

## **VIEWS AND SUGGESTIONS OF TEACHERS OF STUDENTS WITH AUTISM ON TECHNOLOGY- AIDED EDUCATION APPLICATIONS**

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**Abstract.** The objective of the present study is to determine the views and suggestions of teachers, who train students with autism, on technology-aided education applications. The study was conducted in Bursa province Education Center for Children with Autism. Fifteen teachers that work with children with autism in different fields. In the study, data was collected via a semi-structured interview form designed by the researcher. The interviews lasted for 15 – 30 minutes. Collected data were analyzed using content analysis and the findings were discussed in detail.

*Keywords:* Autism, technology, teacher, view, suggestion.

### **Introduction**

According to DSM-5 diagnostic criteria, Autism Spectrum Disorder is a lifelong disorder indicated by deficiencies, limiting and repetitive behavior patterns and interest or activities that onsets during the early development period (American Psychiatric Association, 2013). Children diagnosed with autism spectrum disorder (ASD) experience significant issues such as social interaction problems, language and communication problems with those around them due to the above mentioned deficiencies (Heward, 2013).

The problems children with ASD experience in areas of paying attention, processing information and keeping it in memory affect their academic achievements negatively (Pennington, 2010). Thus, it is significant to note that the instruction of pre-school and school age individuals with ASD using visual stimuli would positively affect their academic performances (Coleman-Martin, Heller, Cihak and Irvine, 2005; Massaro and Bosseler, 2006).

Technology-aided educational applications in training children with autism spectrum disorder could be scrutinized in three categories (Michael, 2004): a) applications that utilize low level technologies; b) applications that utilize moderate level technologies; c) applications that utilize advanced level technologies.

Applications that utilize low level technologies are those that generally utilize visuals with images. Activity tables, calendars, image tables that are frequently used in training of children with autism belong to this group. Applications in this group do not require the use of electrical or battery-powered equipment. Picture Exchange Communication System (PECS) and social stories developed by Gray (1993) are examples for applications that could be considered within this group (Dettmer et al., 2000; McClannahan and Krantz, 1999; Michel, 2004).

Applications that utilize moderate level technologies are the ones that utilize simple equipment. These applications could be implemented using tape players or recorders with an audio out plug and could record sounds. Timers that are used in the education of children with autism could be given as an example to this equipment. These are mostly used with visual or written cues (Michel, 2004).

Applications that utilize advanced technologies are costly applications. Technological equipment such as desktop computers, portable computers, smart phones, video cameras, software and scanners are utilized in this group. The number of applications that utilize advanced technologies in education of children with autism increase every day. Findings of the studies demonstrated that advanced technology use increased attention span of children with autism, reduced their behavioral problems and facilitated the achievement of leisure and gaming skills (Dauphin, Kinney and Stromer, 2004).

Today, it could be observed that changing and advancing technological innovations are successfully used in the education of children with ASD (Ramdoss et al., 2012). Review of technology-aided research would show that instruction by the teachers or practitioners using technological equipment results in more successful results in education of children with ASD (Ramdoss et al., 2011). Successful applications reported in the literature on technology use in education of children with autism are encouraging. Review of national literature would reveal that. In her dissertation, Eliçin (2015) stressed that technology-aided educational applications are still a novelty and further studies are needed in the field. The objective of the present study is to determine the level of awareness of teachers that work with children with autism on the technology-aided applications, whether they utilize technology in education and their positive or negative views on technology use, and their suggestions.

### **Method**

The aim of the present study is to determine the views and suggestions of teachers on technology-aided education for students with autism. The study is designed with descriptive method and semi-structured interview technique, one of qualitative research methods, was utilized in the study. Qualitative research methods are the type of research methods that utilize a qualitative process in order to realistically exhibit the facts in a natural environment, where qualitative data collection methods such as observation, interviews and document analysis are used (Corbin and Strauss, 2008).

### **Participants/subjects**

15 teachers working at Education Center for Autistic Children in Bursa province participated in the study. Five participating teachers were male and ten were female. Their professional experiences varied between 2 and 34 years. Detailed information about the participants is presented in Table 1.

**Table.1** Participant Demographics

<b>Age</b>	<b>Gender</b>	<b>Field</b>	<b>Professional Experience</b>
25	Female	Special Education	2
40	Male	Music	9
33	Female	Handicrafts	6
29	Female	Ceramics	2
39	Female	Ceramics	10
24	Female	Special Education	1
50	Female	Music	25
51	Female	Agriculture	18
44	Male	Music	20
30	Female	Visual Arts	28
56	Male	Physical Education	34
43	Male	Physical Education	17
34	Female	Pre-School	3
31	Female	Pre-School	1
35	Male	Physical Education	8

### **Data Collection**

In the present study, which scrutinized the views and suggestions of teachers of students with autism on technology-aided education, semi-structured interview technique was utilized. Author determined the interview questions from 12 question pools obtained through a literature review. Three education field experts evaluated the suitability of the determined questions for the purpose of the research and the 8-question interview form was finalized. The questions determined for the teachers in the interview form were as follows:

1. Which technologies you think about when you consider technology use in education?
2. Would you consider that technology use in education of children with autism is important? Why?
3. What are the advantages of technology use in education of children with autism in your opinion?
4. What are the disadvantages of technology use in education of children with autism in your opinion?

5. Do you utilize technology when working with your student with autism? If yes, which technologies?

6. Which technologies you would like to use when working with your student with autism? Why?

7. You would consider that technology use is more significant for the development of which skills of children with autism?

8. What are your suggestions about technology use in education of children with autism?

A pre-interview was conducted to determine whether interview questions were suitable for the objective of the research with three teachers, who work at an institution serving autistic students in Bursa province. At the end of the interview, interview questions were reevaluated based on the responses received from these teachers, and a decision was made to keep them as they were. After the finalization of the interview questions, participants of the study were determined and 15 teachers were included in the study. The researcher explained the objective of the study to all participants before the interview and stated that they could openly express their opinion without any reservation. Furthermore, it was stated that the questions could be repeated until the participants comprehended them completely.

The researcher notified the participants that the interviews would be recorded using a recording device to prevent mistakes in the analysis process, and the recordings would be heard only by the person who would conduct the analysis. Study interview questions were not declared to the participants beforehand and the teachers learned about the questions only during the interview. The interviews lasted 15 – 30 minutes. The researcher made sure that teachers' responses stayed on the subject.

### **Validity and Reliability**

Internal validity was established via the consultation of field experts on the research questions. The views of experts on special education were consulted on interview questions, data and interpretations. Furthermore, the results and interpretations after the analysis process were presented to the three teachers, and their approval was obtained. External validity of the study was established via direct quotations from the research data.

### **Data Analysis**

Study data were analyzed using content analysis, which is used in descriptive research methods. Author transcribed the sound recording of the interviews without any adjustments. The final transcript was reviewed by a field expert, and the uniformity of the written transcript with the audio recordings was established. The information and views obtained from the teachers were tabulated for the analysis process. Teacher responses were analyzed in consistence with qualitative analysis practices. Coding and themes obtained as a result of the analysis were presented for the opinion of two experts in the field of special education. Reliability calculations

for the coding conducted by the author was performed using Consensus / (Consensus + Dissensus) x 100 formula (O'Neill, McDonnel, Billingsley and Jenson, 2011). The agreement rate between the two coders was identified as .95. Coded data were reviewed and grouped based on their similarities and differences. Later on, related codes were grouped to establish thematic coding (Corbin and Strauss, 2008). The resulting themes are presented in Table 2.

**Table 2.** Coding and themes created as a result of the views of the teachers

<b>Codes</b>	<b>Themes</b>
Computer, phone, audio recording device, camera, projection device	Technology products
It is significant	Importance of technology
Gathering attention	Advantages of technology
Codependence	Disadvantages of technology
Computer, tablet, phone	Desirable technologies
All skill areas	Technological skills
Game design Smart board, robots Technology classrooms	Suggestions

### **Findings**

#### **Findings on the question “Which technologies you think about when you consider technology use in education?”**

The teachers were asked which technologies they consider when they hear about technology use in education and 8 teachers responded with computers, phones, sound recording devices, cameras and projectors. Among other responses; T4 said “I think about technologies such as kilns, clay rolling machines when I hear technology in education,” while similarly T5 said “I think about kiln and potter’s wheel.” Teacher T9 said “When I think about technology in education, I primarily consider music players,” and T11, “When I think about technology in education, I think about treadmills, fitness equipment.”

#### **Findings on the question “Would you consider that technology use in education of children with autism is important? Why?”**

All teachers that responded to this question were of the opinion that technology use in education of children with autism was important. Among answers on the reasons of this significance, 5 teachers said that visual quality is important for these children, 3 teachers argued that technology use could save time, 4 teachers stated that technology use is a remarkable factor, 2 teachers said that technology supports education, and one teacher stressed that technology is a factor that prevents behavioral problems. T10 said “Visual quality is of utmost importance for children with autism, therefore technology use attracts their attention, and meanwhile technology is quite adaptable.”

**Findings on the question “What are the advantages of technology use in education of children with autism in your opinion?”**

9 teachers that responded to this question stated that technology facilitates the enrichment of activities. T4 answered the question as follows: “Handmade material takes very long time to prepare, but we could prepare those in the computer rapidly and present these in the computer and it attracts the child’s attention, it is beneficial in both ways.” T6: “It facilitates the ability to present different activities, drawing figures, colors or different drawings by hand is challenging economically as well, these material also wear out easily.” 4 teachers stated that technology use is a significant application, 2 teachers argued that technology use made education fun. T7 said “Normally we have problems establishing eye contact, but when the child sees a phone, it grabs her or his attention immediately, I considered whether I should instruct via a phone,” and T1 said “We use the computer as a reward, when the activity is over we turn on the music, it is fun and the children love it.”

**Findings on the question “What are the disadvantages of technology use in education of children with autism in your opinion?”**

8 respondent teachers argued that continuous technology use could result in codependency. T15 said “If we now use it continuously for the child loves it or it is effective, we could not be able to instruct in any other way,” while T3 said “If we instruct continuously on the computer, the child will not even go home in my opinion, these kind of things could cause addiction.” Among other responses; 4 teachers stated that it would not be an effective method of instruction for children with severe autism diagnosis, while 3 teachers argued that children could harm portable devices. On the issue, T14 said “I do not think the child would get through to the tablet or the computer if she or he has very severe autism, I do not think it would be effective,” while T12 said “(S)he grabs everything and throws them away, (s)he could throw the phone or the tablet as well, and I might not be able to control that all the time.”

**Findings on the question “Do you utilize technologies when working with your student with autism?”**

14 respondents stated that they did not utilize any technological tools when working with their students with autism. Only one teacher stated that s(he) used computers as a reward.

Findings on the question “Which technologies you would like to use when working with your student with autism? Why?”

Responses to this question demonstrated that 13 teachers would like to use computers, tablets and phones. On the issue, T5 said “I would be able to do more id we had a computer in the class.” T7: “If we ask for a tablet his or her family could not buy it, in fact if (s)he had a tablet, I would be able to arrange the skills we work on in the tablet, there is one at school, but as you can see there are several classes, how could we share it effectively?” T9: “Phones are carried around easily,

and today they are similar to tablets anyway, I would like to work with a phone that belongs to my student.” In addition, one student stated that (s)he would like to work with a Jacuzzi, another wanted to use smart board. T2 said “We do sports for the student to improve the use of his (her) leg muscles, it would be very helpful if we had a Jacuzzi,” while T11 said “A smart board would be very useful in my classroom, all my students are at a level where I could study academic skills.”

Findings on the question “You would consider that technology use is more significant for the development of which skills of children with autism?”

Responses to this question showed that all teachers indicated that technology use was significant in developing all skills of children with autism. On the subject, T1 said “I mean, technology use is significant in developing imitation skills, social skills, communication skills, in fact, all skills of children with autism.” T8 said “It is important mostly for social and communication skills, but technology could be used for development of any skill.” T15: “It is important for all, but primarily for gathering attention.”

#### **Findings on the question “What are your suggestions about technology use in education of children with autism?”**

Responses to this question indicated that 6 teachers expressed a need for a technology class in their schools, 4 teachers said that several game-based software could be designed for children with autism, 4 teachers thought that smart boards and 1 proposed that special robots designed for children with autism should be introduced in the educational environment. T1 said “Now we hear that these robots became very popular, we would definitely use them if a few are provided by the school,” T3: “There should be a smart board in every classroom, so that different programs could be used depending on the level of the child.” T6 said “It is difficult to provide for every single classroom, but at least one technology classroom, which would be equipped with all types of technology, could be created to serve all that needs to use it,” while T8 said “Even one would be sufficient, one classroom could be designated as the technology classroom.” T11: “One technology classroom could be established in each floor, when a teacher would like to take her or his pupils there, (s)he could, based on their age level or performances.”

#### **Discussion and Results**

The aim of the current study was to determine the views and suggestions of teachers that work with children with autism on technology-aided education applications. For this purpose, 15 teachers with students with autism in their classrooms participated in the study. Findings demonstrated that, although the students had positive views on use of technology, they were not able to implement technology-aided applications in educational environment.

Information gathered as a result of the interviews conducted with teachers in the study demonstrated that the responses given showed similarities. They have named mostly computers, phones, sound recording devices, cameras and projection equip-

ment in relation to the children with autism. Findings on the significance of technology in training children with autism demonstrated that the teachers were aware of the importance of technology use. However, it was determined that all teachers except one did not utilize technology in their classrooms. The views of teachers on the disadvantages of technology use showed that technology use could cause a dependency among children with autism. Furthermore, teachers who considered technology use would be beneficial on development of all skills for children with autism, also stated that they would prefer to use computers, phones and tablets in their classrooms. Teachers suggested that games could be designed for children with autism, smart boards could be used in education, and technology classrooms could be established in schools they attend. In addition, they have proposed that application examples of the use of robotics, which is used in training children with autism in foreign countries, but still in development in Turkey, could be increased. Teachers in general suggested the use of advanced level technologies in education of children with autism. Studies in the literature have several examples demonstrating that advanced level technology use in education of children with autism has positive effects on their learning (Dauphin, Kinney and Stromer, 2004).

Based on the results of the present study, suggestions could be made for further research and applications. It could be suggested that applications that use technology in education of children with autism could be initiated, or the existing number of applications could be improved. It could be proposed that software programs specially designed for children with autism should be produced by field experts and the number of such programs could be increased. Furthermore, technology classes could be organized and teachers that work with children with autism could be informed about applications such as smart boards and tablet computers that could be used in these classrooms.

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