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AR IN PROMOTING SOCIAL EMOTIONAL LEARNING AMONG CHILDREN WITH AUTISM SPECTRUM DISORDER IN MALAYSIAN INCLUSIVE PRESCHOOL CLASSROOMS

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ABSTRACT

Most children begin emotional development at birth with expressing emotions, reading facial expressions and continue to develop skills of empathy and relationship building as they grow. However, children with Autism Spectrum Disorder (ASD) have a harder time with this development which includes having a difficult time understanding their own emotions. As in self-appearance domain stated in the framework of *Kurikulum Standard Prasekolah Kebangsaan* (*KSPK*), Social Emotional Learning (SEL) has been emphasised. It can help children with ASD to develop an awareness of emotions and build social relationships. Therefore, myriad of initiative on SEL are needed in inclusive classrooms to ensure an equal learning opportunities among the children especially those with ASD. Research has shown the positive effects of using visual supports to guide emotional development. This is because children with ASD respond better visually than they do by just listening. By using visual supports teachers can communicate better with them about their feelings and emotions. Over the decades, Augmented Reality (AR) is widely used in many fields such as education especially in helping Students with Special Needs (SSN). AR is a new technology that merges virtual objects with the real world. Fundamentally, it gives the real image of the world virtually and interactively. By adapting AR during teaching and learning process, children with ASD could learn to recognise, understand and express their feelings cum emotions more effectively. In the nutshell, AR is an evidence based learning tools in promoting SEL among children with ASD and applicable in Malaysian inclusive preschool classrooms.

Keywords: Augmented Reality, Social Emotional Learning, Autism Spectrum Disorder, Inclusive preschool classrooms

INTRODUCTION

Malaysia has embarked into the implementation of Inclusive Education (IE) through The IE Programme in 1962, 1988 and 1999 (Latif et al., 2015). It all started with the implementation for visually impared students in 1962, Learning Disabilities in 1988 and Technical School in 1999. This exhibits that Malaysia has been vigilant to the Students with Special Needs (SSN) and gradually improves the education system towards an equal education for all students. As the initiation of The Salamanca Statement on Principles, Policy and Practice in Special Needs in 1994 that stressed on the right of SSN in equal education, Malaysia has taken a great step by introducing the Inclusive Education in Malaysian

Education Act 1996 (1998). Consequently, no one is left behind for the access of education regardless of any difference among the students and changed the perception of the community towards SSN (Jelas & Mohd Ali, 2012).

The Education Act 1996: Education (Special Education) Regulations 2013 has started the official practice of IE Programme at the level of preschool education (Government of Malaysia, 2013). According to data obtained, children with Autism Spectrum Disorder (ASD) is the biggest group among the SSN preschoolers which has been included under IE Programme (Ministry of Education, 2020). ASD is a one of learning disability that involves social and communication deficit, repetitive or restricted behaviour and lacking in understanding emotion (Davis et al., 2011). Those with ASD could be diagnosed through clinical test as early as two years old. However, a reliable, structured and comprehensive diagnosis is required to identity the developmental skill as well as the weaknesses and strengths of SSN. The diagnosis provides important information for the authority to decide the eligibility of children with ASD into IE Programme. Children with ASD have profoundly shown deficit in social emotional skills (Cherynshenko et al., 2018). This skill is an ability to regulate one's thoughts, emotions and behaviour. There are 5 compound skills identified as social and emotional skills, openness to experience (open-mindedness), conscientiousness (task performance), emotional stability (emotional regulation), extraversion (engaging with others) and agreeableness (collaboration) (Cherynshenko et al., 2018). Hence, IE Programme and the support of effective initiative required to alleviate social emotion deficit among children with ASD.

Recent years have witnessed Information and Communication Technology (ICT) have provided vast of positive impact to mankind, including its usage in approaches and methods for the therapy and education of children with ASD. Most computer applications designed for people with autism focus on the relationship between one user and one computer. It aims to help with specific behavioral problems associated with autism (Boucenna et al., 2014). Augmented Reality AR is a new technology that merges virtual objects with the real world. Therefore, it provides opportunities for playing and trying social skills and promoting social functioning (Camras & Shutter, 2010).

Social Emotions among Children with ASD

Undeniably, Autism Spectrum Disorder (ASD) has set a solid boundary for a student to learn and socialise with the community. A typical infant begins to use emotional expression for social referencing between eight and ten months (Camras & Shutter, 2010). This shown that the use of emotional expression plays a major role in one's development and predominantly affects their life. Failure in cultivating early emotion development would not only limits the children to recognise emotions, feelings and responses to one's social expression but deteriorate their social interaction as they would face difficulty in speech and language acquisition (Mody & Bellieveu, 2011). Feelings are the first way children communicate as well as the first weeks of their lives are capable of expressing their core feelings of joy, sadness, anger, disgust, and surprise (Gardner, 2010). Fundamentally, children with ASD should be taught with recognition of social and emotion skills so that they could socialise independently and survive in ever-challenging real world.

Deficits in recognising own emotions and feelings is the major difficulty among children with ASD. Due to that, they would not be able to express themselves appropriately to the situation. From the age of 5 years old to 12 years old, children are at the phase of industry versus inferiority. It is a phase where children try to do everything independently and show their competencies to garner approval from society. The surrounding of the children plays the main role in determining the psychosocial development of children. Children will feel industrious if they are encouraged and reinforced by surrounding (peers, parents and teachers) and feel inferior if their ability is restricted. However, children with ASD were distinguished by the inability to perceive their surroundings and the understanding of their complexity, as well as not realising the inherent function of social interaction (Gonella, 2008). They tend to show abnormal abilities such as rotating objects or flushing their hands close to their eye level, flashing lights or looking at objects from different angles (Tsiouri, 2008). Society often disapprove these behaviours and cause inferiority in children with ASD. This leads to the lagging behind of children with ASD in portraying their ability when compared with the other normal student.

Children with ASD have emotions and feelings yet are having disorder in connection of emotions with perception and thinking, difficulties in understanding, managing of emotions and

personal meaning in what the child perceives. To reiterate, children with ASD are having trouble to manage their feelings and responses towards situation (Frith & Happe, 1994). The abnormal behaviours shown could be the lamentation to the perception of emotion expressed by the children. As they are having difficulty in language acquisition, exhibiting the abnormal behaviours could be the way to express their feelings. This impairment restricted students from socialise as they tend to offence the other party when having two ways communication through their lewd behaviours.

Interpreting the emotions and feelings in back and forth conversation is essential in making decision (Wong, 2000). Unfortunately, besides having difficulty in recognising own emotions, children with ASD also having deficits in communicative behaviour. Unnatural eye contact and body language limits them from creating an interactive atmosphere with other people that results they tend to be alone. Inadequate of facial expressions and gestures proved that the students are hardly define an appropriate reaction to a communication. Feelings are important in one's life because as a subjective response of the person to the event that caused the emotions, guide us in decision making, changes in behavior, facial expression, and posture (Jan et al., 2007). Therefore, everyone has their own emotional intelligence that affects their every action in life. Emotional intelligence is defined as the ability to know about feeling and to be able to handle these emotions, to be able to motivate to accomplish goals, to be creative, to make the most of the abilities, to understand feeling onto others and be able to handle the relationships effectively (Goleman, 1995). Children with ASD should be nurtured with emotional skill so that they could have a better interaction as they grow up and become part of the community.

SOCIAL EMOTIONAL LEARNING

Social Emotional Learning (SEL) is one of the top way to help children to understand and control their emotions. SEL are processes where children acquire and effectively apply the knowledge attitudes and skills to understand and manage their emotions, to feel and show empathy for others, to establish and achieve positive goals, to develop and maintain positive relationships, and to make responsible decision (Kimberly, 2017). Because of that, SEL has been widely used to help children adjusting with the community as they become an adult. SEL been taught to the children with ASD to improve their ability to think, emotions, and behavior (Stephanie & Emily, 2017). It is a process to help children to manage their emotions, develop emotions toward others, making decision and cope with their environment. Thus, SEL is one of the learning that could helps learning process in inclusive preschool classrooms.

SEL allows children with ASD to not only understand their feelings but also helps them to relate and react towards others emotions [20]. The children with ASD learn about their emotions by doing interesting activity inside and outside the classroom. SEL required a caring and safe environment to help children with ASD to develop their emotional skills. Children with ASD that undergo SEL will learn to have empathy towards their environment and know how to fit in with others.

On top of that, SEL has been emphasised in Malaysian preschool education as one of the crucial domains in the framework of *Kurikulum Standard Prasekolah Kebangsaan* (*KSPK*). Preschool education aimed to develop the potential of children between the ages of four to six in a comprehensive and integrated manner with respect to their emotional and social development in a safe and enriching learning environment through fun, creative and meaningful activities. This is to improve skills, cultivate confidence and develop a positive self-concept in children to prepare them in facing challenges and participating in further learning (MoE, 2017).

The personal competence strand in *KSPK* emphasises the development of socio-emotional, interaction skills and social skills amongst children and it is fostered through curricular and extra-curricular activities. There are two main objectives of SEL to be achieved: recognising and managing emotions as well as achieving positive emotions among the children (MoE, 2017). Hence, the preschool inclusive education in Malaysia offers a fundamental and crucial intervention platform of SEL for included children with ASD.

Using Visual Supports in Guiding SEL

Applying visual supports is one of the attractive ways to implement SEL in inclusive preschool classrooms. Visual support such as graphic organisers, flash cards and worksheets can be used to help

develop children's learning skills (Diamond, 2018). Most of the teachers are using visual supports in daily routine to enhance children's memories and become more independent. There are a few types of visual supports such as visual schedules, visual to structure the environment, visual script and visual task analysis that will be given to the children depends on their needs (Meadan et al., 2011). This visual supports is a better option to guide children with ASD in inclusive preschool classrooms in helping them to adapt to the new environment. There are plenty of findings have proven the positive effects of using visual supports to guide social emotional development towards children with ASD (Allen et al., 2017; Nagro et al., 2018; Syahputra et al., 2018). This is a better option for children with ASD because they are more attracted towards learning visually.

Visual supports ensure the predictability as well as provide the ordered and structured learning environment that will help to reduce the levels of anxiety in children with ASD (Allen et al., 2014). The children with ASD can understand better the messages about current activity or option that are available that allow them to make decision. It helps them to have more control over the activities conducted and get ready to involve in it. Consequently, children with ASD will have more potential to actively engage in the learning process and this helps to lessen problematic behaviors among them . Another study has indicated that children with ASD will respond better if they could predict or have something that structural such as visual script. Children with ASD will only explore social interaction in a safe and predictable environment where they could feel comfortable (Syahputra et al., 2018). It helps children with ASD to learn behavior that is acceptable.

Children with ASD are hardly to stay focus, interpret and understand the social situation and react appropriately (Syahputra et al., 2018). Visual supports enable them to illustrate about the activities which is taking place and make the wiser decision. A study has claimed that children with ASD become more independent in the natural environment and decrease their dependency on their caretakers in completing their daily routines (Cruz-Torres et al., 2019). Various facial expressions in photos and videos have been used to develop the communication skills of those with ASD (Chen et al., 2016). It enables them to focus on the specific visual representations and facial cues according to which the facial emotions of others can be determined. In short, by using visual supports, teachers can communicate better with children with ASD about their feelings and emotions.

AR for Children with ASD

Augmented Reality (AR) is a technology that combine all elements such as audio, text and merge virtual objects within the real world (Martin-Sabaris et al., 2017). AR allows a superimposing of real object to be seen in a virtual world. Thus, it helps user to experience real world virtually. Specifically, this provides a good opportunity to children with ASD to learn about social emotions by adapting themselves in the environment by phase. AR for example allow teacher to create a social situation with visual support in different steps to help then adjusting themselves (Lorenzo et al., 2018). Learning through AR could include all senses such as sight, hearing, smell and touch. This is because there are some programme that allow virtual activity to react with the real world. AR was created by combining elements such us audio and video for aiding deaf individuals (Mirzaei et al., 2013). It allows them to interact in real time and it looked realistic for them to relate it with the real world.

AR technology enhances learning process to be more interesting, fun and efficacious to children with ASD (Tentori et al., 2015). AR-based programs can be implemented easily through smartphone, tablet or desktop applications platforms to augment three-dimensional (3D) visual features to the more simplistic features conventionally used in the training paradigms, making them more appealing and engaging for children with ASD (Behnam et al., 2021; Khowaja et al., 2020). There were several proven effective AR technology of which can be utilised as instructional strategies. During the lessons which is relevant to personal competence strand, teacher may develop AR applications, computer games, tablet games, video games or AR interactive books for teaching and learning process in inclusive preschool classrooms in order to gain emotion recognition among the typical children as well as children with ASD. Meanwhile, teacher may also integrate AR technology via self-modelling and video modelling storybook methods to promote facial and emotional expression (Carmen et al., 2020).

With the help of AR, SEL could be better implemented in inclusive preschool classrooms. There are many studies that have proven the possibility for children with ASD to learn faster with the help of AR technology (Chen et al., 2016; Da Silva et al., 2015; Khowaja et al., 2020). As according to

Diagnostic and Statistical Manual of Mental Disorders V (DSM V), children with ASD are having deficits in social emotions (APA, 2013). They are facing hardships in communicating and understanding others or even themselves as well as giving appropriate reaction or response. They face difficulties to express their emotions properly and have the different viewpoints from others. Thus, AR is proven could give motivation and help to facilitate the interaction with others (Quintero et al., 2019).

A study found that three adolescents with ASD has become more aware of facial expressions observed in situations in a school setting simulated using AR technology (Chen et al., 2016). This supported the positive outcomes of AR to help children with ASD to enhance their understanding of others' facial expressions based on several social situations in school. Based on the result study from Escobedo et al. show that children with ASD can improve their attention management and increase the time children with ASD remained on the task by using AR (Escobedo et al., 2014). Another study from McMahon et al. (2015) had shown that AR was found to be the most useful application in improving literacy for children with ASD. These studies have indicated that AR is relevant and needed in improving SEL among children with ASD.

DISCUSSION

A study by McMahon et al. (2015) showed that early childhood teachers found inclusive classrooms as the best place for educating SSN, and for the teachers themselves to learn and grow together. This supports the relevance of implementantion of inclusive in Malaysia Preschool as a necessity to provide a better education for SSN. As stated in *KSPK*, teachers are requested to plan strategies to address learning difficulties by identifying and taking appropriate actions in order to assist children with special needs such as modifying learning resources (Diamond, 2018). Teacher could carry out an alternative learning to ensure that the children with ASD are able to cope with the lesson based on their special needs. The usage of AR in inclusive preschool classrooms seemed to be effective as it focuses on the learning through play technique. The children with ASD could interact with virtual tool that emerged from the AR and initiative with the real world. This helps the children with ASD to express their emotions and feelings without offencing others. The entertaining feature of AR could attract their attention and ease them to learn new thing through playing (Mohd Yusof et al., 2014). Hence, this could ameliorate the children's holistic development coherently to the education guide.

The implementation of AR in inclusive preschool classrooms enhance the children with ASD's interpretation of self-emotions and feelings. AR could help children with ASD to carry out pretend play more frequently, maintain longer pretend play duration and keep their play ideas more consistent with suggested themes (Bai et al., 2015). The degree of realism provided by the AR is observed as it is allowing further approximation to the interaction with the real world. As the children play pretend with the virtual components in AR, they are able to express their feelings freely. The images, videos and musics applied in AR alleviate their motivation and help them to understand information. Furthermore, AR that comes with self-facial modelling allow children with ASD to understand and recognise their own emotions and feelings (Harms et al., 2010). The children with ASD could explore themselves with virtual expressions through imposed mirror feature. At the same time, they could learn on how to response and react appropriately to the expressions in AR.

The accessible AR allows children with ASD to use the technology anytime and anywhere they want (Moralejo et al., 2013). The use of AR could increase amount of time for the children with ASD to learn. In line with the difficulties, they have to interact and socialise with the community. AR that comes with self-correction system and instruction help them to experience the communication with virtual people in real world. The more frequent the children

with ASD spend time to learn with AR, the more they understand and observe the communication ethique. Therefore, they could apply the knowledge that they have practised in AR into the real life situation when they are communicating with real person. AR that includes emotions and feelings could help the children with ASD to response correctly to certain situations (Escobedo et al., 2014).

In general, the use of AR in inclusive classrooms coud help to improve daily routines of the children with ASD, such as recognition of facial emotions (Carmen et al., 2020). This will definitely be an advantange for children with ASD to learn to get along with typical children in the inclusive preschool classrooms. They could understand their friends' emotion better and reduce the anxiety associated with making friends as well as gaining respect from others (Nornadia et al., 2013). In the long run, this will increase their social skills. It is vital to prepare children with ASD at young age with the appropriate social skills as it will enable them to adapt more easily for the upcoming primary school life. Hence, the implementation of AR contributes a mere benefits towards the initiative in promoting social emotional learning among children with ASD in inclusive preschool classrooms.

CONCLUSION

In the nutshell, AR is an evidence based learning tools in promoting SEL among children with ASD. By applying SEL, it helps children with ASD to apply the knowledge, attitudes and skills that relatable to the understanding and managing emotions, setting clear goals and showing empathy towards others (Domitrovich et al., 2017). AR is applicable to Malaysian inclusive preschool classrooms especially in bringing lights to children with ASD who needed technology supports in their SEL.

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