The Urgency of Using Speech Generating Devices (SGD) for Social Communication Improvement Therapy for Autistic Children in Schools

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Abstract: *The main challenge faced by children with autism is difficulty in social communication. Appropriate early intervention is crucial to help autistic children develop their communication skills. One increasingly popular tool in communication intervention for autistic children is Speech Generating Devices (SGD). This study aimed to explore the urgency of using SGD in social communication enhancement therapy for autistic children to improve social interaction and reduce maladaptive behaviour. This study employs a mixed-method research design to explore the urgency of using SGD in treatment to enhance the social communication of autistic children. The sample was taken using proportional random sampling, consisting of 80 teachers for autism and speech therapists in Surakarta. Data collection techniques in this study to explore the urgency of using SGD in therapy to improve the social communication of autistic children were conducted in two ways: through a questionnaire using Google Forms and interviews. The analysis results show that SGD is an essential tool for enhancing the social communication of autistic children, with 66.7% agreeing and 33.3% expressing a neutral stance. The interview results stated that SGD is needed to support autistic social communication. The conclusion drawn from these results indicates that SGD is a crucial element that can be used to improve the communication of autistic children in schools rapidly. The opinions of teachers and speech therapists suggest that the use of SGD can reduce communication challenges in autistic children. This is evident from the questionnaire results filled out by respondents, showing that 95% strongly agree and 5% agree. The use of speech generating devices (SGD) is of high urgency in supporting therapy to enhance the social communication of autistic children in inclusive schools, such as training in social interaction and reducing maladaptive behaviour in autistic children.*

Keywords: *Autism, social communication, Speech Generating Devices (SGD)*

Abstrak: Tantangan utama yang dihadapi anak autis adalah kesulitan dalam berkomunikasi secara sosial. Intervensi dini yang tepat sangat diperlukan untuk membantu anak autis mengembangkan kemampuan komunikasi mereka. Salah satu alat yang semakin populer dalam intervensi komunikasi untuk anak autis adalah Speech Generating Devices (SGD). Tujuan penelitian ini adalah untuk mengeksplorasi urgensi penggunaan SGD dalam terapi peningkatan komunikasi sosial anak autis dalam meningkatkan interaksi sosial dan mengurangi perilaku maladaptive. Pada penelitian ini menggunakan jenis penelitian mixed method untuk mengeksplorasi urgensi penggunaan SGD dalam terapi peningkatan komunikasi sosial anak autis. Sampel diambil secara proporsional random sampling Guru mengajar Autis dan Terapis Wicara di Surakarta berjumlah 80 orang. Teknik pengumpulan data dalam penelitian untuk mengeksplorasi urgensi penggunaan SGD dalam terapi peningkatan komunikasi sosial anak autis ini menggunakan dua cara antara lain kuesioner dengan google form dan wawancara. Hasil analisis menunjukkan penggunaan SGD merupakan alat yang penting untuk meningkatkan komunikasi sosial anak autis sebanyak 66,7% menyatakan Setuju dan 33,3% menyatakan sikap netralnya, serta hasil wawancara menyatakan bahwa SGD diperlukan untuk menunjang komunikasi social autis.Kesimpulan yang dapat diambil dari hasil ini menunjukkan SGD merupakan elemen penting yang dapat

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digunakan untuk meningkatkan komunikasi anak autis di sekolah dengan cepat. Pendapat dari guru dan terapis wicara menunjukkan bahwa penggunaan SGD dapat mengurangi tantangan komunikasi pada anak autis. Hal ini dapat dilihat dari hasil kuesioner yang diisi responden menunjukkan bahwa 95% menyatakan sangat setuju dan 5% menyatakan setuju. Penggunaan Speech Generating Devices (SGD) memiliki urgensi yang tinggi dalam mendukung terapi peningkatan komunikasi sosial anak autis di sekolah inklusi seperti melatih dalam interaksi social serta mengurangi perilaku maladaptive anak autis.

INTRODUCTION

Autism Spectrum Disorder (ASD) is a neurological developmental disorder characterised by difficulties in social interaction and communication and restricted and repetitive behaviour patterns (APA, 2013). This disorder causes autistic children to be affected in terms of social communication (De Luca et al., 2021). The incidence of ASD in the world population is around 1%, with a ratio of 4:1 between boys and girls (Mesa-Gresa et al., 2018). The Central Statistics Agency, currently in Indonesia, has around 270.2 million, with a comparison of the growth of autistic children of around 3.2 million children (Ministry of Education and Culture, 2022). The Special School Statistics Data Centre recorded as many autistic students in Indonesia in 2022 as 144,102 (BPS, 2022). This figure has increased compared to 2021, which recorded 133,826 autistic students in Indonesia (BPS, 2022). Individuals with autism show disturbances in social and communication that significantly affect daily life. This indicates an urgent need for effective interventions to improve the social communication skills of autistic children. The main challenge faced by autistic children is difficulty in communicating effectively, both verbally and non-verbally. This often hinders their ability to interact with others, thus affecting their social and emotional development (Tager-Flusberg & Kasari). Appropriate early intervention is needed to help autistic children develop their communication skills. One of the increasingly popular tools in communication interventions for autistic children is Speech Generating Devices (SGD). SGDs are assistive technology devices that allow users to generate speech or messages through buttons, touch screens, or scanning systems (Light et al., 2019). These devices help individuals with speech or language difficulties communicate more effectively (Light et al., 2019). SGDs in communication therapy for autistic children have shown significant potential in improving their social communication skills, especially for those with speech limitations (Lorah et al., 2020).

Recent studies have shown that the use of SGDs can improve the social participation of autistic children in everyday interactions. Research on autistic children using SGDs shows an increase in communication initiation and response to social interactions (Lorah et al., 2020). SGDs help reduce maladaptive behaviours, such as tantrums, which often arise from frustration due to the inability to express needs or desires (Ganz et al., 2017). This shows that SGDs not only function as a communication tool but also as a tool to improve the overall quality of life of autistic children.

While the use of SGD has been documented in various studies, its implementation still has challenges. One is the lack of understanding and adequate training for parents, teachers, and therapists in using SGD effectively (Holyfield et al., 2020). In addition, the relatively high cost of acquiring and maintaining these devices is also a barrier for many families (McNaughton & Light, 2018). Further research is needed to identify effective strategies for integrating SGD into communication therapy for children with autism, as well as efforts to make these devices more affordable and accessible (Aspiranti et al., 2018). It is essential to consider the individual factors that affect the application of SGD in improving the social communication of children with autism. Every child with

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autism has unique needs and preferences, so a personalised approach to choosing and using SGD is needed (Light et al., 2019). Recent research emphasises the importance of involving children in selecting tools and designing interventions to ensure therapy success (Therrien et al., 2022). In the Indonesian context, the use of SGD is still relatively new and has not been widely adopted in autism therapy practices. In fact, with the increasing prevalence of autism, the need for effective communication interventions is increasingly urgent. Studies show that a lack of awareness and resources are the main inhibiting factors in implementing assistive technology in Indonesia (Istanboulian et al., 2020).

The study aims to explore the urgency of using SGD in social communication enhancement therapy for autistic children to improve social interaction and reduce maladaptive behaviour. This study will also examine factors that influence the success of SGD implementation, including the role of parents, teachers, and therapists in supporting the use of this device. This is in line with research conducted by (Hermawan et al., 2024), which explains that using technology to develop social communication in autistic children requires a long time, so it involves the role of teachers, therapists and parents. In addition, there are still several things that need to be studied further regarding the use of SGD, namely the lack of generalisation of the results of interventions using SGD, the increasing use of alternative augmentative communication, and not all autistic children respond well (Van Der Meer & Rispoli, 2010). Thus, it requires further exploration of the urgency of using SGD, especially for autistic children. This study can contribute to developing more effective and inclusive communication interventions for autistic children.

RESEARCH METHODS

This study uses mixed-method research to explore the urgency of using SGD in therapy to improve social communication in autistic children. The mixed method is a research approach that combines quantitative and qualitative methods in one study (Creswell, 2020). This method is used to gain a more comprehensive understanding of the phenomenon of the urgency of using SGD for autistic children. The design of this study uses convergent parallel designs, which is a way of collecting quantitative and qualitative data and then using them together to understand the problems in the study (Creswell, 2020). The data obtained is quantitative data to show the urgency of using SGD in therapy to improve social communication in autistic children statistically. Qualitative data will be obtained on suggestions and comments from teachers, parents, and therapists who will use SGD for autistic children. The research procedures that will be carried out in this study can be explained in detail as follows:
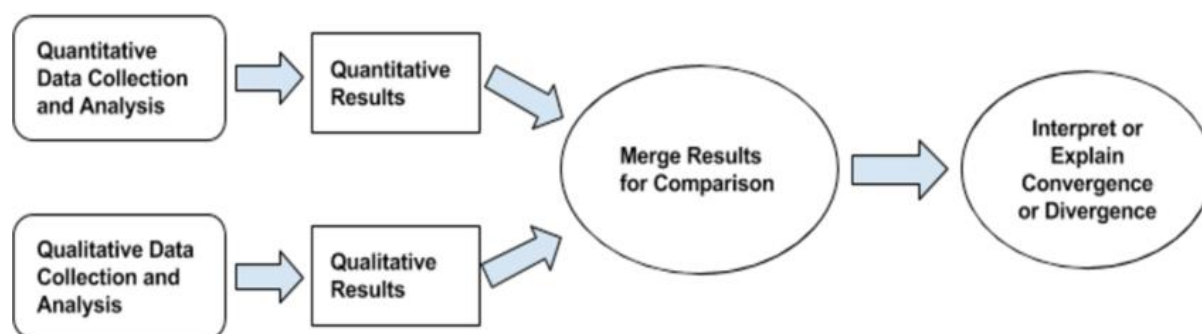

Figure 1. Research Procedure (Creswell, 2020)

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At this stage, the researcher collects quantitative data through a questionnaire instrument given to respondents in the form of initial knowledge of SGD, which includes aspects of SGD use and the usefulness of SGD for social communication of autistic children. Qualitative data collection is done by interviewing and/or observing respondents; structured interviews were conducted with interview guidelines that discussed the benefits of SGD, challenges and respondents' perspectives on appropriate SGD for autism. Validity and reliability trials were conducted, with a trial in use with valid and reliable results. The mixed method mixed model (Concurrent) method is a research procedure where researchers combine quantitative and qualitative data to obtain a comprehensive analysis to answer research problems. Data analysis conducted in this study used the SPSS system to analyse quantitative data. Qualitative data analysis uses thematic, narrative, or phenomenological methods. The results of the study were obtained from instrument data that teachers and speech therapists had measured from interviews that had been conducted. The data will be presented in table form from SPSS results, and the main themes or narratives from the analysis results will be identified with data interpretation according to the results.

In this stage, researchers combine the results of quantitative and qualitative data. Aims to gain a more comprehensive understanding of the variables or phenomena being studied. The interpretation stage explains how the results from both data types complement each other and provide deeper insights. The research sample consisted of 80 Autism Special School Teachers and Speech Therapists, and it consisted of people who had been in direct contact with autistic children, consisting of 40 speech therapists and 40 teachers at the Special School. The sample was taken by proportional random sampling of Autism Special School Teachers and Speech Therapists in Surakarta. The data collection technique in this study to explore the urgency of using SGD in therapy to improve social communication in autistic children used two methods, namely a questionnaire with a Google form and interviews which contains initial knowledge of SGD, the use of SGD and the challenges of using technology to improve social communication in autistic children.

RESULTS AND DISCUSSION

The results of the analysis of the urgency of using SGD in therapy to improve the social communication of autistic children in inclusive schools were conducted through a Google form with 80 respondents, including teachers and speech therapists. The data analysis produced information about the urgency of SGD for the therapy of autistic children, as follows:
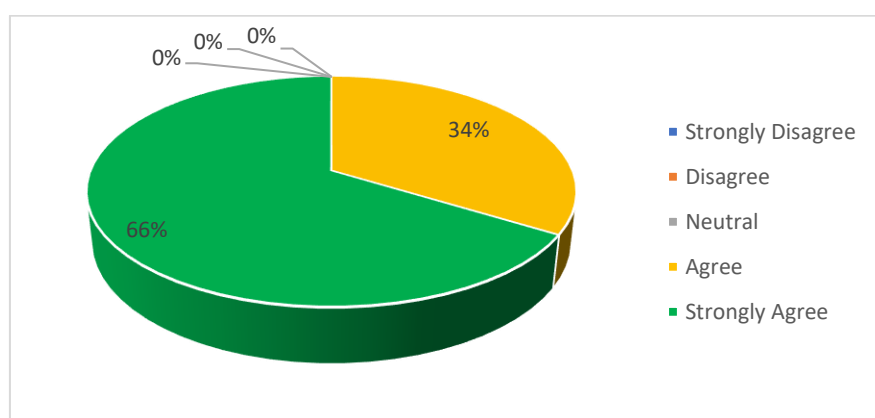

Figure 1. A diagram of SGD as an essential tool to improve social communication in autistic children

The analysis results can be seen in Figure 1, showing that SGD is a vital tool to improve the social communication of autistic children. As many as 66 % stated strongly agree and 34 % said they had an agreeable attitude. The conclusion that can be drawn from these results shows that SGD is an essential element that can be used to improve communication among autistic children in schools quickly. The opinions of teachers and speech therapists show that the use of SGD can reduce communication challenges in autistic children. This can be seen from the questionnaire filled out by respondents, which showed that 95% stated strongly agree and 5% stated agree.
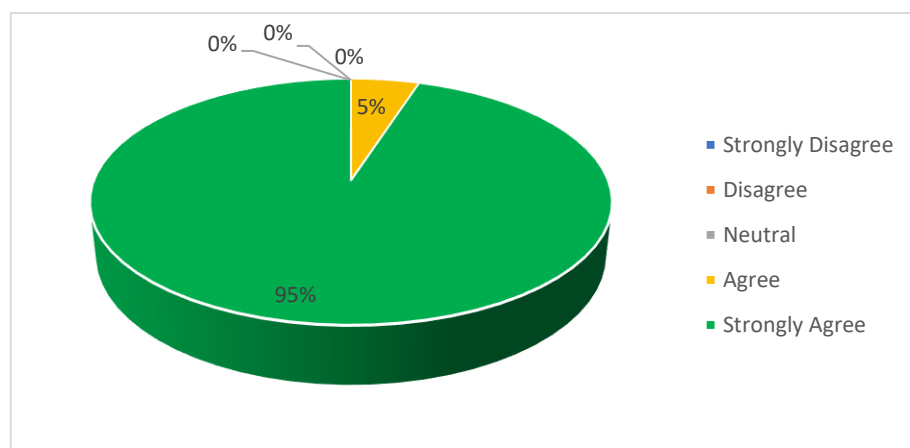

Figure 2. A diagram of the importance of using SGD to reduce communication challenges in autistic children

With the results shown in Figure 2, it can be concluded that SGD can overcome the challenges that arise to improve the communication of autistic children by teachers and speech therapists. This also shows that SGD is very effective for use by autistic children in inclusive schools who experience social communication problems. SGD can be positioned as assistive technology or media to facilitate children's social communication in the school environment. Based on the opinions of teachers and speech therapists, qualitative research shows the importance of SGD for autistic children to facilitate social communication of autistic children, as follows:

Table 1. Qualitative data of respondents' opinions about SGD

No	Respondents	Opinion
1	Teacher A	"Helps communication to be easier to understand."
2	Teacher B	"SGD can help autistic children understand language and communication."
3	Teacher C	"SGD can be an alternative to more effective communication therapy."
4	Therapist A	"Therapists can use SGD to teach autistic children non-verbal language.
5	Therapist B	"For therapists, SGD can help autistic children understand language and communication."

SGD becomes a tool for social communication needed based on the results of the urgency analysis conducted on teachers and speech therapists in the field. The types of SGD from the results of

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literature studies that can be used by teachers and speech therapists to overcome the problems of social communication of autistic children are as follows:

Table 2. Types of SGD

Types of SGD	Function	Citation
Proloquo2Go	an iPad-based app that uses synthetic symbols and sounds to aid communication. Suitable for autistic children of all abilities	Couper et al., 2018 (Journal of Autism and Developmental Disorders)
Tobii Dynavox	An eye-tracking device that allows users to communicate by moving their eyes. Ideal for children with motor disabilities	Ganz et al., 2017 (Augmentative and Alternative Communication)
LAMP Words for Life	An app that uses Language Acquisition through Motor Planning (LAMP) principles to improve functional communication	Holyfield et al., 2020 (American Journal of Speech-Language Pathology)
GoTalk Now	A device with physical buttons that can be programmed to produce speech. Suitable for younger children or those just starting with SGDs	Lorah et al., 2020 (Focus on Autism and Other Developmental Disabilities)
Snap + Core First	An app that combines symbols and text to support communication. Designed for children with complex needs	Thiemann-Bourque et al., 2022 (Journal of Speech, Language, and Hearing Research)
AAC Speech Buddy	A portable device with a simple interface designed for autistic children who have difficulty with verbal communication	Chen et al., 2023 (Assistive Technology)

Note:

  • **Proloquo2Go and LAMP Words** for Life are often used because of their ease of use and flexibility.

  • **Tobii Dynavox** is very useful for children with severe motor disabilities.

  • **GoTalk Now** and **Snap + Core First** suit children needing a more straightforward interface.

Children with autism spectrum disorder (ASD) often have difficulties in social communication, which can hinder their participation in inclusive environments such as schools. SGD has become one of the promising assistive technology tools to support social communication therapy for children with autism. Recent studies have shown that the use of SGD can have a significant impact on improving the communication and social interaction skills of children with autism, especially in inclusive school environments. Inclusive schools aim to provide equal learning opportunities for all students, including children with special needs such as autism. However, children with autism often have difficulties in verbal communication, leading to social isolation and difficulty participating in learning activities (Smith et al., 2020). SGD can function as an alternative and augmentative communication (AAC) tool that allows children with autism to express their needs, desires, and thoughts more effectively.

SGD is designed to generate sounds or text based on input provided by the user. This tool can help children with autism with limited speech to communicate with teachers, peers, and others in the school environment. Research by Ganz et al. (2017) showed that using SGD can increase the frequency and quality of social interactions in autistic children and reduce maladaptive behaviour, such

as tantrums that often arise due to communication frustration. In addition, SGD can also be used to train pragmatic language skills, such as understanding social context and responding appropriately in conversation. A study by Lorah et al. (2020) found that autistic children who used SGD showed significant improvements in two-way communication skills and participation in group activities at school.

Implementation of SGD in inclusive schools requires collaboration between teachers, therapists, and parents. Teachers must be trained to use SGD effectively and integrate it into the learning curriculum. In addition, peers also need to be encouraged to support the use of SGD by autistic children so that an inclusive and supportive environment is created. Research by Holyfield et al. (2020) highlights the importance of training for teachers and school staff in using SGD. Without adequate training, the effectiveness of SGD in supporting communication in autistic children can be reduced. Therefore, schools must provide sufficient resources and support to ensure the success of SGD implementation. Although SGDs have great potential, there are several challenges in their use. One is the relatively high cost of purchasing and maintaining these devices. In addition, some autistic children may take a long time to get used to using SGDs. To overcome these challenges, schools can seek funding assistance from the government or non-profit organisations, as well as provide intensive therapy and mentoring for children who use SGDs. Some challenges faced include personalizing interventions according to individual needs, limitations in understanding children's emotional responses, and technical and financial constraints in developing and using this technology (Cabibihan et al., 2018). In addition, the long-term effectiveness of SGDs in improving social communication skills still requires further research (Diehl et al., 2019). Several solutions have been proposed to overcome these challenges. For example, integrating artificial intelligence (AI) and machine learning to tailor interventions to individual child profiles and multidisciplinary collaboration between technologists, psychologists, and educators to design more responsive and effective systems (Pennisi et al., 2020). Recent studies have also shown that SGD-based approaches can increase autistic children's interest and participation in social activities, which in turn can support the development of their communication skills (Shamsuddin et al., 2021).

CONCLUSIONS AND RECOMMENDATIONS

Speech-generating devices (SGD) are of high urgency in supporting therapy to improve the social communication of autistic children in inclusive schools. This tool not only helps autistic children to communicate more effectively but also increases their participation in learning activities and social interactions. However, the successful implementation of SGD requires support from all parties, including teachers, therapists, parents, and peers. With good collaboration, SGD can be a very effective tool in creating an inclusive environment that supports the development of autistic children. In addition, support from stakeholders, one of which is related officials, is also critical, such as the availability of facilities and infrastructure, one of which is SGD to support the needs of autistic children in the aspect of social communication. This study is expected to help further research to develop the use of SGD to improve the social communication of autistic children in inclusive schools.

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