Instructional Media for Autistic Spectrum Disorder (ASD) Children: A Study on Need Analysis

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A B S T R A K

Anak ASD menunjukkan masalah fungsi sosial yang menunjukkan kesulitan berkomunikasi dengan orang lain dan seringkali tidak mengerti mengapa mereka harus melakukan interaksi sosial dengan orang lain. Salah satu cara untuk membantu mereka adalah mengembangkan media berdasarkan kebutuhan mereka. Penelitian ini bertujuan untuk melakukan analisis kebutuhan untuk menganalisis spesifikasi media yang dibutuhkan. Penelitian ini dirancang sebagai penelitian metode campuran. Pengumpulan data dilakukan dengan menggunakan kuesioner berupa survey dan dipadukan dengan wawancara. Responden survei terdiri dari 24 responden dari Malaysia, Belanda, Kanada, dan Indonesia, termasuk guru dari sekolah inklusi. Pemilihan sampel menggunakan teknik purposive sampling untuk memastikan bahwa mereka memiliki latar belakang pengetahuan baik di bidang pendidikan, linguistik, atau pendidikan khusus dan bersedia untuk diikutsertakan dalam penelitian. Data dianalisis secara kualitatif dan kuantitatif. Hasil penelitian menunjukkan bahwa media memiliki spesifikasi penting yaitu: media harus menggunakan bahasa yang mendukung pembelajarannya; media yang dikembangkan harus dapat menetapkan tujuannya; media yang dikembangkan harus dapat memberikan dukungan pembelajaran; media harus dalam variasi yang berbeda untuk memberikan pembelajaran yang bermakna; media harus mempertimbangkan berbagai faktor yang dapat mempengaruhi kemampuan mereka untuk mengakses dan memperoleh manfaat dari berbagai bentuk media; media harus bermakna untuk menilai kemajuan dan prestasi siswa; dan media harus menyediakan berbagai fungsi. Spesifikasi tersebut menjadi dasar pengembangan media yang sesuai dengan kebutuhan siswa ASD.

A B S T R A C T

ASD children exhibit social functioning issues that indicate difficulty communicating with others and often do not understand why they have to have social interactions with other people. One way of helping them is to develop media based on their needs. This research aimed to analyze the specifications of the media required. The study is designed as a mixed-methods study. The data were collected using a questionnaire in the form of a survey and combined with interviews. The respondents to the survey consisted of 24 respondents from Malaysia, the Netherlands, Canada, and Indonesia, and include teachers from inclusive schools. The selection of the sample used purposive sampling techniques to ensure that they had background knowledge either in education, linguistics, or special education and were willing to be included in the research. The data were analyzed qualitatively and quantitatively. The results of the study show that the media have essential specifications that are: the media should be in the language that supports their learning; the media developed should be able to establish their purpose; the media developed should be able to provide learning support; the media should be in different variations to provide meaningful learning; the media should consider various factors that can affect their ability to access and benefit from different forms of media; the media should be meaningful for assessing students' progress and achievement; and the media should provide various functions. These specifications are the basis for developing the media based on the needs of students with ASD.

1. INTRODUCTION

Children with autism spectrum disorders (ASD) are children who experience disorders in communication and social interaction skills, being repetitive and showing a typical behaviour patterns rejecting environmental changes or changes in daily routines, and giving undue responses to sensory experiences. ASD children also show characteristics that indicate difficulty communicating with others and have basic literacy far below their age (Lane & Radesky, 2019; Padmadewi et al., 2021). The diagnosis of ASD children is increasingly common world-wide and the number of autism spectrum disorder cases in

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Indonesia is estimated to increase by 500 people every year (Arnold & Reed, 2019; Stiller & Mößle, 2018). ASD is recognized through a variety of behavioral symptoms that are different from the behavior of other neurotypical children. Autism is expressed as having disorders in mutual social communication and social interaction and the presence of limited and repetitive behaviors, interests, or activities (McCorkle, 2012; Mink, 2020; Tuononen et al., 2014). Students with autism spectrum disorder (ASD) are less likely than their neurotypical counterparts to start a conversation, respond appropriately to the turn of the conversation, and be able to understand the intent and power of illocution. Autistic children also often have difficulty understanding the emotional state of others and often have difficulty using facial expressions to show their emotions (Accardo, 2015; Cummins et al., 2020; Williamson et al., 2014). Children classified as autistic also potentially have problems with understanding. One of the systems of services provided for ASD students is to integrate them in inclusive schools. Inclusion is also concerned with equity and social justice that demonstrates acceptance and practice, respect, empathy, care, and recognition (DeMatthews et al., 2020; Ford, 2013; Frattura & Capper, 2007). The fact also shows that there is a tendency for parents to prefer and choose to enrol their children in regular schools that have inclusive education policies, even though exceptional schools known as *Sekolah Luar Biasa* (SLB) for the special need children (ABK) are available and can be utilized by parents (Padmadewi et al., 2021; Padmadewi & Artini, 2017). Inclusive education can be described as the practice of including students with disabilities along with other students in regular classes (Ainscow & Sandill, 2010; Ford, 2013). Inclusive education provides diverse activities in the regular classroom for learners in their environment.

Empirical evidence shows that inclusive education proves beneficial to ASD learners. The presence of inclusion education is able to provide meaningful contribution for students with various diversity. Previous study investigated how ASD students are integrated into regular classes. This study adds to the body of knowledge on teaching methods for ASD students that can be consulted while teaching ASD in primary settings. Likewise, other study, studied the learning of ASD students who were integrated into inclusive classes (Padmadewi & Artini, 2017). This study was also carried out qualitatively. The findings of this study provide insight into the forms of media that should be designed for ASD students' learning. In another similar vein study that analyze the characteristics of children with special needs (autism) in the inclusive education of SDN 3 Cipondoh (Nurfadhillah et al., 2021). There is study investigated the attitudes of parents of autistic students toward online learning in Yogyakarta's inclusive elementary schools (Rahim et al., 2020). This study focuses on analysing parents' attitudes toward accompanying children with ASD. The results of the studies contribute to the importance of the role of parents in being able to work together in educating children with teachers in schools.

It cannot be denied that the process of teaching and learning in inclusive education is very challenging, and interactions between normal children and students with ASD can be challenging. For that reason, intensive effort to provide teacher training with pedagogy for special education and additional supports are essentially required (Gómez-Marí et al., 2021; Yuwono & Pasani, 2020). ASD students are special, and their uniqueness requires a clear need for teachers to identify individualized approaches to help them achieve their academic goals (Accardo, 2015; Mayton et al., 2014). The main characteristic of ASD learners is they tend to be visual learners, for that reason the support in the form of visual media is essentially needed. One of the supports that can be provided is the presence of media specially designed for use of ASD children. A number of studies show significant contributions of media support to facilitate learning of ASD learners. Development of media to support learning for learners with ASD is made seamless as the mobile computing develops rapidly. Previous study use the opportunity to develop mobile application (app) which can prompt video (Kellems et al., 2018). The app was compared to use of static pictures to support learning. Irrespective of the similar results gained using both mode of media, the use of mobile app enables learners to interact with media learning anytime anywhere. Other study developed an application enabling use of digital media to support learning for ASD children (Weisblatt et al., 2019). The responses gained from the learners are positively showing that they enjoy manipulating the media. The study also shows the potentially effective use of such digital media to facilitate learning for learners with ASD. In a similar vein, the development of augmented reality application was conducted by previous study (Miningrum et al., 2021). Other implementation of digital media for elementary ASD learners also confirmed the use of digital media brings positive effect to all students (Budiarsini et al., 2018; Sari et al., 2021; Wahyuni et al., 2021; Yuniari et al., 2020). The used adapted book as the source of content of the app designed and developed for ASD learners. The study claim that the use of such augmented reality can help learners learn facial emotional expressions. The usability test performed for the app scored as high as 82.7%. In another case, media in a form of diorama is used to facilitate learning for ASD learners (Homdijah et al., 2022; Padmadewi & Artini, 2017). During the learning process, they learn, that the diorama used is able to increase learner active responses. They further claim that the use of diorama can support teacher to facilitate student with ASD learning. Instead of using artificial media, use of a real

object, school forest, is used as a learning project by (Friedman et al., 2022; Riga et al., 2020). The school forest project, they find, can improve ASD learner learning autonomy and collaboration. Additionally, use of media in a form of social story can also encourage learners with ASD to learn collaboratively. Use of conventional pictures to learn English vocabulary developed for ASD learners was investigated by previous study. They report that there is marked improvement on learner vocabulary mastery (Zohoorian et al., 2021). It is conclusively proven that use of visual media, be it digital or conventional, can potentially impact positively ASD learners with their learning. However, it should be noted that designing and developing media for ASD learners as those previous studies above show involved the hands of professionals. Teachers need to be assisted with instructional media design and development so that the media is ready at hand for them to use in the classroom. As the ASD learners are specific in characteristics, media designed and developed have to be tailored to meet the characteristics and needs of such learners. To serve such a purpose, this study is thus conducted. This study is specifically focused to collect essential comprehensive information of instructional media for ASD children in inclusive education. The collected information will become the basis in deriving the specification of instructional media, which is used as a basis for developing appropriate media for teaching ASD students. The aims of this study is to analyze the specifications of the media required.

2. METHODS

In accordance with the objectives of this study, the research design used mixed method design which combined quantitative and qualitative analysis. The quantitative design used survey in order to collect all information about the needs, and followed by qualitative technique for exploring more information (Yildirim, 2017). The research population includes schools with inclusive education that have ASD teachers in literacy, and lecturers in English literacy and linguistics, as well as English literacy learning experts that use an inclusive education paradigm. Purposive cluster sampling was used to choose the research sample under the following conditions: 1) be willing to participate in this research; and 2) have knowledge or skill in linguistics, English literacy, or English language instruction, and also experience pertaining ASD.

The survey was conducted by using a questionnaire to collect information about the needs for developing media for teaching basic literacy and communication for students with ASD. The questionnaire was in the form of Likert-type questionnaire and has been analysed in terms of its validity and reliability. The questionnaire was distributed to teachers, lecturers, and also professionals from Malaysia, Canada, and The Netherlands. There were 24 total respondents. The engagement of international professionals is critical for gathering thorough information for suitable media development. The respondents involved have different levels of education. 4.2% have an undergraduate degree, 75% have a master's degree, and 20.8% have a doctorate degree. Along with the questionnaire, the data were also collected using interviews to explore more information. The data collected from the survey were analyzed using descriptive analysis, and the data from the interviews were analyzed qualitatively.

3. RESULT AND DISCUSSION

Results

To investigate the specification of media needed to assist ASD in improving their basic literacy ability and communication skills, the data were explored from several perspectives such as from the contexts, input, process and product and compared with the current situation happening in inclusive schools.

The Media Should be in the Language which Support Their Learning

One of the specifications of the media needed can be determined from the language used. The decision about the type of language used can influence how effective the process of learning is. The data about the language used in the media is show in Figure 1. As illustrated in **Figure 1**, the media required should be in the language that best promotes their learning. The results of the survey indicate that respondents prefer to use the student's native language, with bilingual languages coming in second. The next option is English, and the final option is Bahasa Indonesia. The respondents' perceptions on the importance of using the student's language for media purposes are critical for the development of language abilities. Autistic children may experience delayed language development or trouble learning to speak. Using their first language can assist children in developing language abilities, which can benefit their general development and learning results.

Media resources which are needed should be in the languages which support their learning.
23 responses

Figure 1. The Data About the Language Used in the Media

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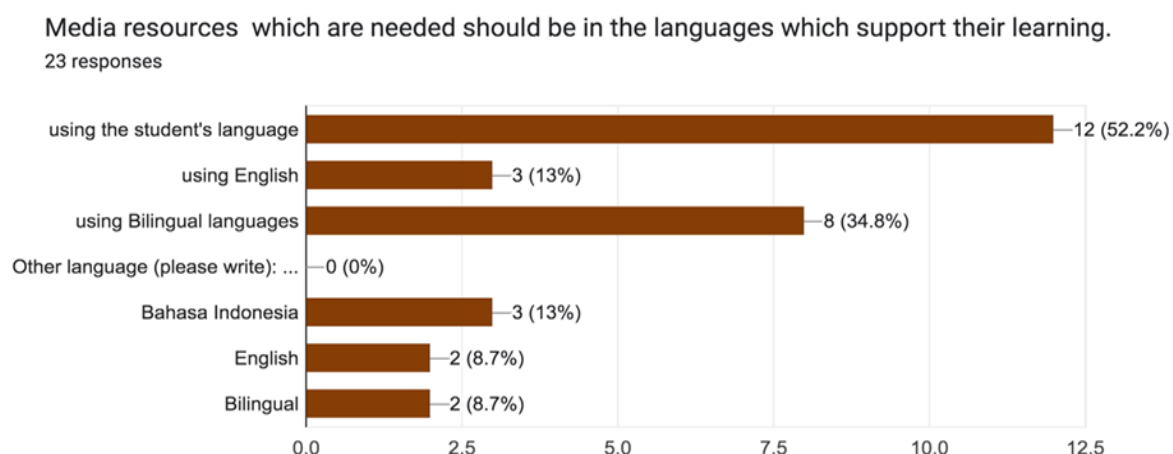
The media developed should be able to establish their purpose

The other specification of media needed for teaching ASD students about literacy and communication deals with how the media can establish the purpose of learning. The relevant use of media for achieving the purpose of learning is perceived as an essential specification of media needed for teaching ASD students. The objective of using media for teaching special needs students is to provide them with a high-quality, effective, and inclusive learning experience that meets their unique needs and abilities, and supports their academic and personal development. The specification of the media based on their purpose is show in Table 1.

Table 1. The Specification of the Media Based on their Purpose

Media specification Based on the Purposes of Developing media:	The respondents' perception			
	Absolutely agree	Agree	Less agree	Not agree at all
1.1 **Enhancing learning opportunities**: Media should provide additional learning opportunities that complement traditional teaching methods and enable ASD students to learn at their own pace and level.	66.7%	3.3%		
1.2 1. **Positive reinforcement media**: Positive reinforcement media such as games with rewards or animated characters giving positive feedback are effective for encouraging and motivating autistic children.	58.3%	1.7%		
1.3 **Encouraging participation**: Media can be used to provide interactive and engaging learning experiences that encourage participation and motivation for special needs students who may struggle with attention or focus	62.5%	7.5%		
1.4. **Providing flexibility**: Media can be used to provide flexibility and personalization in learning, allowing ASD	62.5%	7.5%		

Media specification	The respondents' perception			
Based on the Purposes of Developing media:	Absolutely agree	Agree	Less agree	Not agree at all
students to learn in a way that is most effective and comfortable for them.				
1.5 **Enhancing accessibility**: Media are used to provide accessibility features such as closed captioning, audio descriptions, and other accommodations that can make learning materials more accessible for ASD students.	54.2%	5.8%	‹	

All respondents, as shown in Table 1, believed that media development was necessary in order to achieve their goals. The five aims listed in Table 1 are all seen as necessary goals to give students a high-quality, successful, and inclusive learning experience that matches their individual needs and skills and promotes both their academic and personal growth.

Media developed should be able to provide learning support

In addition to the previously mentioned specifications, the media produced for teaching ASD students should be capable of providing learning support. The specification of the media based on meaningful learning support provided is show in Table 2.

Table 2. The Specification of the Media Based on Meaningful Learning Support Provided

Media specification	The respondents' perception			
	Absolutely agree	Agree	Less agree	Not agree at all
1.7 Selecting media resources for ASD students should take into account cultural and linguistic considerations and how can we ensure that all students feel represented and included.	62.5%	37.5%		
1.8 Language support through the media for ASD students should consider the level of their understanding.	66.7%	33.3%		
1.9 The media for ASD students stimulate activities which can promote communication and interaction.	62.5%	33.3%	0.02%	
1.10 Media resources support the efforts to promote multilingualism and language development.	52.2%	47.8%		
1.11 Media resources should be accessible and inclusive for students with diverse language backgrounds, including those with limited proficiency in the primary language of instruction.	41.7%	58.3%		

As shown in Table 2, nearly all respondents agree that developing instructional media should take into account students' cultural and linguistic differences, provide support for language development to assist students in their interactions and communications, and be accessible to all students, regardless of proficiency level. There are 0.02% fewer respondents who think that the media inspires activities that can increase communication and interactions for ASD students. Further investigation reveals that the respondents' concern is centred on the fact that ASD children may face serious difficulties in their capacity to communicate and engage, necessitating a significant amount of work to assist them in being able to interact and communicate.

The media should be in different variations to provide meaningful learning

The survey results also address the necessity of creating various types of instructional media that can be adapted to the characteristics of the ASD students. Table 3 contains more specific facts.

Table 3. The Specification of the Media Based on its Types

	The respondents' perception			
	Absolutely agree	Agree	Less agree	Not agree at all
1.12 The type of media needed for autistic children will depend on their individual needs and preferences. However, some types of media have been found to be effective for teaching and assessing autistic children.				
1. **Visual supports**: Visual supports such as pictures, symbols, and videos can be very effective for teaching autistic children, as they often have strong visual learning preferences.	75%	25%		
2. **Social stories**: Social stories are short narratives that describe social situations in a structured and predictable way. They can help autistic children to understand social norms and expectations.	62.5%	37.5%		
3. **Interactive media**: Interactive media such as touchscreens, games, and simulations can be effective for teaching and assessing autistic children, as they can provide a more engaging and stimulating learning experience	62.5%	37.5%		
4. **Assistive technologies**: Assistive technologies such as text-to-speech, closed captions, and speech recognition can help to make media more accessible to autistic children with different abilities	41.7%	54.2%	4.1%	
5. **Positive reinforcement media**: Positive reinforcement media such as games with rewards or animated characters giving positive feedback can be effective for encouraging and motivating autistic children.	56.5	43.5%		

As shown in Table 3, there are five types of media that have been agreed upon for teaching ASD students fundamental literacy and communication. 4.1% of respondents did not quite agree with the need for assistive technologies. Further investigation using interviews revealed that the respondents' concerns revolved around the role of technology in replacing teachers. Further discussions eventually lead the respondents to completely agree that technology-based media is required as long as it never replaces the position of a teacher in their instruction.

The media should consider various factors that can affect their ability to access and benefit from different forms of media

The results of the survey show that the media needed should consider the special characteristics of the ASD students in order to provide them with the best learning environment possible. Detailed data about this is shown in Table 4.

Table 4. The Specification of the Media Based on the Process Of Implementaion

PROCESS	The respondents' perception			
	Absolutely agree	Agree	Less agree	Not agree at all
1.13.1 Media content should be in line with the characteristics of ASD and are accessible and tailored to their specific needs.	58.3%	41.7%		
1.13.2 The use of media can provide opportunities for special needs children to learn, communicate, and engage with others.	45.8%	54.2%		

PROCESS	The respondents' perception			
	Absolutely agree	Agree	Less agree	Not agree at all
1.13.3 Media should be a valuable tool for promoting social inclusion and improving the quality of life for ASD children.	54.2%	41.7%	4.1%	
1.13.4 Media can be used to enhance the learning experience of special needs children, but it is important to balance the use of technology with other forms of interaction and communication, such as face-to-face interactions and hands-on activities.	79.2%	20.8%		
1.13.5 The media used consider the potential risks associated with the use of media for special needs children, such as cyberbullying, inappropriate content, and overuse of technology, and to implement measures to mitigate these risks.	58.3%	37.5%		

Table 4 indicates that the media required for teaching ASD students must be adapted to the students' characteristics, either in terms of media content or the use of the media by ASD students to learn, communicate, and engage with others; the importance of balancing the use of technology and other forms of interaction; and the potential risks associated with the use of media. 4.1% of respondents, however, do not quite agree on the use of media to promote social inclusion and improve the quality of life for children with ASD.

The media should be meaningful for assessing students' progress/achievement

Another important specification of the media is the need to have media that are essential for assessment. The use of media for assessment is important to develop as a tool of assessment that deals with assessment as learning, of learning, or for learning. The specification of the media based on the need for assessment is show in Table 5.

Table 5. The Specification of the Media Based on the Need for Assessment

[1] [3]	[2] [4] Absolutely agree	The respondents' perception			
		[5] Agree	[6] Less agree	[7] Not agree at all	
[8] 1.14.1 Clear and concise: Media for assessment of autistic children should use simple and clear language, with concise instructions and explanations to avoid confusion and anxiety.	[9] 70.8%	[10] 29.2%	[11]	[12]	
1.14.2 Visual aids: Visual aids, such as images, graphics, and videos, should be used to support the learning of autistic children and to provide additional context and understanding. [13]	[14] 75%	[15] 25%	[16]	[17]	
[18] 1.14.3 Interactive: Interactive media, such as touchscreens, quizzes, and games, can help to engage autistic children and provide a more immersive and stimulating learning	[19] 62.5%	[20] 33.3%	[21] 4.2%	[22]	

[1] [3]	[2] The respondents' perception							
	[4] Absolutel y agree		[5] Agre e		[6] Less agree		[7] No t agree at all	
experience.								
1.14.4 Personalized: Media for assessment of autistic children should be personalized to their individual needs and preferences, with options for customization, such as font size, color contrast, and audio narration. [23]	[24]	70.8%	[25]	29.2 %	[26]		[27]	
1.14.5 Accessible: Media for assessment of autistic children should be designed to be accessible to children with different abilities, with options for assistive technologies [28]	[29]	54.2%	[30]	45.8 %	[31]		[32]	
[33] 1.14.6 Sensory-friendly: Media for assessment of autistic children should be designed to be sensory-friendly, with considerations for factors such as sound volume, color contrast, and visual distractions.	[34]	62.5%	[35]	37.5 %	[36]		[37]	
1.14.7 Positive reinforcement: Media for assessment of autistic children should include positive reinforcement, such as rewards and praise, to help motivate and encourage their learning.	[38]	66.7%	[39]	33.3 %	[40]		[41]	
[42] 1.14.8 Collaborative: Media for assessment of autistic children should facilitate collaboration and communication between educators, parents, and professionals to ensure that the assessment is effective and appropriate for the child's individual needs.	[43]	75%	[44]	25%	[45]		[46]	

Base on Table 5, in order for the media to function for assessing the process of teaching and learning and the abilities of the ASD students, the media should have clear and concise language, include visual aids, accelerate interactions, encourage collaboration, be personalized, accessible, sensory-friendly, and provide positive reinforcement. Almost all respondents are in agreement on these points, except for 4.2 percent who do not quite agree on the interactive features, which are technology-based.

The media should provide various functions

The survey reveals the other important requirement for instructional media, namely that the media should be able to establish diverse functions that accelerate obvious learning outcomes. Detailed data about this is presented in Table 6.

Table 6. The Specification of the Media Based on Their Various Function

| Media specification based on the aspects of OUTPUT/PRODUCT | The respondents' perception | | | |
	Absolutely agree	Agree	Less agree	Not agree at all
1.15 Improved learning outcomes: Media should provide engaging and interactive learning experiences that can help ASD children to better understand and retain information.	66.7%	33.3%		
1.16 Increased communication and social skills: Media can be used to create social stories, communication devices, and other tools that can help special needs children to improve their communication and social skills.	58.3%	33.3%	8.3%	
1.17 Increased independence: Media should be used to create assistive technology tools, such as text-to-speech software and speech recognition, that can help special needs children to become more independent in their learning and communication.	50%	37.5%	12.5%	
1.18 Improved behavior and emotional regulation: Media can be used to create calming videos, sensory tools, and behavior management tools that can help special needs children to regulate their behavior and emotions.	50%	45.8%	4.2%	
1.19 Improved access to education: Media can provide special needs children with access to educational resources and tools that might not otherwise be available to them due to physical or other limitations.	47.8%	47.8%	4.4%	
1.20 Improved inclusion and integration: Media can be used to create inclusive learning environments that foster the integration of special needs children into mainstream education settings.	54.2%	33.3%	12.5%	
1.21 Improved support for parents and educators: Media can provide parents and educators with the training, resources, and support they need to effectively work with special needs children.	66.7%	29.2%	4.1%	

There are seven statements about various functions pertaining to the instructional media that need to be developed. Table 6 shows positive responses about the media's ability to provide various functions, despite the few respondents who are less agreeing on the aspects of independence, communication and social skills, emotional regulation, improved access to education, improved integration, and improved support to parents and educators. Further deep interviews with the respondents reveal that the concern is based on the serious commitment needed not only for teachers but also on other important factors like the role of parents and the supports provided by the schools involved. In spite of these doubt perceptions, the efforts manifested in the media will obviously be believed to provide improvements and meaningful support and guidance for ASD students to make their process of teaching and learning more fun and not monotonous. More information about the issues which must be taken into consideration is provided in Table 7.

Table 7. Issues Taken into Account When Creating Media to Support Basic Literacy Learning for Children with ASD

[47] Questions	[48]Responses
Please briefly describe any other details on issues that must be taken into account when creating media needed in learning basic literacy for children with ASD! [49]	— Be predictable all the time. First explain, check the understanding, then let them do the exercise. There always will be the need for a real human (teacher, parent) presence and assistance. Be literal in the word usage.
	— The basic problems of children with ASD are communication and socialization. This means that the media developed for learning basic literacy must give children the opportunity to always interact and try to communicate gradually, and provide opportunities for socialization. The media built must be also integrated with activities that provide stimulus for their limitations such as lack of focus, etc.
	— Since media for teaching students with special needs especially ASD has not been given enough attention yet in Indonesia, the development of such media becomes an urgency. The developed media for ASD students should not only accommodate the students' need, but also help the teacher to use it. Thus, the developed media should come with module or explanation on how to use it, and also user friendly both for teachers and students
	— The efficiency of the use of media needs to be considered on the children needs
	— When creating media for children with ASD to learn basic literacy, it's important to use visual aids, create sensory-friendly content, use clear language, maintain consistency, and tailor the content to each child's individual needs and preferences.
	— Clarity and consistency; Children with ASD may have difficulty with abstract concepts and may struggle to understand new or unfamiliar vocabulary. Media should use clear and simple language, and provide consistent and predictable feedback.
	— I think it is important to make sure that the media should support the students to engage in social interaction and real world experience.
	— Media should be close to the students' culture and contain art (music, dance, vocal) that can provide them with something that makes them more excited
	— The media that Will be developed should be user-friendly

The data in Table 7 confirms the need for media for students with ASD and also provides further clarification about the specification of the media required.

Discussion

Media is important in the process of teaching and learning. The analysis of the needs for instructional media for teaching ASD students has reconfirmed the importance of having media for teaching basic literacy and communications for students with ASD. The specification of the instructional media needed is a reference on how the media should be developed in order to reach its fullest potential benefits. Classroom teaching media are appropriate for activating ideas, making difficult subjects more understandable, and maintaining focus on crucial ideas (Al Mamun et al., 2022; Ordu, 2021). The media, as the findings show, should also be in different types tailored to the different characteristics of the ASD students. Visual support is a crucial tool for supporting students with ASD. The visualization of abstract information can help students better understand information, communicate more effectively, reduce anxiety, and enhance social skills. Teachers and caregivers should use visual support as a regular part of their instructional and support strategies to help students with ASD reach their full potential. This is in line with previous study that state some autistic children have higher visual-perceptual talents than language and prefer to process information visually, making digital media even more enticing and intuitive to them (Lane & Radesky, 2019). Media can be an effective tool for teaching social skills to students with ASD. The need for having media for teaching social skills is reconfirmed by study who states that media is an essential educational tool for adolescents and young adults in general, but for those with

ASD, it gives a unique opportunity to learn social skills. For instance, media can provide social scripts, video modelling, and social stories that can help students learn how to communicate, engage in conversations, and interact with others. Media can also be used to improve communication skills in students with ASD. When teaching social skills to adolescents and young people with ASD, using media can help recognize communication patterns, interpersonal interactions, and nonverbal communication (Kiggins, 2020; Sahin et al., 2018). Additionally, providing media in the students' native language can enhance their learning experience, increase engagement, and promote inclusivity and cultural relevance. It is essential to ensure that all students have access to media in their native language to support their academic and personal development. Autistic children often feel more comfortable and secure when communicating in their first language. Using their native language can help reduce anxiety and confusion, which can lead to better learning outcomes (Payant, 2014; Wardani & Mundilarto, 2021). The use of the students' language can make students more convenient in acquiring the language for improving their basic literacy and communication. Autistic children may have difficulty understanding complex concepts or abstract ideas. Using their first language can help ensure that they fully understand what is being taught. Students with ASD have difficulties in their basic literacy and also communication.

The use of the language in the media use must not make the burden and difficulties of the students even bigger. For that reason, it is believed that the language used in the media should be in their native language. Students who learn in their native language are more likely to feel confident and comfortable expressing themselves, participating in discussions, and asking questions (Derakhshan & Hasanabbasi, 2015; Kovács, 2018). This can lead to improved communication skills, increased self-esteem, and a positive attitude towards learning. When students learn in their native language, they are more likely to comprehend the information better. It is easier to understand complex concepts and ideas when presented in a language that student are fluent in and comfortable with. This is in line with the theory of acquired system. According to previous study there are two independent systems of second language performance: 'the acquired system' and 'the learned system' (Friedman et al., 2022). The 'acquired system' or 'acquisition' is the product of a subconscious process very similar to the process children undergo when they acquire their first language. It requires meaningful interaction in the target language - natural communication - in which speakers are concentrated not in the form of their utterances, but in the communicative act. With the language they are familiar with, the focus will be on the content of the instruction the natural communication. When students can understand the media content, they are more likely to engage with it, which can improve their motivation and interest in learning. This can lead to more positive learning experiences, higher retention of information, and a deeper understanding of the subject matter. Media in the students' native language can also provide cultural relevance, helping students connect with the content and better understand the context. This can lead to a deeper appreciation and respect for their culture and language, and also used as a reference for diagnosis. This is in line with sftudy who emphasize the role of culture in teaching students with ASD (Bernier et al., 2010). It is important to focus on both macrolevel cultural factors—factors at the dominant culture level that affect the people in that society and microlevel factors—factors at the family level that affect response to diagnosis or treatment choice. Both can play a role in the course and outcome of an individual with ASD. They also state that one of the core problems of ASD is reciprocal social interaction. As a result, differences in cultural beliefs about appropriate social behaviour can affect the accurate diagnosis of ASD. Providing media in the students' native language with relevant culture can also promote inclusivity and equity in the classroom, making all students feel valued and included. This can help create a welcoming and supportive learning environment.

The study about the use of screen media for students with ASD has been the focus of many researches. Several studies concordantly showed screen media as being a preferred leisure activity for children and youths with ASD, and reported mixed evidence compared to children without ASD (Sahin et al., 2018; Stiller & Mößle, 2018). One of the screen media can be in the form interactive media. Interactive media is particularly important for students with ASD because it can provide a range of benefits that support their learning and development, such as: Interactive media can provide immediate feedback, which is particularly important for students with ASD who may struggle with delayed gratification. Immediate feedback can reinforce positive behaviors and provide students with a sense of accomplishment. Interactive media can be designed to promote social skill development by providing opportunities for students with ASD to practice social interactions and communication in a safe and structured environment. Interactive media can provide a multi-sensory learning experience, which is particularly beneficial for students with ASD who may have sensory processing difficulties. Interactive media can incorporate a range of sensory experiences, such as visual, auditory, and tactile, to support learning (Lane & Radesky, 2019; Stiller & Mößle, 2018). Educational apps and programs can assist students in learning and practicing communication skills, such as expressing emotions, initiating

conversations, and responding to questions. Media can provide a platform for students with ASD to practice self-regulation skills such as self-monitoring, self-reflection, and self-correction. Media can also provide sensory experiences that can help students regulate their sensory needs. Many students with ASD have special interests, and media can be used to incorporate these interests into learning, making it more motivating and engaging for them. Media can be a powerful tool for teaching students with ASD, as it provides various benefits that can support their learning, communication, social skills, and self-regulation (Homdijah et al., 2022; Sahin et al., 2018). However, it's crucial to ensure that the media is age-appropriate, engaging, and accessible for students with ASD. Media can support not only the process of teaching and learning but also the assessment of students' progress and understanding. Media can be a valuable tool for teachers when teaching students with ASD. Visual support, such as pictures, videos, and diagrams, can help students with ASD better understand complex concepts and instructions. Media can be used to provide visual support and enhance comprehension (Padmadewi & Artini, 2017; Sahin et al., 2018). Many students with ASD struggle with communication, making it difficult for them to participate in classroom discussions or ask questions. Media, such as social stories or interactive software, can provide a way for students with ASD to communicate with their teacher and peers. Media can be used to personalize learning for students with ASD, tailoring instruction to meet their unique needs and abilities. Many students with ASD struggle with organization and information processing. Media can be used to provide access to information in a way that is more organized and structured, making it easier for students with ASD to understand and retain information. The use of media can be individualized as a way of assessing the ASD students' strength and progress (Padmadewi & Artini, 2017; Sahin et al., 2018). Assessment of autistic children and young people need to be personalised and relies on careful observation and identification of areas of interest and ability as well as skills that need further development. Assessment is best carried out across a range of environments and with information collected from different sources, including parents and specialists. Flexible systems need to be in place for recording and reporting on individual progress and outcomes.

Media can provide a more accurate assessment of student progress and understanding than traditional assessment methods, as they can capture a range of data, such as response times, errors, and feedback. Additionally, media can provide immediate feedback on assessments, allowing teachers to quickly identify areas where students may need additional support or instruction (Onas et al., 2022; Padmadewi & Artini, 2017). Further, Use of media can reduce bias in assessment, particularly for students with ASD who may struggle with traditional assessment methods. Finally, media can provide a standardized assessment experience, reducing the impact of factors such as anxiety or communication difficulties. The study was limited to an analysis of the media needed for basic literacy and communicationnts with ASD have a developmental disorder that affects communication, social interaction, and behavior. For that reason, media needed to be developed as their learning support. There are several specifications of the media as a result of need analysis, such as: the media should be in the language that supports their learning; the media developed should be able to establish their purpose; the media developed should be able to provide learning support; the media should be in different variations to provide meaningful learning; the media should consider various factors that can affect their ability to access and benefit from different forms of media; the media should be meaningful for assessing students' progress and achievement; and the media should provide various functions. The characteristics of the media that resulted from this research are used as references for developing media for students with ASD. The study was limited to an analysis of the media needed for basic literacy and communication. Further analysis is recommended to investigate the media needed for teaching other subjects.

4. CONCLUSION

Media is highly needed for students with ASD to teach basic literacy and communication. Students with ASD have a developmental disorder that affects communication, social interaction, and behavior. For that reason, media needed to be developed as their learning support. There are several specifications of the media as a result of need analysis, such as: the media should be in the language that supports their learning; the media developed should be able to establish their purpose; the media developed should be able to provide learning support; the media should be in different variations to provide meaningful learning; the media should consider various factors that can affect their ability to access and benefit from different forms of media; the media should be meaningful for assessing students' progress and achievement; and the media should provide various functions. The characteristics of the media that resulted from this research are used as references for developing media for students with ASD.

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