

# Development of Digital Teaching Materials in Methodology of Early Childhood Motor Development Subject Based Project

Rizki Ramadhani<sup>1</sup>, Roni Sinaga<sup>2</sup>, Santa Murni Asih<sup>3</sup>

{rizkiramram@unimed.ac.id<sup>1</sup>, ronisinaga@unimed.ac.id<sup>2</sup>, santamurniasih@unimed.ac.id<sup>3</sup>}

Faculty of Education, Universitas Negeri Medan, Medan, Indonesia

**Abstract.** As technological developments become more and more massive, there are also demands for changes in learning in the PG PAUD study program As an initiative to offer exceptional human talent. We cannot overlook technology; it must be integrated into education, a practice commonly known as e-learning. This integration enhances the quality of student learning by providing greater access to educational content, supporting materials, and fostering collaboration and interaction. E-learning increases the reach and flexibility of education, allowing learning to occur anytime and anywhere, while also reducing costs and adapting to the evolving needs of the workforce. Additionally, the teaching culture is shifting towards a learn-to-learn approach. However, observations reveal a lack of suitable textbooks for the Audi Motor Development Methodology course. Project-based learning, a method aimed at sharpening analytical skills, problem-solving abilities, and accuracy, is particularly effective in this setting. Therefore, researchers aim to develop project-based digital teaching materials for this course. They plan to test the validity, reliability, and practicality of these materials using Borg & Gall's development method. This method includes stages such as preliminary study, preparation, initial product development, initial trials, product revisions, main product trials, final product trials, and dissemination.

**Keywords:** Motor Skills, Projects, Early Childhood

## 1 Introduction

The long and never-ending stages experienced every day by an individual in the process of growth and development make us feel that growth and development are important and cannot be repeated. The words growth and development have different meanings. Both have a very important role and are interconnected. Age development influences the individual to carry out an activity. As individuals age, their physical organs mature, which is further supported by the central nervous system's ability to coordinate bodily functions. This coordination enables a person to perform both gross and fine motor skills effectively. The maturation of physiological organs is characterized by the development of muscle tissue that becomes more complex, robust, and functions systematically. During the growth stages of infants and children, physiological maturity is influenced by factors such as age, nutrition, and overall health. Generally, as a person gets older, their physiological organs reach a higher level of maturity. Early childhood goes through a period of exploration. Interested in exploring, not knowing fear, then all movements and activities taught to children will be

considered as fun games. The first five years of a child's growth and development are called the golden age because during that time the child's physical condition and all abilities are developing rapidly. The rapid physical development experienced by a child is a sign that the child is an active individual and we as parents should know how to direct the child's motor activity. In a child's development, the physical condition of motor skills is of great concern and a matter of discussion, because the child's growth and development process will influence their life in the future. So knowing children's physical development, maximizing children's physical development and the significance of children's physical development is a must to study and understand.

Current technological developments have a big influence on children's motor development. This is evident from the integration of technology in games that children play every day and also from previous research conducted, it was found that early childhood children have daily activities that are very close to technology. The development of technology is not only an advantage by providing many conveniences in carrying out activities but also provides new impacts and challenges, especially in the child's development process. Because the devices produced from technology, namely cellphones, make children love playing with devices all day. Meanwhile, at this age children are expected to be able to carry out more active and varied activities to develop and hone their abilities so that they have skills that can be useful in the future.

In the early childhood study program, Faculty of Education at Medan State University prepares future educators to become teachers in early childhood education settings. In early childhood education, learning often involves activities based on the methodology of early childhood motor development, which are in accordance with aspects of child development. early age. This makes mastering teaching skills by applying and motor development methodology activities important, therefore in lectures in this study program students are given and motor development methodology courses. In several studies, The Aud motor development methodology activities had children's growth and development impact. Additionally, motor development influences six other aspects of children's development. Experience in carrying out movement activities and motor development activities greatly determines the development of subsequent movements. During childhood, the development of movement that occurs is in the form of increasing the quality of mastery of movement patterns that were commonplace during infancy as well as increasing variations in various basic movement patterns. The ability to walk and hold will get better and can be done with a variety of movements [10].

As technology advances, there is an increasing demand for changes in how learning is conducted in the PG PAUD study program to provide superior human resources. Technology cannot be ignored; it must be integrated into education through e-learning. This integration enhances the student learning's quality by providing outstanding access to educational content, supporting materials, fostering collaboration and interaction, and increasing the flexibility, allowing learning to occur anytime and anywhere. Additionally, technology helps reduce learning costs and allows for timely updates to meet the needs of the workforce.

The teaching culture is also evolving, emphasizing a "learn to learn" approach, where students must find their own ways to learn. Cooperative learning has emerged as a more appropriate method, as it encourages collaboration, idea exchange, and enjoyable communication among students. To support these changes, model of learning must be equipped with modern instruments of learning. Traditional methods that rely on blackboards are being replaced with applications and devices featuring audio and video materials.

The impact of technology necessitates suitable teaching materials. Current needs include practical teaching materials that are accessible anytime and anywhere, affordable, and aligned with workforce requirements.

To enhance student learning, it is crucial to provide them with books that serve as effective teaching materials. However, recent observations have revealed a significant gap in the availability of appropriate books for motor development methodology courses. The current teaching approach relies heavily on several printed books that do not adequately integrate technological advancements and lack the depth needed to fully support the learning process.

The existing printed materials have not kept pace with technological integration, which is essential for modern education. These books fall short in providing comprehensive content, leaving a substantial gap in the resources available to students. Recognizing this gap, it becomes evident that there is a pressing need to develop new teaching materials specifically tailored for the Aud motor development methodology course, which is a critical component of early childhood education.

The importance of developing these teaching materials is underscored by research findings, which indicate that the use of online material significantly boosts motivation of student. Digital resources are not only in alignment with the technological trends of the modern era but also offer practical advantages, making them suitable for current educational needs. Unlike traditional printed books, digital teaching materials can provide a more interactive and engaging learning experience, thereby enhancing the overall educational process.

In developing these new materials, it is essential to consider the lecture methods currently employed in the PG-PAUD study program. The program predominantly uses a project-based learning approach, which has proven effective in fostering critical thinking, problem-solving skills, and collaborative learning among students. Therefore, the new digital teaching materials should be designed to complement and enhance this project-based learning methodology.

Project-based learning requires resources that not only provide theoretical knowledge but also facilitate practical application. Digital teaching materials, with their ability to incorporate multimedia elements such as videos, interactive simulations, and online collaborative tools, can play a vital role in supporting this learning approach. These resources can make learning more dynamic and interactive, thereby helping students to better understand and apply the concepts taught in their courses.

In conclusion, the development of new teaching materials for the Aud motor development methodology course is of paramount importance. These materials should leverage digital technologies to enhance student engagement and motivation. By aligning these resources with the project-based learning approach of the PG-PAUD study program, educators can ensure that students receive a more comprehensive and practical education. This, in turn, will better prepare them for their future roles as educators in early childhood education, ultimately contributing to the provision of superior human resources in the field. This teaches people to master the skills of the process of applying them in everyday life so as to make the learning process meaningful. In its application, it will involve students in activities to solve problems and other meaningful tasks, provide opportunities to work autonomously, construct their own learning, and ultimately produce real products that are valuable and realistic [12]. The same impact was also seen in other studies. Considering the methods used and their impact on students, digital teaching materials will be developed on a project-based approach..

Movement is fundamental in a person's development. Movement is a characteristic of life and this movement experiences change, this can occur from birth to adulthood. From free

movement that is meaningless to movement that is directed and has meaning, from rough movement to fine movement from irregular to regular in [10]. And there are many types and forms of movement that need to be learned, developed and adapted to personal needs, development and even social norms. Early childhood has the potential to continuously develop all abilities (cognitive, language, socio-emotional, physical, artistic, moral and religious values) in an unlimited way. Of course, this will happen if children are given the opportunity to develop optimally with the help of the adults around them, namely their parents and teachers at school. With this, we must maximize the unlimited development of children. With development in early childhood, movement and learning to move become very important and must receive special attention. Instilling correct movement/motor skills is very important for children, because it will contribute to the child's growth. In early childhood, the movement development that occurs is in the form of improving the quality of movement patterns that have been mastered in infancy, with the child starting to be able to walk and play with an object, even though it is still simple, this ability is the basic capital for further development. These simple movement abilities make it possible for children to carry out physical activities that require the ability to explore wider spaces. Children can move from one place to another, can catch an object, such as a ball, then use it to play with their peers. The opportunity to carry out movement activities like this really determines the further development of movement. In early childhood, the movement development that occurs is in the form of increasing the quality of mastery of movement patterns that were commonplace during infancy as well as increasing variations in various basic movement patterns. The ability to walk and hold will get better and is usually done with a variety of movements [10].

Motor is a translation of the word "motor", which is a biological or mechanical basis that causes movement to occur. According to Hurlock in [11], motor development is the development of controlling physical movements through the activities of the nervous center, nerves and coordinated muscles. According to Zukifli in [10] what is meant by motor is everything that is related to body movements. There are 3 (three) elements that determine motor development, namely muscles, nerves and the brain. These three elements carry out their respective roles in a positive interaction, meaning that one element is related to each other, supports each other, and complements each other in perfect condition. Motor Skills are deliberate, automatic, fast and accurate movements of the body or body parts. These movements are a complex series of coordination of hundreds of muscles. Fine motor skills are movements that use fine muscles or certain parts of the body, which are influenced by opportunities to learn and practice. For example, the ability to move objects from the hand, scribble, arrange blocks, cut, write and so on. Motor development is the process of acquiring skills and movement patterns that children can carry out, motor skills are needed to control the body. The process of growing a child's motor skills is related to the process of the child's motor skills. Children's motoric development will be clearly visible through the games they can play. Therefore, improving motor skills, especially children's fine motor skills, is closely related to playing, which is the main activity of early childhood.

In principle, children have various developments, one of which is motor coordination. This development is the coordination between the eyes and hands which must develop well, along with the maturity of the child's nerves and experience, the child's motoric development can develop or be well coordinated. Types of Motor Development Children's motor development is divided into two: 1. Gross motor skills Gross motor skills are body movements that use large muscles or most or all of the body parts which are influenced by the child's own maturity. Gross motor skills such as walking, running, jumping, going up and down stairs. Around the age of 3 years, children can walk automatically, even on uneven ground, children

can walk without difficulty. Around 4 years old, children have almost mastered the way adults walk. The difficulty in learning to walk is related to body strength, namely being able to lean all of one's body weight on one leg. When the child can walk, he will try to walk with various variations, for example walking backwards (around 17 months) and walking on heels (around 30 months). Around the 18th month the child tries to run, but his gait still resembles a gait. At the age of 2 or 3 years a child can really run, but he is not yet able to stop quickly or to turn over. At the age of 4 to 5 years children can run, stop and turn around. After being able to walk well, children also learn to walk up and down stairs. Climbing stairs occurs by each time putting one foot forward and pulling the other foot to the side. Around 2 or 3 years old children also learn to jump, tiptoe, and various variations of walking. Around 29 months the child can stand on one leg. Children aged 3 years still have difficulty catching the ball or hitting the ball with a stick [9].

Motor development methodology and early childhood are closely intertwined, influencing each other significantly. Aud motor development activities have important role in optimizing the development of young children in early age. Conversely, the development and growth of early childhood also impact the aud motor development methodology itself. Initially simple, these activities evolve as children begin to incorporate mutually agreed rules and show interest in games involving basic competition. The AUD motor development methodology serves as a key medium for achieving early childhood learning objectives in educational settings. Research indicates that this methodology has a positive impact on early childhood development and learning outcomes. In developing teaching materials, students will be involved in activities to solve problems and other meaningful tasks, providing chances for student to work autonomously, construct their own learning, and ultimately produce products. This collaborative approach entails educators and students working together to create comprehensive educational resources. Through literature reviews and analysis of research findings pertinent to the lecture material, students gain valuable insights into the subject matter while contributing to the development of teaching materials. By actively engaging in this process, students not only deepen their understanding of the content but also hone critical thinking skills and foster a sense of responsibility towards their own education. This collaborative and student-centered approach not only enhances the quality of educational resources but also empowers students to become more self-reliant and autonomous learners.

The early childhood motor development methodology course spans 16 weeks, with one lecture held each week for a total of 16 sessions. The course begins with setting a lecture contract and semester learning plan, establishing a framework for the entire duration. Each week, lectures incorporate a variety of teaching methods including traditional lectures, discussions, team-based projects, case studies, problem-based learning, and other interactive approaches. Aligned with the KKNi curriculum, the course adopts a blended learning and flipped classroom model. This approach combines online and in-person learning activities to enhance engagement and flexibility. Additionally, the course features a structured assignment system consisting of six types: routine assignments, CBR (Community Based Research), CJR (Case Based Research), projects, mini-research tasks, and idea engineering exercises. These assignments are designed to assess different aspects of learning and application throughout the semester. Evaluation of student learning outcomes occurs through both mid-semester assessments and final exams. These evaluations gauge students' understanding and application of course materials, ensuring comprehensive assessment of their progress and achievement.

## **2 Research Method**

This research employs development research, also known as research and development (R&D), aimed at creating new products or enhancing existing ones [7]. The product which is developed in this research is project-based on digital teaching materials for the aud motor development methodology course. The development method chosen for creating these materials is the Borg & Gall model [2]. Conducted at the UNIMED Faculty of Education within the PG PAUD Study Program, this research took place from March to October 2023. The study population included all PG-PAUD students enrolled in the aud motor development methodology course. Sample selection utilized random sampling techniques for both small and large-scale trials. Data collection methods encompassed literature reviews, interviews, and distribution of questionnaires. Literature reviews provided the foundation for material development, while questionnaires were employed to validate designs through expert feedback and assess practicality via student responses. Interviews were conducted to gather detailed insights into student usage of the teaching materials. Instruments used for data collection included Expert Validation Questionnaires, Product Readability Test Questionnaires, Practicality Questionnaires, and student interview guidelines.

Data analysis involved quantitative techniques utilizing data gathered from questionnaires. Descriptive analysis was used to assess media feasibility, drawing on quantitative data categorized from expert evaluations (media and content) and student responses [7].

## **3 Results and Discussion**

This research aimed to develop project-based digital teaching materials accessible via smartphones, tablets, laptops, and other devices to support both online and offline learning processes. Following the Borg & Gall development model, the research began with the information gathering stage. During this stage, focus group discussions (FGDs) were conducted with course lecturers to gather insights into course materials specified in the Course Syllabus (RPS), as well as learning strategies and planned student assignments. Insights from these discussions provided valuable information for designing the teaching materials. Additionally, interviews with students were conducted to understand their perspectives and challenges. The interviews revealed that students encountered difficulties in accessing reference books for their coursework. Based on these findings, students expressed a desire for accessible digital resources that could be used anytime and anywhere, facilitating independent study.

This initial phase of information gathering served as a crucial foundation for developing digital teaching materials that meet the practical needs and preferences identified among both lecturers and students. The second phase of this research involves setting the research goals, followed by estimating the required funds, effort, and time for the research team. Next, tasks are assigned to team members based on their individual qualifications. At this stage, products are created in the form of project-based digital teaching materials. The steps taken are; 1) Make a story board related to lecture material resulting from discussions or FGDs with the course lecturer. Story boards are created with the aim of making it easier to create project-based digital teaching materials, to determine the next stages of development, so that the parts of the teaching materials can be arranged well. 2) The story board is then used as a reference

for making the stages of making a project on this teaching material. 3) The completed stages are then combined with the mandatory student assignments on Early Childhood Motor Development Strategies course.

Before proceeding with trials, the digital-based teaching materials underwent validation by experts proficient in textbook writing and assessment. This validation aimed to identify strengths and weaknesses of the product. Based on the design validation, the expert validators recommended that the developed materials feature a user-centric design that is visually clean and aligned closely with the optimized content. This alignment was intended to enhance knowledge acquisition and motivate readers effectively. Following expert recommendations, the research team proceeded with initial product development. Subsequently, the main product trial involved testing with six samples. The trial results indicated that revisions were necessary, focusing particularly on the aspect with the lowest average score. Surprisingly, while the appearance aspect did not receive the lowest score, the usability aspect did. Therefore, the team prioritized improvements in the usability and practicality of the digital teaching materials. The revisions to the main product were carried out with a keen focus on enhancing the usability aspect to improve overall quality and user satisfaction.

The purpose of testing on small groups is to determine student responses to project-based digital teaching material products that are developed before being tested on large groups. The student response questionnaire in small groups to the project-based digital teaching materials developed contained 3 aspects, including learning, display and use aspects. Testing of digital teaching material products was carried out by 30 students from the PG PAUD Study Program. Then these ten students were asked to explore all the menus and features contained in the digital teaching materials and at the end of the small group testing, It seems like the table of results was not provided in your message. Could you please share the table or the specific results of the trial assessment from the questionnaire responses of the ten students? Once I have the data, I can help analyze it, summarize the findings, and discuss any conclusions or insights drawn from the assessment.

#### **4 Conclusion**

These results indicate no agreement between experts in providing value. This means that project-based teaching materials can be used to help students analyze problems in early childhood. However, the advice given by experts requires improvement presentation in open materials. Based on the results of the trials conducted earlier, revisions were made to refine the product. Following these revisions, the final product is now ready. The next steps involve socialization and implementation stages for students who are currently enrolled or will enroll in the Motor Development Methodology course for Early Childhood Education. These stages aim to introduce and integrate the finalized teaching materials into the course curriculum, ensuring they effectively support student learning and engagement. The product resulting from this research is a teaching module which can be one of the references used by lecturers in early childhood motor development methodology courses.

## References

- [1] Fauziyah, D. N., & Antasari, Y. (2020). Studi Literatur Pengaruh Implementasi Media E-Book Terhadap Motivasi Belajar dan Respon Siswa Pada Pendidikan Tinggi. *IT-Edu: Jurnal Information Technology and Education*, 5(1), 406-416.
- [2] Gall, M. D., Gall, J. P., & Borg, W. R. (2006). *Educational Research: An Introduction 8th Edition*. Oregon: Pearson.
- [3] Johnson, R. T., & Johnson, D. W. (1986). U Cooperative Learning in The Science Classroom. *Science and Children*, 24(2), 31–32.
- [4] Khairrani, A. (2019). E-Book Sebagai Media Pembelajaran di Masa Depan. *Jurnal Repository Universitas Negeri Jakarta*, 1-10.
- [5] Ko Luppicipini, R., & Haghi, A. K. (Eds.). (2012). *Education for a digital world: present realities and future possibilities*. Toronto: CRC Press.
- [6] Kothari, C. (2004). *Research Methodology: Mrthods and Techniques*. New Delhi: New Age International.
- [7] Laws, S., Harper, C., Jones, N., & Marcus, R. (2013). *Research for Development: A Practical Guide*. UK: SAGE Publications.
- [8] Mardapi, D. (2008). *Teknik Penyusunan Instrumen Tes dan Non Tes*. Yogyakarta : Mitra Cendikia Offset.
- [9] Monks. (2004). *Psikologi Perkembangan: Pengantar dalam Berbagai Bagiannya*. Yogyakarta: Gajah Mada University Press.
- [10] Samsudin. (2008). *Pembelajaran Pendidikan Jasmani Olahraga dan Kesehatan*. Jakarta: Prenada Media Group.
- [11] Sukamti, Endang Rini. (2007). *Perkembangan Motorik*. Yogyakarta: UNY
- [12] Tinenti, Y. R. (2018). *Model Pembelajaran Berbasis Proyek (PBP) dan penerapannya dalam proses pembelajaran di kelas*. Yogyakarta: Deepublish.