



## Development of Interactive Multimedia for Introducing Letters and Numbers to Kindergarten Students

Hendra Nelva Saputra <sup>1)</sup>\*, Hasmira Said <sup>2)</sup>, Sarpina <sup>1)</sup>

<sup>1)</sup> Information Technology Education Study Program, Universitas Muhammadiyah Kendari.  
Kendari, Indonesia.

<sup>2)</sup> Non-Formal Education Study Program, Universitas Muhammadiyah Kendari.  
Kendari, Indonesia.

### Abstract

The aim of this research is to develop interactive multimedia for introducing letters and numbers that can be used in the learning process in kindergartens. This study uses the 4D development model, which includes the stages of define, design, develop, and disseminate. The data collection techniques used in this research are observation and questionnaires. The data analysis was conducted using Likert scale measurements. Overall, the developed interactive learning media has undergone a series of feasibility tests from various aspects, both by media experts and content experts. According to the media experts' assessment, this media obtained an average percentage of 91.67%, which falls into the "very feasible" category. This indicates that the media, both visually and functionally, meets the expected standards in educational media development. Additionally, the validation carried out by content experts, who evaluated aspects such as curriculum, material, evaluation questions, language, design, animation, and ease of use, resulted in an average percentage of 77.23%, categorized as feasible. This learning media is considered sufficiently effective and appropriate for use in the context of kindergarten education.

**Keywords:** development; interactive multimedia; introduction to letters and numbers.

### INTRODUCTION

Early childhood education plays a crucial role in laying the foundation for children's cognitive, social, and emotional development (Rohmat et al., 2023). At this stage, children are in a rapid development phase, where they begin to learn basic concepts such as letters and numbers, which form the basis for their future literacy and numeracy skills. Therefore, it is essential to provide learning media that are not only effective but also engaging and suitable for the developmental characteristics of early childhood, thereby facilitating teachers' work (Zaini & Dewi, 2017; Hasan et al., 2021; Priadi, 2017).

However, in many kindergartens, including at TK Islam Terpadu Insanul Faiz, there are often various challenges in teaching letters and numbers. One of the main problems faced is the lack of interest and attention of students towards the material presented in a conventional manner. The monotonous and less interactive teaching methods often make students quickly bored, leading to a less optimal teaching and learning process. Moreover, teachers often struggle to deliver material that accommodates the varying abilities of students, especially in introducing basic concepts such as letters and numbers. On the other hand, the limitations of facilities and learning media that meet the needs of children also pose a challenge. The media used are still very simple and have not yet utilized technology, which could enhance the

\*Correspondence Author, Email: [Hendra.nelva@umkendari.ac.id](mailto:Hendra.nelva@umkendari.ac.id)

Publisher: Department of PG-PAUD Universitas Halu Oleo

effectiveness of learning. This leads to children being less interested in learning and tending to be inactive in learning activities.

In recent years, the use of technology in education has increased significantly, including in kindergarten education (Asmara et al., 2023). According to research conducted by (Nisa, 2020), the involvement of technology in early childhood education is crucial to enhance learning skills. One innovation that has been widely developed is interactive multimedia, which can present learning materials in a more dynamic and interactive way (Saputra & Salim, 2021; Wahyudiani et al., 2020). Interactive multimedia not only allows the delivery of information more visually and auditorily but can also increase student engagement through engaging interactive activities (Ismiwati et al., 2024; Dhitya & Setiyowati, 2024). This is very important considering that young children are more easily attracted to visual and colorful elements.

Interactive multimedia has been proven effective in kindergarten learning, as demonstrated by (Munawaroh et al., 2022), who utilized interactive multimedia in regional language learning. Another study by (Juannita & Mahyuddin, 2020) used interactive multimedia to enhance early childhood listening skills. Meanwhile, (Rahmawati & Mayar, 2023) employed interactive multimedia to improve children's measurement abilities. Therefore, this research is urgently needed to develop interactive multimedia specifically designed for the introduction of letters and numbers, considering its proven effectiveness in various early childhood learning contexts, as shown by previous studies.

This study offers novelty in the development of interactive multimedia specifically designed for introducing letters and numbers to kindergarten students. Unlike previous studies that focused on the use of interactive multimedia for specific skills such as regional language learning, listening skills, and measurement abilities, this research integrates visual, auditory, and interactive elements with a more holistic and contextual approach. The media developed not only functions as a teaching aid but also as a tool to actively engage students in the learning process. By utilizing the latest technology and adapting it to the cognitive developmental needs of early childhood, this research is expected to provide innovative and effective solutions to overcome the challenges in teaching letters and numbers, as well as to promote the development of literacy and numeracy skills in kindergarten children. The aim of this research is to develop interactive multimedia for introducing letters and numbers that can be used in the learning process in kindergartens

## **METHOD**

This research employs the 4D development model, which consists of the stages define, design, develop, and disseminate. The research was conducted at TK Islam Terpadu Insanul Faiz, located in Kelurahan Potoro, Andolo District, South Konawe Regency. The trial subjects involved in this study are content experts and media experts. The data collection techniques used in this research include observation and questionnaires. Data analysis was carried out using Likert scale measurements, with each questionnaire response scored as follows: strongly agree (SA) = 4, agree (A) = 3, disagree (D) = 2, strongly disagree (SD) = 1.

## **RESULTS AND DISCUSSION**

The first stage in this research is the define stage. In this phase, the researcher conducts problem analysis (initial-final), learner analysis, task analysis, and material analysis. The initial analysis was carried out through direct observation at TK Islam Terpadu Insanul Faiz and by conducting interviews with the teachers. The interviews aimed to understand the use of

learning media in the teaching process at the kindergarten. The results of the interviews revealed the following: (1) The learning media used relied solely on children's posters, books, building blocks, puzzles, and hand puppets; (2) The school's facilities included chairs, tables, blackboards, and classrooms necessary for developing children's fine motor skills so that they could develop quickly. Besides the classroom activities, the teachers also prepared outdoor games to allow children to explore and develop all six aspects of development; (3) The teaching models used were group-based learning models with safety activities, area-based learning models, and center-based learning models; and (4) The difficulties faced by students during the classroom learning process were related to how teachers should teach children through play since children typically learn while playing. Given the obstacles experienced by both students and teachers, the researcher engaged in discussions with the teachers and proposed the development of learning media, specifically interactive multimedia-based learning media for introducing letters and numbers.

The next activity was conducting learner analysis. In this stage, an analysis of each child's characteristics was conducted in accordance with the design of the learning media for introducing letters and numbers. Each child has unique and different characteristics, even twins exhibit differences in terms of traits, interests, and backgrounds. Children's cognitive development abilities also vary, depending on how they absorb information from others; some children have mature cognitive abilities, while others are still in the early stages of development. This analysis aims to determine the learning materials to be developed so they align with educational objectives and the needs of the learners. In addition to material analysis, concept analysis was also carried out to ensure that the concepts conveyed in the learning media could be clearly understood by the students. Concept analysis is the process of breaking down and identifying the core concepts to be taught.

The second stage is design. This stage follows the Define process and serves as a concrete step in designing all aspects necessary for the development of the product or learning media. The main goal of the Design stage is to create a blueprint or basic framework of the learning media to be developed, ensuring it aligns with the learning objectives and the needs of the students. The Design stage acts as a bridge between analysis and product development. During this stage, every aspect of the learning media, from structure and media to assessment, is designed in detail to ensure that all elements support the achievement of learning objectives. This stage requires creativity, precision, and strategic thinking so that the final product of the learning media becomes an effective tool in helping students understand and master the material well. The design of the developed interactive multimedia is presented in Figure 1.

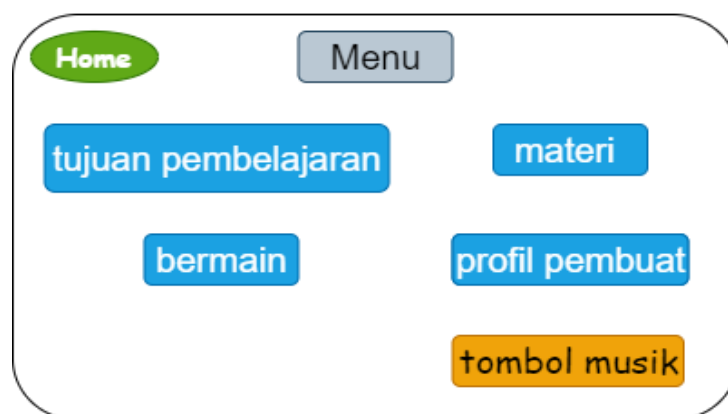


Figure 1. Example of the Storyboard Design for the Developed Interactive Multimedia

The third stage in this research is the develop stage. The Develop stage is the process of transforming the design into a tangible product that can be used in the learning process. In this stage, the developer creates, tests, revises, and prepares the learning media to meet the desired standards of quality and effectiveness. This phase is crucial as it ensures that the produced interactive multimedia is not only of high quality but also relevant, engaging, and capable of optimally supporting the achievement of learning objectives. The developed interactive multimedia is presented in Figure 2.

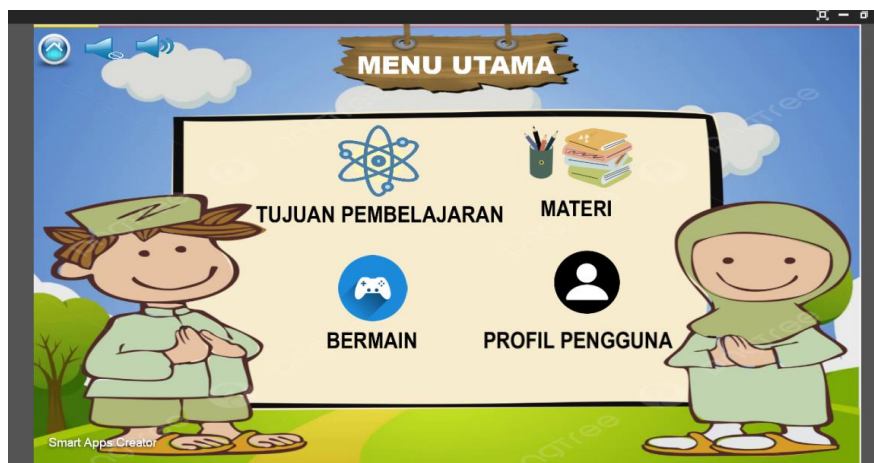


Figure 2. Developed Interactive Multimedia

The main menu of the interactive multimedia developed using the Smart Apps Creator 3 application features three main buttons: a home button, a button to toggle the background sound on and off, and an exit button. This menu offers four options: learning objectives, materials, play, and user profile. The background is light blue, chosen to create a calm and refreshing atmosphere, thus providing a positive feeling. The text is in black due to its high contrast with the background, making it easy to read and reducing eye strain. Additionally, an image of a child wearing a hijab is used to reflect diversity and relevance to the cultural context faced by the users, making them feel more connected and comfortable with this learning media.

After the learning media was developed, media testing was conducted by media experts and content experts. The media experts in this study included three lecturers: one from the Faculty of Teacher Training and Education (FKIP) and two from the Faculty of Engineering. The results of the validation by the media experts are presented in Figure 3.

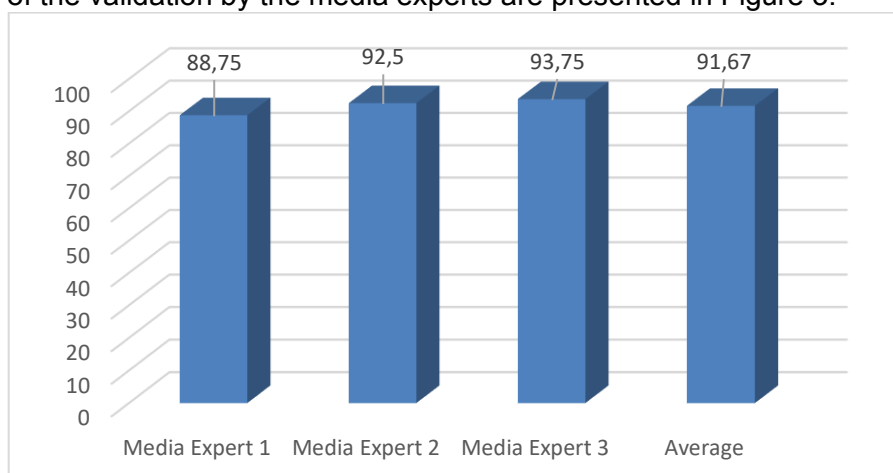


Figure 3. Percentage of Media Experts' Assessment

Referring to Figure 3, it is indicated that the developed media achieved an average percentage of 91.67%, categorizing it as highly feasible. After the media experts' evaluation was deemed satisfactory, content expert testing was conducted by three teachers from TK Islam Terpadu Insanul Faiz, Kelurahan Potoro, Andolo District, South Konawe Regency. The content experts' validation of the developed learning media focused on aspects such as curriculum alignment, content, evaluation questions, language use, design, animation, and ease of use. The content experts' assessment resulted in an average percentage of 77.23%, categorizing the media as feasible for use. The detailed percentage of the content experts' assessment is presented in Figure 4.

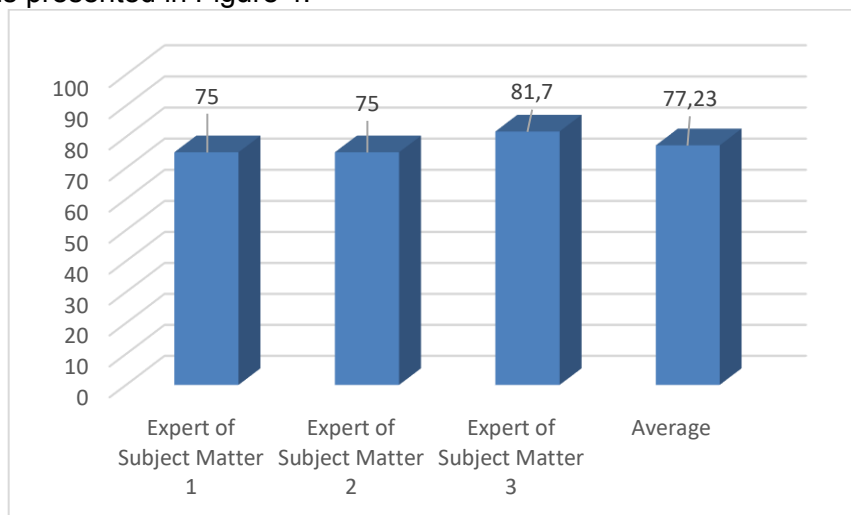


Figure 4. Percentage Expert of Subject Matter Assessment

Based on the research findings, the interactive multimedia developed for introducing letters and numbers to kindergarten students demonstrates significant effectiveness in supporting the early childhood learning process. The use of multimedia rich in visuals and animations helps capture students' attention, thereby increasing their interest and motivation in learning (Arnada & Putra, 2018; Putra, 2020). The use of bright colors and animations, such as a child wearing a hijab, not only enhances visual appeal but also provides cultural relevance that makes students feel more connected to the material presented. This interactive multimedia also supports multisensory learning, where students can engage more than one sense, such as seeing, hearing, and directly interacting with the content. This is crucial during early childhood development, where a multisensory approach has been proven effective in enhancing understanding and information retention (Wijayanti & Laili, 2024).

Furthermore, validation results from media and content experts indicate that this media is not only aesthetically and technically feasible but also aligns well with the current curriculum. Aspects such as content appropriateness, evaluation questions, and ease of use were rated positively by the experts, with some minor suggestions for improvement. The high average feasibility percentage indicates that this media has great potential to be used as a teaching aid in kindergarten settings. These research findings further strengthen previous studies that suggest interactive multimedia is an effective medium for facilitating the learning process for kindergarten students (Kartini et al., 2020; Yolanda et al., 2023; Oktavia et al., 2021).

The success of this media is also supported by its ability to provide interactive evaluations, where students can receive immediate feedback on what they have learned. This not only helps teachers monitor students' progress but also encourages students to learn from

their mistakes independently. Overall, the development of this interactive multimedia significantly contributes to creating an engaging, interactive, and effective learning environment for kindergarten students. It underscores the importance of integrating technology in early childhood education to create a more dynamic learning experience that is adaptive to students' needs.

## CONCLUSION

Overall, the interactive learning media developed has undergone a series of feasibility tests from various aspects, both by media experts and content experts. Based on the media experts' evaluation, this media achieved an average percentage of 91.67%, which falls into the "highly feasible" category. This indicates that the media meets the expected standards in educational media development both visually and functionally. Additionally, the validation conducted by content experts, who assessed aspects such as curriculum alignment, content quality, evaluation questions, language use, visual design, animation, and ease of use, resulted in an average percentage of 77.23%, categorized as feasible. Thus, this learning media is considered sufficiently effective and suitable for use in a learning context, although there are some aspects that may still require further refinement. These results affirm that the developed media is not only visually appealing but also meets educational standards and user needs.

## REFERENCES

- Arnada, E. Z., & Putra, R. W. (2018). Implementasi Multimedia Interaktif Pada Paud Nurul Hikmah Sebagai Media Pembelajaran. *IDEALIS: InDonEsiA journal Information System*, 1(5), 393-400.
- Asmara, A., Judijanto, L., Hita, I. P. A. D., & Saddhono, K. (2023). Media Pembelajaran Berbasis Teknologi: Apakah Memiliki Pengaruh terhadap Peningkatan Kreativitas pada Anak Usia Dini?. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 7(6), 7253-7261. <https://doi.org/10.31004/obsesi.v7i6.5728>
- Dhitya, G., & Setiyowati, A. J. (2024). Upaya Meningkatkan Motivasi Belajar Melalui Bimbingan Klasikal Dengan Media Audio Visual: Literatur Review. *Jurnal Pembelajaran, Bimbingan, dan Pengelolaan Pendidikan*, 4(7), 4-4.
- Hasan, M., Milawati, M. Darodjat, D., Harahap, T. K., Tahrim, T., Anwari, A. M., Rahmat, A., Masdiana, M., & Indra, I. M. (2021). *Media Pembelajaran*. Klaten: Tahta Media Group.
- Ismiwati, A., Syah, B. M., Arcelia, R. D., & Aziz, R. A. (2024). Perancangan Multimedia Interaktif Pengenalan Alat Transportasi Untuk Taman Kanak-Kanak. *Repeater: Publikasi Teknik Informatika dan Jaringan*, 2(3), 178-187. <https://doi.org/10.62951/repeater.v2i3.136>
- Juannita, E., & Mahyuddin, N. (2022). Video pembelajaran berbasis multimedia interaktif dalam meningkatkan keterampilan menyimak anak usia dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 6(4), 3300-3313.
- Kartini, K., Degeng, I. N. S., & Sitompul, N. C. (2020). Pengembangan multimedia interaktif tema binatang untuk pembelajaran di taman kanak-kanak. *Jurnal Inovasi Teknologi Pendidikan*, 7(2), 128-139. <http://dx.doi.org/10.21831/jitp.v7i2.33879>

- Munawaroh, H., Fauziddin, M., Haryanto, S., Widiyani, A. E. Y., Nuri, S., El-Syam, R. S., & Hidayati, S. W. (2022). Pembelajaran Bahasa Daerah melalui Multimedia Interaktif pada Anak Usia Dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 6(5), 4057-4066. <https://doi.org/10.31004/obsesi.v6i5.1600>
- Nisa', L. (2020). Pemanfaatan Teknologi Dalam Pendidikan Anak Usia Dini. *ThufuLA: Jurnal Inovasi Pendidikan Guru Raudhatul Athfal*, 8(1), 1-14. <https://doi.org/10.21043/thufula.v8i1.6283>
- Oktavia, M., Wara, F. A., & Woda, Y. W. B. (2021). Media pembelajaran mengenal angka, huruf, bentuk dan warna berbasis multimedia interaktif. *Increate-Inovasi dan Kreasi dalam Teknologi Informasi*, 7(1), 1-9.
- Priadi, B. A. (2017). *Media & Teknologi dalam Pembelajaran*. Jakarta: Kencana.
- Putra, P. A. (2020). Mengembangkan kemampuan membaca anak usia dini dengan multimedia interaktif. *Incrementapedia: Jurnal Pendidikan Anak Usia Dini*, 2(2), 20-25. <https://doi.org/10.36456/incrementapedia.vol2.no02.a3016>
- Rahmawati, R., & Mayar, F. (2023). Multimedia Interaktif untuk Meningkatkan Kemampuan Pengukuran Anak Usia Dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 7(4), 4673-4681. <https://doi.org/10.31004/obsesi.v7i4.5245>
- Rohmah, R. M., Yusuf, A., Azizah, R., & Mardiansyah, N. R. (2023). Peran Pendidikan Holistik Bagi Pengembangan Karakter Anak Usia Dini. *Jurnal Dimensi Pendidikan dan Pembelajaran*, 11(1), 154-165. <http://dx.doi.org/10.24269/dpp.v11i1.8268>
- Saputra, H. N., & Salim, S. (2021). Analysis of the Multimedia Use of Primary Schools. *AL-ISHLAH: Jurnal Pendidikan*, 13(3), 2535-2544. <https://doi.org/10.35445/alishlah.v13i3.673>
- Wahyudiani, E., Rasyid, H., & Saputra, H. N. (2020). Interactive Multimedia as Computer Assembly Visualization Media. *Jurnal Pendidikan Teknologi Informasi dan Vokasional*, 2(1), 35-41.
- Wijayanti, A. N., & Laili, M. (2024). Strategi Pembelajaran Multisensori: Efektivitas dalam Meningkatkan Pemahaman Matematika di Madrasah Ibtidaiyyah. *Pengenalan Lapangan Persekolahan Pendidikan Guru Sekolah Dasar*, 1(1), 13-18.
- Yolanda, A. E., Wanandi, B. S., Yahya, H., Fiddarain, S., & Ikhwan, A. (2023). Perancangan Aplikasi Multimedia Berbasis Android Dalam Pembelajaran Membaca Tingkat Taman Kanak-Kanak. *Jurnal Penelitian Dan Pengkajian Ilmiah Eksakta*, 2(1), 61-66. <https://doi.org/10.47233/jppie.v2i1.689>
- Zaini, H., & Dewi, K. (2017). Pentingnya media pembelajaran untuk anak usia dini. *Raudhatul Athfal: Jurnal Pendidikan Islam Anak Usia Dini*, 1(1), 81-96.