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DEVELOPMENT OF THE POTTY FUN KID'S DIGITAL MEDIA APPLICATION TO IMPROVE TOILET TRAINING INDEPENDENCE IN CHILDREN WITH AUTISM SPECTRUM DISORDER

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Abstract

This study aims to develop and evaluate the effectiveness of the digital application "Potty Fun Kid's" in enhancing toilet training independence among children with autism spectrum disorder (ASD). A pre-test–post-test design was employed involving 26 children with ASD enrolled in an inclusive school. The application was validated by media experts and subject matter experts prior to its six-week implementation as an intervention. Data were collected through observations of toilet training independence, questionnaires completed by teachers and parents, and semi-structured interviews. The findings revealed a significant increase in toilet training independence scores, from a pre-test mean of 152.88 (categorized as "moderately independent") to a post-test mean of 231.35 (categorized as "independent"). Potty Fun Kid's was rated as highly feasible by both media and subject matter experts, achieving a feasibility score of 90%. The majority of teachers and parents (92.9%) reported improvements in children's toilet training independence, particularly in recognizing signs, following sequences, and communicating toileting needs. The visual schedule and reward system features were identified as the most effective components of the application. Observational data indicated an increase in successful toilet use rates from 40% to 100% and a reduction in dependence on assistance. In conclusion, Potty Fun Kid's is effective in promoting toilet training independence among children with ASD by ensuring a consistent approach between school and home environments.

Abstrak

Penelitian ini bertujuan untuk mengembangkan dan mengevaluasi efektivitas aplikasi digital "Potty Fun Kid's" dalam meningkatkan kemandirian toilet training pada anak dengan gangguan spektrum autisme (GSA). Penelitian ini menggunakan desain pre-test–post-test yang melibatkan 26 anak dengan GSA yang bersekolah di sekolah inklusi. Aplikasi divalidasi oleh ahli media dan ahli materi sebelum diimplementasikan selama enam minggu sebagai intervensi. Data dikumpulkan melalui observasi kemandirian toilet training, kuesioner yang diisi oleh guru dan orang tua, serta wawancara semi-terstruktur. Hasil penelitian menunjukkan adanya peningkatan signifikan pada skor kemandirian toilet training, dari rata-rata pre-test sebesar 152,88 (kategori "cukup mandiri") menjadi rata-rata post-test sebesar 231,35 (kategori "mandiri"). Potty Fun Kid's dinilai sangat layak oleh ahli media dan ahli materi, dengan skor kelayakan sebesar 90%. Mayoritas guru dan orang tua (92,9%) melaporkan adanya peningkatan kemandirian toilet training anak, khususnya dalam mengenali tanda-tanda, mengikuti urutan, dan mengomunikasikan kebutuhan toilet. Fitur visual schedule dan sistem hadiah diidentifikasi sebagai komponen yang paling efektif dari aplikasi ini. Data observasi menunjukkan peningkatan persentase keberhasilan penggunaan toilet dari 40% menjadi 100% serta penurunan ketergantungan terhadap bantuan. Disimpulkan bahwa Potty Fun Kid's efektif dalam meningkatkan kemandirian toilet training pada anak dengan GSA melalui penerapan pendekatan yang konsisten antara lingkungan sekolah dan rumah.

Kata Kunci : **Toilet Training**, **Aplikasi Digital**, **Autisme**, **Kemandirian**

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Introduction

Early Childhood Education (ECE) plays a very important role as a very important foundation in the national education system. This period is widely recognized as the golden age (*golden age*), a critical phase in the human life span in which brain development takes place very rapidly and neural plasticity is at its peak (Sum, 2023). Therefore, the various stimuli that children receive in this phase will have a significant long-term impact on all aspects of their development, which include physical, cognitive, language, social-emotional, as well as moral and spiritual development (Andrian, Makalim, et al., 2025).

In this framework, the function of PAUD goes far beyond just a daycare institution. It is a strategic vehicle designed to form and grow individuals with character, creativity, and independence from an early age (Fikriyah & Diana, 2024; Hewi & Shaleh, 2020). One of the main objectives of educational intervention at this level is to optimize all children's potential, preparing them to face challenges at the next level of education and in community life. The development of independence is one of the fundamental pillars in achieving this noble goal(Helmiyanti & Fikrie, 2024).

A crucial aspect of fostering early childhood independence is the mastery of self-development skills, which includes a set of self-care and self-care skills. Among these various skills, *toilet training* is an essential milestone of development (Sutadi et al., 2024). Success in *toilet training* It is not only related to aspects of hygiene and physical health, but also serves as an important indicator of the child's emotional maturity and independence, which signifies his readiness to participate in a wider social life (Andriyani & Putri, 2024).

For children with Autism Spectrum Disorder (ASD), the developmental process is often colored by unique challenges. Their distinctive characteristics, which include barriers in social interaction and communication, as well as the presence of limited and repetitive patterns of behavior, interests, and activities, directly affect the way they learn and process information from the surrounding environment (Association, 2013). As a result, the mastery of basic skills such as *toilet training* Become much more complex (Mawardah & Hartati, 2024).

More specifically, the process *toilet training* children with ASD are faced with various interrelated obstacles. They tend to have difficulty interpreting and responding to the body's internal signals that indicate a desire to defecate. In addition, there is a rigid behavior and the need for the same routine (*sameness*) makes it difficult for them to adapt to new activities, while high sensory sensitivity can make the experience in the toilet (such as the sound of flushing or the temperature of the toilet seat) feel uncomfortable or even scary (Henderson et al., 2020).

This challenge is empirically proven, with studies indicating that about 68% of children with ASD experience significant delays in *toilet training* compared to

neurotypical child populations (Koegel et al., 2020). This fact underscores that conventional methods are often inadequate. They absolutely require interventions that are specifically designed, evidence-based, and tailored to each individual's sensory profile and cognitive abilities, with a strong emphasis on the use of visual aids.

Along with the advancement of the times, digital technology offers a very promising alternative solution for the world of education, especially for children with special needs. Various interactive digital media, such as tablet-based applications, animations *social stories*, and educational games, have been shown to be effective in increasing children's motivation, engagement, and understanding of a new concept or skill (Walker, 2019).

This technology-based approach is considered very suitable for children with ASD. This is because they often show a better preference and response to visual and interactive media compared to long, abstract verbal instructions. According to Lane and Radesky (2019), well-designed digital media can serve as an effective tool to help ASD children understand and follow daily routines, which in turn can reduce anxiety and build a sense of independence.

Scientific evidence supporting the use of technology in *toilet training* It is also getting stronger. A study by Sorbello et al. (2023) found that the use of tablet apps designed to *toilet training* in children with ASD were able to increase the success rate up to 40% faster than conventional methods. This success is attributed to the app's ability to provide clear step-by-step visual guidance, reinforced with audio elements and a consistent positive reinforcement system.

Despite the enormous potential of technology, the adoption of digital media in early childhood education practices in Indonesia, especially those specifically for children with special needs, is reported to be very limited. Initial observations conducted by researchers in several Inclusion PAUD in Tanjung Priok District found a real gap, where most children with ASD (six out of eight children observed) still experience significant difficulties and are highly dependent on the help of teachers in *the toilet training* process.

This gap in the field is exacerbated by the limitations of relevant learning resources and media. Teachers and educators reveal that the media used today is still conventional, such as static *flash cards*, which have proven to be less effective in attracting attention and maintaining the focus of ASD children. A special assistant teacher, Ike Setiowati, S.Pd., M.Pd., explicitly stated that although his students are very responsive to digital media, there is not a single application specifically designed and systematic for *toilet training* available to them.

In addition to the phenomenon gap in the field, there is also a research gap significant in the academic literature. A literature review conducted by Danela (2020) Of the 35 relevant publications, it was found that only a small fraction, i.e. 8.5%, specifically focused on the development of learning media suitable for *toilet*

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training in children with ASD. This figure shows the urgency to conduct more in-depth research and development in this area.

Answering a series of challenges, this study aims to develop and test the effectiveness of a digital media application called "Potty Fun Kid's". This application is specifically designed to be an innovative solution that can be easily accessed by teachers and parents. By integrating the principles of visual learning, a step-by-step approach, fun gamification elements, and monitoring features, the app is expected to bridge the coordination between home and school, an aspect of collaboration that Simon et al. strongly emphasized. (2022) in order to create consistent and effective interventions to accelerate the achievement of child independence.

Method

This study uses a research and development approach (R&D) with the aim of producing a specific product and testing the effectiveness of that product (Sugiono, 2017). The adapted development model is a 4D model (Define, Design, Develop, Disseminate) that systematically guides the process from needs analysis to the dissemination of learning products (Thiagarajan, 1974). To evaluate the effectiveness of the "Potty Fun Kid's" application, this study applied a quasi-experimental design with a one-group pretest-posttest design.

1. Participants and Research Locations

The participants involved in the study were 26 children with a diagnosis of Autism Spectrum Disorder (ASD) aged between 4 and 6 years. These participants were registered in several PAUD Inklusi institutions in Tanjung Priok District, North Jakarta, with the main location of the research at PAUD Inklusi Kid's Club. Participant selection was carried out using *purposive sampling* techniques based on predetermined inclusion criteria, namely children diagnosed with ASD, in a set age range, not yet independent in *toilet training*, and having basic abilities to use digital devices.

2. Research Procedure

The research procedure was carried out systematically following four stages of the 4D model (Thiagarajan et al., 1974):

a. ***Define*** **:** This initial stage focuses on needs analysis through literature studies, direct observation in early childhood education, and semi-structured interviews with teachers and parents to identify specific problems related to *toilet training* in ASD children.

b. ***Design*** **:** Based on the findings in the previous stage, the researcher designed an initial draft of the application. This process includes *storyboarding*, content flow design, and visual interface design that fits the characteristics and needs of ASD children.

c. ***Develop*** **:** At this stage, the application prototype is developed and validated by experts consisting of subject matter experts, media experts, and PAUD practitioners. Expert feedback is used to revise and improve the product before a limited trial to evaluate user response.
d. ***Disseminate*** **: After the** final product is completed, socialization and limited dissemination to teachers and parents at the research site are carried out, accompanied by guidelines for use for sustainable utilization.

3. Data Collection Instruments

The data collection in this study uses several types of instruments that have been designed and validated to ensure that the data obtained is relevant and accurate. The main instruments are

a. **Observation Sheet** used to measure the level of independence of children's *toilet training* in *pre-test* and *post-test sessions*. In addition, it is also used
b. **Expert Validation Questionnaire** to assess the feasibility of the application from various aspects as well as **the User Feedback Questionnaire** addressed to teachers and parents to evaluate the effectiveness and ease of use of the application after the intervention period. To deepen the analysis, the researcher used
c. **Guidelines Semi-structured interviews** with teachers and parents.

4. Data Analysis Techniques

The data analysis technique in this study combines quantitative and qualitative approaches. Qualitative data derived from interviews and field notes were analyzed using data reduction, data presentation, and conclusion drawing techniques to understand the context and dynamics that occurred. Meanwhile, quantitative data from the expert validation questionnaire was analyzed descriptively to determine the level of product feasibility. To measure the effectiveness of the intervention, independence scores from *pre-test* and *post-test* results were compared to see an improvement. This analysis includes a comparison of average scores and percentage changes in each category and aspects of independence measured.

Result and Discussion

This research resulted in a product in the form of a Digital Media Application "Potty Fun Kid's" which aims to increase toilet training independence for children with Autism Spectrum Disorder, which was developed using a 4D model (Define, Design, Develop, Disseminate). To measure its quality, the application was tested through a feasibility test involving experts (subject matter experts, media experts,

and early childhood education practitioners), as well as an effectiveness test carried out with a pre-test and post-test design on 26 children, with responses collected from educators and parents. Here we have a snippet of the presentation related to the results of research and testing which will be explained according to the findings of feasibility and effectiveness of the product at each stage of development carried out.

1. Results of the Define Stage

The research began with a comprehensive needs analysis to identify problems faced by children with Autism Spectrum Disorder (ASD) in *toilet training*. This analysis was carried out through three main activities: literature study, field observation, and interviews. The results of a literature review confirm that 68% of ASD children experience a delay in *toilet training* and a structured visual approach has proven effective in helping them. Meanwhile, direct observation of 8 ASD children at PAUD Inklusi Kid's Club showed that 75% of them still needed help in the *toilet training* process and experienced difficulties in communicating needs, following orders, and lack of initiative. These findings were reinforced through interviews with teachers and parents, who revealed that the media currently used is only a simple *flash card* that is less attractive, and there is an urgent need for visual media that is interactive, structured, has a reward system, and can be used consistently at school and at home to bridge collaboration.

2. Results of the Design Stage

Based on the results of the needs analysis at the *Define* stage, the next stage is Design which aims to translate these findings into an initial product prototype. This process resulted in Draft 1 of the "Potty Fun Kid's" digital media application, which was designed as a visual, interactive, and structured learning medium. The entire user flow, content, and visual elements are designed in detail through comprehensive *storyboarding*. The prototype design integrates several key features specifically aimed at addressing the needs of children with Autism Spectrum Disorder (ASD). To increase children's personal engagement, a **character personalization feature** was designed that allows users to choose a male or female avatar. Applying the pedagogical principles *of scaffolding*, this application is arranged in **a progressive 5-level structure** to break down complex skills into stages that can be mastered gradually. As a motivational element, a **gamification-based reward system** in the form of stars is integrated which functions as *positive reinforcement* every time a child successfully completes a task. In addition, to accommodate the diverse sensory needs of ASD children, an **adaptive visual mode** was designed that provides black-and-white display options to reduce excessive visual stimulation. The end result of this stage is a functional prototype that forms the basis for the subsequent development and validation process.

3. Results of the Development Stage

The Development Stage focuses on product realization, testing, and improvement iteratively. This process transforms the initial prototype into a validated final product through expert validation and limited testing.

a. Initial Prototype Validation and Revision

The initial prototype (Draft 1) was validated by three experts to gauge its feasibility. The quantitative results of the experts' assessment are summarized in Table 1.

Tabel 1 Summary of Expert Validation Results for Draft 1

No	Aspects Assessed	Material Expert	Media Member	Early Childhood Teacher	Average	Percentage	Category
A. Material Eligibility							
1	Fit of the Material with the Purpose	3.67	3.33	3.67	3.56	89.0%	Highly Worth It
2	Accuracy and Relevance of Content	3.33	3.00	3.67	3.33	83.3%	Highly Worth It
B. Media and Design Feasibility							
1	Visual Display	3.00	2.67	3.33	3.00	75.0%	Proper
2	Interactivity and Navigation	2.67	2.33	3.00	2.67	66.8%	Proper
C. Feasibility of Learning Implementation							
1	Ease of Use by Teachers/Parents	3.33	3.00	2.67	3.00	75.0%	Proper
2	Potential Effectiveness in Learning	3.67	3.33	3.33	3.44	86.0%	Highly Worth It
Overall Average		3.28	2.94	3.28	3.17	**79.2%**	Proper
Percentage		82.0%	73.5%	82.0%	**79.2%**	-	

Based on the validation of three experts on Draft 1 of the Potty Fun Kid's application, an average score of 3.17 (79.2%) was obtained which was classified as "Feasible" with several improvements. The aspect of Material Suitability with the Purpose received the highest score (3.56 or 89.0%) and the Potential Effectiveness in Learning was also high (3.44 or 86.0%), both in the Very Feasible category. The lowest scores were found in Interactivity and Navigation (2.67 or 66.8%), indicating the need for significant improvements in this section. Material Experts and PAUD Teachers give higher ratings (82.0%) than Media Experts (73.5%), so technical aspects and media design need to be the focus of revision.

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b. Trial Limited to Users

The revised product was then tested on a limited basis to 8 children with ASD to evaluate its practicality. A summary of the observations is presented in Table 2.

Table 2. Observations in Limited Trials (n=8)

No	Observed Aspects	Observation Results
1	Your child's interest in the app	7 out of 8 children (87.5%) showed a high interest in the app, demonstrated by a good focus and initiative to use the app
2	Ease of use by children	6 out of 8 children (75%) can use the app with minimal assistance, while 2 children need intensive assistance
3	Response to the reward system	All children (100%) showed a positive response to the star reward system, with a happy expression when they got a star
4	Understanding the toilet training sequence	5 out of 8 children (62.5%) showed an increased understanding of the toilet training sequence after using the app
5	Ease of use by teachers/parents	All teachers and parents (100%) stated the app was quite easy to use, although there were some features that needed simplification

The data in Table 2 show a very positive reception from the target users. The high level of interest in children (87.5%) and 100% response to the *reward system* confirm that the visual and gamification elements of the app successfully motivate children. Qualitative feedback from teachers and parents during this trial, such as suggestions to slow down some animations and increase the size of icons, became a reference for final stage revisions to finalize the product.

c. Final Model Eligibility

After going through the entire revision cycle, the final model of the application was again validated by experts. The comparison of eligibility scores between the initial draft and the final model is summarized in Table 3.

Table 3. Comparison of Initial Draft and Final Model Feasibility

No	Validated Aspects	Early Draft	Initial Percentage	Category Awal	Draft Final	Final Percentage	Category Final
1	Content suitability to the needs of children with autism	2.85	71.25%	Proper	3.65	91.25%	Highly Worth It
2	Compatibility of visualization	2.70	67.50%	Proper	3.55	88.75%	Highly Worth It

No	Validated Aspects	Early Draft	Initial Percentage	Category Awal	Draft Final	Final Percentage	Category Final
	with user characteristics						
3	Ease of use interface	2.50	62.50%	Proper	3.40	85.00%	Highly Worth It
4	Interactivity and feedback	2.90	72.50%	Proper	3.70	92.50%	Highly Worth It
5	Consistency with the stages of toilet training	3.05	76.25%	Proper	3.75	93.75%	Highly Worth It
6	Support for child independence	2.80	70.00%	Proper	3.60	90.00%	Highly Worth It
7	Parent/teacher involvement	2.55	63.75%	Proper	3.50	87.50%	Highly Worth It
8	Educational value	3.10	77.50%	Proper	3.80	95.00%	Highly Worth It
	Average	**2.81**	**70.16%**	**Proper**	**3.62**	**90.47%**	**Highly Worth It**

Table 3 clearly illustrates the success of the iterative development process. The overall average eligibility score increased significantly from 70.16% in the initial draft to 90.47% ("Very Eligible") in the final model. The most substantial improvement was seen in the aspect of "Ease of use of the interface" which increased from 62.50% to 85.00%. Very high scores on "Educational value" (95.00%) and "Interactivity" (92.50%) on the final model confirm that the final product has been successfully refined into a learning medium that is very feasible to implement.

d. Model Effectiveness Test Results

After the product is declared very feasible, the next stage is to test the effectiveness of the "Potty Fun Kid's" application in increasing *toilet training* independence. The test was conducted by comparing *pre-test* (pre-intervention) and *post-test* (after 6 weeks of intervention) data on 26 children with ASD.

1) Pre and Postage Comparison

The results of the initial measurement (pre-test) and *post-test* (after 6 weeks of intervention) in 26 children with ASD level of child toilet training independence were as follows:

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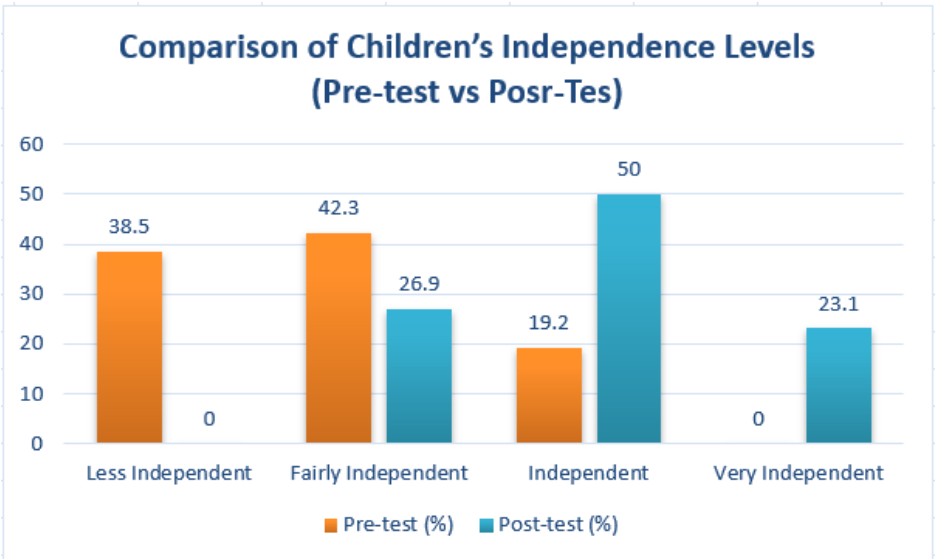
Diagram 1. Comparison of Children's Independence Levels

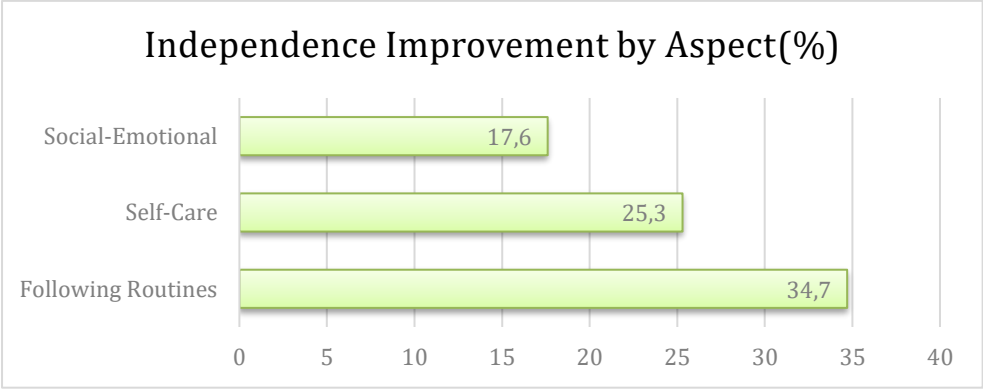


showed very significant changes after the 6-week intervention. The most drastic increase was seen in the loss of the "Less Independent" category which dropped from 38.5% to 0%. On the other hand, there was a surge in the "Very Independent" category which increased from 0% to 23.1% and the "Independent" category which more than doubled, from 19.2% to 50.0%. An increase in the overall average independence score of 24.2% (from 152.88 to 231.35) proves that the use of the "Potty Fun Kid's" application is significantly effective in increasing the independence of children's toilet training.

2) Analysis of Improvement Based on Aspects of Independence

To see the effectiveness of the application more specifically, an analysis of the improvement in each aspect of the independence measured was carried out. The results are presented in **Diagram 2**

Diagram 2. Independence Improvement by Aspect



As detailed in Diagram2, the largest increase occurred in the aspect of "Independence in Following Routine Activities" with a jump of 34.7%. This indicates that the visual features and step-by-step structure in the app are very effective in helping children understand and follow the sequence of toilet training activities consistently. The "Self-Care Independence" aspect also showed a strong increase of 25.3%. Meanwhile, the aspect of "Social-Emotional Independence" experienced

The results of the study consistently show that the "Potty Fun Kid's" digital media application developed through a 4D model has proven to be very feasible and effective in improving toilet training independence in children with Autism Spectrum Disorder (ASD). The product feasibility rate of 90.47% and a significant increase in the average independence score of 24.2% confirmed the success of this intervention. This success can be attributed to the design of the application that is developed based on an in-depth needs analysis and is aligned with the theoretical framework and relevant research that already exists.

The highest increase recorded in the aspect of "Independence in Following Routine Activities" (34.7%) was the most significant key finding. These results directly validate the effectiveness of the application's main approach that presents stages toilet training in the format visual schedule structured, concrete, and repeatable. Children with ASD often have difficulty with executive function, yet they respond very well to predictable visual information (Cagliani et al., 2021; Danela, 2020; Istiqomah et al., 2024). This structure helps reduce anxiety and gives children a sense of control, making it easier for them to internalize a new routine.

The success of this application is also inseparable from the application of behavioristic principles through gamification, especially the reward system (Reward) in the form of stars that received a positive response from 100% of children in a limited trial. This feature serves as a positive reinforcement (positive reinforcement) effective, a technique that is at the core of the Applied Behavior Analysis (ABA) that has been proven to be successful in children (Andrian, Iranda, et al., 2025; Rahmah TM et al., 2024) By providing instantaneous and visually appealing positive feedback, children become motivated to repeat expected behaviors, turning potentially stressful learning processes into fun (Julaeha et al., 2024; Kartika et al., 2023).

When compared to previous research, this study offers an advancement. Research by Andriyani & Putri (2024) which uses animated video modeling has proven the effectiveness of visual media. However, the "Potty Fun Kid's" app goes a step further by adding an element of interactivity, where the child not only observes but also actively participates. This level of active interaction has been shown to maintain attention and reinforce the learning process more effectively compared to passive observation (Zega, 2024).

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The findings in this study are also in line with other more advanced digital intervention studies. Sorbello et al. (2023) reported the success of using mobile apps to improve personal autonomy in ASD children. The results of "Potty Fun Kid's" reinforce the evidence that well-designed mobile apps are a very potential tool for teaching functional skills. In contrast to interventions telehealth that require direct expert assistance such as in studies Little et al. (2023), the app offers greater flexibility for independent use by parents and teachers.

Conclusion

Based on the results of research and discussion, it can be concluded that **the "Potty Fun Kid's" digital media application**, which was developed through a 4D model, has proven to be **very feasible and effective** in increasing toilet training independence in children with Autism Spectrum Disorder. This feasibility is confirmed by a final expert validation score that reaches 90.47% ("Very Feasible"), while its effectiveness is demonstrated by **a significant increase in the average independence score from 152.88 to 231.35** after the intervention. The highest increase in the aspect of "Independence in Following Routine Activities" at 34.7% confirms that the structured visual approach in the application is the most impactful component that successfully helps children understand and master routines consistently

References

Andrian, T., Iranda, A., Ekawati, Y. N., Sundjaya, T., & Devi, P. (2025). *Rising Through Challenges : A Phenomenological Study of Adversity Quotient in Single Mothers ' Child Stimulation Efforts*. *13*(2), 117–128. https://doi.org/10.20473/jpk.V13.ISI2.2025.117-128

Andrian, T., Makalim, I., & Supriyadi, S. (2025). The Influence of Parental Involvement and Work on Early Childhood Language Development. *EDULEC : Education, Language, and Culture Journal*, *5*(1), 1–11. https://doi.org/10.56314/edulec.v5i1.278

Andriyani, & Putri. (2024). *Implementation of video modeling animation on toilet training ability in autism spectrum disorders*.

Association, A. P. (2013). *Diagnostic and statistical manual of mental disorders*. American Psychiatric Publishing. https://doi.org/10.46692/9781447314592.023

Cagliani, R. R., Snyder, S. K., & White, E. N. (2021). Classroom based intensive toilet training for children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *52*. https://doi.org/10.1007/s103-021-04883-3

Danela. (2020). *Implementation of toilet training in children with autism: Literature review*. University of Education Indonesia.

Fikriyah, & Diana. (2024). *Behavioral therapy applied behavior analysis (ABA) method*.

Helmiyanti, H., & Fikrie, F. (2024). The relationship between parental well-being and the quality of parent-child relationships in parents and children with autism. *Journal of Psychology*, *1*(4), 17. https://doi.org/10.47134/pjp.v1i4.2789

Henderson, T. A., van Lierop, M. J., McLean, M., Uszler, J. M., Thornton, J. F., Siow, Y. H., Pavel, D. G., Cardaci, J., & Cohen, P. (2020). Functional neuroimaging in psychiatry—Aiding in diagnosis and guiding treatment. What the American Psychiatric Association does not know. *Frontiers in Psychiatry*, *11*. https://doi.org/10.3389/fpsyt.2020.00276

Hewi, L., & Shaleh, M. (2020). Reflection on the results of PISA (the programme for international student assessment): Improvement efforts rely on early childhood education. *Golden Age Journal*. https://e-journal.hamzanwadi.ac.id/index.php/jga/article/view/2018

Istiqomah, F. Z., Al Hamidi, M. F., & Prasetyoningsih, L. S. A. (2024). Intervention on the speaking ability of children with special needs in early childhood learning at PAUD Mukhtar Syafaat Banyuwangi. *Kiddo: Journal of Early Childhood Islamic Education*, *5*(1), 318–332. https://doi.org/10.19105/kiddo.v1i1.12708

Julaeha, E., Sari, M., & Kurniawati, D. A. (2024). Providing rewards and punishment as an effort to improve the socio-emotional abilities of early childhood. *Journal of Obsession: Journal of Early Childhood Education*, *5*(10), 3711–3724.

Kartika, Sari, R., & Irfan, M. (2023). Training on making interactive learning media based on powerpoint for autistic children at SLB N 2 Padang. *Journal Базовый Федеральный Компонент в Непрерывном Образовании, 4*(2).

Koegel, L. K., Koegel, R. L., Ashbaugh, K., & Bradshaw, J. (2020). The importance of early identification and intervention for children with or at risk for autism spectrum disorders. *International Journal of Speech-Language Pathology*.

Lane, R., & Radesky, J. (2019). Digital media and autism spectrum disorders: Review of evidence, theoretical concerns, and opportunities for intervention. *Journal of Developmental and Behavioral Pediatrics*.

Little, K., Neimy, J., DeGrace, B., & Kearney, S. (2023). A telehealth delivered toilet training intervention for children with autism. *Occupational Therapy Now*, *25*(2), 24–26.

Mawardah, M., & Hartati, V. M. (2024). Ability of autistic children to concentrate in counting through meronce class II SLB Autis Harapan Mandiri Palembang. *Journal of Education and Counseling*, *4*(4), 902–907.

Rahmah TM, R., Nurussakinah, & Sulistyawati, E. (2024). A case study of the speaking ability of children aged 4-5 years at Kindergarten Negeri Pembina Tolitoli. *Journal of Early Childhood Education Teacher Research*, *4*(1), 126–134.

Simon, M., Wilkes-Gillan, S., Chen, Y. W. R., Cordier, R., Cantrill, A., Parsons, L., & Phua, J. J. (2022). Toilet training interventions for children with autism spectrum disorder: A systematic review. *Research in Autism Spectrum Disorders*, *99*. https://doi.org/10.1016/j.rasd.2022.102049

Sorbello, K., Rojas, L. A., Salas, J., & Chavarriaga, E. (2023). A mobile application to dynamically design activities to promote personal autonomy in children with autism spectrum disorder: A usability evaluation. *Lecture Notes in Computer Science*, *13997*. https://doi.org/10.1007/978-3-031-35927-9_19

Suggestion. (2017). Educational Research Methods: Quantitative, Qualitative and R&D Approaches in *Alfabeta Bandung*.

Sum, A. A. (2023). Analysis of the Implementation of Child Care Centers in Manggarai Based on the 2015 Children's Education Park Jurisprudence. In *Golden Age: Journal of Early Childhood Education*. ejournal.unisba.ac.id. https://ejournal.unisba.ac.id/index.php/golden_age/article/download/11764/5023

Sutadi, Suhaer, & Sulasteri, S. (2024). Implementation of the smart ABA (applied behavior analysis) method on toilet training ability in autistic children. *Journal of Nursing*, *16*(1), 321–328. https://doi.org/10.35473/jn.v16i1.2365

Thiagarajan, S. (1974). *Instructional development for training teachers of exceptional children*. In A sourcebook.

Walker, V. L. (2019). Thinning schedules of reinforcement following functional communication training for children with intellectual and developmental disabilities: A meta-analytic review. *Journal of Autism and Developmental Disorders*, *49*(12), 4788–4806. https://doi.org/10.1007/s10803-019-04191

Zega, P. J. (2024). Arouse the spirit of social interaction with children with special needs. *Journal of Mablimas*, *4*(1), 18–22. https://doi.org/10.57251/mabdimas.v4i1.1413