# The Design and Development of Learning Media "Circle Time Management" Based on Virtual Reality Games in an Innovative Pedagogical Perspective

**Mutiara Magta**
**Universitas Terbuka**

**Esti Kurniawati Mahardika**
**Universitas Terbuka**

*The development of increasingly sophisticated technology should be utilized as a medium for educational innovation. One of the technologies currently being developed is virtual reality which provides a real experience to its users. This study describes the analysis, design, development, and validation of virtual reality technology-based learning materials for early childhood education students' comprehension of classroom management content utilizing the Circle Time model. Three teachers and three experts, including media, early childhood, and circle time experts as product validators, participated in this research approach's two-year analysis, design, and development phases. The ADDIE model was modified for use in this process. Afterward, quantitative and qualitative data analysis was done on the information gathered through surveys and conversations. Based on the findings of the expert assessment, it can be concluded that learning media for the "Circle time management" based on virtual game reality can be created by adding components of innovative pedagogy such as experiential learning, computational thinking, embodied learning, multiliteracies, and gamification.*

*Keywords: circle time, innovative pedagogy, virtual reality*

## INTRODUCTION

Education is a communication process based on the definition of an interaction between two or more individuals to improve self-quality (Mahadi, 2021; Wisman, 2017). The process of improving self-quality in the world of education requires a variety of media. Media use can make educational activities more interesting and facilitate the individual's absorption of knowledge and information (Magta, 2022; Muhayat et al., 2017; Widiarsini et al., 2021). Media that is currently widely used is based on virtual reality technology. Virtual reality (VR) is a 3D computer technology that can present an illusion of space/environment adapted from actual conditions so that it seems as if the user can directly experience the condition (Cipresso et al., 2018; Rachmatullah & Sukihananto, 2020; Steure, 1993). Currently, virtual reality is the most popular technology, including in the world of education (Oyelere et al., 2020).

VR technology makes users feel as if they are in an actual situation. This sensation involves direct feelings, which increases the user's experience. The higher the level of reality that appears in the VR world, the higher the level of realism of user behavior (Cipresso et al., 2018). In education, VR is an alternative that benefits the learning process. Through VR, teachers and students can experience real experiences and

interact with learning phenomena that may be difficult to obtain in the physical world (Oyelere et al., 2020). Several studies have shown that using VR media in learning provides users with a pleasant learning experience where students more easily capture the delivery of the material, are stimulated to learn more deeply, and their creativity and constructivist mindsets are increased. In addition, VR media provides time and cost efficiency benefits in the field of medical science, such as nursing, where clinical simulations are required for learning (Hidayati & Ramansyah, 2018; Pratama et al., 2019; Rachmatullah & Sukihananto, 2020; Rohmah & Russanti, 2021).

However, technology does not always significantly improve student learning outcomes; therefore, various learning aids are needed (Bizami et al., 2022). For this reason, the development of technology-based media, such as VR, must to adhere to the principles of an innovative pedagogical approach that directs students to think innovatively and encourages them to be enthusiastic about problem-solving (Kulkarni, 2020). Pedagogical innovation is a process that reinvents teaching practices to better support student learning. Providing real learning experiences is the key to implementing this approach. The discussion results stated that currently, innovative pedagogy is related to technology (LACroix, 2020).

One of the early childhood learning models that students from the Early Childhood Teacher major must learn is the Beyond Centre and Circle Time (BCCT) model. The distinctive feature of this model is the foothold that the teacher must prepare to build children's concepts of rules, ideas, and knowledge (Fitri et al., 2022). The stages include the playing environment, pre-play, playing, and after-play (Based & Intelligence, n.d.). The learning process with the BCCT model is realized by circle time. Circle time is a structured framework for group interaction to develop knowledge and skills of self-awareness, knowledge and an understanding of the environment, a sense of belonging and connection, a focus on the positive, increased emotional resources and well-being, and more collaborative decisions, conflict resolution and problem-solving (Dockett & Perry, 2021). This model relies on Vygotsky's scaffolding constructivism theory which emphasizes that a person's development depends on the results of his interaction with the surrounding cultural environment (Luria, 2015). Thus, circle time classes use play platforms as tools for children's interaction with their environment to achieve their higher potential.

Currently, media can only be used by students in studying the circle time model through videos or conducting comparative studies with schools that have implemented the circle time model. Since early childhood education students from Universitas Terbuka are distance learning students, virtual media is urgently needed to help them study independently and measure their understanding of the material. Based on this description, this study aims to develop learning media in the form of virtual reality-based circle time management games for early childhood education. The research questions in this paper are 1) Is learning media for virtual reality-based circle time management feasible to develop? 2) Does the learning media for managing circle time based on virtual reality contain an innovative pedagogy approach?

## METHOD

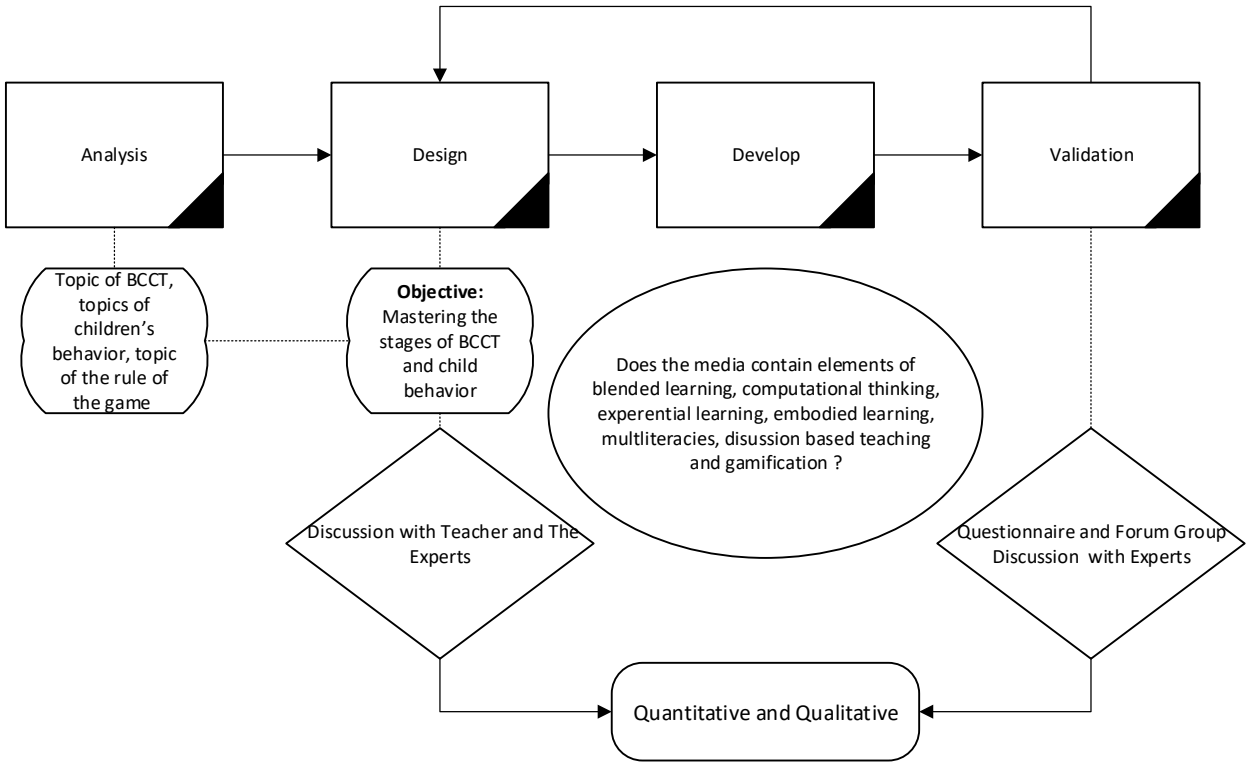
This study uses the ADDIE (analysis, design, development, implementation, and evaluation) model development research type. The ADDIE model is used because it has more concise and easier-to-understand stages in each plot (Aliyu et al., 2023). However, the focus of this paper is to describe the process of the stages of analysis, design, and development, considering that the development of the research process is still ongoing. Data was collected quantitatively and qualitatively through questionnaires and group discussion forums. Questionnaires from the experts validated the products, while discussions were focused on learning scenarios that will be realized in virtual reality games.

**TABLE 1**
**DATA COLLECTION INFORMATION**

| No | Data collection tool | Participants |
|---|---|---|
| 1. | Forum Group Discussion | Teachers and Early Childhood Experts |
| 2. | Questionnaire | Experts |

The focus of the research procedure only describes the stages of analysis, design, and development. In the analysis and design phase, we recruited three teachers and three early childhood education experts to determine several aspects that should appear in the virtual reality game for managing circle time. The involvement of teachers refers to their experience in implementing classes with the circle time model, while early childhood education experts provide perceptions on the theories that will be used in the games. While at the development stage, we involve educational technology experts, circle time experts, and early childhood education experts as product validators. Educational technology experts validate aspects of product feasibility as learning media. Circle time experts validate game content that includes circle time as the game's core. Finally, early childhood education experts validate child behavior content and its theory.

**FIGURE 1**
**RESEARCH PROCEDURE**




The data collection instrument consisted of three instruments: evaluation validation of learning media, circle time material, and early childhood education theory material. The learning media validation instrument is used to measure the feasibility of the product based on the display, the message design, the program strategy, and the audio. The circle time material validation instrument measured the feasibility of the stage material and how it is presented. The early childhood material validation instrument measured the feasibility of the early childhood education theory and its presentation. Meanwhile, the forum group

discussion (FGD) focused on discussing the products' function as an innovative pedagogy medium. Product development process data were analyzed descriptively based on the reviews and suggestions of experts. The expert validation instrument was developed into a questionnaire sheet using the Likert Assessment Scale 4.

## FINDINGS

The results of this study will be described as follows:

The analysis and design phase produces several aspects that must appear in game products. For example, 1) determining the specific purpose of the product, 2) determining the class situation in the game, 3) determining the behavior of children who disturb the class, 4) determining the center to be used, 5) determining the game score calculation, and 6) determining the flow of the game. The design begins with developing a scenario for how the game situation unfolds. From discussions with early childhood education teachers and experts, learning scenarios with game designs were obtained and developed based on two situations: large and small circle time. The situation contains several questions at each level that can advance the player/game user to the next stage.

**TABLE 2**
**SUMMARY SCENE DESIGN**

| Category | The Problem |
|---|---|
| Circle time | What should the teacher do during large circle time? |
| | What is the first step that the teacher must prepare when the child enters small circle time? |
| | Based on the preparatory center playing environment, what media must be available? |
| | Entering the step before playing, what do you do? |
| | After the playing activity is over, what step do you choose? |
| | What do you do in the step after playing? |
| Behavior of children | When the children pray, one runs around, ignoring the teacher's request to join. What do you do in this situation if you refer to Kohlberg's theory? |
| | When explaining a topic to the children, a child hits his friend. Based on Lickona's theory, what do you do? |
| | When the children are playing, a child suddenly forces their way into the playgroup. Based on Skinner's theory, what do you do? |
| | Some children do not want to follow instructions and choose other activities. Based on Piaget's theory, what do you do? |
| | Some children do not finish the game. According to Vygotsky's theory, what do you do? |

**FIGURE 2**
**FLOWCHART OF THE OPENING GAME**

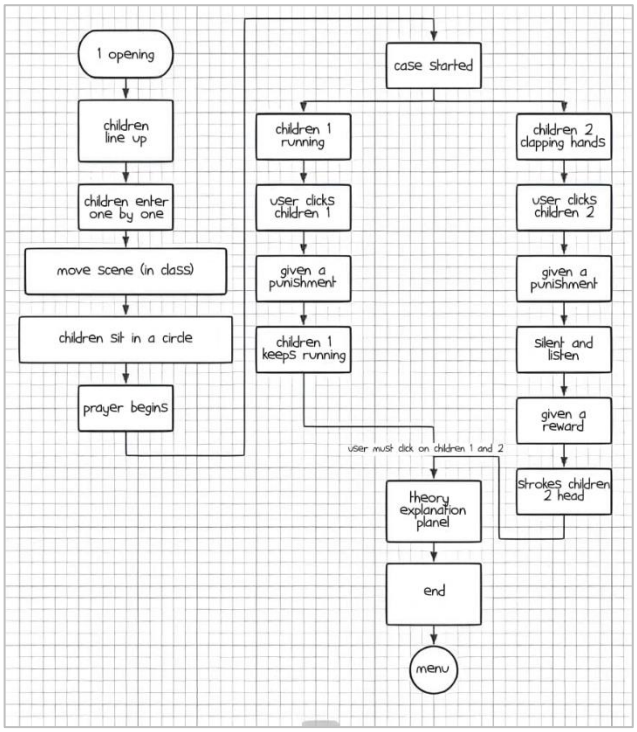



**FIGURE 3**
**FLOWCHART OF LARGE CIRCLE TIME**

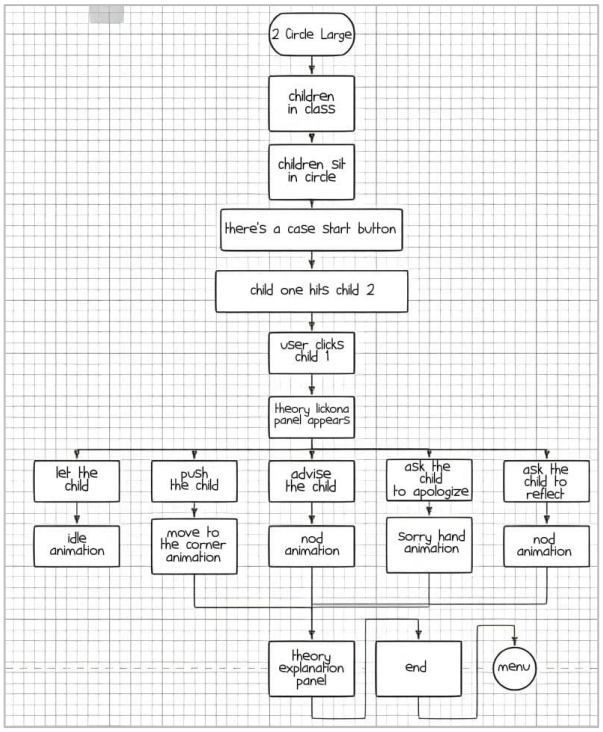
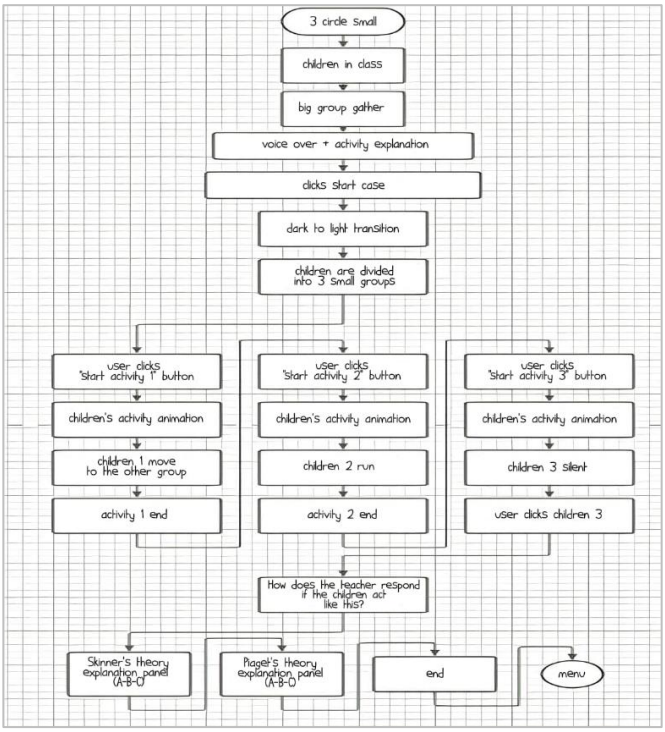


**FIGURE 4**
**FLOWCHART OF SMALL CIRCLE TIME**




Based on the flowcharts above, case scenarios for teaching and learning activities can be described as follows: (1) The game begins with the opening of the logo, and students line up to enter the class. (2) In the design of the large circle time flowchart in the first case, two children showed disruptive behavior (running around and clapping) while the other children were praying. Then the user, who acts as a teacher, is asked to respond following the behavioral theory learned from other courses. (3) In the design of the large circle time flowchart in the second case, child one hits child two. The user is asked to respond according to a moral theory such as Lickona, Kohlberg, etc.; (4) The design is the same as the small circle time flowchart for the third case, where the learning activities are arranged into three groups. Each group displayed different learning cases. In the first group, one child moves to the other groups before finishing their activity. In the second group, children were running around in the class and disturbing their friends doing learning activities. In the third group, there were cases of children who did not want to change groups even though their assignments had been completed. These cases require the user to respond based on the learning theory of Piaget, Vygotsky, etc.

If, in the initial design, the problem only revolved around the child's behavior which disrupted the class, then to strengthen circle time abilities, the problem was added with questions about preparing for circle time and its steps. After the design phase is completed with scenario revisions and flowcharts, the next stage is developing the design into a virtual reality product. From the results of the development of virtual reality media, it can be operated via Smartphone Specifications: 1) Minimum Android API Version 22 or Lollipop, 2) Recommended RAM 4GB, Minimum RAM 2GB, 3) Gyroscope sensor available, 4) Bluetooth available. Add on, Bluetooth Joystick Controller and VR Head Mounted / Cardboard. The development tool uses the Unity 3D Engine: version 2019.4.12f1; Programming Language: C#; Visual Studio: version 2019; 3D Modeller Engine: 3Ds Max v2021; Texturing Software: Photoshop 2022.

**FIGURE 5**
**OPENING "SPLASH VIDEO" AND GAME LOGO AND TITLE**


**FIGURE 6**
**VISUALIZATION OF CONCEPT MAPS THAT STUDENTS MUST MASTER**

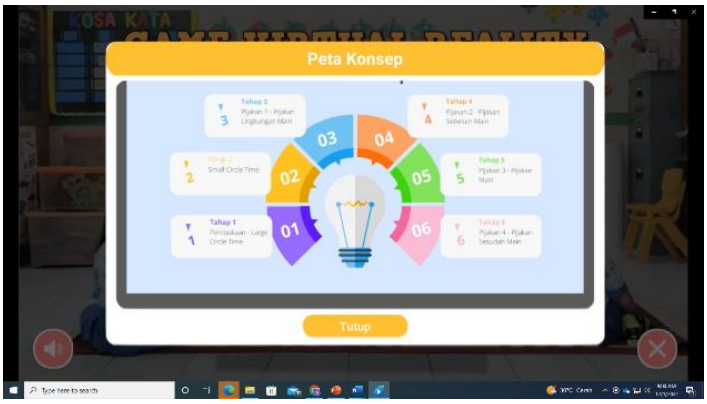



**FIGURE 7**
**LARGE CIRCLE TIME SITUATION**

**FIGURE 8**
**A QUIZ IN LARGE CIRCLE TIME**

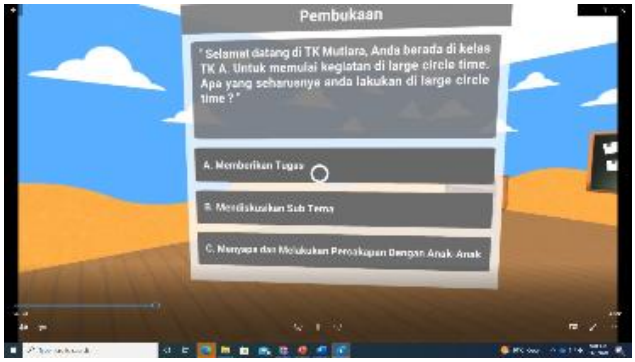



**FIGURE 9**
**A SMALL CIRCLE TIME SITUATION**


**FIGURE 10**
**QUIZ QUESTIONS ABOUT CHILDREN DISTURBING CIRCLE TIME**

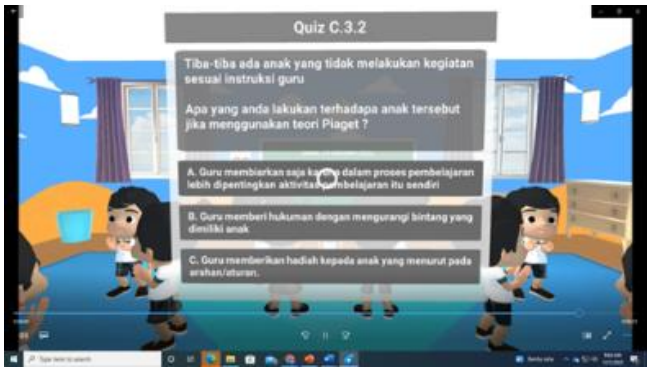
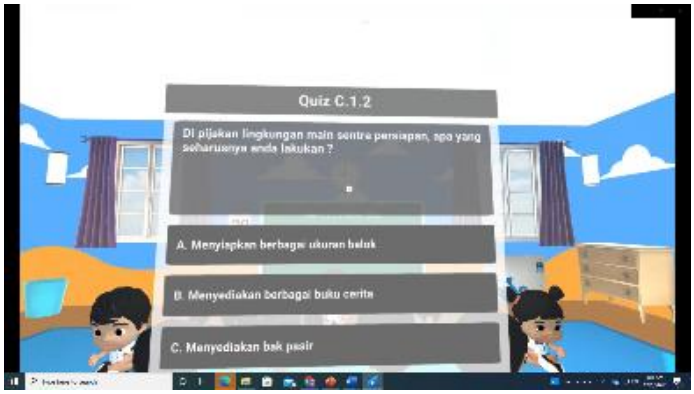


**FIGURE 11**
**QUIZ QUESTIONS ABOUT SCAFFOLDING IN CIRCLE TIME**




Products are assessed quantitatively by experts as a form of validation. The score obtained from the virtual reality experts was 89%. The circle time and early childhood experts' scores were 75% and 81%, respectively. The average of the three scores was 81.67%. Referring to the criteria determined, the score indicates that the virtual reality game product for managing circle time is feasible and can be tested on students. Meanwhile, based on the results of the FGD, the product only contains four out of seven elements of innovative pedagogy. The product's four elements include experiential learning, embodied learning, multiliteracy, and gamification.

**TABLE 3**
**FORUM GROUP DISCUSSION**

| | Media | CIRCLE TIME | PAUD | Result |
|---|---|---|---|---|
| Blended Learning | Not yet seen | | | It needs to be studied again whether this media can be used as a blended learning product. |
| Computational Thinking | This media has been developed with a coherent game flow from each stage that the user must pass. | This media presents problems related to the circle time learning process according to its stages. | This media provides problems related to children's disruptive behavior and prompts users to provide a solution based on an appropriate theory. | Strongly |
| Experiential Learning | This media has presented real classroom situations to ensure students can directly experience being a teacher in a class with the circle time model. | | | Strongly |
| Embodied Learning | This media can be used by students as if they were physically in a classroom and can use all their limbs to move according to the movements of the virtual children. | | | Average |

| | | | | |
|---|---|---|---|---|
| Multiliteracy | This media provides an opportunity for students to understand the technological tools used, such as VR applications, Google Glass, and the operation of games. | Through this media, students can understand the stages of circle time with virtual classroom situations. | Through this media, students can understand the various behaviors of children in class. | |
| Discussion based teaching | Not yet seen | | | - |
| Gamification | Media has been designed and developed with gameplay in mind. | | | Strongly |

## DISCUSSION

The first question of this research is whether this media is worth developing. According to the validation results from experts, it is stated that learning media for managing circle time based on virtual reality technology is feasible to develop. Referring to an innovative pedagogical approach, this media contains elements of computational thinking, experiential learning, embodied learning, multiliteracy, and gamification. The importance of paying attention to pedagogical principles in the development of learning media is the main requirement that must be considered so that learning objectives do not ignore the potential of students to think innovatively and not just accommodate the information. Educators must pay attention to learning objectives, the material presented, student characteristics, and resources to consider what type of media is suitable for use. Effective media can construct and retain knowledge and skills (Marpanaji et al., 2018).

This is expected from the experiential learning element of a learning media that refers to innovative pedagogy. It is designed like an individual game where students are given a case that must be solved to advance to the next level. Although in other studies, it was stated that the application of games could reduce interaction with friends, it was also stated that individual game designs could lead to emotional development, self-efficacy, and the ability to carry out self-assessments (Vlachopoulos & Makri, 2017). This media provides opportunities for students to develop a computational way of thinking, namely, describing and solving problems. This can be seen in the problems presented in the games, such as, “What should the teacher prepare at the reading center?” Students are then presented with material choices that can be chosen for the center. Students now use their thinking skills to sort out suitable choices. Computational thinking encompasses planning, studying, and determining (Wing, 2004).

Although the basic goal of developing this media is for students to understand circle time material in early childhood classes and the development process, this media also helps students deal with children who misbehave in class. In addition, students are also stimulated to recognize various technological tools, such as Google Glass, and operate virtual reality media. This shows that this media can increase student multiliteracy one activity at a time. The characteristics of multiliteracy learning media are multiform, multi-creative, and multifunctional. Therefore, learning media that contain multiliteracy can have a positive impact on increasing student motivation (Sitepu et al., 2022).

## CONCLUSION

The conclusions from this study state that learning media for managing circle time based on virtual reality games is feasible to develop. However, learning media also needs to pay attention to innovative pedagogy. We developed learning media that contains experiential learning, computational thinking, embodied learning, and gamification. This media is multiliterate; students not only understand the basic knowledge of the material but also how to think and solve real problems in the classroom.

**REFERENCES**


Aliyu, J., Osman, S., Kumar, J.A., & Mohd Jamil, M.R. (2023). The design and development of a learning strategy to enhance students' engagement in simultaneous equations: An evaluation viewpoint. *Journal of Technology and Science Education*, *13*(1), 36. https://doi.org/10.3926/jotse.1691

Aulia, R., & Sontani, U.T. (2018). Pengelolaan kelas sebagai determinan terhadap hasil belajar (Classroom management as a determinant of student achievment). *Aulia*, *3*(2), 149–157. https://doi.org/10.17509/jpm.v3i2.11759

Berbasis, T., & Intelligences, M. (n.d.). Media pembelajaran circle time (beyond center and circle time) berbasis multiple intelligences. *Holistika: Jurnal Ilmiah PGSD*, pp. 55–66.

Bizami, N.A., Tasir, Z., & Kew, S.N. (2022). Innovative pedagogical principles and technological tools capabilities for immersive blended learning: A systematic literature review. In *Education and Information Technologies*. Springer US. https://doi.org/10.1007/s10639-022-11243-w

Cipresso, P., Giglioli, I.A.C., Raya, M.A., & Riva, G. (2018, November). The past, present, and future of virtual and augmented reality research: A network and cluster analysis of the literature. *Frontiers in Psychology*, *9*, 1–20. https://doi.org/10.3389/fpsyg.2018.02086

Dockett, S., & Perry, B. (2021). Setting the scene. *Evaluating Transition to School Programs: Learning from Research and Practice*, pp. 1–14. https://doi.org/10.4324/9781003055112-1

Dolgunsoz, G.Y.S.Y.E. (2021). The Effect of VR and Traditional Videos On Learner Retention and Decision Making. *World Journal on Educational Technology: Current Issues*, *11*, 21–29. https://doi.org/10.18844/wjet.v11i1.3983

Fitri, A.N., Steffani, C., & Afifah, S. (2022). Mengenal Model Paud Beyond Centre and Circle Time (Circle time) Untuk Pembelajaran Anak Usia Dini (Get to know the Early Childhood Model Beyond Center and Circle Time). *Jurnal Anak Usia Dini Holistik Integratif (AUDHI)*, *4*(2), 72. https://doi.org/10.36722/jaudhi.v4i2.944

Hidayati, Y., & Ramansyah, W. (2018). Pengembangan Bahan Ajar Berbasis "Virtual Reality" Pada Tema Energi (Development of "Virtual Reality" Based Teaching Materials on the Energy Theme). *Natural Science Education Research*, *1*(1), 73–81. https://doi.org/10.21107/nser.v1i1.5103

Kulkarni, D. (2020, March). Innovative Pedagogy. *International Journal of Scientific Research*, *8*, 1–3.

LACroix, E. (2020, June). Pedagogical Innovation: New Institutional Theory and the Beyond Borders Experential Learning Program. *Journal for Social Thought*, *4*.

Luria, A. (2015). Vygotskian and Post-Vygotskian Views on Children's Play. *American Journal of Play*, *7*(3), 371–388.

Magta, M.Y.L. (2022). Analisis Efektivitas Pelatihan Pembuatan Media Pendidikan Seksual Bagi Anak Usia Dini (Analysis Of The Effectiveness Of Training In Making Sexual Education Media For Early Children). *Jurnal Widya Laksana*, *11*(2), 218–227. https://doi.org/https://doi.org/10.23887/jwl.v11i2.39243

Mahadi, U. (2021). Komunikasi Pendidikan (Urgensi Komunikasi Efektif dalam Proses Pembelajaran) Educational Communication (Urgency of Effective Communication in the Learning Process). *JOPPAS: Journal of Public Policy and Administration Silampari*, *2*(2), 80–90. https://doi.org/10.31539/joppa.v2i2.2385

Marpanaji, E., Mahali, M.I., & Putra, R.A.S. (2018). Survey on How to Select and Develop Learning Media Conducted by Teacher Professional Education Participants. *Journal of Physics: Conference Series*, *1140*(1). https://doi.org/10.1088/1742-6596/1140/1/012014

Muhayat, U., Wahyudi, W., Wibawanto, H., & Hardyanto, W. (2017). Pengembangan Media Edukatif Berbasis Augmented Reality untuk Desain Interior dan Eksterior (Development of Augmented Reality-Based Educational Media for Interior and Exterior Design). *Innovative Journal of Curriculum and Educational Technology*, *6*(2), 39–48. https://doi.org/10.15294/ijcet.v6i2.19337

Oyelere, S.S., Bouali, N., Kaliisa, R., Obaido, G., Yunusa, A.A., & Jimoh, E.R. (2020). Exploring the trends of educational virtual reality games: A systematic review of empirical studies. *Smart Learning Environments*, *7*(1). https://doi.org/10.1186/s40561-020-00142-7

Pratama, I.M.Y., Sindu, I.G.P., & Santyadiputra, G.S. (2019). Pengembangan Aplikasi Virtual Reality Mengenal Macam-Macam Benda Di Sekitar Rumah Dalam Bahasa Inggris (Studi Kasus : SD Cerdas Mandiri Denpasar) (Development of Virtual Reality Applications Recognizing Various Objects Around the House in English (Case Study: SD Smart Mandiri Denpasar). *Kumpulan Artikel Mahasiswa Pendidikan Teknik Informatika (KARMAPATI)*, *8*(3), 544–553.

Rachmatullah, R., & Sukihananto. (2020). Efektivitas Penggunaan Virtual Reality (VR) Dalam Pendidikan Keperawatan (The Effectiveness of Using Virtual Reality (VR) in Nursing Education): Literature Review. *Jurnal Kesehatan*, *9*(2), 11–21. Retrieved from https://jurnal.stikesyatsi.ac.id/index.php/kesehatan/article/view/272

Rohmah, L., & Russanti, I. (2021). Studi Literatur: Efektivitas Penggunaan Virtual Reality Pada Mahasiswa Fashion Design (Literature Study: The Effectiveness of Using Virtual Reality in Fashion Design Students). *E-Journal*, *10*, 168–175.

Sitepu, K.B., Adisaputera, A., & Lubis, M. (2022). Development of Interactive Learning Media Based on Multiliteration for Ability to Develop Exposition Texts in Class X Students of SMA Negeri 1 Salapian. *Indonesian Language and Literature Ecucation Study, Progra, of Postgraduate, Universitas Negeri Medan, Indonesian, 2016*. https://doi.org/10.4108/eai.20-9-2022.2324547

Steure, J. (1993). Defining virtual reality: Dimensions determining telepresence. *Journal of Communication*, *42*(4), 73–93.

Tai, T.-Y. (2022). Impact of mobile virtual reality on EFL learners' listening comprehension. *Language Learning & Technology*, (1), 1–23.

Vlachopoulos, D., & Makri, A. (2017). The effect of games and simulations on higher education: A systematic literature review. In *International Journal of Educational Technology in Higher Education*, *14*(1). https://doi.org/10.1186/s41239-017-0062-1

Widiarsini, N.M.P., Ujianti, P.R., & Magta, M. (2021). Development of Picture Card Learning Media to Improve Sexual Understanding in Group B Kindergarten Children. *Indonesian Journal of Educational Research and Review*, *4*(1), 17. https://doi.org/10.23887/ijerr.v4i1.31565

Wing, J.M. (2004). Computational Thinking. *Communications of The ACM*, *49*(3), 33–35. https://doi.org/10.1201/b16812-43

Wisman, Y. (2017). Komunikasi Efektif Dalam Dunia Pendidikan (Effective Communication In Education). *Jurnal Nomosleca*, *3*(2), 646–654. https://doi.org/10.26905/nomosleca.v3i2.2039