Application of Augmented Reality in Learning Bakery for Autism Spectrum Disorder

Che Ku Nuraini Che Ku Mohd, Faaizah Shahbodin, Suriawati Suparjoh, Nur Alya Sahira Muhamad Khidir

Abstract: Many young children with ASD have difficulty learning the language spoken. Some kids can use just single words while others can create sounds. Someone else couldn't talk at all. Communication is a vital skill in life that contributes to improved interactions and quality of life. Researchers think it's difficult for all young children who have communication impairments to generate and maintain a mental representation in conjunction with the instant fact, that building capabilities are critical. A child with ASD can be taught to interact in numerous distinct ways. For example, a child can study to use the sign language, exchange objects or images and use a voice output electronic device. All these methods of communication are efficient and useful, but we would also like to teach the child to interact with the language spoken. The questionnaire has been distributed to the target user who is a special education teachers from PEMATA for user acceptance testing. Each respondent runs individual tests after the developer provides a brief explanation of the application. They need to scan and test the augmented reality applications on recipe book.

Keywords - ASD; Autism; Augmented Reality; Bakery

I. INTRODUCTION

The brain does not correctly deal with autistic behavioral disorders, verbal and nonverbal communication and communication which impacts cognition, behavior and several structures of the body [11][13]. These methods and techniques can enhance autism spectrum disorder for your child. These techniques include applied behavior analysis, autistic and related communication training and education for children with disabilities, Picture Exchange Communication System (PECS), flora time, social stories and sensor integration [6]. Games are currently recognized in education as the most effective ways of education, because games can help children deal with mental and behavioral problems through education and children's play [7].

Augmented reality (AR) refers to a wide range of techniques that allow users to realize the true world in computers produced products such as text, images and videos. AR technology enables individuals to understand their environment better by merging reality with virtual contents in meaningful ways. AR aims to change the look of a real environment through the combination of virtual content and real world objects (Yan & Hu, 2017). It also advantages from virtual-actual interactions, like a virtual model zoom in or an ongoing virtual model objective for various points of view during broadcasting.

Recent AR broadcasting display methods are still evolving. The most common strategy is that an enhanced view is displayed via a monitor that relates to the monitor display. This is primarily used within three manufacturing types. Some researchers use body-assembly devices to provide the audience with a view for the first person such as AR lenses, which offers people with the view of the first person. In real world environments AR project digital content in order to improve the view while displaying increased opinions with inner devices is the best possible immersion (Yan & Hu, 2017). AR is primarily used to screencast sports competitions as a virtual annotation. In order to indicate the yard in the 1998 American Football broadcasting, the virtual 1st and 10 line inserted virtual lines. Subsequently, AR's annotation was often used in basketball, tennis and ice hockey (Castle, Sports, BBC). In understanding education and therapeutic techniques, emerging techniques such as the virtual reality and the evolving reality are highly efficient. We apply augmented reality technology to social and health centres and make them more interesting (Hosseini and Ghazvini, 2017). AR is a direct or indirect view of a reality that often connects objects and users to the real world (Gay,2004;Raghavsood, 2012).

Researchers initially defined AR in terms of particular enabling mechanisms, such as HMDs. As developers can create images in demands that combine the great world with content, AR can be defined as a combination of adjacent reality and true life. This is new knowledge which includes the superimposition of real-world computer graphics. The user interacts with neighboring materials in the real world using this knowledge. AR provides an interactive interface layer to increase or improve the world of reality such as information, image and 3D animation. In AR, the user differentiates between the real world and the adjacent objects that are superposed or composed by the real world. Furthermore, AR is generating a coalition which, together with complimentary multimedia agents, such as audio, video and graphics. It is important to have a medium that stimulates the application, i.e. demonstrates the recognizable components, in order to imagine the AR. Lastly, we additionally state the necessity of multimedia and hardware that will be utilized to develop this project.

By allocating adjacent objects in today's and real worlds, AR transforms your nature into a digital interface. AR can be perceived across a collection of experience. In AR, there are three primary AR tools categories.

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The 2D and 3D viewers enable users find 2D and 3D life size models or to use a tracker in the user environment. Trackers are simple images which can be included in 2D and 3D models in AR. The subsequent tools of AR are increasing browsers of reality. In addition to contextual information, it can create user-cameras. In order to show their information or value for example, users can point their smartphone to a product. AR's last method is gaming, which produces immersive game experiences which apply the real environment.

II. AIM

This project aims mainly to bring the augmented reality in learning bakery for autism learner based on AR techniques and to provide the prospect in learning bakery with complete information about the bakery using Entity.

III. AUGMENTED REALITY IN LEARNING BAKERY

Using AR in learning bakery for autism learner is an electronic courseware and believed as an interesting application that change the pace by pace orders for baking. It is industrialized to aid the Autistic students from secondary school Sekolah Menengah Bukit Katil, Melaka, Malaysia to discover concerning cooking in a larger discovering platform and in an interactive way.

The aim of this project is to create a recipe book and developed using AR technology. This book used as one design in the books as a marker based or image recognition. As user scan the marker design, AR allows user to interact with two-dimensional. AR help user to interact naturally and spontaneously. The way AR collaboration develops face-to-face because increasing reality ensures a seamless interaction between real-world and virtual environments. AR also has skill to enhance user interaction between users and the knowledge itself. For the marker, it have been selected and will be printed as a recipe book. To develop batter agreement for user, this recipe book need to design an interactive and effective picture and augmented reality content.

IV. METHODOLOGY

Figure 1 shows the project methodology of the project. This undertaking will be industrialized by employing creative procedure that are encompass of commission, research (analytical), believed progress (creative) prototyping (analytical), Design and Creation (creative), Assessment (analytical) and the last one is completion.
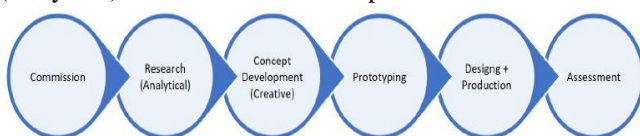

Fig. 1. Project Methodology

This procedure shows research method or data in several periods of the design process. It is additionally permits the designer to redefine preliminary assumption concerning the project. It is because larger notified design decisions extra frequently lead to prosperous aftermath for the undertaking and this method could involve extra iteration across development. At assessment periods to the procedure, designers can trail the accomplishments or shortcoming of the

project. Moreover, this summative consultation could aid craft ongoing connections, lucrative to both parties and it is additionally can be one more ability that designer can proposal to their client.

There are various software and hardware to use to develop the augmented reality. The BlippAr Builder is to develop augmented Reality while BlippAr Viewer Apps software used to scan the marker image. Adobe Illustrator To design and illustrate object and Adobe Premiere for editing and creating a video. Software requirement to be used for developing augmented reality product. Laptop for development and documentation. Smartphone to scan the marker, marker as Augmented Reality marker and printer to print the report.

All production shall be combined with media integration. The AR Bake recipe book includes all media, including text, graphics, audio and video. Figure 2 shows the development process of AR Bake. All the content and design will be integrated into Blipp Builder software. Blipp Builder software is used to build and it will be the platform to create the augmented reality. After the process done, the AR recipe book can be preview using BlippAr Application and the ingredients, utensils and recipe will be printed.
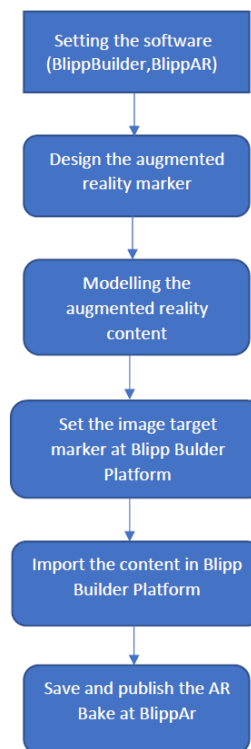

Fig. 2. Development Process of AR Bake

V. RESULTS AND DISCUSSION

All analyzes were provided on the basis of the study issue. All respondents were selected based on criteria of already having teaching experience and history of outstanding teacher over their service. Figure 3 shows the gender of the respondents. The result show a percentage of male is 10%, although a percentages of female is 90%. Female is more than male that have answer the questionnaire.
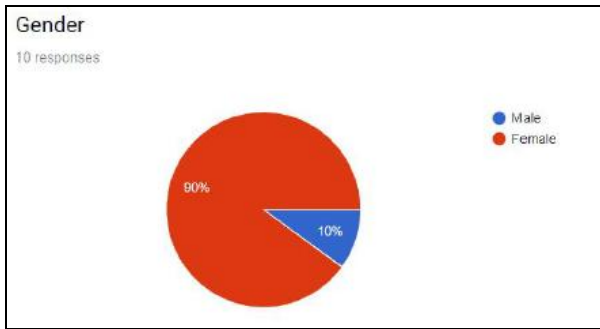
Fig. 3. Gender

Figure 4 shows that teachers experience in teaching autism students. The result shows that 80% of teachers having 5-6 years in teaching autism students. While 20% below 4 years in teaching autism. Teachers with experience of teaching children with special needs had more knowledge, they also have positive attitudes as compared to others from different majors.
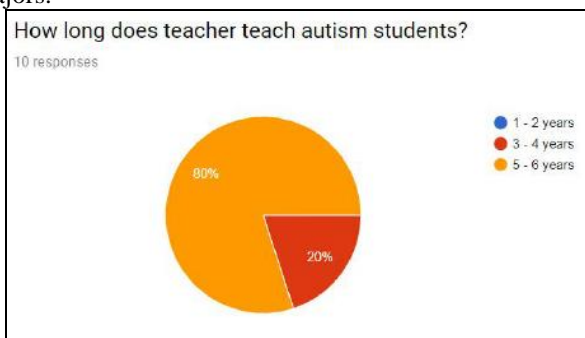

Fig. 4. Teaching Experience

Figure 5 shows learning techniques used in classroom. 100% 100% vote share a song with hand or body movement instead of showing images on the whiteboard and giving a worksheet to complete. A number of different methods that have proven to produce positive outcomes can be used to teach students with Autism Spectrum Disorder (ASD). Every student and his needs are unique, and every time you work with another child, you do not need to reinvent the wheel.
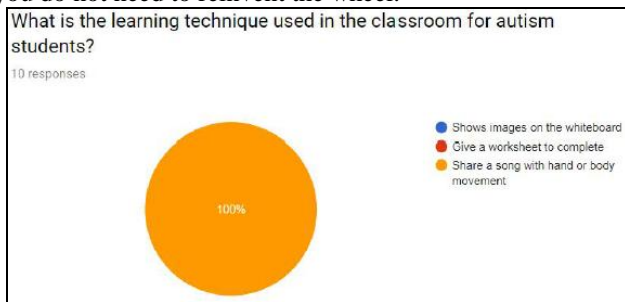

Fig. 5. Learning Technique used in Classroom

Figure 6 that are there are no technologies used for bakery for autism students at this school. So, the AR is proposed to be implement during teaching and learning in that school.
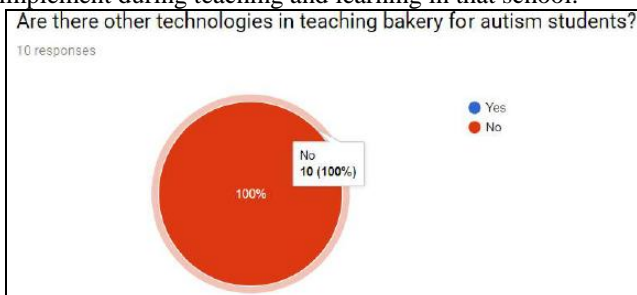

Fig. 6. Technologies used in teaching bakery

Figure 7 shows experience of teachers in teaching bakery. The result shows that 70% teaching between 1 - 2 years. While 20% teaching below 12 months and 10% below 6 months. They are usually on the front line, in pre-school or in school as educators in initial diagnosis. Teachers often talk to parents first and propose formal diagnosis.
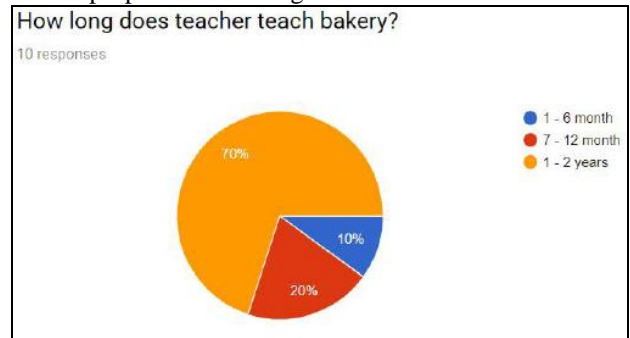

Fig. 7. Experience of Teaching Bakery

Figure 8 shows their opinion on understanding about current learning technique. According to results, 66.7% agree that autism student understand the current learning techniques by one to one teaching compared to show image or body movement which is 33.3%. Good teachers will help students to achieve success. The problem created by differences in social skills, communication and behavior in comparison with normal is said to be children with autism. This caused teachers problems in applying their teaching and learning. The characteristics of the various autisms are different. For this reason, a teacher who knows about unique characteristics and is always ready with rigorous lessons needs for special education for students with disabilities such as autism.
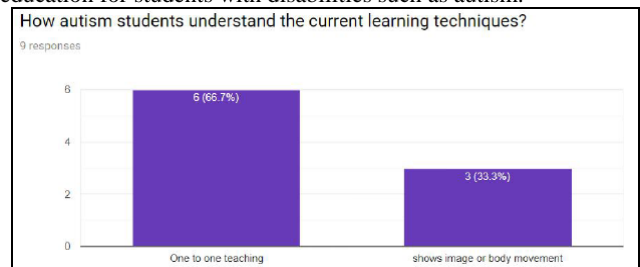

Fig. 8. Current Learning Techniques

Figure 9 shows the percentages using augmented reality may help students get more information or not. 70% respondents agree that using augmented reality may help students get more information. As technology is an important component of VR research, technological advancement in this century is growing rapidly. The majority of studies relates to modifications in everyday life and communication, especially social and emotional abilities, with the possibilities offered by AR technology being taken into consideration. If an intervention field is considered, in specific, six obviously defined areas can be differentiated including social skill and knowledge, emotions, everyday life and communication and cognitive training.
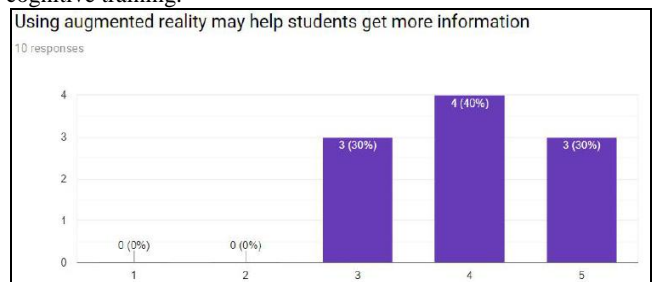

Fig. 9. Information Using Augmented Reality

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Figure 10 shows 80% agree that using augmented reality may increase student's interest. As can be seen, The use of a AR settings enables instruction in a secure and controlled setting that can be personalized [9]. The rapid growth of innovative techniques and the low cost of sensors can help provide the knowledge of social interaction through new techniques and new paradigms. These data can assist to clearly define each child's stages choosing the most efficient therapies with him.
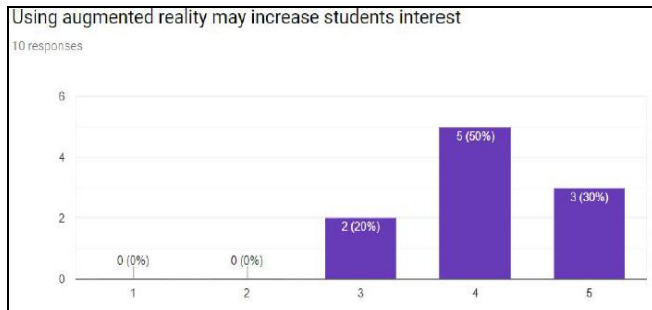

Fig. 10. Student Interest

Figure 11 shows 70% agree that using augmented reality is easy to use. AR has several exploitable benefits in working with autistic spectrum disorder (ASD) children. In reality, it promotes environmental control as well as social personality relations. This can increase the self-esteem of patients who are struggling with social circumstances in the real environment [4].
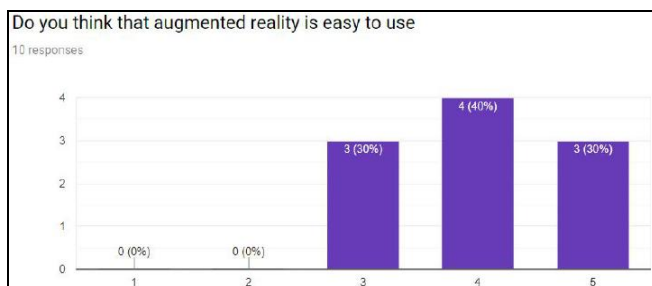

Fig. 11. Easy To Use

Figure 12 shows 80% agree that to become skillful at using augmented reality. Another challenging task to study was to build an efficient system of AR media content. The use of certain media such as video, audio, picture or text has in specific been found to impact on specific tasks, circumstances and problems [12].
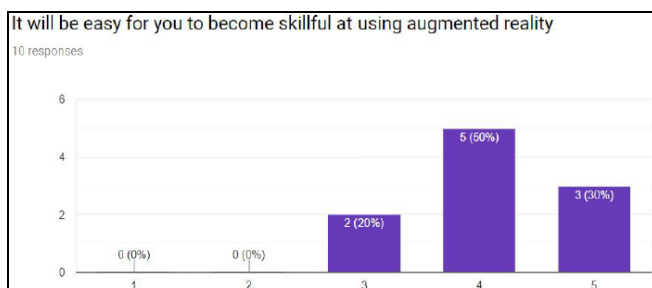

Fig. 12. Skill in using Augmented Reality

From collected testing data, it is not stated who is familiar with augmented reality technology. So from the observation, the users need instruction to able for them to use AR. It is because they not familiar or does not know about the BlippAr Viewer application that used to scan the recipe book. Before displaying how to use the technology for enhanced reality, this apps was fully dependent on the internet connection with

AR. The users have no trouble scanning the marker with a strong internet connection. From the observation, it show the hang issue only happen because of the internet connection is too slow so after scanning the marker, the loading process takes long time to show the content. Since they are not familiar with augmented reality technology, researcher need to conduct and give some demonstration on how to use the augmented reality and researcher need to explain about how this AR technology works. During the test, the user gained a certain understanding that the user needs assistance during the procedure. Since most users had no experience with this new technology, the users were provided with a briefing about AR. After that, the users were given the instructions some times to see if they needed assistance to scan the marker. The instructions were then made. Users can understand the instruction from the observation and the mobile camera on the packaging has been identified. After the product is scanned, they enjoy the content and exit without any assistance using BlippAr Viewer.

VI. SIGNIFICANT OF STUDY

The important aspect of this project is that it helps autism students 'knowledge process by methods of an interactive and exciting way, different from their previous book by way of AR technology. This project also can give a new environment for autism learner while learning the product in interactive and informative way. The additional application interaction will enhance the attraction of the autism learner. This is because the AR apps are attractive, simple to use and desirable. It provides the efficient and exciting way of creating the rest of society with content and information. The end-user can use a smartphone in its entire existence.

VII. CONCLUSIONS

Results show a beneficial feedback on the AR system that has expanded and is relevant. AR systems were actively involved in participants and a variety of game concepts were generated. Individual differences between respondents predict that children with unique autistic circumstances will have gradual effectiveness. AR has got excellent responses to the quality and weakness of the app. Thinking back to the product objectives, the objective is to create an app that uses the AR to contain crucial information and promotion. The limitation of the apps is depend on the internet connection. However, there will be no problem with accessing the AR material if there is a better internet connection. However, it takes so long for users with poor internet connection when entering the application. Furthermore, after we talk about marker-based enhanced AR technology, users certainly need the marker, from the website for screening and viewing the contents of the recipes. This app offers users the opportunity to experience the AR technology they can experience themselves. Users are not required to interact technology for any device such as a joystick or goggles. But users need their phones just like their mobile phones, tablets, and new technology. Although the barriers encountered by things it is still inspire everyone.

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