by the students and teachers to this question, it was found that they saw learning disability as a learning situation, defined it as difficult learning and defined it as the situation of not understanding what one's reads and writes.

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

'Learning disability means unable to learn something'.

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'People who have learning difficulties, have difficulty in understanding what they read, have difficulty in writing, and learn what they are told later than others'.

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

'Learning disabilities are people who have difficulty in understanding what they read, have difficulty in writing, and learn later than others'.

3.3. What behaviours do you observe in children with dyslexia?

Table 4. What behaviours do you observe in children with dyslexia?

Theme	Teacher (*f*)
Late learning	**10**
Difficulty reading and writing letters	10
Difficulty in memorisation	8
Frequent grammatical, punctuation and spelling mistakes	7
Learning to speak late and acting hesitantly	5
Students' distraction and forgetfulness	4

Teachers working in primary school were asked about the behaviours they observed in children with dyslexia. When the findings of this view were examined, it was stated that children with dyslexia were late learners, had difficulties in reading and writing letters, had difficulty in memorising, made mistakes in grammar and learned to speak late. Likewise, four teachers stated that children with dyslexia are distracted very quickly.

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

'The most common behaviour problem you observe in our students with dyslexia is that they have difficulty in learning. They learn later than their peers, makes mistakes in reading and writing letters. While reading the letters, they do not read some letters and swallow them'.

4. Discussion and conclusion

Dyslexia, which is a learning disability, is the difficulty in reading and writing. Children with dyslexia have difficulties in reading and writing cognitive skills. The effects of using technological tools in special education have been determined by studies. For this reason, interviews were conducted with primary schoolteachers to determine the benefits of technology in children with dyslexia. As a general result of this research, teachers and students stated that effective learning is provided by technology. Most of the teachers and most of the students stated that they were advantageous from the findings regarding the relationship between classroom teachers and students regarding the positive and negative aspects of technology use in the education of special education students. Students' learning is permanent as a positive aspect of using technology in their lessons. Again, thanks to the technological tools, the opinions of the students that they provide learning with entertaining content have emerged. They stated that the negative findings obtained from the students did not draw their attention to technological tools. As a result of the interviews with the teachers, they stated that technology enables students to learn in the education of dyslexic students. In the same way, they stated that they made easy measurements in the measurement and evaluation part. As a negative aspect, one teacher mentioned the difficulty of the application. The more technology students

integrate into their course content, the more benefits of technology (Colomo-Palacios, Paniagua-Martin, Garcia Crespo, & Ruiz-Mezcua, 2010; King-Sears & Evmenova, 2007). Assistive technologies help individuals with special needs to overcome difficulties they experience it means the tool, hardware and system that help. These individuals have a more successful learning, and it helps them become productive learners. At the same time, their confidence and independence increases. For example, for students with learning and attention problems who have different disabilities, reading and many types of technology help teach writing, listening and math skills (Bozkurt, 2017). Special education teachers used in the classroom technological tools to facilitate teaching, embody the taught topic, prepare the student for the lesson and draws their attention; the student interacts with the teacher for a long time; increases the attention span of the students; makes the student active in the lesson; the students are against the lesson there are studies that it allows him to develop a positive attitude (Eldeniz-Çetin & Geçal, 2017; Sola Özgüç & Cavkaytar, 2016).

The definition of special education is known. However, the opinions of students and teachers were consulted to determine whether the learning disability was known or not. Considering the answers given by the students and teachers to this question, it was determined that they saw learning disability as a learning situation, defined it as learning difficult and defined it as not understanding what one reads and writes. In fact, learning disabilities are grouped under three headings, including difficulty in reading, difficulty in writing and difficulty in mathematics.

Teachers working in primary school were asked about the behaviours they observed in dyslexic children. When the findings of this opinion were examined, it was stated that dyslexic children were late learners, had difficulties in reading and writing letters, had difficulties in memorising, made grammatical errors and learned to speak late. Likewise, four teachers stated that dyslexic children get distracted very quickly. When these results are considered, students with dyslexia have distinctive features. This situation can be corrected by their answers to the advantages of technology in the first item of this research.

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