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“Dear Caregiver, Embrace The Unique Way!”

DESIGNING VIRTUAL REALITY (VR) FOR CHILDREN WITH SPECTRUM DISORDER

a chapter by

MUHAMAD HAFIZ BIN HASSAN, RAINAL HIDAYAT BIN WARDI, MOHAMAD HARIRI ABDULLAH & BADRUL ISA
College of Creative Arts, Universiti Teknologi MARA, Cawangan Sarawak, 94300, Kota Samarahan, Sarawak
College of Creative Arts, Universiti Teknologi MARA Shah Alam, 40450, Shah Alam, Selangor
Faculty of Education, Universiti Teknologi MARA Puncak Alam, 42300, Puncak Alam, Selangor



Abstract

This chapter highlight the usability perception for overcoming the problem of sensory special needs to children with autism. Sensory processing disorder is a condition in which the brain has trouble receiving and responding to information that comes in through the senses. Formerly referred to as sensory integration dysfunction, it is not currently recognized a distinct medical diagnosis. Some children with sensory processing disorder are oversensitive to things in their environment of their life. Therefore, one educational tool should be developed in order to help children with autism by implementing and introducing interactive learning process. In this paper, researchers had focus on developing new tools to get focusing to children with autism by designing Virtual reality (VR) that special to them with putting the element and design criteria according to their need.

Keywords: *Sensory special needs, educational tool, interactive learning, Virtual reality (VR)*

Introduction

As is available in the market, Virtual reality (VR) created with computer generated scenario that simulates experience through senses and perception. The immersive environment can be similar to the real world or it can be fantastical, creating an experience not possible in ordinary physical reality. This product is also created to normal people only in getting attention and focus while using it with systems may also be considered a form of VR that layers virtual information with live camera feed into a smartphone or tablet device giving the user the ability to view three-dimensional images.

Meanwhile, according to Michael Cordell 2018, the researcher constantly looking for tools to help accelerate autism students in learning perspective. This incremental innovation of this tools freely interact with researcher to share what is their problem during using Virtual reality (VR) and researcher take note on what of autism children need. The research is worth to improve to existing products and incorporating the appropriate criteria used by children with autism to help them improve their quality while focusing on vision.

- **Aim**
This paper discuss on action of researcher to create a educational tools which is Virtual Reality (VR) with better design criteria as needed and appropriate for children with autism.
- **Theme**
Learning aids with sensory special needs for children with Autism Spectrum Disorder, ASD.

Literature

Several methods are reported in the literature to address this issue. Wolniak, & Grebski have describes the concept of innovativeness and creativity from the perspective of natural ability and skills developed by the educational process, parenting style, societal values and traditions. Additional studies to understand more completely the key tenets of innovativeness in creativity are required. Innovation and the influence of it on the workforce gets identified by the organization and the innovation sector are among the one which will gain the implication (Wolniak, & Grebski, 2018). There has been numerous studies to investigate about sensory regulation among

Autism Spectrum Disorder, ASD. Children with ASD have difficulties with social contact and communication, as well as a tendency to engage in the same activities over and over again. Due to their inability to communicate, many of these individuals have sensory problems that go undiagnosed. (Posar and Visconti,2018).

In clinical practice, ASDs have been more often than not treated with cognitive-behavioral approaches, including a face-to-face interaction with the advisor. Over the final a long time, virtual reality (VR) has played an vital part in neurorehabilitation, indeed for ASD cognitive treatment. (De Luca,2021).VR as “an artificial environment which is experienced through tangible stimuli (such as sights and sounds) given by a computer and in which one’s activities somewhat decide what happens within the environment”. In a broader sense, VR incorporates a few intuitively video gaming, virtual situations, and, commonly, a multisensory encounter. VR employments numerous distinctive innovations: monoscopic or stereoscopic shows, client following advances, increased reality (AR) to combine genuine and virtual universes, etc. (Mesa-Gresa,2018)

Methodology

Research begins with addressing the issue of children with Autism Spectrum Disorder (ASD). According to research method which is qualitative research from the interview if 4 instructor, the researcher has chosen the categories of autism spectrum which is severe types. Then researcher choose one of the special needs in sensory to use as a main criteria in designing product which is eye focus. The final product, which is Virtual Reality (VR) with putting the element and design criteria according to the result from the survey and peer review completed by researcher to respondents. One of the guidelines to assist the researcher in the design process in producing products based on requirements according to the research made is the design criteria table that comprises of aesthetic, usability and technical aspects. Researcher have made mapping and interpretation of design criteria in detail for the production of the good product according to the proper specifications. These aspects also will

help to determine and focus the direction of the proposed design. Basically, the researcher chose to list these criteria through mapping and interpretation based on percentages and design attributes that are appropriate in the production of products for children with autism. The type of mapping of Usability, Technique and Aesthetic is shown as below in Figure 1:



Figure 1: Mapping and Interpretation

The researcher released all the important points throughout the interview and realized in the form of mapping. The results of the interview can help the researcher to produce some of the design criteria that are required and appropriate to the user. The type of design criteria which was found throughout the interview session to make a educational tool for children with autism is shown as below in Figure 2:

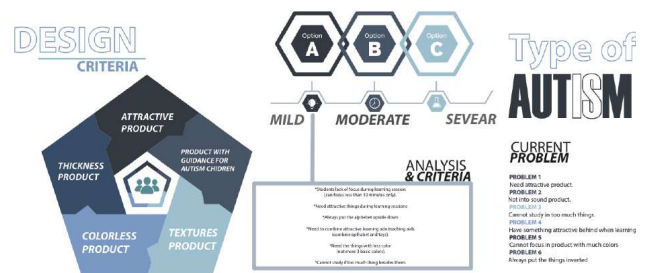


Figure 2: Design Criteria

Studio Research & Analysis
(Process of artwork making)

Researcher emphasizes on criteria product to design (Virtual Reality VR) that is suitable for children with autism. The resulting sketch will cover all the features and design requirements to produce this Virtual Reality. The researchers make sketches with all the requirements that need to be

completed according to the needs of the users. The criteria contained in these design criteria are also as a whole to fulfil the requirements of the Clarification Criteria in Figure 3 below.

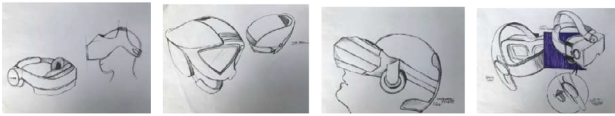


Figure 3: Clarification Criteria

(Studio investigations)

Starting from this process, the idea began to be developed and before the researcher made the final design, the reviewer made a peer review to get an outside idea from the respondent. From that, the researchers came out with the design of ideas designed digitally through a schematic drawing ratio. This step is aimed at ensuring the final product gains actual measurements and avoids confusion when producing final product designs.



Image 1

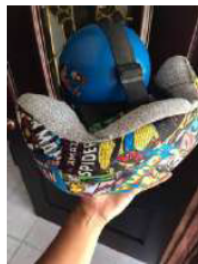


Image 2

Based on the session, after exploring sketching two-dimensionally, researcher produced mock-up study model in order to study the form three-dimensionally. The first mock up study that researcher started producing such Image 1. At this stage, the researcher included all the elements and design criteria requirements. only using cheap and easy-to-use materials. The researchers replaced Virtual Reality with spectacles to save on costs. The first attempt is to see the position and function on the product. Then, the researchers made improvements by producing mock-up studies using the correct material. This step is aimed to see how far the product is before the researcher makes usability testing. Furthermore, the tangible mock-up can be felt and researcher can measure its shape and proportion in order to suit users comfortable. The production of mock-

up study looks like a Image 2.

Final product

This product as a whole emphasizes the importance of helping autism children improve their behaviours to better focus and have eye contact when speaking. Researchers choose safety designs that can be affixed and wearable to the child according to the size required. This can help them Image 1 Image 2 wear this product comfortably and the guard does not have to worry about the damage that will occur on the Virtual Reality. Finally, all of these ideas will be forwarded to the next process, which is the final product in Figure 4.

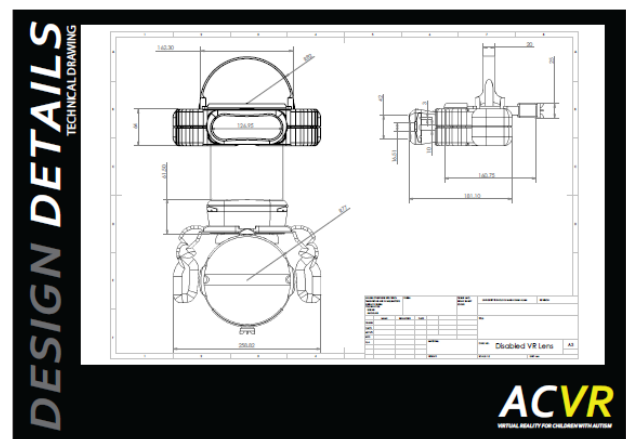


Figure 4: Technical Drawing & 3 Dimensional Shape

Findings

Researchers initiate product creation by making an operation on existing Virtual Reality. Adding appropriate criteria for autism children does improvement. As we know, Virtual Reality nowadays is just created for a normal person as a viewing entertainment. In fact, this product is

needed for special needs children with autism children who have no eye contact. Researchers attach soft material to Virtual Reality by sewing cotton cloth around. This is aimed at providing comfort to consumers. Based on Figure, researchers place the fibre glass on the front of the Virtual Reality before they are wrapped with cotton fabrics. It aims to make this product stronger and more sustainable. In a sewing cotton fabric, the researcher put the material of ‘small bubble sponge’ to get the form of a pillow. This design becomes lighter and more comfortable. Wrapping cotton fabric around that can reduce the risk of fracturing on Virtual Reality when it falls. Furthermore, the Figure 5 below shows the researcher to attach the safety material by emphasizing the locking buttons that can be attached to when it is used (final design).



Figure 5: Final Design

Conclusion

To conclude, the study focused on design element and comfortable by manifesting the innovative solutions focus on children with autism. This is one of the initiatives products that help these groups change behaviour to better. The child’s sympathy to be better is through the production of products that emphasize the importance and method of helping them to become like a normal children. This tool also will be enhanced with additional functionality and criteria that make it appropriate and user-friendly for users such as kids with autism spectrum.

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Tarikh : 20 Januari 2023

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