



The Use of iPad as an Educational Tool for Students with Autism: Challenges and Opportunities in Special Education Settings

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Abstract

This qualitative study explores the experiences of special education teachers using iPads in teaching students with autism (ASD) in comprehensive special education schools in the north of Israel. Twelve teachers participated in semi-structured interviews, which were examined using a thematic analysis. The findings revealed a duality in iPad usage experience: teachers recognised significant benefits in communication processes, learning enhancement, motivation, and emotional regulation, while simultaneously uttered facing challenges related to technological barriers, classroom management, and the need for an efficient preparation. The study highlights a generational gap in technology usage and emphasises the need for comprehensive training and institutional support. Recommendations include developing targeted professional development programs that address both technological and pedagogical aspects of iPad integration in educational processes, establishing clear school policies for technology use, and providing ongoing technical support. The current research contributes to understanding how assistive technology can be effectively integrated into educational settings for students with autism.

Subject Areas

Literature

Keywords

Autism Spectrum Disorder, iPad, Special Education, Augmentative and Alternative Communication, Educational Technology

1. Introduction

The prevalence of autism spectrum disorder (ASD) continues to rise globally, with current estimates in Israel indicating that approximately 1 in 88 children are diagnosed with ASD (Alut, 2023) [1]. Educational institutions face increasing challenges in providing appropriate and effective educational attitudes for students with ASD who often experience difficulties with communication and social interaction (American Psychiatric Association, 2013) [2].

In recent years, technology has emerged as a promising tool in special education settings, while the iPad is becoming particularly popular due to its portability, versatility, and intuitive interface. For students with ASD, who often demonstrate strengths in visual processing and may have an affinity for technological devices, the iPad offers unique educational opportunities (Lofland, 2016) [3].

Research has indicated that students with ASD often feel more comfortable interacting with technological devices like computers or tablets and that many exhibit strong visual learning abilities and technological aptitude (Lofland, 2016) [3]. While not all individuals with ASD require an iPad for augmentative and alternative communication (AAC), the device can support various developmental domains including academic skills, social abilities, language development, motor skills, daily living skills, and independence (Lofland, 2016 [3]; Alhajeri *et al.*, 2017 [4]).

Despite growing evidence of the potential benefits of iPad usage with students with ASD, there remains limited research on how teachers experience and perceive this integration in their daily classroom practice, particularly in comprehensive special education settings. Teachers' perceptions and experiences are crucial, as they ultimately determine how and to what extent assistive technology is incorporated into educational programs.

The current study aims to explore the experiences of teachers using iPads with students with ASD in comprehensive special education schools in the north of Israel. By understanding teachers' perceptions of both the benefits and challenges of iPad usage, this research seeks to identify factors that influence effective implementation and to develop practical recommendations for enhancing the integration of this technology in educational settings for students with ASD.

2. Literature Review

2.1. Autism Spectrum Disorder (ASD)

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition characterised by persistent challenges in social communication and interaction, alongside restricted and repetitive patterns of behavior, interests, or activities (American Psychiatric Association, 2013) [2]. The autistic spectrum recognised today as neurological diversity is characterised by varied perceptual characteristics. According to the DSM-5, diagnosis requires symptoms in both domains: social communication deficits and restricted, repetitive behaviors (American Psychiatric Association, 2013) [2].

The social communication domain encompasses difficulties in social-emotional reciprocity, nonverbal communicative behaviors, and developing interpersonal relationships. The restricted, repetitive behavior domain includes stereotyped movements, unique areas of interest, and sensory sensitivities. These challenges significantly impact functioning across various life contexts (American Psychiatric Association, 2013 [2]; Dromi, 2018 [5]).

Recent reports indicate that ASD prevalence in Israel among children and adolescents is approximately 1 in 88, with continuous growth in diagnosed cases across different public systems and within the general population (Alut, 2023) [1].

2.2. Augmentative and Alternative Communication (AAC)

Augmentative and Alternative Communication (AAC) encompasses methods designed to support individuals who cannot express themselves effectively through speech. This support is provided through various strategies, techniques, and technologies tailored to individual needs and abilities (Chatzouri, 2010) [6].

AAC techniques include both unaided approaches (without external support) and aided approaches (utilising external equipment or technology). Unaided techniques include vocalisations, gestures, and signs, while aided techniques range from low-tech solutions (communication boards) to high-tech options like speech-generating devices and computer-based communication systems (Light & Beukelman, 2020) [7].

Communication channel impairment is one of the central and prominent characteristics in diagnosing children with autism. Deficiencies can be seen that may affect the existence of effective communication in each of the components of communication (Tager-Flusberg & Kasari, 2013) [8]. Intervention through alternative supportive communication (ASC) is essential. ASC is an area of intervention designed to provide a response to those who cannot express themselves naturally through speech, through a variety of diverse strategies and techniques, tailored to each person according to their needs and abilities. One of these external means is the use of technology that includes speech generation, such as the iPad (Light & Beukelman, 2020) [7].

2.2.1. iPad Use with Students with ASD

In 2010 Apple introduced a new product, the iPad. Along with advances in personal technology, the iPad also brought technological advances to the field of education around the world (Sciuto, 2013) [9]. The iPad is a mobile device that includes a touch screen and is powered by the iOS operating system. In March 2011, the iPad 2 was released, which significantly increased the possibilities of using the iPad as a tool for promoting speech and language development (Fernandes, 2011) [10]. Although the iPad was not originally designed and created as an educational tool, it has been widely used in classrooms around the world and became a tool in everyday use in education (Sciuto, 2013) [9].

Today, children, including many with ASD, are often considered as “digital natives” who intuitively understand technology. For individuals with ASD, who may

prefer interactions with technology and often possess strong visual learning abilities, iPads can be particularly beneficial (Lofland, 2016) [3].

The iPad offers an important technological platform for students with ASD, serving as an effective communication and teaching tool in both group and individual settings (Alhajeri *et al.*, 2017) [4]. Lieberman *et al.* (2019) [11] recommend incorporating iPads in teaching students with ASD as they provide a structured platform combining visual, auditory, and tactile elements; it has been found enabling the effective expression of communicative intentions of a request while increasing communication skills in classroom activities (Alhajeri *et al.*, 2017) [4]. Various studies have found that mobile devices such as the iPad have encouraged the advancement of language skills among children with autism, and that the iPad can be an effective language expression tool among students with autism. Among children with high-functioning autism, who do not require the support of the iPad as a learning tool, it has been found that higher narrative abilities are seen when using a digital book on an iPad compared to using a regular picture book (Ebert, 2018) [12].

2.2.2. Teachers' Attitudes Toward iPad Use with Students with ASD

Several studies have examined teacher attitudes toward iPad use with students with ASD. Lieberman *et al.* (2019) [11] found that teachers of students with ASD generally favor incorporating iPads in their teaching, viewing the device as a “disability bypass tool” that promotes communication and social goals while addressing writing difficulties. This study also identified a correlation between teacher age and attitudes toward iPad integration, while younger teachers demonstrated more positive attitudes, possibly because they were born into an environment where technology is more integrated into daily life.

A similar study conducted in an Israeli special education school with students with ASD aged 6 - 12 years with moderate to low functioning also found positive attitudes among participants toward iPad integration. Participants viewed the integration as important and meaningful and considered the iPad an advanced teaching tool suitable for students with ASD. However, the study raised questions about how often professionals actually use iPads in their work according to the specific needs of students with ASD (Lavian & Alshech, 2015) [13].

3. Methodology

This study is based on a qualitative research paradigm that emphasises the holistic understanding of phenomena and the importance of context in the interviewees' interpretation. According to this methodology, phenomena can only be understood from the internal perspective of those experiencing them, with the meaning of the phenomenon being personal for each individual. In qualitative research, the researcher serves as the primary tool for data collection—observing, speaking, listening, and participating with the subjects. Research data is collected in the natural environment being studied, and the categories for analysis emerge from the data collection process (Shkedi, 2003) [14].

3.1. Participants

Twelve female teachers of students diagnosed with ASD participated in the study. All participants work in comprehensive schools for students with complex communication difficulties aged 6 - 21 years. The average age of the teachers was 42.8 years, with an average of 14.5 years of teaching experience and 12.5 years of experience at the current school. All participants have Master's Degree in Education.

3.2. Research Tool

The research tool was a semi-structured interview developed specifically for this study.

- The interview included 15 questions focusing on the following aspects:
- Background data of the educator and classroom characteristics.
- iPad usage habits in the classroom—scope of use, content of use, integration of iPad into the daily classroom routine.
- Main goals of using iPad in the classroom.
- Advantages, challenges and difficulties of using iPad in the classroom.
- Personal and emotional experiences in the context of using iPad in the classroom.

3.3. Procedure

All interviews were conducted face-to-face. After transcription, the interviews were processed in three stages according to Shkedi (2003) [14]:

1) During the initial analysis stage, interview transcripts were divided into categories of phenomena, and each category was named, with each category representing a theme.

2) In the mapping analysis stage, based on the initial analysis, the primary categories were organised and grouped, and the information was arranged in new ways by creating connections between categories on a horizontal axis and between categories and sub-categories on a vertical axis.

3) During the focused analysis stage, based on the previous stages, the categories were arranged into a narrative line by focusing on the central category and its associated categories.

This study strictly adhered to the rules of research ethics. All participants received an explanation of the study's objectives and process at the beginning of each interview and expressed their consent to participate. All names appearing in the interview transcripts are pseudonyms.

4. Findings

The findings present different perspectives, from which a complex picture of advantages is obtained, alongside challenges and needs. It is evident that on the one hand, the educators recognise the great potential of the iPad as a communicative, expressive, educational and emotional tool. On the other hand, they contestants with technological difficulties, challenges in classroom management and the need

for ongoing training and support that affect their daily use of this tool and lead to a feeling of unfulfilled potential. In addition, the findings reveal generation gaps in the perception of the use of technology in general and the iPad in particular. The interviews' analysis revealed the following themes:

4.1. Advantages of Using iPad in the Classroom

This theme highlights the significant potential of the iPad as an educational and therapeutic tool for students with ASD. It demonstrates that the iPad can serve as a communication “bridge,” motivate students, support learning, and assist with emotional regulation. When used correctly, the iPad can be a powerful tool for promoting student development across various domains. This theme was divided into the following sub-themes:

4.1.1. iPad as a Tool for Communication and Self Expression

The interviews revealed that the iPad can serve as a significant AAC tool for students with verbal communication difficulties. Daniella describes using the iPad to support classroom discourse at various times throughout the day: “It really supports conversation with them (the students) during morning meetings. In language lessons too, it supports both conversation and learning.” Nira adds:

“For non-verbal students, there’s no alternative; we need to know, and the iPad bypasses this issue and helps them participate...: “The students in my class are also non-verbal, so essentially the iPad gives them a means of expression, to be partners and express their choice, their feeling.” Dina further emphasises the expressive ability and vocalization capabilities that distinguish the iPad from other AAC methods: “...there’s also feedback; in communication, there are actual words with sound, giving a voice to someone who isn’t verbal.”

4.1.2. iPad as a Tool for Increasing Learning Motivation and Engagement

Another advantage emerging from the interviews is the iPad’s effectiveness in increasing motivation and engagement among students. Dina describes students’ fondness for this tool and its positive impact on their motivation: “It’s a tool that students really love and enables motivation.” She adds, describing the iPad’s attractive features: “There’s something colorful, very interesting, intriguing; I also think there’s a different kind of feedback there.” Gili elaborates on the visual advantages and accessibility of the iPad compared to other learning tools like the classroom board or whiteboard: “I think that making it accessible to them and with colors, it’s not like a whiteboard that might neutralize all that, but there’s also something that might be less attractive about it.” These quotes demonstrate how the iPad, through its visual and interactive features, succeeds in generating interest and increasing student engagement in the learning process.

4.1.3. iPad as a Learning Support Tool

Another advantage emerging from the interviews is the use of the iPad as a signif-

icant support tool in various learning processes. Mika describes successful iPad use in a math lesson: “I did a math lesson with students around 8-9 years old, I think. Actually, non-verbal kids. We were learning up to 10, and I used an application called ‘To Do Math’ which was simply amazing.” Naomi emphasises the iPad’s advantages as a learning support tool over other learning tools: “It’s like more efficient, saves time, it’s efficient and also more understandable for them; I think maybe something about the lighting focuses them more.”

4.1.4. iPad as an Emotional Regulation Support Tool

The interviews reveal the iPad as an effective tool for emotional expression and regulation for students. Naomi emphasises the importance of the iPad as a tool for calming and regulation: “I think its ability to calm...I mean for calming, for regulation, first, I have it all the time. Like if I don’t have the iPad, it would be very difficult.” Her words clarify how essential the iPad has become in dealing with emotional challenges in the classroom. Nira shares a situation in which the importance of the iPad as a tool for emotional expression is noticeable:

“Actually, an entire language class was about family. What I like to do with family members, and then suddenly we could hear from this student what the parents meant to him as well. What excites him and suddenly a window opened that we had not had in any other class, both because it was a small group and also because the emphasis in the language class was on the iPad and he was a student who was non-verbal and suddenly it was as if we were able to penetrate him and then over the years he also started typing and I’m sure we set a milestone for him. In terms of his expressive ability... because he really is a student with a lot of challenges, and suddenly in this class with the iPad he would sit and have tears in his eyes. And it was amazing. I really remember it made a turning point for me too. As if in the importance of the iPad. Because until then we hadn’t been able to reach any depth with him.”

4.2. Challenges in Using iPads in the Classroom

This theme exposes the challenges and barriers that teachers encounter when trying to integrate the iPad in the classroom. This theme was divided into the following sub-themes:

4.2.1. Technological Barriers and Difficulties

Technological barriers and difficulties emerge as a significant challenge in classroom iPad use. Dina presents the apprehension about lack of technological knowledge as a main barrier:

“I think there’s apprehension because of technological knowledge, because many times people do use applications for learning, and whoever is apprehensive doesn’t use it, so for me it’s really a tool in language lessons because someone who can’t write can do a worksheet and write the word on the iPad, and that’s what I want to happen, so technological knowledge is a barrier.”

Even teachers without technological difficulties find that technology poses a challenge for them. For example, Gili, a young teacher, doesn't feel technological challenges in operating the iPad but does describe a technological difficulty stemming from technical issues like internet connectivity in some environmental spaces:

“The difficulty I experience is mainly either suddenly there's no internet or suddenly it doesn't load for me. But I don't experience difficulties with the technology or preparing a game beforehand or opening it on the iPad. More the issue of internet...”

These quotes highlight the range of technological challenges teachers face when using iPads, from apprehension and lack of knowledge to the rapid advancement of technology and specific technical issues.

4.2.2. Classroom Management Difficulties

The challenge of using the iPad in the learning environment emerges as a significant challenge leading to classroom management difficulties. Dina describes the complexity of managing a lesson with iPads, emphasising the difficulty in maintaining class focus and managing the diverse reactions of students to the presence of iPads:

“I do feel that bringing the iPads into the learning process is still cumbersome; I still haven't managed to make it accessible, and then situations arise where the iPad isn't used. When there are iPads, it's a bit like a child who just started talking, so it constantly triggers conversation, and it's difficult to manage the class; for example, there's a student who constantly needs to say something, not necessarily related to the lesson, and then it's difficult to manage it in terms of the class.”

4.2.3. The Need for Preparation and Planning Before Using the iPad

Another challenge that emerges in iPad use is the need for preparation time and planning and the lack of spontaneity in using it efficiently. Lian describes the lack of spontaneity as a limitation in using it during a lesson:

“For example, we're watching a video, so during it I write points or let's say all kinds of things that come up during it I write on the whiteboard, and then I actually come and approach students to choose, and then the tool isn't, it's not a spontaneous tool, that's the issue, to now make boards live when you're in the middle of something would take me longer than writing.”

Naomi describes the extensive time and preparation required from her:

“It's something I feel that the preparation with the iPad for the lesson is really more significant... Yes. It's something you need to consider. Yes. In a full-time position, you have lots of lessons. Like when I was in a half cessation of work, then I could devote time to it, so let's say, the ratio between preparation and lesson was equal, I would prepare a lot, like I had a lot of time to pre-

pare... I have lots of lessons and such, then I have less time to do it, it's more difficult.”

These quotes highlight the challenges considering the time and planning required for effective iPad use, the difficulty in using it spontaneously, and how this affects the ability to integrate it smoothly and efficiently into teaching.

In summary, from these themes, several central needs emerge to expand the integration of the iPad in educating students with ASD; comprehensive and ongoing technological training for teachers, continuous technical support at school, adapting training and support with regard to ages and technological literacy levels, developing strategies for classroom management when using iPads, formulating clear school policies, and maximising the full potential of the iPad as an educational tool. Comprehensive attention to these needs could significantly improve the effectiveness of iPad use and holistically address existing challenges.

5. Discussion

The autistic spectrum is being recognised today as neurological diversity characterised by varied perceptual characteristics. A common denominator is a unique communication processing and expression.

In the last decades, there has been a rapid development of technological tools, which are also creatively used in schools through the integration of technology in teaching processes. Researchers emphasise the importance of using technology in teaching processes, in developing assessment methods according to teaching objectives by using different knowledge bases, and in adapting them to the learning capacity, as well as in diversifying teaching methods, and increasing levels of curiosity and motivation in learning (Wang, Wangw, Wangz, Huangz & Chen, 2004) [15]. On the other hand, various studies describe the difficulties in using the technique that arise from the knowledge differences that exist between teachers and students in using technology daily (Hattie, 2013) [16].

The purpose of this study was to examine the experience of iPad use among teachers who teach students with autism (ASD) in a comprehensive special education school (6 - 21 years) from their perspective.

The findings present the usage of iPad experience characterised by significant duality; on the one hand, teachers see the iPad as an important tool with many advantages in learning processes, creating communication, and emotional regulation. On the other hand, they express meaningful barriers and challenges in integrating the iPad into their daily work. This reveals a complex picture reflecting the challenge of integrating technology into special education.

5.1. Advantages of iPad Use in Educational Settings

Teachers perceive the iPad as a tool with significant potential both as an educational therapeutic tool and as a tool for creating interest and enjoyment during leisure time for students with autism. They emphasise that it is a motivation—inducing and participation-enhancing tool that helps promote students in various

areas such as communication, learning, and emotional regulation. This perception aligns with professional literature emphasising the many advantages of using the iPad for students in general and for students with autism in particular in areas such as learning (Alhajeri *et al.*, 2017 [4]; Aspiranti *et al.*, 2020 [17]; Lofland, 2016 [3]), leisure and play (Nitzan *et al.*, 2015) [18], and communication and pragmatic language (Vizengrin & Eden, 2017 [19]; Ebert, 2018 [12]; Alhajeri *et al.*, 2017 [4]).

Regarding the iPad as an augmentative and alternative communication (AAC) tool, the iPad is described as a “bridge” to communication. This finding strengthens previous studies indicating the iPad is a significant and effective augmentative and alternative communication tool for students with autism (Alhajeri *et al.*, 2017) [4].

5.2. Challenges and Barriers of iPad Use in Educational Settings

Alongside the many advantages, the study findings indicate a variety of barriers and challenges affecting daily classroom iPad use. These can be examined in the three main aspects:

1) *Technological barriers.* The main technological barriers and difficulties that emerged are expressed in lack of knowledge and/or apprehension about technology, as appears in previous studies:

Minsheu & Anderson (2015) [20] divided technological barriers in iPad use into external barriers including institutional aspects regarding technology integration and infrastructure aspects, and internal barriers including technological knowledge and teacher perceptions regarding how technology can serve them in the classroom.

Lavian & Alshech (2015) [13] described this process of integrating new technology in school, such as the iPad, as a long and complex process, in which the rate of progress is not suitable for all staff members.

2) *Classroom Management.* This challenge combines the technological aspect with the pedagogical aspect; according to Walsh & Farren’s (2018) [21], lack of professional training in iPad use during the lesson was the main barrier to its implementation in school. In other words, it seems that professional training in general use of the iPad is not enough, but rather there is a need for specific training for real-time classroom iPad use.

3) *Material Preparation.* The findings indicate a need for extensive preparation time and planning for classroom iPad use. This aspect is linked with the difficulty in using the iPad spontaneously, especially regarding the iPad as an AAC tool that can support discourse in a situation for which there is no prepared communication board on the iPad. The time aspect was found to be a significant barrier in iPad use also in Young’s (2016) [22] study.

5.3. Generational Gap

An interesting finding emerging in the current study indicates a gap between different generations of teachers in perceiving the iPad usage experience. Younger

teachers tend to feel more comfortable with technology, while older teachers may have more difficulties with using it. This finding matches Lieberman *et al.*'s (2019) [11] study, which found a connection between teacher age and their attitudes toward iPad integration; they explain this by the fact that these teachers were born into a technology-rich environment that is part of their daily lives, and therefore they are more skilled in operating the iPad.

5.4. The Need for Training and Systemic Support

To address this gap between perceiving the iPad as an important and significant tool and its actual use, the need for training and support emerges from the interviews in several aspects: basic and advanced technological, pedagogical for integrating the iPad during teaching, motivational and emotional, alongside the need for systemic implementation and formulation of school policy. These findings align well with existing literature in the field:

Lavian & Alshech (2015) [13] found that staff support is perceived as needed in the process of implementing iPads in special education and should include guidance in using technological devices and their regular use in learning, similar to the findings of this study that found both the need for technological training and the need for ongoing support throughout the process. An interesting insight that emerged from their study was the emphasis regarding motivation as a significant and important component that also promotes the implementation process. In reference to this, it is important that the training process includes reference not only to the technical side of technology use but also to the rationale behind it with the intention of arousing motivation among teachers to use this tool.

5.5. Study Limitations and Recommendations for Future Research

The sample size of the current study may limit the generalisability of findings; the self-reported nature of qualitative interviews may introduce personal bias, affecting the findings' objectivity. Researching these aspects in a wider sample, in different educational frameworks, combining quantitative and qualitative methods, may significantly broaden the knowledge and insights regarding the use of the iPad in learning processes in general, and in teaching students with autism in particular.

Conflicts of Interest

The author declares no conflicts of interest.

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