

Designing a Virtual Exhibition of Children's Drawings for Parents to Learn About Their Child's Growth and Development

Amalia Ghaisani¹, Antonius Edi Widiargo², Lukas Sugiyanto³

^{1,3}Visual communication design, Recreational Arts Science Polytechnic, Ciangsana, Bogor, Indonesia. ²Animation, Recreational Arts Science Polytechnic, Ciangsana, Bogor, Indonesia

Email: antoniusediwidiargo@politeknikssr.ac.id², lkssugiyanto@gmail.com³

This study aims to determine the physical and psychological development of children interpreted through children's drawings. The research method uses research and development with a descriptive approach. The design technique uses 3D Vista while data collection is done by observation and interviews. The design results educate parents about child development through visual representation in a virtual exhibition that can be accessed online and form a dynamic platform in child education and parental involvement.

Keywords: Virtual Exhibition, Growth and Development, 3D Vista Design, User Interface, and User Experience

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Corresponding Author:

Antonius Edi Widiargo

Recreational Arts Science Polytechnic, Ciangsana, Bogor, Indonesia

antoniusediwidiargo@politeknikssr.ac.id

1. Introduction

Child growth and development is the process of growth and development that occurs in children from childhood to adulthood through experiences that will influence their growth and development in the future [1]. Children have growth and development patterns (fine and gross motor coordination), thinking power, creativity, language and communication, which are included in intellectual intelligence (IQ), emotional intelligence (EQ), spiritual intelligence (SQ) or religious intelligence (RQ), according to the child's growth and development level [2]. Children are the hope as the next generation for their parents and for the nation, so children need to be looked after and their growth and development must be monitored so that the quality of their growth and development is good [3].

Parents' ignorance of their children's needs and the lack of appropriate responses shown by parents to their children indirectly have a negative impact that can influence the development and personal tendencies of children in adulthood [4]. Children's drawings can essentially be analyzed for their meaning from every stroke, scribble, line, color, and object they create. Each child's drawing is unique in each stroke, the shape and size of the object, and its composition. These drawings can be analyzed to reflect the child's development both physically and psychologically. A child's physical and psychological development can be influenced by hereditary factors and environmental influences. The results of the researcher's interview with Kak Kresno, a child psychology expert, explained that the essence of psychology related to children is essentially a science that studies the psychological aspects of children from various perspectives that allow us to recognize the tendencies that will be carried out or occur in children, so things related to their uniqueness are still related to their stages. This shows the importance of the role of parents in understanding child growth and development.

The problem of parents' ignorance of their children's needs and their lack of appropriate responses to them indirectly have negative impacts that can affect their development and personal tendencies in adulthood. Therefore, in this increasingly sophisticated and modern era, parents are required to be extra careful in

carrying for, guiding, and paying attention to their children's growth and development [5]. Problems in designing a virtual exhibition of children's drawings for parents to learn about their child's development include: (1) the availability of technology, such as internet access and adequate devices, may be uneven among parents. (2) parents' technical skills in using technology, along with adequate technical support, are crucial. The user interface design must be intuitive, easy to navigate, and consider accessibility for users with special needs. The content presented must be relevant, informative, engaging, and interactive to capture user attention. The security and privacy of children's and parents' personal data must be guaranteed, and strict access controls must be implemented. Social interaction features that enable collaboration and communication between parents, teachers, and child development experts must be provided, as well as community support for sharing experiences and suggestions. Effective feedback mechanisms and assessments of the exhibition's effectiveness are also crucial to ensure maximum benefits. (3) development costs and financial support for the exhibition's sustainability need to be well-managed. Addressing these issues will help create a virtual exhibition that is accessible, engaging, and useful for parents in understanding their child's development.

Based on the above problems, this design will provide understanding and knowledge for parents who want an easier and more efficient way to obtain information about their child's development. A virtual exhibition of children's drawings offers a solution by presenting children's artwork online, allowing parents to view, appreciate, and understand developmental stages through artistic expression. Furthermore, this exhibition can also serve as a means to strengthen relationships between parents and children, as well as between parents and the wider community.

This study aimed to examine children's physical and psychological development as interpreted through children's drawings. Because age influences children's cognitive development, this study focused on children aged 3-6 years. The children's drawings were collected and then digitally illustrated. The visualizations of these drawings were then presented in the form of a virtual exhibition. Explanations of visual language related to physical, psychological, and cognitive development were included in the presentation, leading to the title "Designing a Virtual Exhibition of Children's Drawings for Parents to Understand Children's Growth and Development."

2. Literature Review

Growth and development are two distinct but inseparable phenomena. Growth is a change in body shape and is something that can be measured and observed directly, such as height, weight, and head circumference. Development, on the other hand, focuses more on the functional maturity of body parts [6]. Growth is often associated with the word "development," thus the term "growth and development" exists, making it a component of development. Growth can be easily observed through weighing or measuring height. Development, on the other hand, is a mental change that occurs gradually and over time, from simple abilities to more complex ones, such as intelligence, attitude, behavior, and so on [1].

Furthermore, visual communication design is a science that studies the concept of communication with the expression of creative power applied in various visual communication media by processing graphic design elements including images (illustrations), letters, colors, composition and layout [7]. Meanwhile, visual elements consist of points (One of the visual elements whose form is relatively small with the dimensions of length and width considered insignificant. Points tend to be displayed in the form of groups with variations in number, arrangement, and certain density), lines (lines have a direction and elongated dimensions that can be done straight, curved, wavy, zigzag, and others), planes (Planes can be presented by arranging points or lines in a certain density, and can also be presented by bringing together pieces of

the results of scratches of one or more lines), space (Space is the division of planes or distances between objects consisting of points, lines, planes, and colors), color, and texture (the tactile value of a surface) [8].

In this design, we use an internal expression system, namely a way to arrange various contents of the wimba and a wimba method in a single image so that it can tell a story and an external expression system, namely a series of single images one after the next until the series of images can tell a story [9]. Both internal and external expressive systems each have four types of scope, namely expressing space, expressing movement, expressing time and space, and expressing importance. Meanwhile, the fine arts aspect in children's drawings can be seen from two elements: the visual elements (line, color, shape & space) and the emotional elements (story, theme, fiction or fantasy) [10].

A virtual exhibition is a single or multi-user realistic 3-dimensional representation, where visitors can navigate, observe the exhibit, learn related information about it presented in various media [11]. Meanwhile, virtual technology focuses on computer-generated images and sounds designed to simulate a realistic environment and played using sensors or navigation. This technology is designed with computer devices so that users can interact and explore as if they were walking through a real location, which in this context is an art exhibition space [12].

This design utilizes User Interface (UI) and User Experience (UX). UI, or user interface, is the communication mechanism between the user and the system in a program, whether it be a website, mobile application, or software. UI encompasses the physical appearance, color usage, animation, and communication patterns between a program and its users. UX, or user experience, is the user experience an application provides to its users, ensuring engaging and enjoyable interactions [13]. UX is based on user experience. The goal of UX is to understand who the users are, what they want to achieve, the best way to achieve it, how they feel, and what difficulties they encounter when using the application. The primary focus of UX is on the user experience. The visual concepts used in designing a virtual exhibition of children's drawings for parents to learn about their child's growth and development include character, layout, typography, and color.

Framework

Based on the description of the concept of designing a virtual exhibition of children's drawings for parents to understand their children's growth and development, the conceptual framework is presented below.

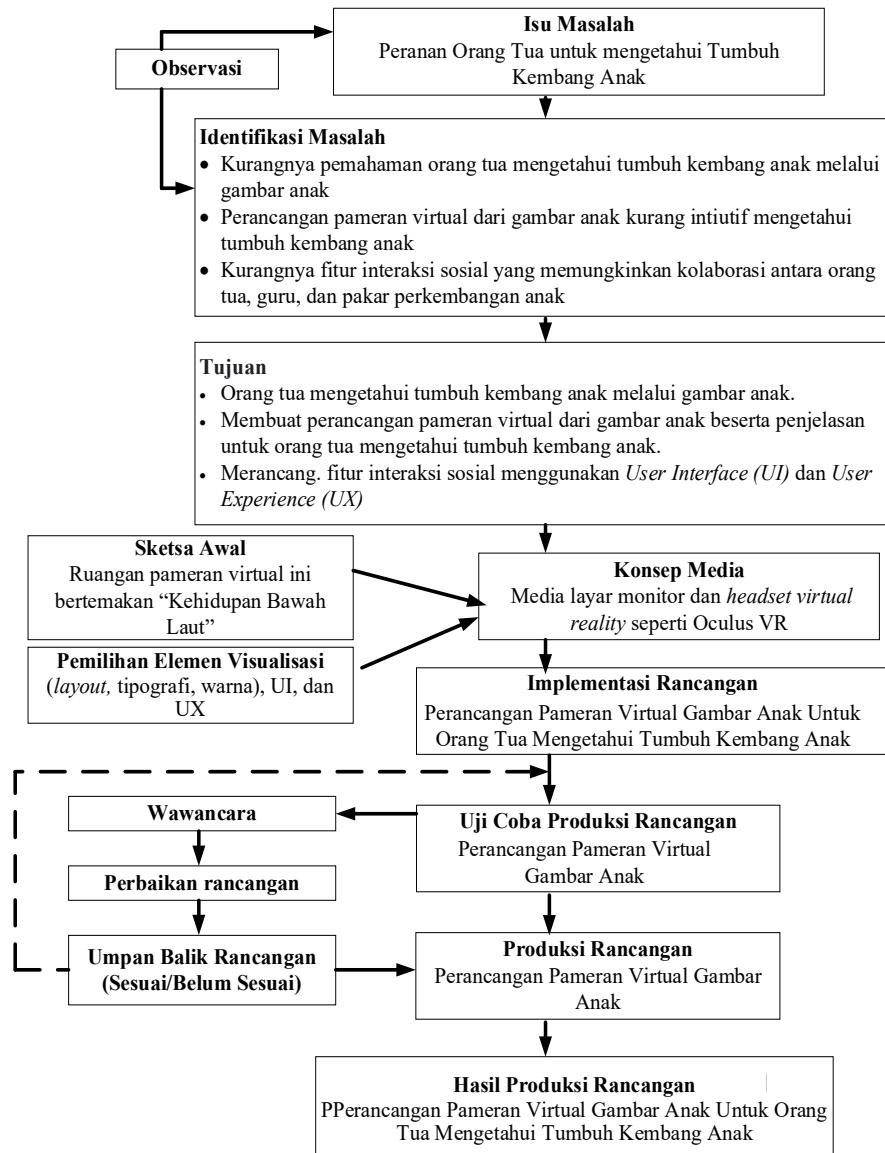


Fig. 1. Thinking Framework

3. Research Methods

The Research and Development method is a research method used to produce a specific product and test its effectiveness. This research employs a pre-production, production, and post-production research model. The goal is to design a virtual exhibition of children's drawings for parents to learn about their child's growth and development. Data collection techniques include observation, interviews, documents, theoretical literature, and research journals.

4. Results and Discussion

Pre-production results

The visual design of the virtual exhibition is designed to make visitors feel as if they are actually inside the exhibition space. Visitors are allowed to move or relocate from one point to another within the virtual exhibition area. The visuals of the virtual exhibition are designed to engage visitors, especially young children, and encourage them to linger.

The objects displayed in the virtual exhibition are drawings created by students from the Early Childhood Education (PAUD)/Kindergarten (TK) at Citra Berkas Citra Indah City Jonggol School. The drawings, collected on paper, were then scanned and converted into digital form. In addition to the drawings, the results of an analysis of children's cognitive and character development through visual language are also presented.

Character



Relia artwork

Gung De artwork

Jordan artwork

Shafia artwork

Fig. 3. Children's Cognitive and Character Development in Terms of Visual Language

Based on the image above, several characters were designed to be used as visuals in this virtual exhibition to support the theme. Several posters or images closely related to the underwater theme were displayed on the exhibition walls as interior and exterior decorations. Some of the characters used include turtles, whales, divers, and jellyfish.



Source: <https://www.freepik.com/>

Fig. 4. Characters Used in the Exhibition

Rough Sketch

A rough sketch drawn before creating the design in the 3D Vista application for designing the virtual exhibition visual design, shown in the image below.

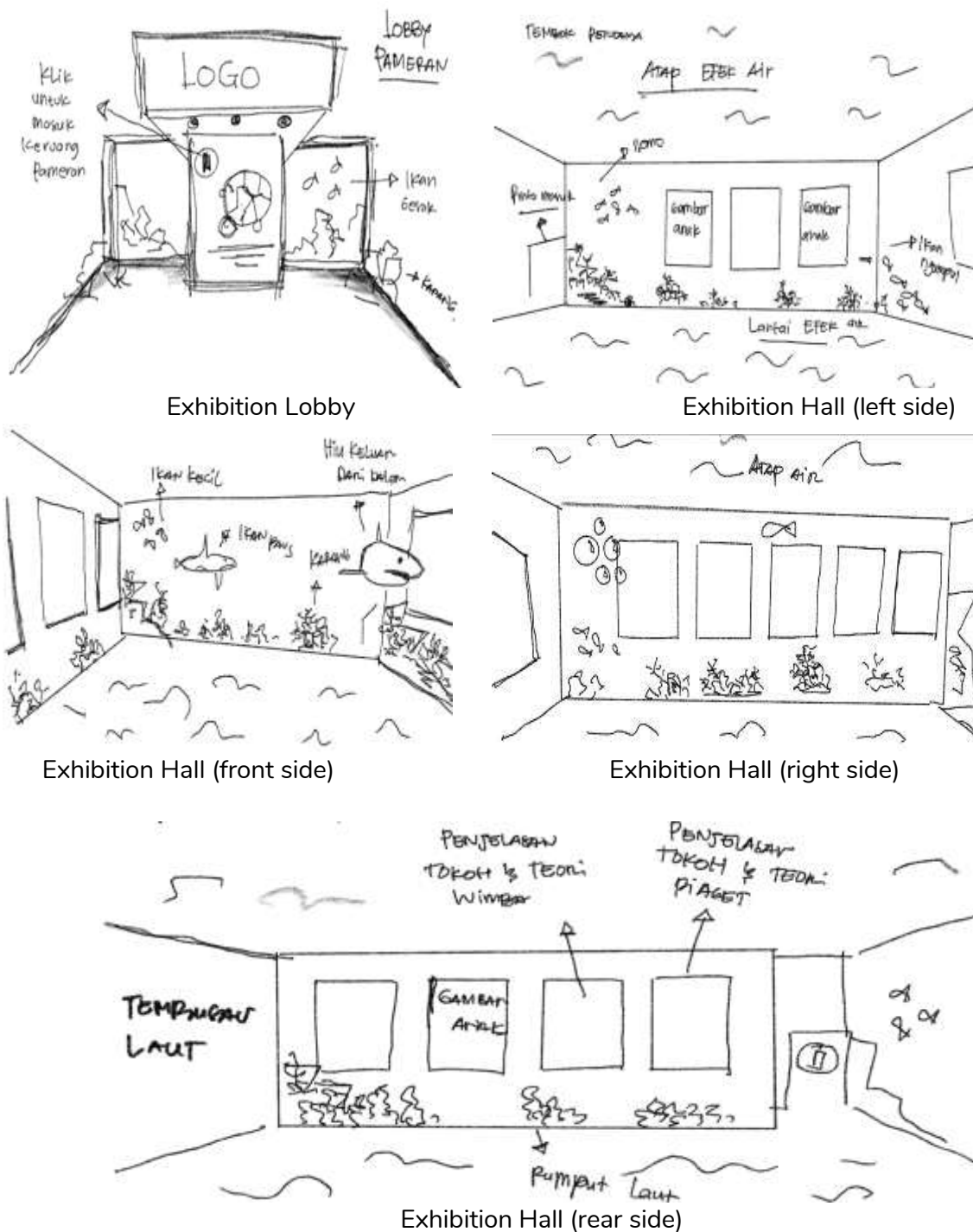
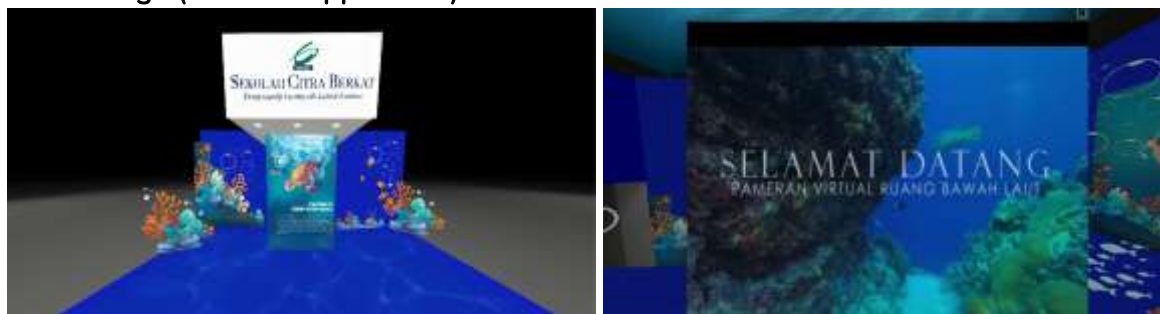


Fig. 5. Design in the Vista 3D application

Final Design (3D Vista application)



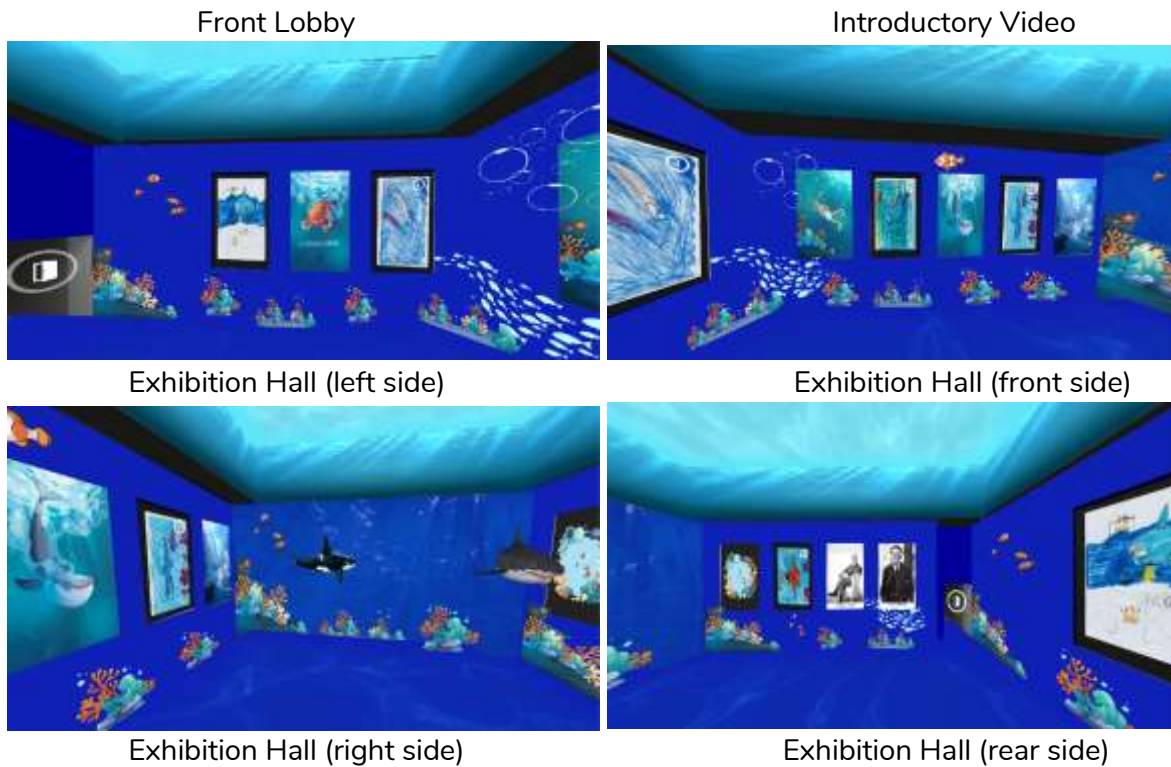


Fig. 6. Exhibition Hall

Display of Works at the Exhibition

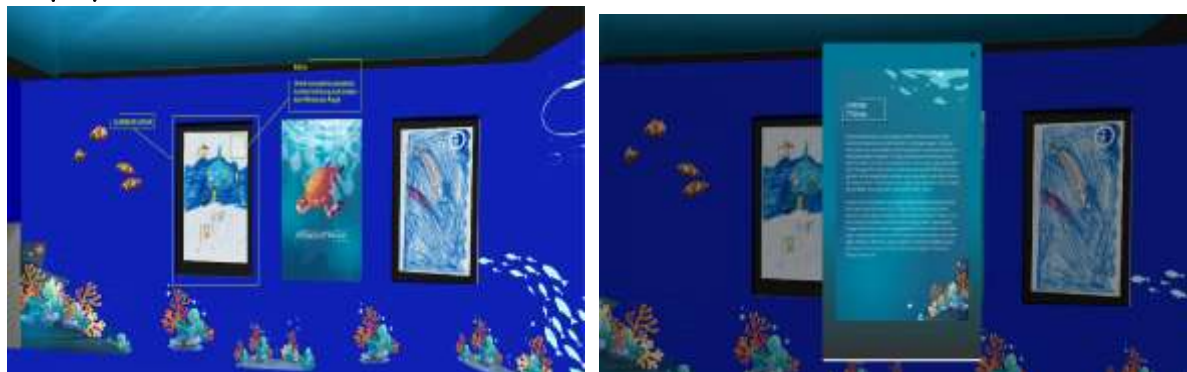
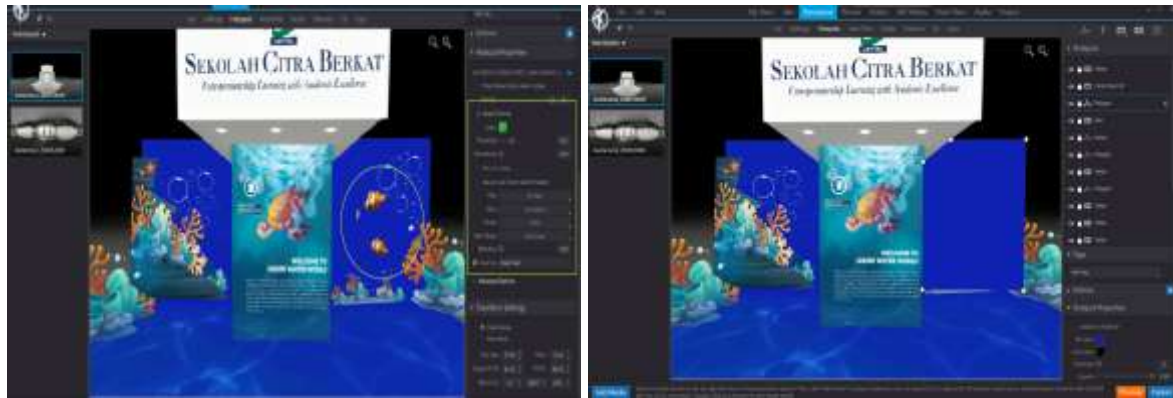


Fig. 7. Display of Works at the Exhibition

Production Process Results

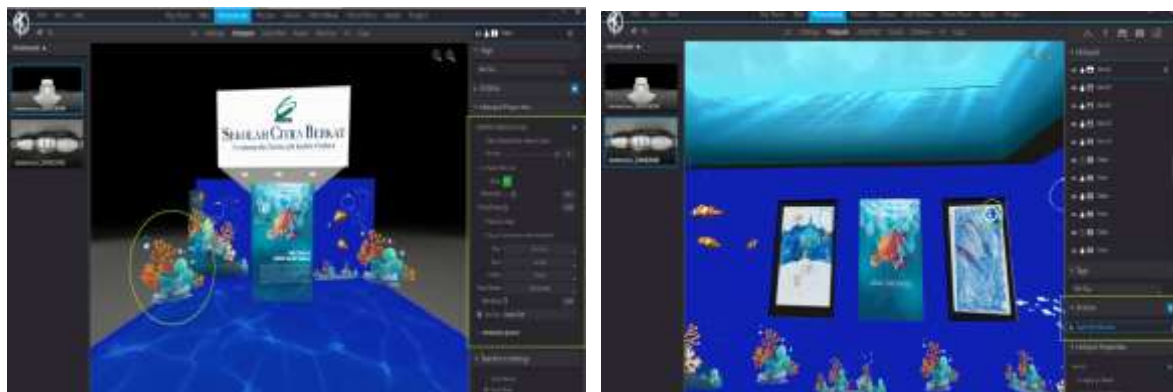
The production process for designing a virtual exhibition of children's drawings for parents to learn about their child's growth and development. This virtual exhibition was designed using the 3D Vista application, as shown in the image below.



Exhibition Lobby Display and
Green Screen Animation Video

Front Lobby and Lobby Wall View

Green Screen Animation Video



Front Lobby and Lobby Wall View

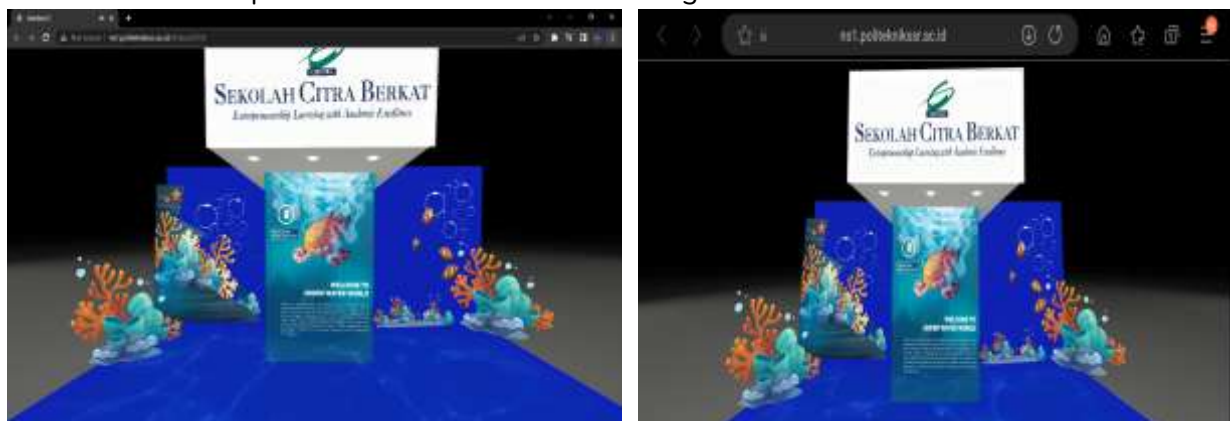
Add Actions View

Fig. 8. Display of the Exhibition Production Process

Post-Production Results

A virtual exhibition was chosen as the display medium so that the information presented from this research could be easily accessed through a user interface and enjoyed effectively and without boredom. Furthermore, a virtual exhibition can reach a wide audience without the constraints of distance and time.

The results of the data analysis were then presented in the form of a virtual exhibition so that they could be viewed by researchers, academics, children (who were the subjects of the research), parents, school teachers, and other interested parties. The virtual exhibition was uploaded to the SSR Polytechnic website because it has the potential to reach a wider and larger audience. Virtual exhibition link:



Virtual Exhibition View via Browser

Virtual Exhibition View via Mobile (Landscape)

Source: <http://ns1.politeknikssr.ac.id/Ghaisa2019>

Fig. 9. Virtual Exhibition View

The design of a virtual exhibition of children's drawings to help parents understand child development. The exhibition aims to educate and provide parents with insight into child development through visualization. The exhibition concept is designed to illustrate child development throughout childhood, and to present information in an engaging and informative manner, ensuring accurate and useful information. The design of a virtual exhibition of children's drawings, aimed at helping parents understand child development, involves three key stages: pre-production, production, and post-production. The exhibition's goal is to educate parents about child development through drawings, design the exhibition concept, including the theme, storyline, and presentation method, collect relevant and informative children's drawings, and conduct research on the stages of child development that will be presented in the exhibition. Furthermore, choosing the right platform is crucial.

The use of the 3D Vista application was chosen as the platform for the virtual exhibition to support the presentation of content in an interactive 3D format. Furthermore, collecting relevant and informative children's drawings enriches the exhibition experience. The production team consisted of a graphic designer, a web developer experienced with 3D Vista, and a child development expert, namely Kak Seto.

The design of a virtual exhibition of children's drawings using the 3D Vista application aims to help parents understand their children's growth and development, offering a number of significant benefits including education, interaction, accessibility, and user experience. Firstly, from an educational perspective, this exhibition provides detailed and structured information on the stages of child development through engaging visualizations and infographics, making it easier for parents to understand their child's development process comprehensively. This information is presented in an easy-to-understand and accessible format, allowing parents to learn and gain valuable insights without having to search for information from various, potentially less reliable sources.

Furthermore, the accessibility benefit is equally important. This virtual exhibition can be accessed from anywhere and at any time, without any time restrictions. This is particularly advantageous for parents who may have limited time or difficulty visiting a physical exhibition. This exhibition benefits from being able to reach a wide audience, especially parents interested in understanding their children's growth and development, and thus benefit from the information presented. From a practical perspective, this virtual exhibition design also offers cost and time efficiencies. Without the need to rent a physical exhibition space, arrange shipping logistics, or print exhibition materials, operational costs can be significantly reduced. The information production and dissemination process also becomes faster and more flexible, allowing for real-time content adjustments and updates as needed.

Finally, a long-term benefit of this virtual exhibition is easier documentation and evaluation. With the analytics features provided by the 3D Vista application, data on user interactions, visitor numbers, and feedback can be effectively collected and analyzed. This information is invaluable for future evaluation and improvement, ensuring that the virtual exhibition remains relevant and effective in achieving its objectives. Structured documentation also facilitates the preparation of final reports and references for similar future projects.

Overall, designing a virtual exhibition of children's drawings using the 3D Vista application not only provides significant educational benefits for parents in understanding child development but also offers an immersive user experience, broad accessibility, cost and time efficiency, and the potential for continuous evaluation and improvement.

5. Conclusion

Conclusions of the design of a virtual exhibition of children's drawings for parents to learn about their child's growth and development: (1) Presenting information about child development through informative images so that understanding the growth and development process is easier and more enjoyable for parents. (2) The design uses UI/UX features to provide ease of social interaction and a comprehensive user experience, including interactive features that increase visitor involvement in exploring the exhibition content. (3) The exhibition design can be accessed online from various locations and at any time so that more parents can access this important information easily. (4) The design of a virtual exhibition of children's drawings with the 3D Vista application provides the benefits of user interaction and accessibility to increase parents' understanding of child growth and development.

6. References

- [1] W. S. Aisyah, N. Dede Khoeriah, I. Setiawan, and M. Rifai, "Upaya Orang Tua Dalam Tumbuh Kembang Anak Untuk Membangun Karakter Anak Usia Dini Di TK Kemala Bhayangkari 30 STIK Kebayoran Baru Jakarta Selatan," *AL-AFKAR J. Islam. Stud.*, vol. 6, no. 2, pp. 585–599, 2023.
- [2] N. Putri, W. Ningrum, F. Mayang, J. Pane, I. Seri, and K. Yani, "Pendidikan Anak Usia Dini: Perannya dalam Membangun Karakter dan Tumbuh Kembang Anak Usia Dini," 2021.
- [3] I. Kuswanti, L. Rochmawatia, and L. Rahmawati, "Pengetahuan Ibu Tentang Tumbuh Kembang Anak Umur 1-3 Tahun di Masa Pandemi Covid 19," *J. Indones. Sehat*, vol. Vol. 1, No, no. J. Indones. Sehat, pp. 1–6, 2022.
- [4] P. Y. Pratiwi and I. G. A. P. W. Budisetyani, "Emosi dan Penggunaan Warna Dominan Pada Kegiatan Mewarnai Anak Usia Dini," *J. Psikol. Udayana*, vol. 1, no. 1, pp. 160–170, 2013.
- [5] S. Nahriyah, "Tumbuh kembang anak di era digital," *Risâlah*, vol. 4, no. 1, pp. 65–74, 2018.
- [6] T. Nurwulandari and T. Arifin, "Sistem Pakar Untuk Mendeteksi Tumbuh Kembang Anak Usia 0 Sampai 2 Tahun Berbasis Android," *J. Tekno Insentif*, vol. 12, no. 2, pp. 28–35, 2019.
- [7] Abdurrozaq and G. R. Deni, "Perancangan Branding Kre Sesek Sentra Tenun 'Karya Mandiri' Sumbawa melalui Media Desain Komunikasi Visual," *JISIP (Jurnal Ilmu Sos. dan Pendidikan)*, vol. 6, no. 1, pp. 1821–1831, 2022.
- [8] S. Wahyuningsih, *Desain Komunikasi Visual*. Madura: UTM Press, 2015.
- [9] T. Primadi, *Bahasa Rupa*. Bandung: Kelir, 2012.
- [10] H. Pamadhi and E. Sukardi, *Seni Keterampilan Anak*. Jakarta: Universitas Terbuka, 2008.
- [11] F. Al Hazmi, K. N. Zenmira, and S. A. Budyawan, "Persepsi Partisipan Terhadap Kualitas Pameran Seni Rupa Secara Virtual dalam Situasi Pandemi Covid-19," *J. Tata Kelola Seni*, vol. 7, no. 2, pp. 79–90, 2021.
- [12] M. E. Rahmah and Jassica Nikita, "Dampak Penggunaan Teknologi dan Pameran Virtual pada Komunitas Seni Lokal Selama Pandemi," *J. ATRAT*, vol. 10, no. 1, pp. 9–18, 2022.
- [13] H. Himawan and M. Y. F., *Interface User Experience*. Yogyakarta: Lembaga Penelitian & Pengabdian kepada Masyarakat Universitas Pembangunan Nasional "Veteran," 2020.