The Level of Using Assistive Technologies in Inclusive Education for Students with Autism Spectrum Disorder from Teachers' Point of View

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Abstract

The current study aimed to identify the level of using assistive technologies in inclusive education for students diagnosed with autism spectrum disorder (ASD). The sample of the study consisted of 193 teachers who responded to the used scale in order to assess the reality of assistive technologies in inclusive education after verifying the validity and reliability of the scale. The study results revealed that the level of using assistive technology was moderate. Furthermore, the results revealed a statistically significant difference in the level of using assistive technologies in inclusive education for students with ASD due to the teachers' educational qualification in favour of post graduate qualification. Finally, the study findings showed no statistically significant difference between the arithmetic means of the level of using assistive technologies in inclusive education for students with ASD due to gender variable. The study recommended providing special rooms in autism centers to use assistive technology in teaching children with autism spectrum disorder, and providing what teachers need from these technologies to use with the children.

Keywords*:* Using Assistive Technology, Inclusive Education, Autism Spectrum Disorder, Students' Learning.

مستوى استخدام التقنيات المساعدة في التعليم المدمج للطلاب الذين يعانون من اضطراب طيف التوحد من وجهة نظر المعلمين

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ملخص

هدفت الدراسة الحالية إلى تحديد مستوى استخدام التقنيات المساعدة في التعليم المدمج للطلبة المصابين باضطراب طيف التوحد، تكونت عينة الدراسة من 193 معلماً، استجابوا للمقياس المستخدم لتقييم واقع التقنيات المساعدة في التعليم المدمج بعد أن تمَّ التأكد من صدقه وثباته.

أظهرت نتائج الدراسة أن مستوى استخدام التكنولوجيا المساعدة كان متوسطاً، علاوة على ذلك كشفت النتائج عن وجود فروق ذات دلالة إحصائية في مستوى استخدام التقنيات المساعدة في التعليم المدمج للطلبة المصابين بالتوحد تعزى للمؤهل العلمي للمعلمين لصالح مؤهل الدراسات العليا أخيراً، أظهرت نتائج الدراسة عدم وجود دلالة إحصائية بين المتوسطات الحسابية لمستوى استخدام التقنيات المساعدة في التعليم الشامل للطلاب المصابين بالتوحد تعزى لمتغير الجنس. وأوصت الدراسة بتوفير غرف خاصَّة في مراكز التوحد لاستخدام التكنولوجيا المساعدة في تعليم الأطفال المصابين باضطراب طيف التوحد وتوفير ما يحتاجه المعلمون من هذه التقنيات لاستخدامها مع الأطفال.

الكلمات المفتاحية: استخدام التكنولوجيا المساعدة، والتعليم المدمج، واضطراب طيف التوحد، وتعلم الطلبة.

1. Introduction:

Autism Spectrum Disorder (ASD) is a developmental disorder that affects an individual's ability to communicate, interact socially, and engage in repetitive or restrictive behaviors. The disorder is considered to be a spectrum disorder because it can present in a wide range of forms and severity levels, with some individuals experiencing more significant challenges than others.

ASD is typically diagnosed in early childhood, with symptoms often becoming noticeable in the first two years of life. Children with ASD may have difficulty with social interaction and communication, such as making eye contact, initiating and responding to conversation, and understanding nonverbal cues. They may also exhibit repetitive behaviors, such as hand-flapping, rocking, or lining up toys in a particular order. Sensory processing issues, such as oversensitivity to loud noises or certain textures, may also be present.The exact causes of ASD are not yet fully understood, but research suggests that both genetic and environmental factors

may play a role in the development of the disorder. Studies have shown that there may be a genetic predisposition to the disorder, with some families having a higher incidence of ASD than others. Environmental factors, such as exposure to toxins or infections during pregnancy, have also been suggested as potential risk factors for the development of the disorder(Baykal, van Mechelen and Eriksson, 2020; Alves, de Carvalho, Aguilar& de Brito,2020).

Autism definitions until now are constructed on the authentic work of Kanner, in the year 1943 who insisted that autism is a distinct disorder and described it as a behavioral syndrome that affects children. He defined the behavioral characteristics of autistic children and introduced a diagnostic definition of "Infantile autism" Next, numerous and different definitions were introduced according to the commission or association interested in this disorder. One of the recent definitions is the diagnostic and statistical manual (DSM-5) that invokes it as a pervasive deficiency of social interaction and communication that manifested in many interactive contexts by restricted and repetitive behavioral patterns, interests, and activities (American Psychiatric Association, 2013; Valencia, Rusu, Quiñones & Jamet, 2019).

Autism Society of American (ASA) designated autism spectrum disorder as a developmental disorder remarked early in the first three years of infants caused by brain injury or chemical imbalance in the blood, which affect various developmental aspects and cause disturbance of his behaviors, communication, and thinking (Benson, 2018).

Evidence-based treatments and interventions can be effective in supporting the development of important skills and competencies, such as communication, socialization, and independence. Treatment options may include behavioral therapy, speech and language therapy, occupational therapy, and assistive technologies. The most effective approach will depend on the individual needs and strengths of the learner. Behavioral therapy is one of the most commonly used treatments for individuals with ASD. This approach involves teaching new skills and behaviors while reducing or eliminating challenging behaviors. Behavioral

therapy may be delivered in a variety of settings, such as in the home, school, or clinic, and may involve individual or group sessions. Applied Behavior Analysis (ABA) is a specific type of behavioral therapy that has been shown to be particularly effective for children with ASD(Saleh, Hanapiah& Hashim, 2020; Ismail, Verhoeve & Dambre,2019).

Speech and language therapy is another important intervention for individuals with ASD,this approach focuses on improving communication skills, such as vocabulary, grammar, and social communication. Speech and language therapy may also help individuals with ASD to understand and interpret nonverbal communication, such as facial expressions and tone of voice. Occupational therapy can be effective in addressing the sensory processing issues that many individuals with ASD experience. This approach involves teaching skills and strategies to help individuals with ASD regulate their sensory systems and improve their ability to participate in daily activities, such as self-care and play(Sansoti, Powell-Smith, & Cohan, 2010; Grossard, Grynspan, Serret, Jouen, Bailly & Cohen, 2017).

Assistive technologies, such as communication devices, visual supports, and computer programs, can also be valuable tools for individuals with ASD. These technologies can help to support the development of communication skills, socialization, and academic achievement, and may be particularly helpful for individuals who have difficulty with traditional forms of communication or learning (Wong, Odom, Hume, Cox, Fettig, Kurcharczyk, et al. 2015; Nadeem, Hussain& Sajid, 2020)

While individuals with ASD may face challenges in many areas of their lives, they are often capable of leading fulfilling and meaningful lives, and can make valuable contributions to their families, communities, and society as a whole. It is important to recognize the strengths and abilities of individuals with ASD, and to provide support and opportunities for them to reach their full potential. This may include access to educational and vocational programs, as well as community-based resources and services (Baykal, van Mechelen& Eriksson, 2020).

Overall, ASD is a complex and multifaceted disorder that requires a comprehensive and individualized approach to assessment, diagnosis, and treatment. With appropriate support and interventions, individuals with ASD can

achieve important goals and milestones, and can make valuable contributions to their families and communities(Wollak & Koppenhaver,2011; DiPietro, Kelemen, Liang, Sik-Lanyi, 2019).

Assistive technologies can play an important role in promoting inclusive education for students with autism spectrum disorder (ASD). These technologies can provide support and accommodation for learners with ASD, helping them to participate in learning activities and engage with their peers in the classroom. Examples of assistive technologies for learners with ASD include visual aids, such as picture schedules and communication boards, which can help to facilitate communication and support social interaction. Technology-based interventions, such as virtual reality and gamification, have also shown promise in supporting learners with ASD, providing opportunities for engagement and motivation in learning activities. However, it is important to note that the effectiveness of assistive technologies for learners with ASD may depend on individual factors, such as the learner's specific needs and preferences, and should be used in conjunction with evidence-based practices and support from skilled professionals, such as special education teachers and behavior analysts. Overall, using assistive technologies in inclusive education for students with ASD has the potential to improve the learning outcomes and social participation of learners with ASD, and should be considered as part of a comprehensive and individualized approach to supporting their educational and developmental needs(Baykal, van Mechelen & Eriksson, 2020).

Autism is one of the most complicated developmental disorders, distinguished by a close association with a spectrum of disorders and other different impairments. Autism is a relatively new development in the field of special education science. Autism was first labeled by the American child psychiatrist, Dr. Kanner. He placed an emphasis on work on autism recognition and its categories independently from other child psychotic disorders. Over the early years, autism was introduced by different labels, namely but not limited to, Early Infantile Autism, Childhood Autism, Childhood Schizophrenia, and Childhood Psychosis (Sansoti, Powell-Smith & Cohan, 2010).

The use of assistive technologies in inclusive education for students with ASD has been a subject of increasing interest in the field of special education. These technologies offer a range of potential benefits for learners with ASD, including increased access to curriculum materials and social supports, as well as the opportunity to engage in learning activities and peer interactions in ways that are tailored to their individual needs and preferences. Some examples of assistive technologies that have been used effectively with learners with ASD include visual supports such as picture schedules, communication boards, and visual organizers, as well as technology-based interventions such as virtual reality, gamification, and computer-assisted instruction(Baykal, van Mechelen and Eriksson, 2020).

However, it is important to note that the effectiveness of assistive technologies for learners with ASD may depend on individual factors, such as the learner's specific needs and preferences, as well as the support provided by skilled professionals. In addition, there is a need for on going evaluation and refinement of assistive technologies to ensure that they remain relevant and effective for learners with ASD. Despite these challenges, the use of assistive technologies in inclusive education for students with ASD holds great promise for improving educational outcomes and promoting social inclusion for this population. By providing learners with the tools and supports they need to access and engage with the curriculum, as well as opportunities for meaningful social interactions, assistive technologies can help to facilitate the development of important skills and competencies, such as communication, socialization, and academic achievement. As such, the use of assistive technologies in inclusive education for students with ASD should be considered an important component of a comprehensive and individualized approach to supporting their educational and developmental needs (Syriopoulou-Delli and Gkiolnta, 2020).

Autism is the most complicated and ambiguous, which is considered a confusing mystery. Because autism affects various developmental features of children, there is no particular cause of autism that can be known, high ambiguity also surrounds maladaptive behaviors, and it is four times more likely to affect males than females(Lorenzo, Newbutt & Lorenzo-Lledó, 2021).

According to Kavanagh, Luxton-Reilly, Wuensche and Plimmer (2017) autism is one of the most pervasive developmental disorders since its symptoms are fall in numerous relative disorders such Asperger Syndrome, Retts Disorder, Childhood Disintegrative Disorder, and Pervasive Developmental Disorder not otherwise specified. Autistic children are characterized by having communication difficulties either verbally or nonverbally, and a deficiency or slowing down in the development of spoken language. Their verbal traits, namely, voice tone, rhythm, and morphology, are further considered abnormal. Also, their grammatical language described by repetition or stereotypical like repetitive verbal expression or phrases, and their language has an idiosyncrasy, which only relatives or familiar persons such as father, mother, or care provider (teacher) can understand.

In this vein, it is necessary to consider the characteristics of students with special needs in all educational process elements, particularly, supportive and assistive educational technology.Because realizing students' attributes is very advantageous in choosing and using convenient educational technologies for them since students with multiple disorders or impairments need assistive educational technology compatible with their impairment, whether it be visual, mental, physical, or auditory (Qutami et al., 2008; Bradley & Newbutt, 2018).

Recently, the increased production of assistive technology and its applications have been broadly utilized in the context of individuals with impairments, which is attributed not only to the technological revolution but also to the supportive legislation of individuals with impairment rights (Visser, et al., 2020). Assistive technologies contribute to developing various autistic children's social skills such as cooperation, taking responsibility, and participating through group activities and projects; they afford opportunities for learning enrichment and accelerate learning to meet the demand for further learning by some groups, such as talents and gifted. Furthermore, assistive technology develops some life skills that support handling their own problems and community challenges (Alrabae & Abdelhameed, 2012;Choque, et al, 2016).

Assistive Technology for Autistic individuals:

Tracking the continuum of employing assistive technology in general education and education persons with disabilities, principally, carries a slow adaption of developing and changing. Nevertheless, there is an increased consciousness of the assistive technology significance to promote teaching practices on both a formal and community basis. However, the assistive technologies widely are diverse in tools and teaching approaches to manage the individual differences of learners and special needs, particularly. Hence, the association between the current circumstance of teaching approaches and embracing contemporary techniques is demolished (Lahresh, 2015).

Recently, the significance of using assistive technology in education has been raised. The Paramount role of technology in the teaching process for all students, either normally developed or with a disability, is accountable for this growth. Because assistive technology helps students overcome various obstacles that hinder their independence, facilitates their social communication, ascending their comprehension and their abilities to implement daily life skills(Baykal, van Mechelen and Eriksson, 2020).

Mind mapping is a computer interface tailored to use with autistic. These maps evolve connections and links between objects, yields a comprehensive vision about things since autistic children are known for poor exhaustive vision. Accordingly, mind maps motivate students to concentrates on details of association and provoke brainstorming to induce and suggest ideas and relationships between them. Another example Fast ForWord software is designed to enhance the linguistic level of autistic by the novel scholar work of Paul Tallal, who demonstrated that autistic children gain an average of two years of linguistic skills advancement in a short time. Students wear a headset, sit in front of a computer screen, quietly listen to voices out from the game, and play. The program mainly focuses on verbal training exercises, listening, and auditory attention. Students are assumed to be able to settle in front of a screen without any behavioral impediments. Thus, autistic students learn the language rapidly during playing and enjoying the auditory production in the game(Lorenzo, Newbutt and Lorenzo-Lledó, 2021).

A recent study is conducted in Qatar revealed a high level of using assistive technologies in the education of special needs according to the perceptions of 83 kindergarten teachers of students with impairments without any differences either to gender or specialty (Arouri et al., 2020). Likewise, Saudi female teachers at an autism center reported a high consent on the benefits of using a computer to develop the communication skills of autistic children (Altamimy, 2016).

British and Irish teachers of autistic children similarly reported positive experiences of using assistive technology and increasing tends toward using aid technologies in the last years compared to the previous ones (O'Neill et al., 2020). However, Nigerian teachers of students with disabilities illustrated irregular using of assistive technology despite their high positive perception toward the using benefits of assistive technology (Chukwuemeka & Samaila, 2019). An experimental scholarly work established that teaching students with video modeling using picture exchange communication (PECS) exhibited growing initiations of independent communication with a higher learning rate using video modeling (Cihak et al., 2012).

Alqahtani (2015) also demonstrated the development of some basic motor skills of autistic children who are taught by developed program-based visual strategies (visual aids and visual tools). In this context, Zahra and Ali (2019) found that visual aids such as photographs and videos are the most common assistive technology for teaching autistic children.

Altamimy (2016) disclosed a high average consent among female teachers at a Saudi autism center on the presence of difficulties and obstacles hindering assistive technology using. Furthermore, Al-Kurati & Manhi (2014), Zahra & Ali (2019) are agreed that there are challenges to utilize assistive technologies in the classroom of special needs, cited, poor technological infrastructure, lack of educational technique productions, poor teachers' competency to use assistive technology in the learning process, lack of maintenance and technical supports in school (Altamimy, 2016; Al-Kurati & Manhi, 2014), lack of appropriate classes to use assistive technology, a limited number of available assistive technology (Zahra &

ALi, 2019), lack of financial budget, lack of teacher training and rehabilitation program to use assistive technology, a limited quantity of computer devices, inadequate customize d programs compatible with each impairment, and lack of educational programs associated with educational curriculum for all impairment genre(AL-Badu, 2020; Altamimy, 2016)

Study Problem:

Students with Autism Spectrum Disorder (ASD) often face significant challenges in inclusive education environments, which can impact their academic and social outcomes. While assistive technologies have shown promise in supporting the learning and communication needs of students with ASD, there is a lack of understanding regarding the most effective and appropriate use of these technologies in inclusive education settings. This highlights the need for research to explore how assistive technologies can be utilized to enhance the educational experiences and outcomes of students with ASD in inclusive education environments. Moreove, Learning has become a guaranteed right for special-needs individuals, particularly, autistic individuals, according to legislation and acts. Thus, children with ASD must get a place in a school that admits and respects them. Unfortunately, autistic children still face numerous challenges such as accessing, acquiring, and employing information, which poses a new challenge to teachers and care providers, since each case needs particular treatment and activities compatible with its competencies and abilities. Put all together, the significance of using assistive technology appears to decrease the influence of deficiencies, promote children with ASD to develop different communication and social skills, and afford assistance in learning, social life, professional life, and psychological confidence and competencies. The significance of conducting the current study lies in the Affordable Accessibility Act of using affordable assistive technology for individuals with disabilities. Accessing technology is a right of human rights constituted by prominent guidance documentaries like the Convention on the Rights of Persons with Disabilities, World Reports on Disability, the Global Disability Action Plan 2014, and Sustainable Development Objectives 2013 (Visser, et al., 2020). Accordingly, the study was

conducted to reveal the reality of assistive technology in inclusive education for children with ASD by answering the following questions:

Q1) What is the level of of using assistive technology in inclusive education for children with ASD from their teachers' perceptions?

Q2) Are there a statistically significant differences at (α=0.05) between the means of the level of using assistive technology in inclusive education for children with ASD attributes to teachers' gender or qualification?

The Study Significance:

The study gains significance from the importance of using assistive technology in inclusive education for children with ASD, and its theoretical and practical consequences appear in enriching the theoretical background of assistive technology and ASD, demonstrating the effectiveness of using assistive technology in educational inclusion in enhancing the competency of students with ASD and facilitating their learning and Providing empirical evidence to the ministry of education to amend the educational curriculum to support the character development of students with ASD through programs and recent aids enabling teachers to use it in the classroom. Developing a validated scale of using the reality of assistive technology for students with ASD. Investigating some assistive technologies, which teachers use with autistic children.

Operational and Conception Definitions:

Assistive Technology: Mohammed and Fauzi (2009, p. 16) defined assistive technology as "All services can technology afford to students with special needs including tools facilitating their learning and creating more engaged and active environments". The internationally accredited definition refers assistive technology to any element, item, or production system, which is either commercial or customized, and it is used for improving, maintaining functional competencies of individuals with disabilities or prevent deficiency, activity constraints, or participating restraints (Visser et al., 2020). Operationally, assistive technology is described by the overall

response score of examinees on the reality scale of using assistive technology for children with ASD. That was developed for carrying out study purposes.

Autism Spectrum disorder (ASD): It is a neurological development disorder that involves a broad range 'spectrum' of conditions and impairment severities, including social, communication, interactional challenges, and repetitive behaviors. Some individuals are mildly disabled by their conditions and living a normal life with less dependence, while others are severely disabled, thus, fully depending on their care providers(Begum, Serna, Yanco, 2016).

Operationally, students who are diagnosed with ASD by special education centers in Amman province, Jordan.

The study was carried out within the succeeding limits:

1- Sample profile limit: The study targeted teachers who are teaching students with ASD only.
2- Spatial limits: The study covered public and private special education centers in one province only, Amman.
3- Time: The study was conducted during the second semester of the academic year of 2020/2021.
4- The study followed the Survey methodlolgy.

Study Instrument:

To achieve the goal of the study, a scale related to the use of assertive technology was prepared by the researchers after referring to previous studies and related theoretical literature, such as the study of Altamimy (2016) and the sudy AL-Badu, (2020); Arouri et al., (2020), O'Neill et al.(2020) Chukwuemeka & Samaila, (2019) and Zahra & ALi, (2019). The accriedted version of questionnaire consists of 28 items, the instrument consisted it its initial form of (34) items.

The instrument validity:

The content validity of the study instrument was verified by presenting it to a group of (8) specialized referee. The amendments were made in light of the observations they made and (5) items were deleted, so that the questionnaire in its final form consisted of (29) items.

The instrument reliability:

The reliability of the study tool was verified by extracting the internal consistency in terms of the Cronbach's alpha equation, as it was applied to an exploratory sample that consisted of (25) teacher outside the main study sample. The internal consistency of the questionnaire was extracted using Cronbach's alpha coefficient and its value was (0.86), which is acceptable for the purposes of this study.

Correction of the study instrument:

The Likert scale was applied to measure the total score. It is a five-fold scale: always, often, sometimes, rarely, and never. To judge the weighted arithmetic means of the questionnaire statements, the following formula was used:

Interval length = (Highest valueof the scale- Lowest value of the scale)/number of levels = (5-1)/3=4/3 = 1.33

1- 2.33: low, 2.34 - 3.67: Moderate, 3.68- 4: High

3. Method:

The Study adopted the survy methodology using a quantitative approach through distributing a scale over the study sample.

Study Pariticapnts:

The study population are all teachers at private special education centers in Amman, Jordan, counting 213teachers. A sample of 193 teachers was randomly recruited for participation, and the rest 20 participants were excluded to the sake of validity and reliability calculations.

Results and Discussion:

The results of the first question whict state: What is the level of of using assistive technology in inclusive education for children with ASD from their teachers' perceptions?

Descriptive statistics, namely, means, standard deviation, and rank quietly answer the question (see table 1).

TableError! Reference source not found.. **Means and Standard deviation of teachers' responses to the study scale**

No#	Item	Mean	Std. Deviation	Level
5	I use assistive technology with autistic children to promote their independence	3.99	.93	high
4	I exploit assistive technology for information collection, analysis, abstracting, and composing reports of autistic children's performance	3.98	.95	high
1	I utilize assistive technology to afford participation opportunities for autistic children to opt for compatible programs and activities.	3.89	1.01	high
2	**I use assistive technology to increase autistic students' recognition ability of the surrounding objects.**	3.74	1.11	high
3	Using assistive technology overcomes individual differences between children	3.63	1.02	Moderate
6	**Assistive technology contributes to enhancing the attention and concentrating abilities of autistic children**	3.54	1.02	Moderate
7	**I exploit assistive technology for planning and producing new distinct programs in the autistic classroom**	3.53	1.10	Moderate
8	I capitalize assistive technology for enhancing the sensory skills of autistic children	3.53	1.11	Moderate

No#	Item	Mean	Std. Deviation	Level
9	I utilize assistive technology to teach autistic children daily life skills	3.51	1.01	Moderate
10	I use assistive technology for acquiring information that autistic children are unable to access by any other techniques	3.50	1.10	Moderate
11	Using assistive technology contributes to improving the different academic skills of autistic children	3.42	1.07	Moderate
12	I exploit assistive technology for designing and installing individualized educational programs for autistic children	3.36	1.17	Moderate
13	I utilize assistive technology to teach autistic children daily life behavior	3.33	1.16	Moderate
15	Assistive technology enables autistic children to develop social interaction strategies	3.28	1.24	Moderate
16	I can utilize and install assistive technology to enhance numerous commutation skills	3.27	1.16	Moderate
14	Assistive technology contributes to enhancing the competency of autistic children to recognize motor, auditory, and visual skills	3.26	1.09	Moderate
18	I use assistive technology to manage the classroom setting of autistic children	3.26	1.09	Moderate
17	Using assistive technology with autistic children permits constructive investing of their idle time	3.22	1.12	Moderate
19	Using assistive technology encourages designing and	3.18	1.14	Moderate

No#	Item	Mean	Std. Deviation	Level
	implementing curricular and non-curricular activities			
21	I use assistive technology to motivate autistic children to play educational games to promote their communication skills	3.17	1.17	Moderate
20	I use assistive technology to assess the progress of autistic children in the educational program	3.15	1.11	Moderate
23	I employ assistive technology to diverse **interesting** knowledge resources for autistic children	3.15	1.12	Moderate
22	Assistive technology facilitates coping with the challenges facing teachers while teaching autistic children	3.13	1.12	Moderate
24	I use assistive technology techniques to teach autistic children linguistic communication skills	3.13	1.18	Moderate
25	Assistive technology contributes to supporting autistic children to take an active role in the educational process	3.11	1.25	Moderate
27	Using assistive technology gives the opportunity of autistic children to interact actively with their teacher	3.08	1.21	Moderate
28	Assistive technology enables autistic children to interact with games actually, which they cannot easily engage with it in class	2.81	1.25	Moderate
29	I use assistive technology to develop educational programs enhancing the classroom's interactive environment	2.81	1.21	Moderate
Total Degree		3.35	0.66	Moderate

The simple descriptive statistics in table 1 indicate that all items of the scale have roughly approximated mean values ranged from 2.81 to 3.99, equivalent to moderate to high response levels. Precisely, the overall score of teachers' responses is at a moderate response level (*M*=3.35; *Std. Div*=0.66). According to teacher perspectives, assistive technology is remarkably important to promote autistic children's independence, which was at a first rank (*M*=3.99). Next, teachers clearly opted that assistive technology is used for assessing autistic children's performance through collecting information, analyzing data, abstracting, and composing reports. Also, assistive technology is used to afford participation opportunities for autistic children to opt for compatible educational programs and activities (*M*=3.89).

The moderate response level, noticed in table 1, demonstrates the level of awareness level of the significance of assistive technology using in the standard and special education process for autistic children in both academic and communication skills development aspects to the teacher of special needs and teachers of autistics, particularly. Teachers reported the significance of such assistive technology for autistic children to entertain and amuse them and assisting teachers to save time and effort and manage technical, academic, and administration processes while teaching autistic children. Teachers, also, agreed to the convenience of such assistive technology for autistic children lacking communication skills, which is considered an optimal tool to teach and train these children. All aforementioned encourages teachers to use assistive technology, precisely, computers, for teaching autistic children broadly.

The results maintain the previous studies' results, including (Arouri et al., 2020; AL-Badu, 2020; Chukwuemeka & Samaila, 2019; Al-Kurati & Manhi, 2014), and insist on the significance of using assistive technology broadly among teachers of students with ASD.

<u>The results of question two which state:</u> Are there a statistically significant differences at (α=0.05) between the means of the level of using assistive technology

in inclusive education for children with ASD attributes to teachers' gender or qualification?

Table(2): Means and Standard deviation of teachers' responses to the questionnaire according to gender and qualification

Gender	Mean	Std. Dev.	Quantity
Male	3.43	0.63	92
Female	3.27	0.67	101
Total	3.35	0.66	193
Qualification	**Mean**	**Std. Dev.**	**Quantity**
Bsc.	3.31	0.63	115
Post graduate	3.36	0.69	78
Total	3.35	0.66	193

There is an ostensible variance of teachers' responses according to their gender and qualification, considering the values of statistical mean and standard deviation in Table 2. To test the statistical significance of variance, the two-way analysis of variance (ANOVA) was applied and obtained results summarized in succeeding table (Table 3).

Table (3): Two-way ANOVA results for teachers' responses to the questionnaire according to teacher's gender and qualification

Source	Sum of Squares	df	Mean square	F	Sig.
Gender	1.000	2	.500	1.223	0.295
Qualification	8.262	3	2.754	6.735	0.001*
error	219.157	185	.409		
Total	6360.698	193			

*significant at(α=0.05)

The two-way ANOVA results showed that the variance according to gender was not significant, $F(2,193) = 1.2$; $p.=0.29$, interoperating an equivalent usage degree between female and male teachers representing their high consensus on the significance of assistive technology and its positive implications on all educational, academic, and entertaining aspects of autistic children. However, the results

demonstrate a statistical significance variance due to qualification variable, $F(3,193) = 6.73$; $p. = <0.00$, in favor of teachers with a post-graduate degree (M=3.36, see Table 2). This implies that teachers with a post-graduate degree have a higher usage degree of assistive technology than teachers with a bachelor degree since teachers in post-graduate studies receive more information about using assistive technology, its significance, and its implications in the numerous courses despite the practical experience of using assistive technology in the classroom of autistic children, which increase their abilities to uses assistive technology at the classroom of autistic children.

Recommendation:

In the context ofthe obtained results, the researchers exhort the following:

- Providing special rooms in autism centers to use assistive technology in teaching children with autism spectrum disorder. Providing what teachers need from these technologies.
- Training teachers to use assistive technology to develop different educational competencies among children with autism spectrum disorder.
- Following up on research and new developments in the use of assistive technology in the field of special education.
- The necessity of employing supporting technological techniques in the education process mainly, and not limiting this use to communication and personal communication processes.
- Promoting positive attitudes towards the use of supportive technological technologies in education among teachers of children with autism spectrum disorder by holding courses to introduce them to their importance and how to use them with children with autism spectrum disorder.

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