Review Article

Investigating the Methods of Teaching English as a Foreign Language to Students with Autism Spectrum Disorder

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A B S T R A C T

Introduction: Teaching foreign languages, such as English, as an international language, to children with autism spectrum disorder (ASD) has been considered by the researchers of language instruction, language learning, and teachers of children with special needs. The population of children diagnosed with autism is rapidly growing and they must have similar opportunities for enhancing life skills, education, successful interactions, and universal communicative skills.

Materials and Methods: This study reviews and discusses the findings of past studies that investigated effective ways and efficient methods for teaching these children English as a foreign language.

Results: Although there has been restricted literature throughout the world, the reviewed studies demonstrated improvement of English language learning by suitable strategies and various methods, including pictures representing, humanoid robots, Montessori-oriented methods, applied behavior analysis (ABA), cognitive method, the picture exchange communication system (PECS), well-designed educational environments, mixed methods and strategies, speech therapy, media, total physical response (TPR), and individualized education plan (IEP).

Conclusion: This narrative review encourages various interventions and integrated methods for teaching the English language to autistic children, considering their differences from diverse aspects.

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Introduction

Nowadays, the number of children with disabilities is increasing worldwide [1], and autism is one of such cases. The prevalence of autism is reported as 1 in 88 children. Accordingly, the number of autistic students entering foreign language classes is increasing and this matter causes concerns for teachers. These students can succeed in learning foreign languages and teachers can train them well if teachers become aware of the learning strategies of this group of students who may be different from other students [2]. Moreover, considering that children with autism spectrum disorder (ASD) have behavioral problems while doing assignments in the classroom can help teachers vastly.

There is limited information as to the effective strategies and methods of foreign language instruction rather than mother tongues for children with autism [3]. Education is the right of every child, and the most vulnerable children are those who need different learning techniques, such as children with ASD, who have often been deprived of foreign language education. It is rare to find suitable courses for these children compared to normal children. Similarly, In Iran, for such individuals, a wide range of options has not been made and even limited research has been done. According to the importance of teaching English in the present era, researchers have tried to provide conditions and procedures for teaching English to this group of people. Learning a foreign language goes beyond learning a subject and can have psychological benefits for children with ASD; for example, research has shown that such training can improve a person's ability to concentrate [4]. The other reason that learning a foreign language can be useful for autistic children is that it can make the brain more flexible; accordingly, it can improve brain activity in shifting from one task to another or even focusing on more than one task at a time [5]. Although restricted research is done on how to teach foreign languages to autistic children, most studies have expressed the facilitation of learning foreign languages by diverse procedures. For instance, Wire in 2005 declared that even those who had had little speech, including selective silence, had a good perception of a foreign language and could respond to it through role-playing, nodding, and even drawing [6]. Accordingly, this article reviews, summarizes, and makes a readable synthesis of the past studies that have dealt with teaching procedures and strategies in teaching English as an international language and the second language of most countries, to students (age range=6-18 years old) with ASD.

Materials and Methods

In the present article, the narrative review method, which has an important role in the scientific community, is used to review the research performed concerning the procedures and strategies for teaching the English language to children with autism. The authors have used the titles and the abstracts of scientific articles, theses, and conferences to achieve the goal of the narrative review. A comprehensive search of the various databases (Google Scholar, PubMed, Scopus, and Semantic Scholar) from August 2012 to June 2021 was performed. For accessing scientific resources in Iran, authors consulted related databases, including, IranDoc, Magiran, DOAJ, and ISC. The used keywords were as follows: Teaching/ instruction/ training of foreign language OR international English language and autism spectrum disorder OR autistic children OR autism spectrum disorder OR Asperger.

The inclusion criteria were studies published in English or Persian languages and autistic children 6-18 years of age, and the procedures/methods/strategies applied for teaching. Meanwhile, the exclusion criterion was inaccessibility to the full text. Regarding the scarcity of research done in this field, all of the research designs were considered. A total of 27 articles through electronic databases were identified using initial research using keywords. After reading the titles and going through abstracts, 18 studies were accepted based on the inclusion criteria (9 studies were removed). Afterwards, a reviewer searched the accepted literature and downloaded their full texts while two articles out of 18 studies could not be retrieved. Subsequently, full-text studies were completely studied, and just one article was rejected again as the information was not transferred thoroughly and was vague for the reviewer. Eventually, a total of 15 studies were reviewed (Figure 1).

Results

According to the review of articles published in Iran, some instructors employed pictures representing [7], humanoid robots [8, 9], Montessori-oriented method with and without audio lingual method [10, 11], applied behavior analysis (ABA), cognitive method [12], well-designed educational environment [13], and the picture exchange communication system (PECS) [14]. In other parts of the world, diverse methods were developed to improve the education of students with autism. The nature of most of these methods was mixed methods and strategies [15-17], speech therapy [18] and individualized education plan (IEP) visual media, co-teaching, and buddy progra [19], media [20], and total physical re-

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sponse (TPR) [21]. A summary of the studies is presented in Table 1. The descriptions of various studies done in this area will be presented subsequently in chronological order.

One of the studies pertinent to English language instruction was conducted by Sharifi Moghadam et al. to compare normal children with autistic children in terms of learning different words. Two groups of participants participated in this study. One of the groups consisted of four boys and four girls with autism diagnosis and the other group included four boys and four girls with typical growth. They were between 8 and 12 years old. None of them had ever learned the English language. Teaching sessions were led by the speech therapist, using cards with animal pictures. Both groups' training sessions were performed every day for 1 h and lasted for 10 days. The results showed that no significant difference was observed between the two groups. However, there were negligible differences in learning a few words. The researchers also stressed that more time should be devoted to educating children with autism [7]. In 2015, Alemi et al. implemented the humanoid robot "NAO" for teaching the English language. This study considered robots as teacher assistants to teach English to Iranian children with ASD. The study included 4 boys aged 7 to 9 years (three of whom had high function and one had low function). This robot, NAO, was applied as the main instrument in this study, the intervention continued for 12 sessions while 10 of the sessions involved the educational sessions. The researchers used pre-test, mid-test, immediate post-test, and delayed post-test designs. They found that the student's learning rate based on function was significantly different in the group that had training with the robot in the delayed post-test. In addition, the learning rate varied in the range of high and low functions [8]. In another study, the same researchers in 2016, surveyed the effects of robot-assisted language learning (RALL) on teaching English words to 6 Iranian high-function male autistic students (6-10 years old). Both groups formed, including RALL and non-RALL groups. A total of 12 sessions were held during 2 months. Pre-test, mid-test, immediate post-test, and delayed post-test designs were used for conducting the study. The results showed that the RALL group outperformed the non-RALL group in the designed tests according to parents' feedback and video recordings [9].

To determine the appropriate strategies for teaching English at a basic level, Vargas Castillo and Mendioroz Sánche led a study in 2016. Based on the findings, they reported that each child had different capacities and abilities that attention has to be oriented to them [15]. Ques-

tionnaires, observations, and interviews were used for this study. The participants were two autistic students at Saint Mary Bilingual School in Managua. Strategies highlighted by researchers included ABA (to control student activities), role-playing/modeling (learning through imitation and movement), use of clear and simple instructions, supporting (having a sense of empathy), social communication (use of visuals to help the child), the use of various stimuli in teaching (use of educational materials if possible), and self-management (use of specific instructions to prevent anxiety). These strategies improved the process of learning the children with ASD [15]. Romadlon conducted a study to examine the effect of speech therapy on improving English language skills for students with autism. The purpose of this study was to investigate how the integration of speech therapy with English instruction can improve junior high school students' English skills as well as speech skills. This study was carried out at Sunan Muria in Kudus Regence, Central Java, Indonesia. The results of the initial analysis showed that the speech therapy method with PCES well-enhanced students' speech even in their mother tongue [18]. Padmadevi and Artini conducted a study to examine appropriate strategies in teaching English to autistic students by IEP by using two systems, such as "pull out" and integrated system, with the ABA. Their research was part of a case study (the student of 10 years old) at a bilingual school in Bali, Indonesia. Two methods of observation and interview were used to collect data. The findings of the study confirmed that the IEP provided with visual media through, co-teaching, differentiated instruction, and peer-mediated instruction helped students to learn English. Besides these cases, suggested strategies were efficient to be performed in inclusive classroom programs [19]. Meanwhile, Rezvani conducted a qualitative study to examine the effect of using the Montessori method on the enhancement skills of English teachers as well as on the productive skills of students with ASD. For implementing the design, three English teachers who had training sessions in a center in Iran with 10 students with autism were selected. The participant had to take part in a 10-week course training on the Montessori method. Afterward, for gathering the data, teaching inventory, interviews, open discussion sessions, and observation were used. The results demonstrated that the Montessori-oriented training changed the approach to teaching English to autistic students. Thus, it facilitated teacher-student relationships. It also enhanced their independence in learning and improved the productive skills and motivation of autistic students [10]. Additionally, in another study by them, they compared Montessori-oriented and audio-lingual methods in
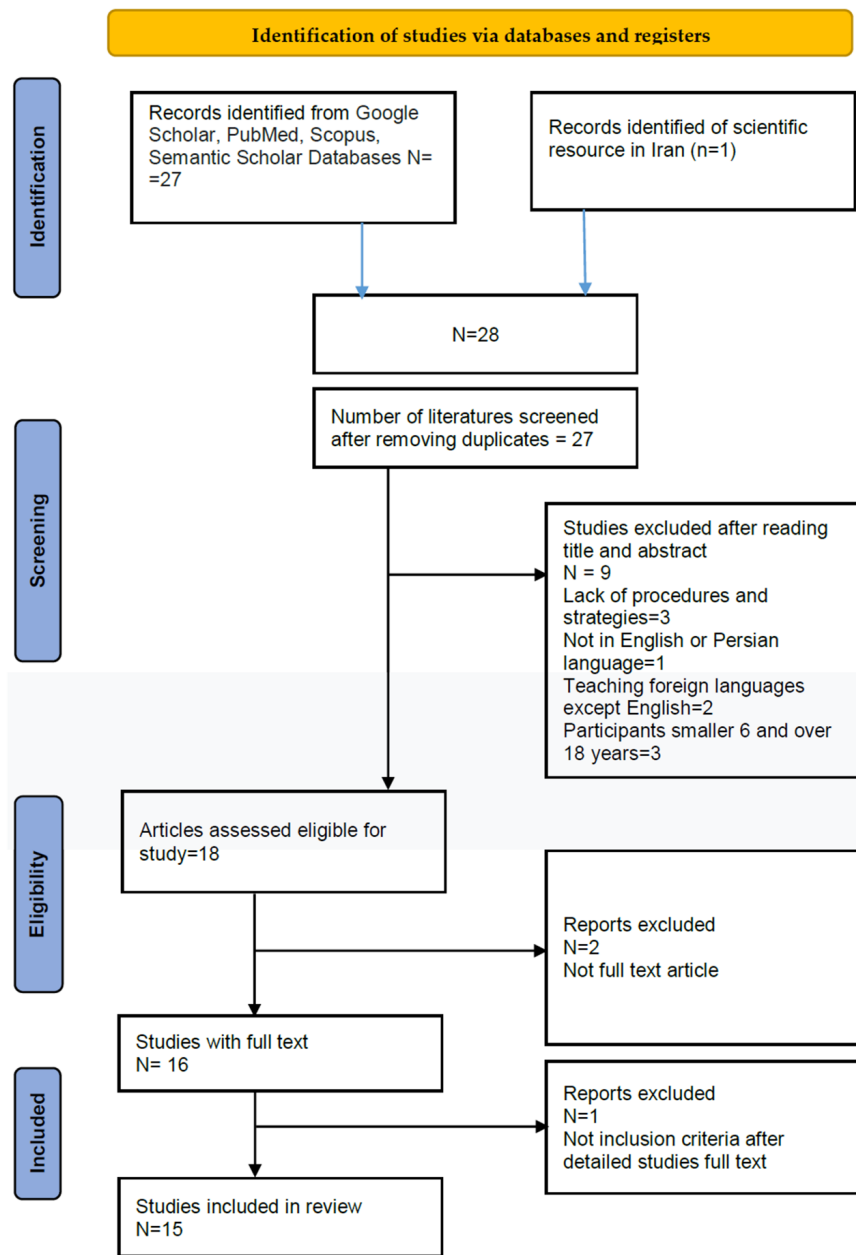
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Figure 1. The flow diagram depicting the process of reviewing the articles and the number of studies examined   **JMR**

teaching English to 7 students aged 15-17 with autism. For this qualitative study, the data were gained through interviews, class observations, and teaching documents. Two English teachers took part as trainers, one of them used the Montessori method and the other applied the audio-lingual method. The findings confirmed the success of both methods for the acquisition of English language skills. However, the Montessori-oriented significantly contributed to increasing interaction with peers, enhancing their independence, and improving their motivation [11]. Khodaverdi et al. performed a multiple em-

bedded case study in Iran focusing on high-performance autistic children that had speech additionally. They examined the effect of interventions of verbal behavior approach based on ABA as well as cognitive instruction method for two language learners, respectively. Four skills of movement imitation, tacting, echoic, and manding were used for instruction. According to the teaching of 103 cases, there were only 9 cases of failure concerning using the method of behavioral intervention (including 4 cases in Echoic skill and 5 cases of imitation-movement), and it was observed only in one of the

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Table 1. Teaching English to students with ASD

Author, Year, Country	Design	Samples (No.), Age	Procedures/ Strategies	Dependent Variable	Results
Sharifi Moghadam et al. 2012, Iran [7]	Quasi-experimental	2 groups: Girls (n=4) and boys (n=4) with ASD and 8-12 years of age; girls (n=4) and boys (n=4) normal growth with 8-12 years of age	Using cards with pictures of known animals	English vocabulary learning	No significant difference was observed between the two groups.
Alemi et al. 2015, Iran [8]	Quasi-experimental	Boys (n=4) with 7 to 9 years of age; n=3 high function and n=1 low function	Using the robot as a teacher's assistant	Learning rate in high-function students and low-function students	A significant difference in English learning is based on the function level of the children.
Alemi et al. 2016, Iran [9]	Quasi-experimental	2 groups including 3 male high-function autistic students of 6-10 years of age	Using the robot as a teacher's assistant	Learning English language in robot-assisted language learning and non-robot-assisted language learning groups	The robot-assisted language learning group had a better function compared to the non-robot-assisted language learning group.
Vargas Castillo & Mendioroz Sánche, 2016, Nicaragua [15]	Mixed method	2 autistic students in a bilingual elementary school	ABA, role-playing/ modeling, use of clear and simple instructions, supporting, social communication, use of various stimuli in teaching, and self-management	English language learning	Different strategies helped to learning process.
Romadlon, 2017, Indonesia [18]	Experimental	Junior high-school students	Speech therapy along with a PECS	Enhancing English language learning	Speech therapy and PECSs enhanced students' speech even in their mother tongue.
Padmadewi & Artini, 2017, Indonesia [19]	Descriptive qualitative method (case study)	1 student with 10 years of age	IEP program	Teaching and learning English language	Effectiveness of buddy program, IEP program, video media, and co-teaching on English learning.
Rezvani, 2017, Iran [10]	Qualitative study	3 English teachers and 10 students with ASD (14-17 years of age)	Teaching by Montessori method	Enhancement skills of English teachers and productive skills of students	Facilitating teacher-student relationships, increasing their independence in learning, improving productive skills, and motivating autistic students by this method.
Rezvani, 2018, Iran [11]	Qualitative study	2 teachers and 7 autistic students (5 females and 2 males)	Montessori method and audio-lingual method	English language learning	Both methods improved English language productive skills; however, the Montessori-oriented method enhanced the students' interaction with peers, increasing their motivation and increased independence level.
Khodaverdi et al. 2018, Iran [12]	Multiple embedded case study	N=2 English learners (high-function autistic children)	Behavioral and cognitive methods	Enhancing skills of imitation-movement, repetition, naming, and requesting	The method of cognitive is associated with less failure.
Golshan et al. Iran, 2019 [13]	Mixed research method	18 students	Well-designed educational environment	Social skills and communicating desire	Positive effect on social skills from the perspective of caregivers and parents.

Author, Year, Country	Design	Samples (No.), Age	Procedures/ Strategies	Dependent Variable	Results
Galazka & Dick-Bursztyn, 2019, Poland [16]	Qualitative study	10 English teachers of 5 primary, mainstream school	Charades, cultural content, interactive whiteboard software, games, teaching pronunciation, teaching of phatic language, drama, language games based on numbers and memorization, student presentation, routine-based design of lessons	Learning the English language	Foreign language can be presented in favor of their improvement; however, language instruction must meet their needs.
Sari Puspita et al. 2019, Indonesia [20]	Descriptive qualitative (case study)	1 teacher and an autistic student	Media, such as videos, pictures, matching exercises, and real objects	The learning activities of English students with autism	A better understanding of the English lesson through media rather than listening to the teacher's speech
Xie, 2021, China [21]	Qualitative research	2 teachers, 2 students, and 2 parents at a private primary school	TPR method (pictures, flashcards, songs, storytelling, role-plays and rhymes)	Teaching English to autistic children	Teaching the English language through TPR was beneficial because it could stimulate students' interest, reduce emotional obstacles increase motivation, enhance confidence, and improve listening.
Zohoorian et al. 2021, Iran [14]	Repeated measures designs	2 high-function autistic students (2 years and 3 months and 9 years and 3 months)	PECS	Learning English vocabulary	Performance improvement, lack of cooperation in stage 2, lack of attention and cooperation in the intervention, and sensory problems.
Lasintia et al. 2021, Indonesia [17]	Descriptive qualitative method	1 English teacher at junior high school	Strategies such as developing oral language comprehension, echolalia, and communication skills enhancement through the PECS method	-	Teaching the English language has to be based on the plan and student development.

ASD: Autism spectrum disorder.

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learners. They concluded that the cognitive intervention method had less failure, so it was recommended for training children with ASD [12]. Golshan et al., implemented research in which the effect of foreign language well-designed environment use of PECS and video modeling was provided. Also, the individual's preference and circumstances for planning the classroom lessons were approved by a clinical psychologist to pave the way for social skills and willingness to communicate in children with autism. The study was mixed-method research. Using stratified sampling, a limited sample of 18 students from Kerman Province, Iran, were classified into three levels of autism (high/middle/low-functioning disorder) for both experimental and control groups. Each participant received 15 sessions totaling 67 hours of language learning. The first 10 sessions ended in training and the 5 sessions later in class with peers. Before and after the sessions, caregivers and parents completed a student so-

cial skills questionnaire (Vanderbilt Kennedy Center with high validity and reliability). The English teacher also assessed the participant's willingness to communicate with a questionnaire. The findings showed that teaching a foreign language had a positive effect on social skills from the point of view of caregivers and parents. In conclusion, the researchers reported that children's abilities for social skills and tendency to communicate increased [13]. Galazka and Dick-Bursztyn designed a study to interview teachers on the efficiency and success of the teaching techniques in their classrooms for students with autism. In this case, a small-scale qualitative study was conducted among a group of 10 English teachers from 5 primary mainstream schools in Poland. These techniques included charades, teaching English through cultural content, the use of interactive whiteboard software/mobile devices/computers, the use of games based on authentic programs, teaching pronun-

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ciation, teaching of phatic language, drama techniques, language games based on numbers and memorization, student's presentation about some topics, and the routine-based design of lessons. The results of this article restated that delivering a foreign language was useful for this group of students; however, language instruction must meet their needs [16]. Sari Puspita et al., carried out a case study with a descriptive qualitative method to examine the kinds of instructional media used by teachers for transferring English content to autistic students in the Singaraja. Observations, interviews, and documents were 3 ways of collecting data. Findings showed that the teacher used four types of instructional media such as videos, pictures, matching exercises, and real objects. The researcher expressed that the autistic students had a better understanding of the English lesson through media rather than listening to the teacher's speech [20]. In 2021, the TPR method was evaluated by Xie, and the data were gathered by observing two teacher's classes and interviewing them as well as 2 students and 2 students' parents at a private primary school. The purpose of this article was the examine the effectiveness of TPR and how using this method was difficult for teachers applying it. TPR is one of the most important techniques in communicative language teaching and is made based on games, role-plays, storytelling, and pair works with physical actions. The obstacles of this method were the use of traditional methods, training limitations, students' low English mastery, lack of an authentic environment, and exam-oriented assessment. TPR was useful for teaching English to young learners because it could stimulate students' enthusiasm, motivate students' interest, reduce the emotional filter, and increase motivation, enhance confidence, improve listening, and reveal the characteristics of students. Also, it was according to English curriculum requirements [21]. In one of the recent studies, Zohoorian et al. examined the effect of using PECS in learning English vocabulary by relying on its effectiveness in mother-tongue communication. The study was based on the use of single-subject experimental A-B. The participants were two autistic children (9 and 12 years old with high function) who were studying at a special needs children's school. The intervention stages consisted of 15 sessions. The analysis of visual inspection and graphic representation confirmed function improvement in both cases after the interventions. In addition, problems were observed during teaching English vocabulary to two participants, such as the lack of cooperation in stage 2, the lack of attention and cooperation during intervention, and proprioceptive, and vestibular sensory problems [14]. Lasintia et al. investigated English teaching strategies used for ASD students at Curup, Bengkulu, Indone-

sia. The subject of this study was an English teacher at SMPLB of CURUP. For this research, a descriptive qualitative method was used. Interviews and document analysis were used for data gathering. According to the results, the strategies used by the teacher included developing oral language comprehension by visual input, echolalia, and communication skills enhancement through the PECS method. Those were three of the seven strategies of the British Columbia Ministry of Education learning to listen, developing oral language comprehension, developing oral language expression, developing conversation skills, echolalia, using alternative or augmentative communication systems, and communication skills enhancement through PECS Method. In line with this study, teaching English language to students with autism has to be based on plan and student development [17].

Discussion

This study described the most commonly used procedures and strategies of teaching the English language to students with ASD in recent studies. We found few studies focusing on comparing teaching English to autistic students and typically-developed students. According to the present review, most of the research was conducted in Indonesia. In Iran, in the last few years, more attention has been oriented on ASD children especially in terms of teaching the English language considering differences, strong points, and weaknesses. One of the strong points of these students is visual channels [22, 23] to be more precise. Some students can more easily learn and remember information presented in a visual format and may have problems learning without pictures [6]. Thus, some researchers or teachers have used pictures and other visual media for teaching English and declared positive effects [7, 20]. Besides, some researchers [12] found that to involve students in instructional activities effectively, it is necessary to first focus on behaviors using ABA because ASD students demonstrate unusual and challenging behaviors that can disrupt learning [6]. This method led to appropriate conditions for learning in terms of the author's view [12]; however, it was associated with more failure in comparison with the cognitive method. In one recent research, a method called PECS [14] was employed. It was based on picture representations, behavioral analysis, and social communication. Although this technique is a lesser-used method in research despite its common clinical usage, many advantages have been stated so researchers [14] claimed that PECS is a promising method for teaching English. It is possible that one educational method may not have the same yields for all children with autism be-

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cause it may depend on their intellectual and social developments, as a result, some studies [15-17] utilized mixed methods and strategies in which a few methods were used at the same time for teaching. This brought opportunities for students to get information easily, henceforth, these models of teaching were successful. One of the other signs of ASD children is impairment in social interaction and communication [6], which results in a lack of the ability to interact with other people while, they enjoy working with technological tools, such as computers, mobile phones, smart toys, and robots [8, 9]. Thus, other studies implemented robots for teaching and reported the efficiency of this method. As ASD students are required to have the experience of the outside world, environmental Montessori classrooms were recommended by other researchers [10, 11]. It was expressed that the Montessori environment covers visual, auditory, kinesthetic, and tactile senses and supports the student's natural interest finally contributing to teaching the English language. Moreover, other attempts were made to show the effects of several methods in a few studies, including, well well-designed environment [13], speech therapy [18], and the TRP [21], and effective results were presented. In both the speech therapy and well-designed environment methods, the PECS method was used as well. Considering that PECS is the basis of communicative ways [14], it can be the cause of achieving positive results. Besides the mentioned methods, the IEP that was delivered to the ASD student by English teachers [19], in a mainstream educational system and regular class demonstrated that segregation of ASD students from regular classes whenever a student needs more time or instruction is beneficial in learning the English language.

Conclusion

ASD students need to learn English or any other language besides their native language to keep pace with scientific and technological breakthroughs and meet their needs through effective communication with others. This can expand their future career horizon. Moreover, learning a foreign language at a young age can develop their brain, help them make friends, as well as identify others and empathize with them. Subsequently, they have the right to learn other languages and society must be responsible and responsive to these children by facilitating, preparing, and providing proper conditions for their education based on their differences. The present study reviewed the previous procedures and strategies for teaching English as a foreign language to help researchers access the possible approaches. The paper emphasizes the invention and inclusion of modern methods to be employed for teaching languages to ASD students.

Ethical Considerations

Compliance with ethical guidelines

This article is a review with no human or animal sample.

Conflict of interest

The authors declared no conflict of interest.

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