

## The use of multimedia technologies in teaching primary schoolchildren with intellectual disabilities

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### Abstract

In this study, it is aimed to reinforce the use of multimedia technologies in teaching primary schoolchildren with intellectual disabilities. The study was conducted in the spring semester of 2021–2022, and the quantitative research method was used in the study conducted with the participation of 262 elementary school students. Within the scope of the study, 3-week multimedia education online training was also provided to the students. In the study, the ‘multimedia in primary education’ measurement tool developed by the researchers was used to collect data. The data collection tool used in the study was delivered to and collected from primary school students by the online survey method with the help of their families. The analysis of the data was carried out using the SPSS programme; frequency analysis was carried out with the *t*-test; and the results obtained were added to the study accompanied by tables. As a result of the research, it was found that multimedia technologies have values that benefit primary school students within the field.

Keywords: Intellectual disability, primary school students, multimedia, distance education;

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## 1. Introduction

Mentally retarded children constitute a very important group among children in need of special education. It is known that the first definitions of mentally retarded children date back to ancient years, and it is observed that more descriptive definitions were made in the 1900s (Ozcan & Uzunboylu, 2020). In the ninth booklet published in the new definition and classification system, mental disability was defined with the name of idiocy. Idiocy shows significant limitations in the current functions (Khodabakhsh & Hoseini, 2019). This normality is a significant mental function. Besides, the adaptive skills area (i.e., communication, self-care, home living, social skills, social efficacy, self-management, health and safety, functional academic skills, leisure and business) is known to show limitations in two or more situations (Erdogan & Koç, 2021). It is known that learning disabilities occur before the age of 18. In addition, teaching with this model shows that an individual exhibiting or modelling a target behaviour and an individual modelling the results obtained by the individual achieve similar results by imitating the behaviour observed by the model field (Ouherrou, Elhammoumi, Benmarrakchi, & El Kafi, 2019). Teaching in accordance with this model is teaching with a live model and with a video model. Like all individuals, individuals with mental disabilities respond better to visual stimuli and benefit more from teaching where visual materials are used (Hewapathirana et al., 2021). The difficulties they experience in processing information and storing it in memory make it inevitable to use images and videos that provide visual presentation of skills and instructions in teaching practices for people with mental disabilities (Brito, Dias, & Oliveira, 2018). In applications performed with a video model, video recordings of the target behaviour are usually prepared and watched, and processes, such as becoming a model or providing tips or feedback, are included in this process (El-Kah, Zeroual, & Lakhouaja, 2021). In recent years, researchers and experts have often used it when teaching community-based skills and professional skills to people with mental disabilities (Rodríguez, Jiménez, de León, & Marco, 2021). The field of video technology is discussed in six forms in the article. They are video feedback, being a model, being a model with video, personal point of view, interactive video tutorial/video tips and computer-aided video tutorial.

Computer-aided video teaching is a method that combines two technologies, i.e., video technology and computer-aided teaching, using a computer programme with a video player (Abed & Shackelford, 2021). It is a combination of computer-aided teaching and video technology teaching, which is the use of all kinds of information and communication technologies for educational purposes. In this method, articles, graphics, animations, texts, slides, sounds, music, movies or movements are interactively used in a single system and the user is actively involved in the process (Akdeniz & Özdiñç, 2021). With this technology, it can not only provide an interactive learning environment, but also be developed in a way that can react to student behaviour. The student can react to the stimulus coming from the computer by using the mouse, keyboard, screen or other supporting technologies. Therefore, in this process, the individual can actively participate in the teaching process. In recent years, it has been observed that technology has been used more in special education research, especially with the use of video technology, and many skills have been taught (Cuturi, Cappagli, Yiannoutsou, Price, & Gori, 2022). Skills such as the ability to prepare and serve cold drinks, the teaching of simple first-aid skills in household accidents, the teaching of soup cooking game and first-aid game skills have been gained by using video technology (Gelsomini, Spitale, & Garzotto, 2021).

### *1.1. Related studies*

Ouherrou et al. (2019), in their study on virtual learning environments, intended to identify ways of learning, including emotions, and also children with learning disabilities, learning difficulties and behavioural problems compared to their peers without the power of the class. They also emphasised the result of some emotions in children with learning disabilities that is present and non-experienced as the same feelings as their peers. It is seen that the results have been achieved.

Petretto et al. (2021), in their study on classroom teachers 'at risk', described how 9- and 10-year-old children receive help with interactive multimedia and also investigated how teachers might use software and technologies. As a result, teacher observations, according to all of them who read, increases self-esteem and motivation, although showing signs of normal classroom in the context of students' literacy development. It is seen that the performance results have been achieved.

Ahmad, Rosmani, and Nazri (2021), in their study on multimedia game-based learning approach, investigated whether alternative learning can help as an application when students learn fractions. As a result, it was determined that multimedia blended with the principles of game-based learning is an application that can help learn fractions. They also stated that using these technologies benefits the field.

In this context, it can be said that these studies will benefit from the problem situation in the research, which will, in turn, benefit the literature. In the below sections, the level of primary school students in the dimensions of multimedia technologies will be focused on.

### *1.2. Purpose of the study*

Based on the problem situation in the research, it was aimed to strengthen the use of multimedia technologies in teaching primary schoolchildren with intellectual disabilities. At the same time, answers to the following questions were sought for the general purpose of the study:

- 1) How much time is devoted to multimedia technologies by primary school students participating in the study?
- 2) What is the smart device usage time of the primary school students participating in the study?
- 3) What is the purpose of using multimedia activities by primary school students participating in the study?
- 4) What are the opinions of primary school students participating in the study on multimedia technologies according to the gender variable?
- 5) What are the opinions of the primary school students participating in the study on multimedia technologies after the study?

## **2. Method**

It is known that this section where the methods of the research are discussed and focused on is also the main part of the research. In this context, the method used should be directly proportionate to the problem situation. Here, we will see the collected statistical data.

## 2.1. Research model

It is seen that the method model used in this research is used in many studies. In this study, a quantitative research method was used. It is known that the quantitative research method, as well as the wide acceptance of the dimension due to the meaning of the word, is caused by the events and phenomena that have occurred up to this time (Uzunboylu et al., 2022). In this study, we will see the reinforcement of the use of multimedia technologies in teaching primary schoolchildren with intellectual disabilities with the help of the quantitative research method, the application situations, the conditions of use and the determination of the research conditions of using these applications; gender is defined according to class variables.

## 2.2. Working group/participants

In this section, the participants included in the study are selected by the researchers. In this context, the participants are volunteers in this research from various primary schools around Kazakhstan; yararlanis situations with the help of their families were taken. A total of 262 voluntary primary school students participated in the study. In the research, the data collection tool was applied to the students and their families with the help of an online questionnaire.

### 2.2.1. Gender

The differences of the participants participating in the study according to their gender are given in Table 1.

Table 1. Distribution of primary school students with mental disabilities according to gender variable

Gender	Boy		Girl	
	F	%	F	%
Variable	137	52.29	125	47.71

It is seen that the gender information discussed in the study is presented in Table 1. The gender variable of the primary school students with intellectual disabilities participating in the study was divided and the number of students participating voluntarily was grouped close to each other. In this context, 52.29% (137 people) were male and 49.71% (125 people) were female primary school students. The findings reflect the actual gender distribution.

### 2.2.2. The time devoted to multimedia technologies by primary school students participating in the study

In this section, multimedia technologies and applications were given to students with mental disabilities regarding the problem state of the research, and they were asked about the time devoted to multimedia technologies during the day. The studied values are digitised and presented in Table 2.

Table 2. Time devoted to multimedia technologies by primary school students participating in the study

Multimedia technologies	1–3 hours		4–6 hours		7 hours or more	
	F	%	F	%	F	%
Variable	7	2.67	58	22.14	197	75.19

When Table 2 is examined, the situations of primary school students with mental disabilities devoting time to multimedia technologies are examined and detailed information is added. It can be seen that 2.67% (7 people) expressed spending 1–3 hours of their time on multimedia technologies, 22.14% (58 people) expressed spending 4–6 hours of their time on multimedia technologies and 75.19% (197 people) expressed spending more than 7 hours on multimedia technologies. In this context, elementary school students with mental disabilities prefer spending more than 7 hours of their time on multimedia technologies.

### 2.2.3. The time of the smart device usage process of primary school students with mental disabilities

In this section, the use processes of primary school students with mental disabilities who participated in the research on the use of smart devices were investigated and examined, and the data examined were added to Table 3 with detailed information.

Table 3. Time of smart device usage process of primary school students with mental disabilities

Smart device	1–3 hours		4–6 hours		7 hours or more	
	<i>F</i>	%	<i>F</i>	%	<i>F</i>	%
Variable	10	3.82	38	14.50	214	81.68

In Table 3, it is seen that there are time periods related to the smart device usage time of primary school students with mental disabilities. In that case, 3.82% (10 people) used their smart device for 1–3 hours, 14.50% (38 people) used their smart device for 4–6 hours and 81.68% (214 persons) used their smart device for more than 7 hours. In this context, smart device usage of more than 7 hours was preferred by elementary school students with mental disabilities.

### 2.2.4. Class status

In this section, the class information of the primary school students with intellectual disability in the study was examined and detailed information is given in Table 4.

Table 4. Distribution of primary school students with mental disabilities according to their class status

Class	Second grade		Third grade		Fourth grade	
	<i>F</i>	%	<i>F</i>	%	<i>F</i>	%
Variable	40	15.27	58	22.14	164	62.59

When the class information of the primary school students with mental disabilities included in the study is considered, it is seen that the numerical values are divided into groups and added to Table 4. According to the class groups, 15.27% (40 people) are in the second grade, 22.14% (58 people) are in the third grade and 62.59% (164 people) are in the fourth grade. The findings regarding the distribution of class values reflect the actual distribution.

### 2.3. Data collection tools

It is seen that the data collection tool selected and also preferred and used in the research was created by the people who formed the problem situation and purpose of the study. As for the data collection tool, in accordance with the problem situation of the research, it was aimed to be examined by people who are experts in the field of mental competence and have expertise in the field of multimedia technologies and have revealed its importance. The topics in the content of the data collection tool were created in accordance with the state of mental disability and problems at the same time and were called the 'multimedia in primary education' measurement tool. In addition, a personal information form was developed by the researchers and applied to the participants. The validity of the developed measurement tool was examined by four professors and three associate professors working on distance education platforms technology education, and unnecessary items were removed from the measurement tool and rearrangements were made.

1. Personal information form (demographic data): In the personal information form, information such as gender, multimedia technologies usage times, smart device usage times and class is provided.
2. Multimedia data collection tool in primary education: The study participants rated two categories 'mental competency' and 'multimedia technology' on 5-point Likert-type data collection tool. 19 items were used out a 23-item scale and 4 items were extracted from the measurement tool using experts' opinions. The opinions of primary school students with mental disabilities from two factorial dimensions, such as 'mental competence' and 'multimedia technology', were sought. The Cronbach alpha reliability coefficient of the measurement tool as a whole was calculated as 0.84. The measurement tool was rated as 'strongly disagree' (1), 'disagree' (2), 'I'm undecided' (3), 'agree' (4) and 'strongly agree' (5). The data collection tool was sent by email to primary school students with mental disabilities in the form of an online environment, also known as a virtual questionnaire, with the help of their families and was collected online.

### 2.4. Application

In this part of the research, it was aimed to address the design of multimedia technologies and application areas for primary school students with mental disabilities. This is of importance to the people who came up with the research part of the application. 262 volunteers from several elementary school classes in the Kazakhstan region who continue their education in Moodle learning management system and BigBlueButton were included in the study. Elementary school student prepare for scheduled lessons with the help of multimedia technologies such as video conferencing and live events prepared by experts in the field of this activity. Once the research part of the application is completed, multimedia training for elementary school students with mental disabilities size and material are presented with synchronous training. A 3-week skills training for elementary school students with mental disabilities and their families is provided with the use of multimedia technology in their daily lives merge this training conditions, the terms of use and use of learning techniques in various applications of how often to be identified by 'mental competency', 'tenoloji lessons' etc. Such information was provided to elementary school students with mental disabilities in the form of distance education, and it was expected that elementary school students would participate in the event held every week on this topic. After 3 weeks of training, the measurement tool and the information form were applied to the elementary school students together with their families with the help of an online questionnaire, and the data are given in the form of tables in the findings section.

Parents of the students were asked to help with the online survey. Most elementary schools and schools of education (BigBlueButton) distributed the application programme. Each so-called targeted online training programme/activity was carried out for 60 minutes, i.e., 45 minutes for discussion and 15 minutes of feedback in the online event. The measurement tool applied to primary school students was collected through an online questionnaire and transferred to the SPSS programme by coding them in the environment of calculation programmes.

### 2.5. Analysis of the data

It is known that the applied data is always updated with the help of analysis programmes called filtering. As for the numerical values, frequency ( $f$ ), percentage (%), mean ( $M$ ), standard deviation ( $SS$ ) and  $t$ -test were investigated and presented in the findings section in the form of tables.

## 3. Findings

In this section, we discuss the findings related to the learning status of primary school students with mental disabilities participating in the study using multimedia technologies and methods, and each finding discussed in the research is given in the form of tables accompanied by comments.

### 3.1. Purpose of using multimedia technologies by primary school students with mental disabilities participating in the study

The objectives of using multimedia technologies related to the problem state of primary school students whose mental competence was investigated and included in the research and detailed information is given in Table 5.

Table 5. Purpose of using multimedia technologies by primary school students with mental disabilities participating in the study

Department	Social activity		Personal activity development		Other	
	$F$	%	$F$	%	$F$	%
Variable	118	45.04	132	50.38	12	4.58

The purpose of using social multimedia technologies by primary school students with mental competencies participating in the research is investigated and detailed information has been presented in Table 5. In this context, 45.04% (118 people) stated that they used social multimedia technologies for social activities, 50.38% (132 people) said that they used it for personal activity development and 4.58% (12 people) stated that they used social multimedia technologies for other reasons. In this context, it can be said, based on Table 5, that most of the participants used social multimedia technologies for personal activity development.

### 3.2. Multimedia opinions of primary school students with mental disabilities participating in the study according to the gender variable

Here, it is seen that ideas have always differed regarding the concept of gender. In this context, the multimedia technology opinions of primary school students with mental competences are evaluated according to the gender variable and detailed information has been given in Table 6.

Table 6. Multimedia opinions of primary school students with mental disabilities participating in the study according to the gender variable

	Gender	N	M	SD	Df	t	p
Multimedia Technologies	Boy	137	4.48	0.32	262	0.28	0.478
	Girl	125	4.45	0.28			

According to the concept of gender, an application was made for the information of primary school students with intellectual disabilities participating in the study, and relevant information was collected by examining multimedia technology situations. It was found that there was no significant difference according to the gender criterion in this study [ $t(262) = 0.478, p < 0.05$ ]. In addition, when the multimedia technology opinions of primary school students are examined, it is seen that male students have an average score of  $M = 4.48$ , while female students have an average score of  $M = 4.52$ . In this context, it can be said that there is no difference between the distance education scores of male primary school students included in this study and the female students. The findings of the study are also high.

### 3.3. Post-study opinions of multimedia technologies of primary school students with intellectual disabilities participating in the study

In this section, the opinions of primary school students with mental disabilities about multimedia technology courses at the end of the training were taken with the help of an online survey method and with the help of their families. The opinions are presented in Table 7.

Table 7. Post-study opinions on multimedia technologies of primary school students with mental disabilities participating in the study

No	Multimedia Technologies	M	S
1	I found the training enjoyable and fun in my field	4.42	0.38
2	Using multimedia technologies has increased my interest in my field	4.38	0.33
3	I enjoyed using multimedia technologies	4.41	0.37
4	With multimedia technologies, I was able to easily navigate and reach where I wanted to go in the Learning material	4.52	0.41
5	I have identified important information in the learning material with multimedia technologies.	4.38	0.47
6	All that I can interact with in the multimedia technologies material	4.47	0.42
7	I was able to use the features	4.46	0.48
8	I aimed to learn the subject while studying multimedia technologies.	4.42	0.57
9	I always feel comfortable and peaceful when using multimedia technologies	4.40	0.49
10	I have studied and discovered the environment while using multimedia technologies	4.49	0.42



11	I have studied multimedia technologies and materials with my family in their entirety	4.45	0.48
12	I was able to contact my friends while using multimedia technologies	4.42	0.38
13	I was happy to contact my friend while using the multimedia technologies I use	4.48	0.41
14	When I used multimedia technologies, a positive bond was formed between me and my teacher Dec	4.42	0.42
15	During my time using multimedia technologies, I realised where I was using what I was doing in the training I was receiving	4.43	0.43
16	Doing activities with my family has made me both comfortable and happy in multimedia technologies	4.38	0.44
17	I think that I have covered my shortcomings in education by using multimedia technologies	4.41	0.48
18	I liked the multimedia technologies and the way the learning material explained the topic.	4.47	0.44
19	I made sense of the topics in the multimedia technology material in my mind.	4.38	0.43
	Overall Average	4.43	0.43

In Table 7, the opinions of elementary school students with mental disabilities are examined. It is evident that each opinion of elementary students with mental disabilities carries a different meaning. However, their opinions about multimedia technology can be said to be high based on Table 7. The most obvious expression of the survey was ‘With multimedia technologies, I was able to easily navigate and reach where I wanted to go in the Learning material’, with a score of  $M = 4.52$ . It is seen that each value in the research is evaluated separately and added to the table. Among these statements, it was found that ‘I have studied all the multimedia technologies materials with my family’ had a score of  $M = 4.47$ . While it was seen that the opinions of primary school students with mental competence about multimedia technologies were high after the study, another finding was ‘I aimed to learn the subject while working on multimedia technologies material’, with a score of  $M = 4.46$ . Other findings of the research are ‘I was able to use all the features that I could interact with in the multimedia technologies material’, with a score of  $M = 4.47$ , and ‘I was able to contact my friends when using multimedia technologies’, with a score of  $M = 4.45$ . In addition, another finding was ‘I always feel comfortable and peaceful when using multimedia technologies’, with a score of  $M = 4.42$ . The overall average of finding was  $M = 4.43$ .

In Table 7, the opinions of elementary school students with mental disabilities were seen to be positive and related to multimedia technologies in the research. It can be argued that the values make sense, also in research in any area of multimedia technologies that they can use, what they have learned about doing research, they are having more efficiency and time, when there is a problem and they solve their teachers with a lesson in taking pleasure in this environment a very positive value is reached where they work is observed. In this context, it can be said that the numerically given findings in Table 7 constitute a positive meaning and based on the findings that the participants participating in the study are also in a good and positive state of multimedia technologies.

#### 4. Discussion

Akhundi Yamchi, Davatgar Asl, and Asadi Aidinloo (2021) aimed to study the effectiveness of the use of technology and multimedia in smart classrooms in improving reading disorders, word chain

and word comprehension skills in late learners. In this context, when this value is combined with the results of the research, it is seen that primary school students with mental competence use and enjoy multimedia technologies for 7 hours or more during the day.

Arumugam, Govindaraju, and Tamilarasan (2022) sought to adopt artificial intelligence technology integrated with the Internet. As a result, the time usage of children with and without learning difficulties in reading, writing and drawing results have been achieved and there is a statistical correlation between the duration of learning disabilities, parents of children with a learning disability known about the possibility of bilgilendirile for their children. It is seen that the results have been achieved. When this value is combined with the results of the study, it is seen that the results of this study are achieved that students with mental disabilities enjoy this environment with their families, thanks to this training. In this context, it can be said that these technology opportunities provide meaning to both the student.

Yilmaz, Topu, and Takkaç Tulgar (2022) aimed to explore the perspectives of the retention of learning English in mind levels by using augmented reality technology. In order to achieve this goal, the AR-aided educational tools for preschool children in English vocabulary/concepts was undertaken to assess the influence on the levels and learn keeping in mind and the result after the application of the word/concept. It is observed that it increased to 72 points for learning. In this context, when these values are combined with the results of the research, it is seen that students with mental disabilities use technology in the field and the results that they are happy in this field are reached.

There is no doubt that the research given in the discussion section undoubtedly benefits the related research in the field. In this context, it is among the expectations that each value mentioned in the discussion section benefits the students in this field and also shines a light on future studies.

## **5. Conclusion**

Considering the results of the research, it is seen that the number of people is given first, and considering that each value given in the study is important within the scope of the research, it is seen that 262 mentally retarded students participated in the research. Another value of the study is, when considering the situations of primary school students with mental disabilities, the time devoted to multimedia technologies being examined. As a result, it was seen that they preferred 7 hours and more and their results were reached. This value can also be said about their environment in the field. Another value of the research is the time period investigated by elementary school students with intellectual disabilities. As a result, smart device usage time of up to 7 hours was preferred.

Another value of the research is the purpose of the field-researched multimedia technologies and social activities of elementary school students who are mentally competent and the investigation for its intended use. The research problem according to most social activities and personal development is in accordance with the consequences of choosing the problem. Another value of the research is that, according to the concept of gender, applications were made to the information of primary school students with mental disabilities participating in the study, and relevant information was collected by examining multimedia technology situations. It was found that there was no significant difference according to the gender criterion in this study. Also, the highest scores of both male and female students were based on the opinions of elementary school students with mental disabilities. Also, the opinions of elementary school students with mental disabilities were seen to be

related to multimedia technologies and the positive research results in multimedia technologies in the value of its meaning and also that they can use in any area of research and more efficient doing what they have learned about a time they are having, when there is a problem, they solve it with the help of their teachers with a lesson. Taking pleasure in this environment, they work in a very positive way.

As a result of the research, it was observed that primary school students have the values that multimedia technologies benefit them in their fields, and besides these values, it is also among the expectations that it will benefit the field.

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