

The Eurasia Proceedings of Educational & Social Sciences (EPESS), 2024

Volume 34, Pages 1-11

IConSED 2024: International Conference on Special Education and Diversity

DiGi-ViS Intervention Module: A Need Analysis**Tharishni Anblagan**

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Abstract: Autism Spectrum Disorder (ASD), a neurodevelopmental disorder, is now a significant public health concern. The goal of this study is to determine whether there is a need for a Digital Visual Support (DIGI-ViS) intervention module among preschoolers with autism in Perak. The informants of this study were a total of five special education preschool teachers who were selected by purposive sampling. The data was used to analyse the interview transcripts. An interview method using semi-structured, guided questions is used to explore the study's objectives. The findings of the data analysis revealed five themes (benefits, teaching practice, threats, approaches, and subject matter) that emerged, recommending that there is a need to develop digital visual support among preschoolers with autism placed in the Preschool Special Education Integration Program in Perak. Need analysis studies are essential for determining the content and requirements of an intervention module. Researchers also explored the expert opinion of special education teachers on the current challenges experienced in the classroom setting during self-management subjects. The outcomes of this study suggest that digital visual support as an intervention tool for preschoolers with autism is recommended and very useful.

Keywords: Digital visual support, Autism, Preschool, Need analysis, Design and developmental research

Introduction

According to recent statistics from around the world, autism spectrum disorder affects one in 100 children (Zeidan et al., 2022). Globally, from 2016 to 2017 school year, over 76,000 children between three and five years old were in the autism eligibility category (U.S. Department of Education, 2018). The increasing trend is also noticeable in Asia, with one out of every 500 children in Malaysia (Hanafi et al., 2020). Similarly, in Malaysia, as early as two to three years old, doctors can diagnose over 47,000 Malaysians with autism spectrum disorder (Hanafi et al., 2020).

Table 1. Preschoolers with autism (2019-2022) in Malaysia.

No.	Preschoolers with Autism/Year	2019	2020	2021	2022
1	Special Education Schools	36	67	70	69
2	Special Education Integration Schools	444	537	639	658
3	Inclusive Education Schools	27	32	24	30
	Total	507	636	733	757

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- Selection and peer-review under responsibility of the Organizing Committee of the Conference

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In addition to the global and local statistics, the number of students with autism in Malaysia is increasing every year. The education system in Malaysia places preschoolers with autism spectrum disorder, as presented in Table 1. According to the recent data in Table 1, preschoolers are the largest group in the preschool special education integration program compared to students with autism spectrum disorder in special education schools and mainstream settings (Ministry of Education, 2022).

Studies conducted in the United Kingdom and Ireland have shown that assistive technology such as smartphones and tablets has doubled in recent years (O'Neill et al., 2020). People use assistive technology as a support in their daily lives. Comparing iPad-assisted training to flashcard-assisted training, another study has indicated that iPad-assisted training results in faster learning and fewer prompts (Ulzii et al., 2022). Depending on the needs of preschoolers with autism, technology assisted visual support may take the form of real objects, photographs, texts, and sketches shown to assist the learner in participating in a desired action or skill without the need for prompts (Barczak, 2020; Solano, 2020).

This encompasses the provision of visual support via technology, also known as digital visual support (DIGI-ViS). These interventions provide visual support to selected individual autism students, but they do not use a digital visual support application to compare groups. Therefore, this paper addresses the need for digital visual support, which is so far lacking in the scientific literature.

Problem Statement

There are three main reasons why Malaysia is currently catching up. First, while schools in Malaysia continue to use "outdated visual support" for preschoolers with autism spectrum disorder in the "Let's Get Organised" programme, statistics show that 71.4 percent of special education teachers supported evidence-based visual support for preschoolers with autism spectrum disorder (Dyenia et al., 2020). It is also challenging to educate teachers about the need for early intervention approaches, such as visual support, in the classroom because of the existing curriculum, which is known as the *Kurikulum Standard Prasekolah Kebangsaan Pendidikan Khas Masalah Pembelajaran* (Ministry of Education, 2017). Thirdly, the current implementation of the Treatment and Education of Autistic and Related Communication Handicapped Children (TEACCH) programme provides insufficient visual support (Bakar et al., 2020). High workload and teacher lacking knowledge on visual support were other contributing factors of this problem (Macdonald et al., 2020). Preschool special education instructors receive no special education training, even though Perak is still home to the TEACCH programme. To create visual support, teachers don't work together. Special education preschool teachers can overcome this challenge by providing visual support, proper implementation, and adherence to a set of regulations.

Research Objective

This study's main objective is to explore the need for developing a digital visual support intervention module for preschoolers with autism in Perak.

Method

The goal of this research's need analysis is to explore whether an intervention module is necessary in Perak state. This study uses an interview-based method to obtain the opinions of the professionals in the educational setting, which includes experienced teachers, about the necessity of creating the intervention module. Before conducting the interview sessions, the researcher developed an interview protocol.

The informants were five experienced government school teachers who teach preschool education in a special education integration programme. The researcher conducted the interview according to the preferences of the informants. Therefore, the researcher conducted online interviews with four informants and face-to-face interviews with one. Previous research suggests that face-to-face interviews aim to elicit deeper and self-generated answers (Cohen et al., 2017). However, comparing online camera-based interviews has advantages such as flexible scheduling, cost, and time effectiveness (Oates et al., 2022; Prior & Lachover, 2023). Therefore, the researcher mostly conducted the interview online using the Google Meet application, in addition to face-to-face interviews.

Data collection consists of semi-structured interviews with open-ended questions. The researcher conducted a pilot test prior to the actual interview to assess the flow of the response to each question and identify any unclear questions (Dikko, 2016). According to Berliner (2004), teachers moving to the proficient stage will have at least 5 years of experience working. The informants were selected using purposive sampling based on the following criteria: i) more than ten years of experience teaching preschool students with autism; ii) awards for outstanding achievement. The informants chosen for this study satisfies the requirement.

The researcher recorded the interview after obtaining the informant’s consent. Prior to producing the main themes and subthemes through conventional qualitative analysis, the data were first transcribed, analysed, and coded (Saldana, 2017).

Findings

The informants in this study consisted of five preschool special education teachers teaching preschoolers with autism in the Special Education Integration Program. Table 2 summarises the information from the informants.

Table 2. Profile of informants

No.	Category	Informant				
		R1	R2	R3	R4	R5
1	Field of Education	Female	Female	Female	Female	Female
2	Level of Education	Degree	Degree	Masters	Masters	Degree
3	Teaching Experience	22 years	15 years	15 years	16 years	18 years
4	Excellence Award	State level	State level	State level	School level	School level

Table 3 presents the main themes and subthemes identified in this study. The main themes are benefits, teaching practice, threats, approaches and subject matter.

Table 3. Main themes and subthemes during need analysis

Number	Main Theme	Subthemes	Code
1	Benefits	Digital Visual Support Utilisation	attracts students' interest, aid in focus and understanding, assist teacher in reaching learning objective, fast and also efficient,
2	Teaching Practice	Guidebooks	beginner guide, new, learning from manual before apply to students.
		Type of Guidebook	printed modules in book form, videos, and training on an online platform.
		Absence of Guidance	no guidance, create our own guides, make module ourselves and share it.
3	Threats	Problems in Teaching and Learning	time, not able to multi task, not all topics covered, priority to students not able to complete the skills.
4	Approaches	Strategy	segmenting the skills into smaller skills, usage of visual and audio, checklist and routine, star, suitable in various categories (high and low functioning autism), reward, token, praises.
5	Subject Matter	Living skills topic	hygiene and cleanliness, clothing, toileting and eating etiquette.

The Need to Develop “DiGi-ViS” Intervention module among preschool students with autism in Special Education Integration Programme Classes

The interview data analysis among five informants revealed five main themes, which are the benefits, teaching practice, threats, approaches, and subject matter related to the need for the development of the DiGi-ViS intervention module (Table 3).

Theme 1: Benefits

Preschoolers with autism benefit from learning numbers and comprehension using the application during the post-pandemic period (Kamaruzaman et al., 2023; Satari et al., 2020). This study showed all informants have the same perspective on the advantages of technological applications for learning living skills.

Based on the informants statement about the benefit of utilising digital visual support, one informant (R1) expressed her opinion as follows:

“In the past, we may have used tools such as flash cards, but now this visual is more attractive because we know that these preschoolers with autism are interested in music, so this can help us achieve our objectives”.
(R1)

Another informant’s opinion (R4) supported this view:

“Yes, it is very necessary, to attract interest. Students will be attracted if there is a visual strategy”.
(R4)

Informant (R5) also mentioned other ideas, such as focus.

“Everyone looks at the teacher, they focus... it's more fun”.
(R5)

Other opinions were identified as assisting teachers in reaching learning objectives besides being fast and efficient.

Theme 2: Teaching Practice

When presenting an intervention module, the guidebook is crucial. An education module to identify autism spectrum disorder, module on dental and oral health problems in children with autism is used as a guide by preschool teachers (Rachmani et al., 2020; Taresh et al., 2024). However, when it is a new intervention, this guidebook is important. The subthemes derived are guidebooks, types of guidebook and absence of guidance.

i) Guidebook

The informants in teaching practice describe using beginner guides, new and learning from manuals before applying them to students.

Informant (R3) viewed teaching practice as follows:

“If the application is new, built new, of course I think I need something manual, right, the beginner’s guide”.
(R3)

This was supported by informant (R4) stating that:

“Have to learn, so need a guide”.
(R4)

Other informants also suggested learning from manual before apply to students.

ii) Type of Guidebook

Informants can introduce the modules through book form, video, or online training platform. Informants also mentioned that they had previously created and distributed the modules among themselves.

Informants differed in what kind of beginner guide they preferred; R2 and R5 recommended any beginner guide that is simple as long as it is appropriate.

Informant (R2) and (R5) opinions on teaching practice are as follows:

“Okay, for me, if there is a guide... even printing, of course... is something we need”.
(R2)

“A guide could be anything easy”.
(R5)

R2 and R4, for instance, recommended that the guidebook be available in print or as a book. Furthermore, R4 suggested that delivering the training with a video demonstration of the guidebook would be preferable.

Informant (R2) and (R4) statement is as follows:

“Okay, for me, if there is a guide... even printing, of course... is something we need”.
(R2)

The book and the video. The usage of videos... so can understand better... It's also okay if we do it on Google meet.
(R4)

iii) Absence of Guidance

At present, according to informant (R4), there is no existing guidance on this digital visual support intervention module.

The following statement outlined the type of guidance:

“I never got it yet”.
(R4)

R1 stated that the teachers must prepare themselves and share it with other teachers. R2 supported this, emphasising the importance of teachers preparing themselves and sharing their knowledge with their colleagues.

In the statement below, informants (R1) and (R2) describe the type of guidance as follows:

“We often have to create our own guides. We do not receive any guide ...to help special education teachers.”
(R1)

“Sometimes, we will make this module ourselves or share it with teachers in Malaysia.”
(R2)

Theme 3: Threats

i) Problem in Teaching and Learning

The time constraint of 30 minutes is not sufficient when teaching preschoolers with autism. R1 argued that it is not possible to cover all topics for each preschooler. Preschoolers who have not completed the skill receive priority. When teaching eating etiquette, R5 mentioned that she has to eat before the lesson. R5 is not able to multi-task and sometimes needs to control the students during other lessons.

The following statement mentioned the constraints on teaching and learning as follows:

Actually, 30 minutes is not enough because we need to handle 7 students, right? So we sometimes take a chance to do for two students first...So we make a plan for who needs to go first...
(R1)

I will eat early, at seven thirty... When the students are in the class, I really can't eat because when I eat, I have to handle them. During teaching and learning, I can't do other things; I have to handle them, even during other teacher time...

(R5)

Theme 4: Approach

i) Strategy (Task Analysis)

R3 suggested the need for segmenting big skills into smaller skills in self-management subjects such as brushing teeth. The segments are different for both typically developing preschoolers and those with special needs. The explanation of how to introduce visual and audio pictures was very good.

Following were the statements given by the informant:

In task analysis, we segment it into something very simple...For special education children, they have to take a toothbrush and hold it...Visuals and audio are indeed good...

(R3)

ii) Strategy (Checklist and Routine)

R1 and R4 both suggest that routines are important for self-management skills. In addition, R3 and R5 suggested the use of checklists for self-management skills. R5 explained that she also used verbal feedback to assess her self-management skills. However, R2 argued for a new method using task analysis.

The following statement describes the type of checklist and routine are as follows:

Wow...when we use the routine, step by step, a month or two months later, it's sorted...They need a routine that is consistent...so when we use a routine... will look easier and more organised.

(R1)

So far, the checklist is the closest that people say is the most effective. If I were myself, I would choose a checklist, even though it is a lengthy evaluation process. It takes a little time, but it is accurate...

(R3)

...We want the boys to understand that we follow a routine every day...When it takes place every day, they will understand. What to do after this...

(R4)

It's easier for me to show the students because you already have a checklist. "You haven't yet..., You have to do this,"...

(R5)

iii) Strategy (Reinforcer)

R1 mentioned giving praise. Similarly, R2 supported R1 by acknowledging that rewards can encourage them to learn better. R2 gave examples such as "Wow, you're very good," and "clever." All informants primarily utilise rewards. For example, R1 mentioned rewards in the form of not only gifts but also praise and clapping hands. Additionally, R2 added reward token. R5 suggested reward in the form of an actual star that the preschoolers with autism can see, which will motivate them to work on more stars.

R3 mentioned that this would drive the preschoolers with autism to be more motivated. According to R2, the use of gadgets can also be a source of motivation for preschoolers with autism spectrum disorder. R4 added that mild autism would benefit more from this intervention than low functioning preschoolers with autism spectrum disorder.

The following statement mentions the type of checklist and routine in detail:

This reward does not mean the way we give a gift or something, but just an applause...praises. Gadgets, maybe we can use mobile phones... apps. If the students completes something, he will get a star, wow... he will clap.
(R1)

Yes, rewards are very important for special education students...through digital or through other teaching methods, the rewards are very important to encourage them to learn further... “Wow, you're very good,” “Clever”...
(R2)

For me, in self-management, we want to build his motivation. This subject is not an academic link; it is not directly related to his cognitive skills. Whether he is smart or not, he is himself. The name is self-management, right? So, when he attempts to do something that is hands-on like this, build his confidence, build his motivation, he is happy, everybody will be happy...
(R3)

Once in a while, we also have to motivate the low-functioning ones... If the student has mild autism, it is effective. It is sometimes difficult for low-level students because it is a little difficult for them to understand the meaning of these tokens. With mild autism, he will be racing with his friends.
(R4)

Whoever has many, many stars will be a source of motivation because they can see it. They can see... “Oh, I have a lot... I want”,..
(R5)

Theme 5: Subject Matter

i) Living Skills Topic (Hygiene, Cleanliness, Clothing, Toileting, Eating Etiquette)

The statement indicates that the existing topics discussed fall under the subject matter theme. The subject matter of living skills divides into hygiene, cleanliness and clothing in addition to toileting and eating etiquette

i) Hygiene, Cleanliness and Clothing

R2, R3, R4, and R5 all brought up the subject of hygiene. Brushing teeth and washing hands are some of the examples mentioned by R2, R3, and R4.

On the topic of clothing, R2, R3, R4, and R5 concentrated on how to wear clothes correctly.

The following statements explains the hygiene, cleanliness and clothing in detail:

Then we have the aspect of personal hygiene; for example, brushing teeth is a routine for them, followed by putting on clothes...
(R2)

... We have personal cleanliness and tidiness, how to wear clothes, brush teeth...
(R3)

The steps, from washing your hands... hygiene and personal hygiene, for example, brushing your teeth, putting on clothes...
(R4)

So there is no specific time to teach how to wear clothes... Here I teach how to wear clothes properly...
(R5)

ii) Toileting and Eating Etiquette

Nevertheless, toileting skills and eating etiquette have been mentioned by all informants. R1 stated that the self-management subject teaches both toileting and eating etiquettes. R2, R3, and R5 mentioned the step-by-step of toileting clearly.

The following statements explain in detail:

“What we always have in self-management is the use of the toilet...Topics like eating in an orderly manner...Ah, so this is also what we use during self-management time”

(R1)

“We have eating and drinking practice... we have instructions on how to use the toilet,”

(R2)

KSPK topics has... eating, toileting... Eating is the introduction of eating utensils, proper eating practices, if using the toilet... squatting toilet... sitting toilet, how to use the toilet... squatting if sitting.

(R3)

Most important to me in self-management, eating and drinking practices. After using the toilet...etiquette in the toilet instead of pointing to the toilet...

(R4)

Ways to eat and drink...When going to the toilet, we teach them to go to the toilet for peeing, when they poo...

(R5)

Discussion

According to the findings of the need analysis phase, the expert consensus agreed on the need for a digital visual support intervention module. Experts unanimous agreement among teachers were consistent with previous studies on teachers perceptions of the need for a tablet-based application for self-management skills (Omar et al., 2020). Similarly, Quintana et al. (2012) found that the use of visual and physical support in educational applications aided teachers in overcoming the problems they experienced in the classroom. Cohen et al. (2022) argued that self-management and textual cues are effective intervention strategies for improving nonverbal communication among adults with autism, besides self-management skills. Thus, in this study, digital visual support has a consistent finding from previous studies, strengthening the need for it.

In the global and local context, many educational modules comprise different types of topics, such as identification kits and dental kits, as guides for carers and teachers (Taresh et al., 2024; Rachmani et al., 2020; Mah et al., 2023). Booklets and videos are used to deliver the modules (Mah et al., 2023; Rachmani et al., 2020; Taresh et al., 2024). For example, the modules for the dental kit are for older students with autism. Importantly, in this study, the informants requested training for teachers using an online platform. This will be beneficial, as teachers will be able to clear their doubts immediately during the online training. Conversely, countries where adults gain more independent living skills than young children also widely used assistive technology (Al-Hendawi et al., 2023). The findings revealed that the informants emphasise topics related to independent living skills, including toileting and eating habits, hygiene and cleanliness, and clothing. Our need analysis clearly shows an advantage over practical skills over academic skills.

Preschoolers with autism commonly use teaching and learning strategies. For instance, children with learning disabilities use digital teaching aids and audio-visual learning styles when teaching the Quran (Zulkifli et al., 2022). Shminan et al. (2020) also highlighted the use of audio-visual for teaching and learning in other life skills. Previous studies on the use of technology-enhanced systems found that they created a routine in dental care at home (Parvin et al., 2022). Therefore, this study reinforces the usefulness of visual, audio, and routine in teaching children with disabilities. It can also enhance students practical skills in the classroom.

Conclusion

The present study demonstrated the need for a visual support intervention module integrating a digital application, taking into consideration the issues and demands of preschool special education teachers. The teacher's insight and opinion on this are very important, as this is first-hand input from those who have been

teaching these preschoolers with autism at present. The findings indicate that introducing the application in a school setting offers several advantages over the conventional teaching method.

This study also explores the types of teaching manual kits that teachers deem important and relevant. The findings highlight challenges, even though we can improve the teaching strategy to align with current classroom teaching practices. Therefore, there is an essential need to design and develop a comprehensive intervention module that will be beneficial to the teaching community in the school and further extend to intervention centres and caregivers. We will use visual support application to develop an intervention guideline for preschoolers with autism.

Recommendations

Based on the research findings, we have made several recommendations for families, educators, researchers, and policymakers. These suggestions have been divided into two categories: ones for use in educational practise and ones for future research.

Recommendations for Educational Practice

1. In the classroom setting, teachers and students should be introduced to visual support using applications.
2. Introduce digital visual support for both academic and non-academic skills. For instance, schools should implement the activity of brushing one's teeth to teach proper technique and to promote memory through practice and guided prompting.
3. Workshops and in-house training should be organised for the teachers and parents on various independent living skills to support preschoolers with autism.
4. The school intervention should be continued at home by families with preschoolers with autism. Joint effort and collaboration on the skills the students lack will enhance practice and promote improvement in the taught skill
5. Rewards should be provided during digital visual support to help students learn in classroom.

Recommendations for Future Research

1. Students with mild autism can benefit from the current research in the preschool setting, and students with special needs and various learning disabilities can participate in related research.
2. Initiate studies that allow both individuals with special needs and those with normal development to perform a taught skills independently.
3. The process of accepting children from families with individuals with special needs should emphasise the introduction of visual support with gamification elements.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the authors.

Acknowledgements or Notes

* This article was presented as oral presentation at the International Conference on Special Education and Diversity (www.iconsed.net) held in Alanya/Turkey on May 02-05, 2024

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To cite this article:

Anblagan, T., Ahmad, N.A. & Roslan, S. (2024). DiGi-ViS intervention module: A need analysis. *The Eurasia Proceedings of Educational & Social Sciences (EPESS)*, 34, 1-11.