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Exploring Home-Based Learning by Using Mobile for Children with Autism During COVID -19 Pandemic

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Abstract

Educating children with autism is a big responsibility for special education teachers and parents. Since the Covid-19 pandemic hit Malaysia, the learning approach has been shifted to virtual learning. The use of education technology has gained state-of-the-art research interest in children with autism, especially in the context of mobile learning. This study will examine how mobile learning could assist children with autism in coping with their daily routine study during the pandemic era. Instructors, teachers, and parents of children with autism may find the findings useful as one of their references in determining their teaching aids and strategies.

Keywords: Education Technology, Children with Autism, Pandemic Covid-19, PdPR.

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1.0 Introduction

Children are the greatest treasure of each nation and nation building development demands significant growth of human resources from an early age. For this to happen, proper education and care must be made as the foundation. Emphasis must also be placed on nurturing every child to assist the nation to develop adequately. In light of the phenomenal rise of Autism Spectrum Disorder (ASD) globally, the Malaysian government has revealed the complete early intervention system where it is a state-of-the-art research force to transform the understanding of ASD among Malaysians. In Malaysia, ASD is becoming increasingly common in schools and society. Currently in Malaysia, there is no accurate data available on the prevalence of children with autism. However, a smaller scale research by the Ministry of Health (MoH), Malaysia on the children with autism between the age of 18 to 36 months has shown a rate of 1 in 625 children is a child with ASD. The significant total of number toward children revetment learning problems is currently a documented phenomenon worldwide, with countries around the world giving more importance to address this issue. Malaysia is also no exception to this trend, where the number of children enrolled in special needs programs has more than doubled between 2013 and 2018. Given the far-reaching implementations of this trend on the country's education system, health, economy and society, a deeper understanding of these issues is vital. The dissemination of pandemic COVID-19 has created an enormous fear throughout the world. Various measures have been taken to curb the spread of Coronavirus disease. In response to the pandemic, the government has imposed wide scale social restrictions

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to the whole state of Malaysia. Education institutions such as the schools, higher education institutions, and other educational institutions were asked to close down. The main factor in the implementation of education policy, the physical and mental health of each student, teachers as well as all school members need to be considered. (Gersons et al., 2020 and Zahro, 2020). According to the Deputy Director General of Health Malaysia, in the star online 2021, the pandemic and social restriction have already been shown to impact mental health as well as every aspect of individuals life. This situation also indirectly affects children with autism and their families, as well as autism clinical services and research development.

Educating the children with autism requires a whole lot of compassion as well as effective strategies by educators, parents, caregivers and other professionals, whereby there are no single approaches successful for all children. Beside using the current learning approach to educate these children, there might be a chance to boost educational as well as social and communication skills by utilising technology know-how. Schools serve a variety of essential purposes such as improving interaction, fostering social skill repertoires as well as establishing intellectual attitude. For children with autism, schools may be the only place to gather academic experiences, evidence-based training and social interaction. According to Roitsch, et al., 2021, even though there are a lot of advantages in schools such as an inclusive classroom, the children with autism do struggle due to challenges in social cognition. Macintosh and Dissanayake (2006) as well as Cook, Anna, and Jane Ogden (2021), however, found the children with autism were likely to have behavioural difficulties in school such as internalising behaviour and self-control. However, policy makers emphasise that school closure does not mean learning and teaching will come to an end. They affirm the appropriate solution of maintaining classrooms from home by remotely using the advancement of Industrial Revolution 4.0 and the Information Communication Technologies (ICT).

Digital computer technology has become a trend and serves a big purpose in today's life among individuals. Thus, digital computer technology has extended its use to a digital assistant not just to make life easy but also to foster learning. Due to the economical price, the said technology has intensely changed how service providers deliver educational services to all individuals and this also includes children with autism. From touch screen phones to tablet devices, mobile computing instruments or assistive learning technology have never been more practical and user friendly. According to Waite, et al., (2021), currently most children's increasing use of technology has implications for both educational and communicational practices because it is now a predominant environmental factor in their lives. Using devices like smartphones or any other handheld devices are useful tools due to their light weight and multipurpose. Besides, the assistive learning technology offers scope to play, explore, a highly controllable environment and it need not make any verbal demands. By using the said technology as intervention for children with autism, it could increase the integrated cognitive component which scaffolds learning. Hence, effective pedagogical agents and peer directed learning groups are all influenced by the ability of the assistive learning technology to create an educational context for total inclusive learning environment (Muhamad Fairus, et al., 2016a).

The use of assistive learning technology permits the development of skills in highly standardised, predictable and control environments while simultaneously allowing children with autism to work at their own pace (Muhamad Fairus, et al., 2016b). These features may be beneficial to children with autism, which often experience discomfort with unpredictable social environments. Given the top priority of technologies such as Mobiles, Augmented reality, Virtual reality and Artificial intelligence in teaching and learning, without exception, the Malaysia learning context needs to be prepared to accept the modern era of learning mechanism. Since online education suddenly becomes the centre of attention all over the world during the COVID-19 pandemic, the use of technology know-how not only can assist all school children, but it can correlate, motivate, and magnetise the children especially when they have a tough time to comprehend the subjects that is being taught through online. This study will examine how mobile based visual learning could possibly assist the children with autism to cope with their daily routine study during the pandemic time. The Ministry of Education (MoE), Malaysia has instructed all schools, higher education, and other educational institutions to establish home-based teaching and learning (PdPR) sessions starting on 8th November 2020. It is a day that all children including children with autism must start their learning activities.

2.0 Children with Autism Spectrum Disorder (ASD)

At present, children with autism are diagnosed based on a combination of behavioural characteristics of impairment in verbal and nonverbal communication skills and social interaction. Children with autism also do not follow the normal patterns of typical children's development. Having a child with autism is a challenge for any family. To raise a child with autism is a prodigious task. The parents of these children need full commitment and support from the education and healthcare system, as well as the family and society as a whole. The family's participation, especially in the education of children with autism, can arise at various levels. Family members or parents can learn to apply skills successfully to change and develop their children's behaviour. They also need to plan for their children's long-term well-being. Parents may use effective teaching methods, support from within the family and the community, and access to balanced information about ASD and the range of appropriate services can contribute to successful child and family functioning. It is crucially important to make information available to parents to ensure their active role in advocacy for their children's education environment. It is also significant to note that, the involvement of each family member should be supported in the upbringing through the consistent presentation of information by special school systems, through autism experts, researchers as well as through learning new skills for teaching their children with new skills and reducing behavioural problems. Even though families should not be expected to cater all the educational settings for their children with autism, the parents' concerns and perspectives should actively support in shaping the educational planning.

2.1 Education and Mobile Technology

Educators, parents and other professionals need effective strategies, procedures for positive behaviour support, technologies and evidence-based intervention that are useful for children with autism. Currently, there are no single approaches for teaching children with

autism successfully for all children. Each child requires a certain exclusive approach targeting specific needs of the children. According to Genius Kurnia (2021), appropriate interventions can lead to positive outcomes by making changes in the children's environment, adjusting how others interact with the child, improving functioning, and teaching new skills. Educational intervention for autism is practised with the support of Individual Educational Plan (RPI). RPI is a program that has been designed for Special School Curriculum by MoE for the use of special education children. RPI programs vary from each subject including the level of understanding of each child.

Most children with autism receive multiple interventions from various kinds of providers with specific goals. Educational intervention can reduce symptoms of autism while increasing children with autism's independence, wellbeing as well as improving the quality of life. It is a continuous and ongoing process that begins with assessment for intervention planning (Genius Kurnia, 2021). In any intervention, there are three basic steps to consider throughout the intervention. These steps are 1) conduct assessment, 2) develop an intervention plan, and 3) monitor the progress of the intervention programme. Over time, additional assessment and revisions to the intervention plan are included as necessary. The goals of most autism interventions are to improve core deficits in social communication and social interactions while minimising the impact of restricted behaviours, with an aim to help the children to develop functional skills and independence. According to Waite, Sue et. al (2021), to produce a holistic child is not an easy task whereby education is important to nation building as it produces children with a building block for every child that is finally shaping the nation's economic growth. Education that is up to date and significant may be seen as one of the revolutions organised and prepared by MoE. Accommodating the children with autism sensitivities can make the teaching and learning experience more positive. Looking at the pandemic scenario, the children with autism will be utilising the technology know-how on accommodating their daily learning activities.

Kamaruzaman et al., (2016b) stated that the technology advancement is continuously changing and evolving school's pedagogical approaches. This includes the setting of learning and teaching methods. Technology gives the opportunity to monitor children's status and offers adaptability, safety, and accuracy of the information. The development of mobile learning applications, virtual reality and robots have shown a positive impact reflected in the performance of daily activities and a better understanding of how these children with autism feel, how to behave, how to express themselves, interact with others and it need not make any verbal demands. The affordability and portability of technology have increased interest in its use as an intervention tool for children with autism. Technology tools coupled with visual communication designs are eye-catching. They support the principles of Universal Design by providing multiple and flexible methods of presentation for learning, providing manifold and flexible methods of expression for engagement in learning. The universal design focuses on the variability of children with autism. It allows multiple representations of content, material and supports different learning needs. Technology tools have created more options for intervention planning. The driving educational belief, as knowledge and practice, is that by bringing ideas to life in design, hence with decent technology infrastructure it will acclimatise the lifelong learning for these children. According to Osos, et al., (2020), visual aid has long been established as an operative tool to assist children with autism to communicate and learn more without difficulty. The fact that children with autism would depend on their parents, caregivers, and instructors to perform a task is undeniable. Often, children with autism are recognised for their difficulty in understanding, recalling, and using verbal information. According to Temple Grandin and Kate Duffy (2008) many children with autism are visual oriented, thus many scholars have taken the initiatives in creating the content development based on visual schedule modules to assist the teaching and learning.

3.0 New Way of Learning

Distance education has been used extensively in advanced countries. It can be defined as education guided by institutions or schools, where the teacher, instructor and students are physically separated, and interactive communication systems are used to transport related information between teacher students. The conventional learning approach that has been used normally by the children with autism has been changed to home-based teaching and learning (PdPR). Established by MoE due to Pandemic COVID-19. It forms a new paradigm of teaching and learning not only for the children with autism but also towards special education teachers and instructors. The PdPR which at the early stage seems to be very demanding for all parties due to the new routine of learning seems to be more adaptable as times goes by. It takes up to four weeks for children with autism to gist and blend properly to the new way of learning (Nasom, 2021).

At present, most Malaysian special education teachers and instructors have opted for technology such as mobile, tablet and laptop to carry out the PdPR session. According to two instructors from Ideas Autism Centre, Rawang, Selangor, Malaysia, their daily routine before commencing the PdPR, requires them to organise and prepare various segments of learning experiences to accommodate different types of children with autism needs. This also includes the high functioning as well as low functioning children with autism. Besides that, the instructors also need to snapshot or record all the visual teaching aids by using a smartphone before they can upload it to Google Drive or attach it in the real time during the PdPR session. This process will continue day-to-day until the education syllabus comes to an end.

During the PdPR session, the teachers or instructors continuously need the parents' cooperation and commitment to assist their children's learning activity. Normally, the instructor will initially explain to the parents regarding the subject matter. It will take roughly around five minutes. RPI form also will be given to the parents to validate their child performance after the class session comes to an end. Children with autism will need special attention and a special goal when it comes to their education. According to one of the children with autism parents', during PdPR, she will be guiding and supervising her child according to the special education teacher instruction. Nevertheless, by using the RPI structure, she could determine the degree level of her child education performance. Besides, she also admits being a parent during this pandemic era, she needs to be familiar on how to utilise the technology know-how, as PdPR use the online platform. Given the paramount importance of technologies such as tablets and mobiles technologies in learning and education,

without exception, the Malaysia learning context needs to be prepared to accept the modern learning technology, for instance, mobile learning.

PdPR should provide enjoyable, meaningful and suitable learning experiences for typical as well as children with autism. Hence, MoE personally has opted various platforms of virtual learning such as Google Classroom, Google Meet, DELIMA, Cikgootube, eBooks, e gamification, and Microsoft Team for the optimum learning outcome. It is up to the special education teacher and instructor to choose either one of the said platforms to deliver the learning activity. The main reason behind it is to avoid confusions among children with autism. In order to measure every child's understanding, besides RPI the special education teacher needs to fill up an online form in MoE website (figure 1) to validate every aspect of teaching and learning. This procedure will take place before the new chapter will be introduced.

Figure 1: PdPR online form that need to be filled up by special education teacher
(Source: <https://www.moe.gov.my/pendidikan/khas>)

Instructors constantly provide freedom of flexibility to the children with autism as well as their parents to make sure all the relevant knowledge in the PdPR session reaches their children thoroughly. According to Ideas Autism Centre's instructor, before commencing the PdPR session, they will usually inquire the children's parents to ensure their child is all set physically. This is to ensure the learning session will be delivered without any significant obstacles such as tantrums, meltdown, etc. Time management is also crucial during this learning session as not all children with autism would have the same cognitive load intensity (Nasom, 2021). Due to this, each learning session will be no more than thirty minutes. PPR activities may vary between all children with autism, including their conditions on that particular day of learning and gaps in accessing learning facilities at home. This learning approach has been supported by Nasom as a new norm to children with an autism learning environment during Pandemic Covid-19.

Table 1: Parents with children ASD

Number of Parent	Knowledge Know-how	Technology Used in PPR	Type of Children with Autism	Location
Parent A	<ul style="list-style-type: none"> Visual Schedule Visual Strategy 	Smartphone / Tablet	Mild	Saujana Utama, Selangor
Parent B	<ul style="list-style-type: none"> Visual Schedule 	Smartphone / Laptop	Mild	Denai Alam, Selangor
Parent C	<ul style="list-style-type: none"> Visual Schedule Visual Strategy 	Smartphone	Mild	Seksyen 7, Shah Alam, Selangor

Table 2: Teaching and learning approach used for teaching children with autism during PPR

PPR	Contains	Teaching Aids
Induction / Stimulation Encouragement	Ideas	Actual Images
	Technique	Vibrant Colour
	Activities	Computer Graphics
	Example	Clarity
		Simplicity

Note: The stimulation encouragement approach is still applied during PdPR for children with autism. It comprises inspiration, the motivation of ideas, technique, activities and a set of examples. The teaching and learning process will also utilise the teaching aids to extemporise the learning ability to hold the attention of children with autism. This activity needs to be assisted by parents.

Due to the pandemic situation, this study has opted for a virtual discussion with three parents willing to share their experiences while assisting their children with autism throughout the PdPR session. The demographic segmentation of children with autisms' parents is displayed in Table 1. The discussion was distributed into categories which are 1) Biographical information, 2) Knowledge on assisting learning toward children with autism, and 3) The use of technology know-how in during the PPR. The local Research Ethics Committee also approved this study, UiTM (REC/04/2021 (MR/290)) to ensure that all procedures have been followed accordingly.

Table 2 shows the current approach used in PdPR teaching and learning for children with autism. It comprises stimulation encouragement, creative concept and supporting materials in order to attract children with autism enthusiasm. According to all parents, the special education teacher and the instructor will inform and brief them on the whole learning structure for that day. Prior to that, all special education teachers must prepare the primary activity attractively, creatively, and vibrantly. This is supported by the philosophy of a particular education curriculum which is an ongoing effort to foster the best possible development for every child. In the context of special education in Malaysia, it emphasises the cognitive skills, functional skills, and achievement of every child with autism towards having a better quality of life in time to come. This includes ability to learn, soft skills, self-reliance and responsiveness (Bryant, Bryant, & Smith, 2016).

4.0 Results

Teaching children with autism is not an easy task. However, it is delightful for special education teachers who are passionate. Teaching children with autism requires teachers to have various teaching aids and strategies. It is to determine the effectiveness of the teaching and learning process. It is believed that the result from the research study above indicates that children with autism are captivated with the visual images. This in turn would reconnoitre their idealistic conception beyond the logical perception and attain their learning interests to achieve self-reliance and self-independence. Besides, the teaching and learning during the PdPR session are using handheld devices such as mobile and tablet. The special education teachers still need to show an example by explaining the complete process due to the cognitive constraints of children with autism. Figure 2, demonstrates that children with autism control the instrument, gestures, emotions, communication, and consistency during the PPR.

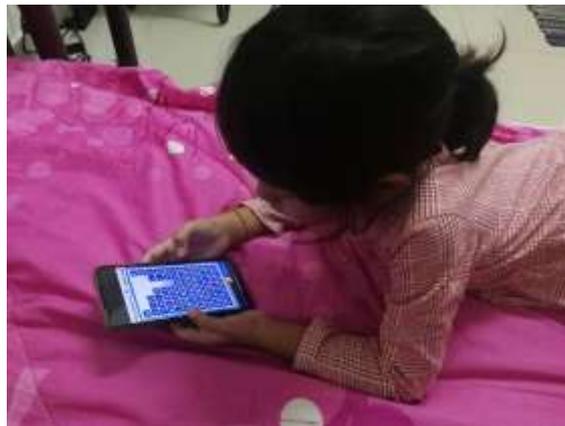


Figure 1: One of the children with autism interacting
(Source: Parent personal collection)

5.0 Conclusion

Children with autism have various challenges and need an impressive framework of support that should begin in their formative years. With an early intervention, outcomes are better. Challenges attending to one aspect of a situation, cognitive inflexibility and over selectivity require additional support. Learning environments can be complex due to this challenge. Structuring the instructional environment with predictable schedules, having knowledgeable teachers who are well versed with autism and having experience with different kinds of learners in the Autism Spectrum are critical elements that foster children's success. A variety of forms of technology can be used to assist and foster learning. Assistive learning technology and its tools can inspire enthusiasm and provide instructional content options for children with autism.

Additionally, it facilitates the teaching practices and supports the visual curriculum. Technology will probably never replace efficacious treatment in ASD, just like it will never replace the special education teachers. However, the state-of-the-art in educational technology strongly suggests that by using assistive learning technology, it is possible to support both structured and open-ended models for learning. As stated by Nasom (2021), every success and result that the children with autism have shown should always be cherished and appreciated.

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Article Contribution to Related Field of Study

This study can serve as a reference for the Department of Special Education, Ministry of Education, Malaysia during the Pandemic Covid-19. Besides that, other scholars who wish to explore beyond the same field of study may use this study as state-of-the-art for their research purposes.

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