

Development of direct and indirect assistance approach using jigsaw method and android-based digital design method for gymnastic materials

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Abstract:

This research aimed to create an innovative digital-android learning media product tailored for students and teachers, integrating direct and indirect assistance approaches, jigsaw methods, and design elements in written, visual, and audio-visual formats. Following the Research and Development methodology, the Borg and Gall development research model was the guiding framework, encompassing ten meticulous stages. Preliminary Research (Data Collection and Analysis): The initial phase involved extensive data collection and analysis to identify critical components for effective learning media. Media Planning and Analysis: A comprehensive plan for the learning media was formulated, incorporating direct and indirect assistance strategies, jigsaw methods, and multimedia design principles. Product Development: The creation of learning media commenced, with validation sought from media and subject matter experts to ensure quality and relevance. Small-Group Trials: 1) Preliminary Research (data collection and analysis). 2) Make a plan and an analysis of the media to be produced. 3) Product development begins with the creation of learning media and is validated by media and material experts. 4) Run small-group trials. 5) Product Improvement. 6) Carry out field trials. 7) Go over the final product again. 8) Evaluate the product's effectiveness using data from gymnastics skill tests in experimental and control classes. The assessment results up to the third revision stage revealed positive criteria, with an average score of 4.33 for both theoretical and practical materials. The learning media scored 4.67, indicating a "very good" category. Subsequent field trials demonstrated a significant improvement in gymnastics skills in the experimental class compared to the control class, with a mean value of 76.37 (experiment) surpassing 64.28 (control).

Keyword: Gymnastics, Direct, Indirect, Jigsaw, Planning

Introduction

The development of learning media is very important in enhancing the learning experience and mastery of skills in various disciplines, especially in Physical education (Handayani et al., 2023; Mackenbrock & Kleinert, 2023). In physical education (PE), gymnastics is a discipline that demands a unique combination of flexibility, agility, and substantial strength in both parts of the body (Desai et al., 2019). Gymnastics is not only a sports discipline but also an integral part of the curriculum, including it at the higher education level in Indonesia (Sriwahyuniati et al., 2023). Gymnastics materials serve as a means to improve physical fitness, motor skills development, and overall well-being among college students (Kanaya et al., 2023). The term "gymnastics," which translates directly from English, encompasses a wide range of physical activities involving a wide range of movements (Handayani et al., 2022). Gymnastics athletes are often required to perform these movements while wearing tight clothing, commonly known as "tights". Gymnastics consists of individual and group categories, characterized by the absence of direct contact with opponents (Handayani, 2019). Thus playing a role in the holistic development of motor skills (Starzak et al., 2022). Basic gymnastics skills are built on three main elements such as locomotor skills (e.g., walking and jumping), non-locomotor skills (e.g., bending), and manipulating abilities (involving skillful handling of specific objects using various parts of the body) (Yuwono et al., 2022). The characteristics of gymnastic movements make it a suitable physical activity to integrate into physical education (Ilkim & Akyol, 2018). Gymnastics is believed to have the potential to significantly contribute to developing motor skills and overall physical fitness. Gymnastics skills are constantly being developed based on these basic elements, emphasizing the importance of locomotor, non-locomotor and manipulative skills.

In gymnastics, individual self-confidence plays a key role in acquiring specific skills. The nature of gymnastics often requires significant motivation, courage and determination (Paloma et al., 2014). It is an individual sport where movements can be performed without interruption, allowing precise execution that demands flexibility (Kumagai et al., 2023; Mkaouer, B., Hammoudi-Nassib, S., Amara, S., & Chaabene 2018; Vlahovi 2022). However, in the world of education, especially in schools and colleges, floor gymnastics

exercises certainly require careful practice because of the high risk of injury due to errors in carrying out movements (Yendrizal et al., 2023; Kozin et al., 2023). Field observations still show that many students are reluctant to practice gymnastics in their academic environment because of this perceived risk. So, a learning method is needed that can increase the confidence of students in doing floor gymnastics. Jigsaw Cooperative Learning Method, as described by (Amador & Mederer, 2013). The Jigsaw model is a variation of collaborative learning in which each group member provides information, experiences, ideas, attitudes, skills, and knowledge to increase the understanding of all group members (Saputra et al., 2019). In addition to studying the material discussed, students must be willing to present and teach the material to others. (Rahmawati, 2021) stated that the Jigsaw learning model is an approach that combines various potential students to generate confidence to do something, especially in floor gymnastics.

Therefore, the Jigsaw method is very cooperative in providing material understanding and new skills. Furthermore, the Jigsaw method emphasizes the responsibility of students to foster a sense of cooperation among group members (Jeppu et al., 2023). (Torabi et al., 2022) also explained that the purpose of Jigsaw learning is to train students to engage in discussion and take individual responsibility to aid understanding of the subject matter. So, it can be concluded that the Jigsaw learning method divides students into small groups and encourages responsibility and collaboration. Each member contributes to collective understanding, facilitating discussion and independent learning. With that, this research aims to address challenges in gymnastics teaching through the development of specially designed digital Android learning materials. This material combines direct and indirect assistance approaches by utilizing the Jigsaw method and Android-based design. The research methodology includes collaborative activities, group assignments, and applying jigsaw methods and design to enhance the learning experience through collaborative efforts. The two main methods used are Jigsaw and design, where the design method aims to create structured and engaging content. In contrast, the jigsaw method focuses on increasing cooperation and student confidence. This learning material supports teacher guidance and provides opportunities for students to practice outside the classroom. The purpose of the study involves creating innovative learning tools that can enhance the educational experience of gymnastics, support gymnastics clubs, and align with the university's vision. The collaboration between the Jigsaw method and design is expected to address challenges in teaching and create valuable resources for students and instructors.

Material & methods

Study Design

This study used R&D, a research method used to create specific products and test their effectiveness. This study's development procedures were based on the stages of development research, which are as follows: (1) preliminary research (data collection and analysis), (2) plan development, (3) initial product development, (4) small group trials, (5) product revision, (6) field trials, and (7) product effectiveness test (Syahmi & Ulfa, 2022).

Participant

two media and material experts were involved in the research to test the feasibility level of the product to be developed. Then, 100 students of the faculty of sports science in 2022 were also involved in this study to test its effectiveness.

Statistical Analysis

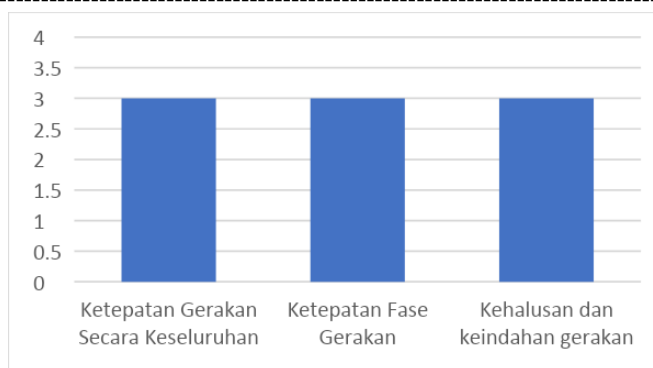
Data collection for expert validation of the media and applications developed was carried out using a questionnaire. The questionnaire was used to assess the appropriateness level of training media and applications developed by experts. The type of questionnaire was a closed questionnaire, that was, a questionnaire that contained answer choices that have been made.

Table 1. Score Intervals

Score Intervals	Criteria
$X > 4,21$	Very good
$3,40 < X \leq 4,21$	Good
$2,60 < X \leq 3,40$	Pretty good
$1,79 < X \leq 2,60$	Not good
$X \leq 1,79$	Very bad

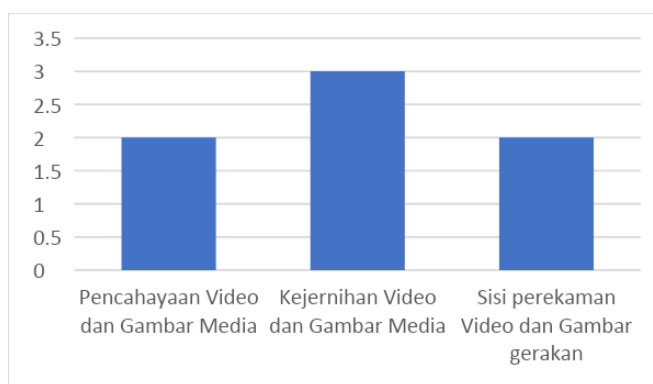
Results

The development of learning media products was based on a prior needs analysis. The design process begins with developing ideas, which then continues with collecting necessary materials and is integrated into a form of learning media using computer programs. The following was the learning media product's first appearance before material experts and media experts validated it. The following were the results of the material and media validity test, by undergoing 3 phases of testing :



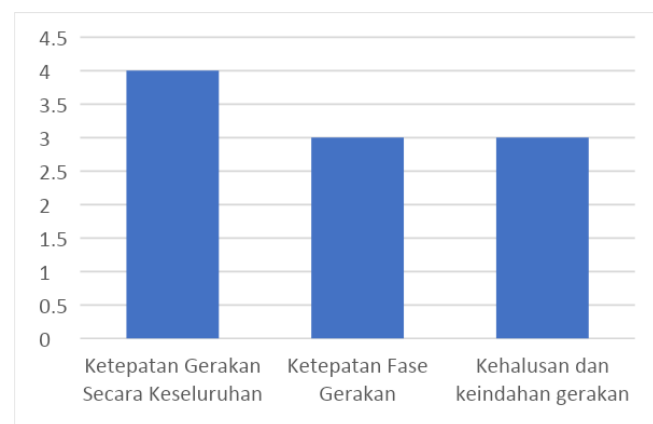
Picture 1. Phase I trial data from material experts

Based on the score intervals in picture 1, we can conclude that the assessment results for the material were sufficient, with a score of 3 as the average.



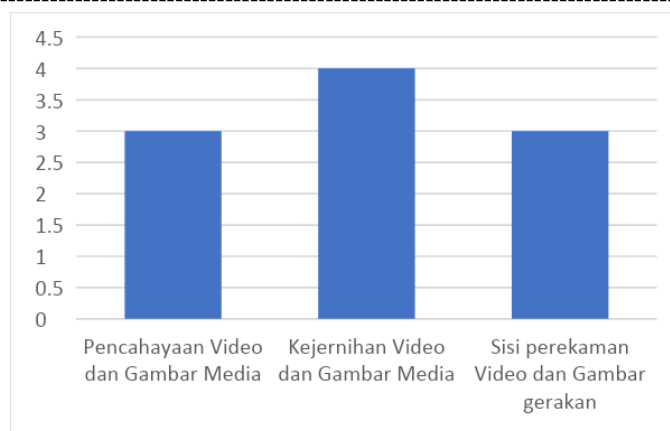
Picture 2. Phase I trial data from media experts

Based on the score intervals in picture 2, we can conclude that the media assessment results were poor, with an average score of 2.33.



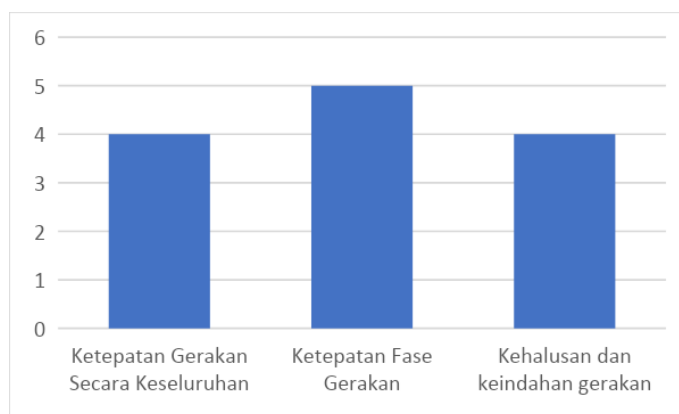
Picture 3. Phase II trial data from material experts

Based on the score intervals in picture 3, We can infer that the evaluation outcomes for the content, particularly the criteria, demonstrated satisfactory performance, yielding an average score of 3.33.



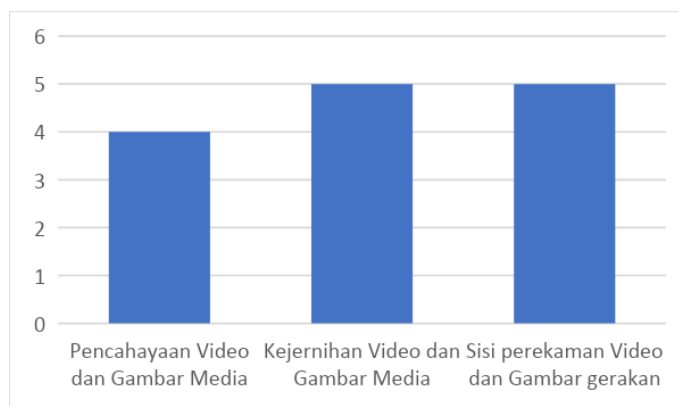
Picture 4. Phase II trial data from media experts

According to the score intervals in picture 4, The material's assessment results, especially the criteria, were pretty good, with an average score of 3.33 achieved.



Picture 5. Phase III trial data from material experts

Based on the score intervals in picture 5, we can conclude that the material's assessment results were on good criteria, with an average of 4.33.



Picture 6. Phase III trial data from media experts

Based on the score intervals in picture 6, the media assessment results showed very high standards, with an average score of 4.67.

Effectiveness Test

The comparison of average gymnastics skill scores between experimental and control classes serves as a benchmark in determining the efficacy of using gymnastics learning media with direct and indirect assistance. The results of the comparison of the average scores for students' gymnastics skills in the experimental and control classes are shown in the table below:

Table 2. Comparison of the Average Values of Student Gymnastics Skills

Class Group	Average Score
Experimental Class	76,37
Control Class	64,28

The difference in the average value of students' gymnastics skills in gymnastics learning using the direct and indirect assistance approach as an experimental class, while in the control class with conventional learning, as seen in Table 2, is that the average value was 76.37 (experimental) > 64, 28 (control). The experimental class's average value was higher than the control class's. This suggested that gymnastics learning with direct and indirect assistance was more motivating and positively impacts students' participation in learning so that they can improve their gymnastics skills.

Discussion

In this development research, a gymnastics learning media product was created, which was packaged in Android digital-based media. The use of digital Android provides information¹³ that can support the learning management process. The use of Android digital learning presents interesting things for students and students (Gregory & Bannister-Tyrrell, 2017) and in gymnastics learning, developing Android-based digital media on gymnastics material through a direct and indirect assistance approach. It is essential to utilize an immediate and backhanded help approach (direct help approach), which is a type of preparing with the contribution of companions to assist each other in development exercises and a circuitous help with drawing closer (roundabout help approach) with the assistance of apparatuses, as well as the jigsaw technique which is the execution of practices in gatherings (Lubis & Hasrul Harahap, 2014; Oakes et al., 2018; Nopiyanto & Raibowo, 2020). Moreover, the design method involves assigning specific movements to students. When these approaches and methods are implemented, teachers and professors can address and rectify mistakes or deficiencies in students' movement processes. This undoubtedly accelerates the mastery of motor skills compared to individual exercises.

On the other hand, performing gymnastics skills will be safer with this approach and training method. This approach and training method can benefit from handstands, headstands, rolling cartwheels, and other gymnastic maneuvers. The steps and training aids necessary to learn floor gymnastics will be included in a digital Android learning medium.

Technological developments are very rapid and are widely used in the world of education, one of which is learning media (Handayani et al., 2022). Media can be used to introduce information from the sender to the recipient. Learning media is a source of fresh content. (Nopiyanto & Raibowo, 2020). With the presence of learning media, all instructional materials and physical tools are effectively utilized to execute teaching methods and streamline the attainment of educational objectives by students (Arief S. Sadiman, 2011). Learning media serves as a versatile learning aid that can be employed both inside and outside the classroom. This medium facilitates communication and interaction between educators and students throughout the learning process (Didi Supriadie & Deni Darmawan., 2012). The digital-android-based learning media crafted in this study serves as a dynamic tool for conveying messages, seamlessly integrating multiple media elements such as text, images, graphics, photos, sound, films, and animations. These elements are thoughtfully combined in an integrated manner and packaged in a digital-android format, enhancing the overall learning experience (Didi Supriadie & Deni Darmawan., 2012)(Cecep Kustandi & Bambang Sutjipto, 2013)

Conclusions

This research presents a groundbreaking digital Android learning media for gymnastics meticulously developed through the Research and Development methodology. Integrating direct and indirect assistance approaches, the Jigsaw method, and multimedia design principles, the innovative product effectively enhances gymnastics skills among college students. The study was guided by the Borg and Gall development research model, involved comprehensive data collection and analysis to identify key components for effective learning media. The subsequent stages included media planning, product development, small-group trials, iterative improvements, field trials, and a final evaluation. Notably, the gymnastics learning media received high praise from both material and media experts, with average scores ranging from good to very good.

The utilization of the Jigsaw method proved instrumental in fostering cooperation, responsibility, and confidence among students in gymnastics practice. The Android-based digital format added a dynamic dimension to the learning experience, aligning with the rapid technological advancements in education. The study's

statistical analysis revealed a significant improvement in gymnastics skills in the experimental class compared to the control class, affirming the efficacy of the innovative learning approach. In practical terms, the developed digital Android learning media provided a versatile tool for teachers and students to engage in collaborative learning, addressing challenges in gymnastics teaching. Integrating direct and indirect assistance methods and multimedia design principles contributed to a safer and more motivating gymnastics learning environment. This research contributed to the theoretical understanding of effective learning media development, particularly in physical education.

Overall, this research advances theoretical knowledge and offers a practical solution to enhance the educational experience of gymnastics. The collaboration between the Jigsaw method and multimedia design was a model for creating valuable resources, aligning with the university's vision and supporting gymnastics clubs. The findings underscore the importance of innovative digital learning tools in physical education, paving the way for future advancements in pedagogy and skill development.

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