Journal of Disability
Volume 4, No. 2, December, pp. 38 – 47

THE EFFECT OF USING A DIGITAL-BASED COMMUNICATION LEARNING GUIDE FOR AUTISM CHILDREN ON PARENTS UNDERSTANDING WHEN TRAINING COMMUNICATION IN AUTISM CHILDREN

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Abstract

The background to this research is the lack of understanding of parents in assisting children with autism in learning to communicate at home. This is due to the lack of references and inappropriate learning assistance methods. Parents need proper guidance to assist children with autism in learning to communicate at home. This research aims to determine the effect of using a digital-based communication learning guide for autistic children on parents' understanding when training communication for autistic children. This research uses a Research and Development (R&D) approach with the ADDIE development model. The subjects in this study were 24 parents of autistic children. The data collection technique uses a multiple-choice objective test with a total of 15 questions. The data analysis technique uses non-parametric statistics with the Wilcoxon Sign Rank Test with the help of SPSS 29. The results of data analysis obtained a scale value of *Zhitung* = -4,299 with Asymp. Sig. (2-tailed) <.001. The probability value in Zcount is then compared with the significance level α = 0.05. There is a significant difference between the pretest and posttest results with P 0.01, which is smaller than the significance level of 0.05 or 5%. Thus Ho is rejected and Ha is accepted. Based on the results of the research analysis, it was concluded that there was a significant influence on the use of digital-based communication learning assistance guides for autistic children for parents in increasing parents' understanding when training communication for autistic children.

Keywords: Autistic Children, Communication, Digital Applications, Parents

Abstrak

Latar belakang dalam penelitian ini adalah kurangnya pemahaman orang tua dalam pendampingan belajar komunikasi anak autis saat dirumah. Hal ini disebabkan karena minimnya referensi dan metode pendampingan belajar yang kurang tepat. Orang tua membutuhkan panduan yang tepat untuk melakukan pendampingan belajar komunikasi pada anak autis saat di rumah. Penelitian ini bertujuan untuk mengetahui pengaruh penggunaan panduan pendampingan belajar komunikasi anak autis berbasis digital terhadap pemahaman orang tua saat melatihkan komunikasi pada anak autis. Penelitian ini menggunakan pendekatan Research and Development (R&D) dengan model pengembangan ADDIE. Subjek dalam penelitian ini adalah 24 orang tua anak autis. Teknik pengumpulan data menggunakan tes objektif pilihan ganda berjumlah 15 butir soal. Teknik analisis data menggunakan statistik non parametrik dengan uji Wilcoxon Sign Rank Test dengan bantuan SPSS 29. Hasil analisis data diperoleh nilai skala *Zhitung* =-4.299 dengan Asymp. Sig.(2-tailed) <,001. Nilai probabilitas dalam Zhitung selanjutnya dibandingkan dengan taraf signifikansi α = 0,05. Terdapat perbedaan yang signifikan antara hasil pretest dan posttest dengan P 0.01 lebih kecil dari taraf signifikansi 0.05 atau 5%. Dengan demikian Ho ditolak dan Ha diterima. Berdasarkan hasil analisis penelitian tersebut diperoleh kesimpulan bahwa terdapat pengaruh yang significant penggunaan panduan pendampingan belajar komunikasi anak autis berbasis digital bagi orang tua dalam meningkatkan pemahaman orang tua saat melatihkan komunikasi pada anak autis.

Kata kunci: Aplikasi Digital, Komunikasi, Anak Autis, Orang Tua

How to Cite: Utami, W., Kristiyanto, A., & Yuwono, J. (2024). The Effect Of Using A Digital-Based Communication Learning Guide For Autism Children On Parents Understanding When Training Communication In Autism Children. *Journal of Disability*, 4 (2), 38 – 47.

INTRODUCTION

Children with autism have difficulty understanding and using language to communicate with others (Yuwono, 2016). Communication barriers in children with autism according to DSM V include barriers in social and emotional communication skills, impaired verbal and nonverbal communication behavior, loss of eye contact, body language, and facial expressions, and deficiencies in developing and maintaining relationships so that they have difficulty adjusting behavior in various social contexts, difficulty in imaginative play or making friends, and lack of interest in peers (American Psychiatric Association, 2013). The communication barriers in children with autism above will affect their ability to interact socially and understand the world around them.

Factors that affect the communication skills of children with autism include internal and external factors. Internal factors that affect the communication skills of children with autism are physical conditions related to the growth of speech organs and intelligence of children with autism (Sunarto & Hartono, 2006). External factors that affect the communication skills of students with autism are factors that come from outside children with autism. The environmental conditions in which autistic children grow and develop contribute significantly to language and communication (Sunarto & Hartono, 2006). Teachers are one of the most important external factors in learning communication for autistic children in the school environment. The communication learning program for autistic children carried out by teachers at school will certainly not run optimally if there is no cooperation between teachers and parents at home. Active parental involvement is needed to support the development of communication in autistic children. Considering the large role of teachers and parents in communication learning for autistic children, cooperation and active communication between the two is needed to achieve common goals. Parents should be able to provide assistance in communication learning by continuing the communication learning program for autistic children provided by teachers at school. The reality is that parents of autistic children experience confusion and difficulty in teaching autistic children communication (Rohman et al., 2021).

The limitations of parents in assisting communication learning for autistic children must of course be immediately intervened because it will be detrimental to autistic children. Based on a preliminary study conducted by researchers on September 8, 2022, on 34 parents of autistic children at SLB Negeri Surakarta, parents of autistic children do not understand how to teach communication to autistic children at home. The limitations of parents in assisting communication learning for autistic children must of course be immediately intervened because it will be detrimental to autistic children. Autistic children will experience developmental failure in the long term. If autistic children have difficulty communicating, they tend to have trouble interacting. The implications for their education are that autistic children have difficulty in completing pre-school education, even in elementary school. This situation is less beneficial for developing their social, emotional, and cognitive aspects (Yuwono, 2016).

Based on a preliminary study conducted by researchers on September 8, 2022, through written interviews with 34 parents of autistic children at Surakarta State Special School, parents of autistic

children do not understand how to teach communication to autistic children at home. Parents admitted that they did not understand the material that needed to be practiced in communication learning. Parents practice communication with autistic children without sufficient references. As many as 82% of parents of autistic children need a guide that provides information about the material and how to practice communication with autistic children at home; clear and easy-to-understand methods; explains the steps to practice communication correctly; a guide that has a clear and attractive appearance; a practical, flexible and easily accessible guide wherever parents are; a good quality guide accompanied by audio-visual development so that parents can easily imitate the steps to practice communication; and a guide that can build motivation and confidence in practicing communication with autistic children at home.

One effort to meet the needs of parents for a guide to accompany morning communication learning for autistic children at home is to develop an application in the form of a digital-based guide to accompany communication learning for autistic children parents. Previous studies have provided an overview of the positive influence of using a guide to improve the communication skills of autistic children. The results of research from (Rohman et al., 2021), an Android-based parenting guide is suitable for use to improve verbal communication in children on the autism spectrum. In addition, the results of research (Sicillya E. Boham, 2013), explain the importance of a guide for parents in developing communication in autistic children. The purpose of this study was to determine the effect of using a digital-based guide to accompany communication learning for autistic children on parents' understanding when training communication in autistic children.

METHOD

This study uses a type of development research with the ADDIE development model consisting of the stages of analysis (Analysis), design (Design), development (Develop), implementation (Implementation) and evaluation (Evaluate) (Branch, 2009). The following is a picture of the stages of R&D research steps with the ADDIE approach method according to (Branch, 2009):

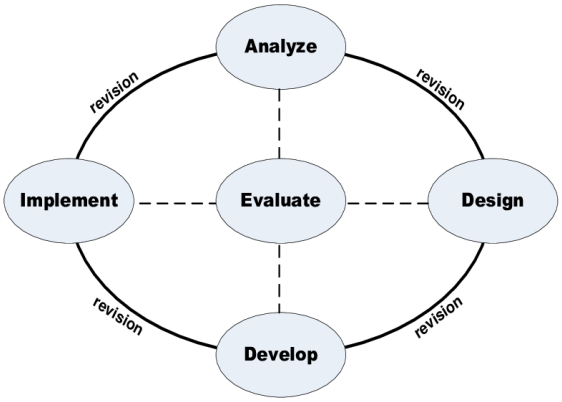

Figure 1. ADDIE Development Model Chart

The first procedure is the Analyze stage which consists of material analysis activities and parent

needs analysis. Material analysis aims to determine how parents' knowledge of communication learning materials for autistic children. The results of the parent need analysis are used as a reference for selecting media, determining the format, and creating the right device to meet the needs of parents when providing communication learning assistance to autistic children at home.

The second procedure is design. The design stage is carried out through three stages, namely designing a flowchart, determining the application, and designing a script (storyboard). A flowchart is used as documentary evidence to explain the logical description of a system to be built to the programmer (Rosaly & Prasetyo, 2019). To determine the application, the researcher first. Prepares a database as a database in the form of displays, colors, images, videos, writing, materials, and sounds that will be displayed. The storyboard describes each scene that clearly describes multimedia objects and their behavior. The storyboard contains sketch images that are used as planning tools to visually show how the action of a story script is (Boham et al., 2017).

The third procedure is to develop. The development stage is the process of realizing the design that has been prepared into a real product. The steps in product development include making a draft of the guide application, producing the guide application, producing a manual book and validation test (content/material, language validation test, media validation test), product revision stage 1, practitioner test, product revision stage 2 and validity and reliability test. The content validity test by experts also revealed suggestions and comments that were used as a reference for revising the pretest and posttest questions. The validity test of the question instrument obtained the results of 15 questions declared valid and could be used by researchers as pretest and posttest questions. The results of the reliability of the test questions using the Cronbach alpha test were 0.924 Cronbach alpha values, meaning that the question instrument was declared to have very good reliability (excellent reliability).

The fourth procedure is implemented. The implementation stage aims to determine the causal relationship after treatment of the subject. This research design uses one group pretest-posttest. The level of parents' understanding of the material studied in the Digital-Based Communication Learning Assistance Guide for Parents is then categorized according to the table 1.

Table 1. Pretest and posttest understanding categories

Criteria	**Level of Understanding**
75 - 100	Exelent
50 – 74,99	Good
25 – 49,99	Enought
0 – 24,99	Bad

The research procedure at the implementation stage begins with a pretest, device trial, and posttest. The research subjects were 24 parents of autistic children from 5 schools, namely SLB Negeri Colomadu, SLB Autis Alamanda, SLB-E Bhina Putra, SLB C1 YSSD, and SLBS Mitra Ananda.

The fifth procedure is evaluation. The evaluation stage is the stage where researchers test the effectiveness of using digital-based communication learning assistance guides for parents. To test the

effectiveness of using the guide, researchers used quantitative statistics with non-parametric analysis tests, because the subjects given treatment were less than 30 subjects. The type of statistical test in this study is the Wilcoxon Sign Rank Test because the groups tested at the pretest and posttest stages are the same group. The research is declared successful if the posttest score increases from the pretest score.

To ensure comprehensive evaluation, the study also developed a detailed instrument grid in table 2 to measure parents' understanding of communication learning for autistic children.

Table 2. Instrument Grid for Assessing Parental Understanding

Aspect	**Indicator**	**Question Item**	**Scale**
Understanding of Communication in Autism	Definition and characteristics of autism-related communication difficulties	1, 2, 3	Likert (1-5)
Communication Strategies	Methods to enhance communication skills in autistic children	4, 5, 6	Likert (1-5)
Digital Learning Guide Usage	Ease of use, relevance, and usefulness of the guide	7, 8, 9	Likert (1-5)
Parental Implementation	Application of learned strategies in real-life situations	10, 11, 12	Likert (1-5)

RESULTS AND DISCUSSION

The analysis stage includes material analysis activities and parental needs analysis. Material analysis was carried out in September 2022 at the Surakarta State Special School with 16 parents of autistic children as subjects. The data collection technique used an open questionnaire consisting of 10 questions. The results of the material analysis showed that parents of autistic children still do not understand the communication material that needs to be taught in home learning assistance. The results of the parental needs analysis were that 82.8% of parents of autistic children needed an application for autistic children's communication learning assistance guide that contains communication learning steps that are displayed attractively, accompanied by clear images, videos, and sound, and equipped with many choices of appropriate menu icons. As many as 17.2% of parents did not want an application that was only in the form of writing.

The design stage was carried out in three stages, namely designing a flow chart, determining the application, and designing a script (storyboard). This Autistic Children's Communication Learning Assistance Guide Application for Parents is website-based with the domain name https://belajarkomunikasianakautis.com/

The development stage is the process of realizing the design that has been prepared into a real product. The development steps include making an application draft, application production, manual book production, expert validation test, stage 1 revision, practitioner test, and stage 2 revision. The tabulation of the results of the feasibility test assessment is shown in the following table 3.

Table 3. Tabulation of feasibility test results

No	Validation Type	Assessment Results (Presentation)	Feasibility Category
1	Content/material validation	96,15%	Very feasible
2.	Language validation	100%	Very feasible
3.	Media validation	95,83%	Very feasible

The first stage of product revision is in the e-book menu displayed in the guide application. The practitioner test of the digital-based autistic child communication learning assistance guide application for parents was conducted on 4 special education school teachers who teach autism at the SDLB, SMPLB, and SMALB levels at the Surakarta State Special Education School. The results of the practitioner test are explained in the table 4.

Table 4. Practitioner test results

No	Practitioner Validator	Assessment Results	Assessment Category
1.	Teacher 1 (NK)	96,42	Very feasible
2.	Teacher 2 (EK)	96,42	Very feasible
3.	Teacher 3 (AR)	92,56	Very feasible
4.	Teacher 4 (PW)	100	Very feasible
Mean		96,35	Very feasible

The practitioner test was used as a guideline for the revision of stage 2. Based on the results of the practitioner test as in the table above, it was stated that the application of a digital-based communication learning assistance guide for parents was very feasible to use without revision.

The implementation stage aims to determine the causal relationship after the treatment of the subjects. The research design used one group pretest-posttest. The results of the pretest and posttest in the field trial are as table 5.

Table 5. Pretest and posttest score results

Parents' initials	Pretest	Posttest
SN	40	93
B	53	93
WD	53	86
GJ	46	100
BR	60	100
AR	66	100
KN	53	93
ST	66	73
TK	80	100
JW	46	93
RK	66	93
NN	33	80
LW	53	86
TP	60	86
CA	53	86
LN	53	100
FD	60	100
SF	66	100
MR	46	93
CC	66	100
FK	53	100
RR	46	93
DN	60	86
MN	46	80

The evaluation stage is the stage where researchers test the effectiveness of using the Digital-Based Autistic Children's Communication Learning Assistance Guide for Parents. To determine the effectiveness of the product, researchers analyzed the data quantitatively using non-parametric statistics, the Wilcoxon Sign Rank Test.

The data from the pretest and posttest research results were processed using SPSS version 29 and obtained on this table 6.

Table 6. Descriptive statistics comparing pretest and posttest scores

Descriptive Statistics					
	N	Mean	Std. Deviation	Minimum	Maximum
Pre Test	24	55.17	10.366	33	80
Post Test	24	92.25	7.831	73	100

The lowest score of the pre-test result was 33, while the post-test was 73. The highest score of the pre-test result was 80, while the post-test was 100. The average score of the pre-test was 55.17, while the post-test was 92.25. There was a difference in scores between before and after the treatment of using the Digital-Based Autistic Children's Communication Learning Assistance Guide for Parents. The comparison of the results of the pre-test and post-test scores is explained in the figure 2.

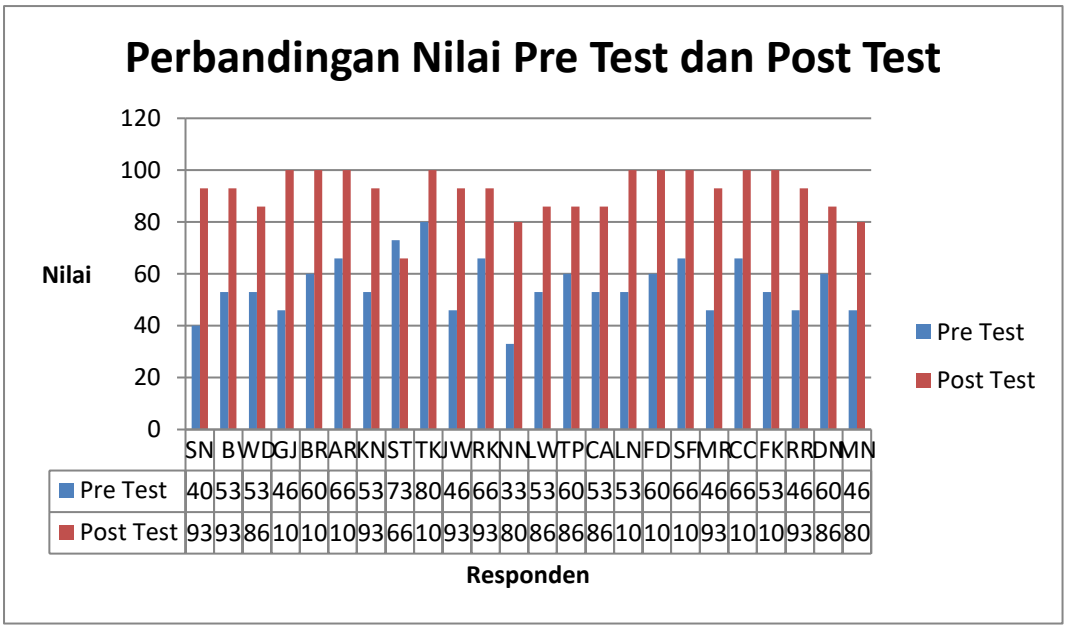

Figure 2. Histogram comparing pre-test and post-test results

The research results were then analyzed quantitatively using non-parametric statistics, the Wilcoxon Signed Rank Test. The Wilcoxon Signed Rank Test showed that no subjects received negative ranks. Total of 24 subjects received positive ranks. No subjects had the same score (ties). A total of 24 subjects experienced an increase in score during the post-test with a mean rank (average) of 12.50 and a sum of ranks of 300.00.

After calculating the ranking of the pre-test and post-test data, the next process is to calculate the test results. The non-parametric statistical calculation of the Wilcoxon Signed Rank Test aims to obtain Zcount along with Asymp. Sig (2-tailed) or P score. This study uses a significance level of $\alpha = 0.05$ or 5%. The results of the statistical test calculation using SPSS version 29 obtained the following table 7.

Table 7. Statistical Test Results

Test Statistics[a]	
	Post Test - Pre Test
Z	-4.299[b]
Asymp. Sig. (2-tailed)	<,001
a. Wilcoxon Signed Ranks Test	
b. Based on negative ranks.	

Statistical test calculation based on pre-test and post-test values obtained Zcount -4.299 with Asymp. Sig. (2-tailed) <,001. The probability value in Zcount is then compared with a significance level of $\alpha = 0.05$. The comparison of probability values showed that there is a significant difference between the results of the pre-test and post-test with P 0.01 smaller than the significance level of 0.05 or 5%.

The results of the study stated that 24 out of 24 subjects studied experienced an increase in understanding in assisting communication learning in autistic children. Thus, Ho is rejected and Ha is accepted. There is a significant influence on parents' understanding of assisting communication learning in autistic children after the use of digital-based media for assisting communication learning in autistic children for parents.

Effectiveness testing in a study was conducted to determine whether the product developed has an impact on users. The results of the non-parametric statistical data analysis of the Wilcoxon Sign Rank Test showed that the Development of a Digital-Based Autistic Children's Communication Learning Assistance Guide for Parents was stated to have a significant influence in increasing parents' understanding of the material and steps to teach communication to autistic children at home.

The results of research from (Rohman et al., 2021), android-based parenting guides are suitable for use to improve verbal communication in children on the autism spectrum. In terms of visuals, android-based parenting guides make it easier for parents and provide an attraction for autistic children to quickly grasp communication materials and easily remember the communication learning that is taught, this is because the displays are easy for parents to understand and attractive images, animations, and audio with harmonious colors accompanied by sound images, so that they are effective in improving the communication skills of autistic children. The advantages of digital-based applications are also explained by (Nagmoti, 2017) in his research that digital applications have a strategic role because they can improve understanding, improve skills, and improve a person's memory to store messages in short-term memory and long-term memory. In addition to this, digital applications can convey information to be more organized, attract attention, and make it easier for users to understand content/material (Prabawa & Restami, 2022).

CONCLUSION

The Digital-Based Communication Learning Assistance Guide for Parents of Autistic Children has been found to significantly enhance parents' understanding of communication teaching strategies for autistic children, as evidenced by the pre-test-posttest score increase of 12.50 and a sum of ranks of 300.00. This study reinforces the role of digital tools in facilitating parental learning, aligning with prior research by Rohman et al. (2021), who demonstrated that Android-based parenting guides effectively improve verbal communication skills in children with Autism Spectrum Disorder (ASD). The interactive design, incorporating engaging visuals, animations, and audio, provides an intuitive learning experience for parents while capturing children's attention and improving communication retention, a concept supported by Nagmoti (2017). Additionally, Prabawa & Restami (2022) found that digital applications make learning materials more structured, engaging, and easier to comprehend. Despite these advantages, this study has several limitations. First, the small sample size (n=24) limits the generalizability of the findings to a broader population, requiring future research to include larger and more diverse samples across different educational and socio-economic backgrounds. Second, the study

only assessed short-term learning gains, making it uncertain whether parental improvements translate into long-term changes in autistic children's communication skills. Future studies should incorporate longitudinal research to measure the sustained impact of digital learning guides. Another limitation concerns technological access and literacy, as parents with low digital literacy may struggle to effectively utilize the application, highlighting the need for further training and accessibility adaptations. Lastly, while digital applications are effective, they cannot fully replace human interaction in developing communication skills for autistic children. A hybrid approach, combining digital learning with direct parental coaching and professional support, could lead to more effective communication development for autistic children and maximize the benefits of digital-based learning interventions.

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