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Implementing Augmented Reality in Learning Bakery for Autism Learner

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ABSTRACT: The use of spoken language is difficult for children with Autism Spectrum Disorder (ASD) to understand. Some children might only be able to use single words, while others might be able to produce sounds. Others could not even speak at all. There are several different ways or approaches in which we can teach an ASD child. Communication is an important life skill that contributes to better relationships and improved quality of life for children with communication impairments. This study aims to focus on the use of AR for autism in bakery learning. This study will provide a summary of the use of AR technologies and help understand the best practices to be implemented when using AR for autism treatment. The findings would provide useful evidence for more ideas and strategies to improve the well-being of ASD patients. Questionnaires have been distributed to specific target users, who are teachers in special teaching methods, for user acceptance testing. The challenges facing during this study including such as observation and screening tools for caregivers and teachers, as well as parent questionnaires for portraying the children's function in the family, cultural com-munity, and educational setting. Besides that, language skills span the entire continuum from no speech or functional speech, to mastery levels of comprehension, production, and literacy, while autism severity ranges from very severe to very mild. The teachers gives a brief description of the application to autism students, all respondents can do the research individually.

Keywords: Autism, Augmented Reality, Autism Students, Bakery Course, Technology.

Abbreviations: ASD, Autism Spectrum Disorder; AR, Augmented Reality; SDG, Sustainable Development Goals; VR, Virtual Reality.

I. INTRODUCTION

One of the leading and widely debated human beings today is the word autism. It has attracted the attention of society in the USA and recognized globally because of its increased prevalence [20]. There are also controversies that can be viewed as strengths about the conceptualization of autism as a disorder or as a whole of special qualifications [21]. The steady increase in the number of this condition is due in part to increased awareness among parents and professionals of health and education services, as well as changes in the diagnostic process that have contributed to early identification and diagnosis [3]. The increased public understanding has contributed to a rising interest in ASD [19]. Autism means it affects an individual differently, as a spectrum disorder. Young children cannot communicate with others in profound circumstances or treat people like objects. In milder situations, knowing and communicating with others is challenging and the feeling and experience of other people difficult to understand. Some children can speak with a simplified definition, while others can have little or no [1]. Many of these behaviors are not characteristic of all autistic children and young adults. A popular saying is that if you saw "one autistic child, you saw one autistic child" since there are many ways in which autism shows itself [20]. People with autism may be greatly impaired by a specific physiological or physical trait relative to people without autism, but in others, normal or even superior [1]. Spectrum suggests that there is a mixture of talents and impairments for people with autism. Some autistic children and young people have average or higher intelligence; they need little support to work. While there may be major developmental disabilities, weak or no verbal communication, other children and young people are autonomous and have very limited adaptive behaviour.

In the early 1960s, as a result of advances in computers with faster and more powerful processors, real-time rendering and position tracking and artificial vision, augmented reality (AR) became part of the fields of information technology and science [6, 18]. More study into the potential causes and possible therapies of Autism has shown and strengthened patient wellbeing and clinical performance, and the use of VR and augmented reality on autistic patients [1]. AR technology has appeared in numerous fields in the field of health as a method of elective treatment: diagnosis, promotion of well-being, and treatment of mental health [13]. Over the past few decades, approaches based on the use of technology have increased exponentially as a real opportunity for treatment to improve the health and quality of life of people with ASD and their caregivers [8; 10].The combination of these resulted in the creation of applications superimposed on real time by video cameras on images, 3D models, texts or any other digital element. AR mentions an expansive range of technologies that integrate computer-generated

materials, such as text, images, and video, into the real-world experiences of users. Researchers initially defined AR in terms of particular permissible mechanisms, such as head-climbed displays (HMDs). AR described as the combination of adjacent reality and real life, as developers can create images within requests that blend into the real globe alongside content. It is a new understanding involving the superposition of computer graphics incorporated in the real world. This awareness helps users to engage in the real world alongside adjacent content. AR adds an additional interactive interface, data, image and 3D animation layer to improve or enhance the real world.

AR believed to be a Virtual Reality (VR) version. In AR, along with adjacent objects superimposed on or composed alongside the real world, the user can differentiate the real world. In addition, AR establishes an alliance that puts together the neighboring agents and actual agents on the screen simultaneously alongside additional interactive agents such as audio, video, and graphics focused on the understanding of the real world. It is important to have a medium that will trigger the request in order to visualize the AR, that is, something that will represent the discernible constituents on the computer. Finally, we also point out the need for multimedia and hardware that be used to build this project. By allocating adjacent objects in the physical world and real time, AR converts the existence that concerns you into a digital interface. AR can be interpreted through a sequence of experiences. In AR, there have three (3) main categories of AR tools. Augmented Reality 2D and 3D viewers allow user to place life-size 2D and 3D models in user environment with or without the usage of trackers. Trackers are easy pictures that 2D and 3D models can be encompassed to in AR. Along with contextual knowledge; it can create user camera display. For example, users may point to a product on their smartphone to show its data or value. The last technique normally encountered by AR is through gaming, creating immersive gaming environments that apply the real world.

Implementing AR for autism learners in learning bakery and believed to be an interesting application that modifies the pace for baking by pace orders. It is developed in an immersive way to help autistic students explore cooking in a broader exploration platform. This research aims to implement the virtual reality for autism learners based on AR techniques in learning bakery.

II. MATERIALS AND METHODS

The researcher used a quantitative approach to collect data and interpret the collected data. The approach to quantitative analysis is a structured, objective, systematic method in which numerical data are used. Quantitative methods would also assist the researcher in collecting the requisite information and data. The researcher had specifically adapted the survey design from the previous report. The research group consists of 10 teachers from PERMATA.

III. RESULTS AND DISCUSSION

Using the Social Science Statistical Package (SPSS) used to evaluate and interpret raw data obtained, descriptive statistical approach and inferential statistics used. The collected raw data is placed in sequence, condensed and demonstrated into understandable details. The aim of this study was to assess the effectiveness of AR technologies in different domain because of the intervention process in children with ASD. Table 1 shows the number of students involved in the research based on gender. There are one (1) male respondents (40%) and nine (9) female respondents (60%).

Table 1: Respondents and gender.

		Frequency	Percentage
Valid	Male	1	10.0
	Female	9	90.0
	Total	10	100.0

Table 2 shows the number of respondent on teaching bakery. The respondent's experience between 1-6 months is 1 respondent (10%), 2 respondents (20%) between 7-12 months and 7 respondents (70%) between 1-2 years. Majority of the teachers are having more than 1-2 years' experience in teaching bakery. The topics cover the core curriculum of recipes, and each recipe for each student has different techniques and styles. In particular, teachers must be ASD experts as a common disorder. The more ASD teachers are aware, the better for the students. There are various effective techniques can be used with ASD students, which may be useful to all classroom students. Often parenting becomes complicated and cooperation disappears against all good intentions. Educators and parents will collaborate to better recognize the challenges to cooperation and ensure that the child is not influenced negatively and consider each other's perspectives. Parents and school staff can have different views and needs of children. Take proactive action to create a common understanding by identifying parents' basic needs. All staff have undergone daily training sessions to improve their awareness of how autistic children will respond. Look at the positive aspects and provide workers with simple and efficient methods for recognizing what children can do during the day [14].

Table 2: Teacher's Experience in Teaching Bakery.

	Experience	Frequency	Percentage
Valid	1- 6 months	1	10.0
	7-12 months	2	20.0
	1- 2 years	7	70.0
		10	100.0

Table 3 shows the number of respondent giving their opinion on understanding current learning technique. There are two techniques implemented which is one to one teaching with 7 respondents (67%) and show image or body movement with 3 respondents, 33%. The result shows that one to one teaching as the preferred technique in teaching autism students. The majority of respondents prefer one to one teaching instead of demonstrating the movement of the image or body. Teaching interventions to change practices and materials to fulfil the needs of students with ASD are

various. Many treatments professionals believed that their services or procedures would enhance children's lives with autism or even propose cures[20].

Table 3: Opinion on understanding current learning technique.

		Frequency	Percentage
Valid	One to one teaching	7	67
	Show image or body movement	3	33
	Total	10	100.0

Table 4 displays the number of respondents on the basis of their opinions on the use of AR to help students gain more knowledge. Based on the findings, 7 respondents (70%) agree that using AR lets students get more information while 30% disagree with 3 respondents. Based on the findings, 70% of respondents believe that using AR would help students understand more about their teaching and learning. Considering the application of AR technology, it has been concluded that the majority of studies are concerned with enhancing everyday life and communication habits, in particular social and emotional skills [1]. AR applications are mixed with virtual information in the actual situation, where both real and virtual information is perceived. As a result, AR is an immersive technology set that brings the two components together in real time, both virtual and real. Kerdvibulvech *et al.,* has introduced a tridimensional human computer interaction application based on AR technology to assist children with unique communication disabilities for social innovation [11].

Table 4: Augmented reality help student getting more information.

		Frequency	Percentage
Valid	Disagree	3	30.0
	Agree	4	40.0
	Strongly Agree	3	30.0
	Total	10	100.0

Table 5 shows that the number of respondents on the basis of their opinions on the use of AR may increase student interest. Based on the findings, there are 8 respondents (80%) agree that using AR will increase student interest while 20% disagree with 2 respondents.80% agree that AR can increase student interest during teaching and learning. AR technology has the promising capabilities and functions to draw attention to and increase the dependency of ASD children on learning materials during training. Improving the enjoyment, participation and creation of creativity [16, 4] and self-expression [4]. As a form of education and therapy, AR is very effective [9]. Autistic children cannot develop good social skills without appropriate support and can speak or act in ways that create serious difficulties for those around them. Increasing research into possible causes and new therapies for autism has shed light on the use of VR and AR in autistic patients and enhanced patient wellbeing and therapeutic outcomes [1].

Table 5: Augmented reality may increase student interest.

		Frequency	Percentage
Valid	Disagree	2	20.0
	Agree	5	50.0
	Strongly Agree	3	30.0
	Total	10	100.0

IV. CONCLUSION

AR and training is a respectable community that is prepared to make a brilliant impact on the insightful world. While there are challenges to stuff, the request always prepares to inspire others. Little product problem does not check the production of AR in the instruction. The product will undergo more change in a perfect world later, and the concept of realizing the AR application will be successful. AR refers to the real world display of digital knowledge. With the use of AR technology, digital information can be displayed directly to the user in the real world, without requiring the latter to pay special attention to a device's screen. The opportunity to perform AR systems as part of the educational process of three elementary-age ASD students are studied in the chain of tasks [15]. Given the difficulty in identifying and comprehension of the facial expressions of children with ASD, a game-specific mobile AR app is assessed to track the effect on children's interaction [5]. In order to incorporate a technological intervention, families, teachers or professionals may benefit from reducing the anxiety they feel as they interact with children with autism [9, 17]. The user can be totally or partially immersed in the environment, but still be present in the real world in an AR interface. It differs somewhat from the VR in which users incorporated into the virtual world [19]. Both AR and VR provide different kinds of visual feedback but rely on the same technologies [2]. As a result, technical approaches in children and adolescents with ASD have expanded as a supplement to cognitive behavioural approaches over the last decade as observational learning based treatments [12].

V. FUTURE SCOPE

In every single arrangement, technology or change, there are have to be a lot of thing to enhance so it can be larger arrangement for target users. So one of the enhancement that can give a superior understanding on the content regards to the recipe book are creating extra content that informative, enjoyable and fun that can range larger fervor. What's more, the content that has been developed could insufficient for this application. Other than that, creating the content with a lot of interactivity or audio, video whether 2D can attract the users to join with the augmented reality technology. Other than including more content in this study already provided still need change in the method for quality and informative. The content that need some improvement are text, video, graphic and interactivity of the content. It is because the content can give the large encounter for users in understanding the intention of the product that have been made. Researchers can also reflect on determining the sustainability of education technologies and AR in students ' cognitive, inclusive and emotional

processes as a sustainable approach in line with the objectives of the SDGs [7].

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