

## Development of Android Application-Based Teaching Materials for Physical Education, Health and Recreation Students

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### ABSTRACT

This development research attempts to improve learning outcomes and sports science, especially physical fitness. The programme uses learning apps and instructional videos. In each face-to-face session, the learning app includes lecture explanations, videos of learning variations, fitness programme preparation, and other blended learning instructions. When researchers realised students needed an independent learning curriculum to complete the 20 SKS Thematic KKN programme off campus, they came up with this proposal. Help students access all Thematic KKN lectures. The quantitative research method leverages Sugiono's R & D method to develop and evaluate items that meet goals. After this investigation, students' cognitive abilities, programme compilation capabilities, and fitness activity variants will be assessed. Three experts—two material and one media—will validate the Android-based learning medium in advance. 40% know the needs analysis, and experts' validation percentage. The average validation value with a bad category is 29%–46%. The small group test has 63% validity, according to expert review. The validation value is 47%–64%, which is good enough for the large group test stage following repair. With an outstanding category, application-based learning media for physical fitness activities is developed effectively and efficiently. The large group test has 94% validity, and the average validation score is 83% to 100%. The small group test of 16 Medan State University students of Physical Education, Sports, and Recreation had a score of 66% with a good category, and the large group test of 32 students had a score of 88% with a very good category. Thus, researchers can improve student learning results in physical fitness activity classes utilising an Android-based software.

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## 1. INTRODUCTION

Physical education is a fundamental component of the standard curriculum in educational institutions (Bangun, 2016). Physical education involves a strong connection between educators and students. Teachers help students achieve development, growth, and knowledge through learning. According to Yuliansyah et al. (2021), physical education thrives on the strong bond between the teacher and the student. The teacher plays a leadership role, guiding students as they engage in the learning process. Research by Fajar (2020) highlights that physical education teachers frequently employ teaching techniques that lead to student boredom. The suggestion is to vary teaching methods to avoid monotony.

Exploring sports instruction has always been closely tied to physical activity. One common physical activity for students involves practising movement to improve their skills. Learning skills progress through three distinct stages in sports training: (1) cognitive stage, (2) association stage, and (3) automation stage. During the cognitive stage, the teacher imparts knowledge to students about the new movement, explaining what it is and how it is done. After students respond to cognitive questions and successfully organise movement patterns to generate movement, the association stage is implemented by developing skills and attitudes, along with consistency and confidence (Susanto et al., 2021).

One important aspect of learning is the use of learning media. The use of media must be a part of every learning activity that attracts the teacher's attention. Given the limited facilities and infrastructure in the process of implementing learning using the *merdeka* learning curriculum, therefore lecturer must create something new to help students understand the material while studying independently (Harahap & Sinulingga, 2021). Using learning media in the teaching and learning process can generate new desires and interests, motivate students, strengthen learning activities, and even psychologically influence students (Susanto et al., 2021). Learning media is a tool or media to convey messages to students. One of them is learning media based on Android applications. The process of practicing learning with Android applications can help students to understand content (Aufan & Handokko, 2022). Planning sessions with a focus on the variability of practice, tailored to the trainees' needs, is crucial in the learning process. The effectiveness of blended learning in teaching and learning has captured the interest of numerous teachers, administrators, and researchers in physical education. Aside from the possible advantages, this innovative learning approach also presents obstacles like digital media integration, tool accessibility, and instructional methods.

Android is one of the information systems with the most users around the world today. In Kompas Tekno, 2015, The Verge daily reported that Google created 1.4 billion OS users in 2015. From the previous year, when Google announced that the Android operating system had been used by one billion active users worldwide, this figure had increased by 400 million active users. Leuw et al. in Adi (2019) reported: 1) That Android is a Linux-based open-source operating system for smartphones and tablet computers developed by Google and the Open Handset Alliance. Android was developed as an open-source platform for application development as an operating system (Zou et al., 2012). The concept of learning media based on android applications which are usually in the form of educational applications or applications that contain learning materials and materials is a new thing in the field of education (Malasari & Fikri, 2021). On Android-powered smartphones and other devices, these application products can be downloaded from Google Play or Play Store. Learning media products in the form of applications that can be downloaded or installed on Android-based smartphones are essentially Android-based learning media (Christianto & Dwiwiyogo, 2019).

In a study by Bahri and Zain (2019), it was found that learning is conducted in a manner that holds significance for education, impacting the interactions between teachers and students. One aspect involves engaging in sports and physical activities to promote health and learning. As Rosdiani (in Nasution & Ilham, 2021) research, Sports and Health Physical Education is a structured programme designed to enhance various aspects of individuals' development within the school environment (Handoko et al., 2020; Rustrini et al., 2016). In a study conducted by Nutaracot (2019), it was found that utilising application media focused on motion analysis and proper stroke techniques assisted badminton players in assessing their performance and movements during a match.

Learning materials used in lecture activities at Medan State University's Department of Physical Education, Sports, and Recreation include subjects related to physical fitness activities (Riza et al., 2021). Being physically fit is essential for a healthier lifestyle and increased productivity, as highlighted by Ilham and Nasution (2021). Physical fitness development is a crucial component of school physical education programmes as it enhances students' learning capacity and overall participation.

According to previous research, the creation of Android application-based teaching materials for Physical Education, Health, and Recreation students is crucial to support lecturers in the educational process. In this study, the focus is on investigating the effects of Android-based learning apps on the instruction and acquisition of sports skills in physical education.

## 2. METHODS

This project involved researching and developing a product that meets students' needs. Developed using a method inspired by Sugiyono (2016), the researchers utilised an eight-step model: (1) Potential Problems, (2) Data Collection, (3) Product Design, (4) Expert Design Validation, (5) Design Improvement, (6) Product Testing, (7) Product Improvement, and (8) Final Product.

In the small group trial, around half the number of students participated in the physical fitness activity course compared to the 32 students in the large group tryout stage. The study involved administering a questionnaire and interviews with students, an Android application-based media expert, and two material experts or physical fitness activity trainers. The Likert scale was utilised in the questionnaire to gauge respondents' views and attitudes towards the product under development. The interviewer was requested to supply a checklist in the designated column (Sitompul et al., 2019).

The research involves data collection through observations conducted by researchers at prominent campuses in North Sumatra, specifically Medan State University, during the implementation of physical fitness activity courses. This study involves the distribution of questionnaires to students, an Android application-based media expert, and two material experts or physical fitness activity trainers. The questionnaire uses the Likert scale to gauge respondents' views and attitudes towards the product under development. The interviewer was requested to supply a checklist in the designated column (Sitompul et al., 2019). The research involves data collection through observations conducted by researchers at prominent campuses in North Sumatra, specifically Medan State University, during the implementation of physical fitness activity courses. Next, it's time to examine the collected data.

According to Sugiyono (2018), research procedures are used in this learning model. 298) research and development methods, also called R&D, which has eight stages, as below:

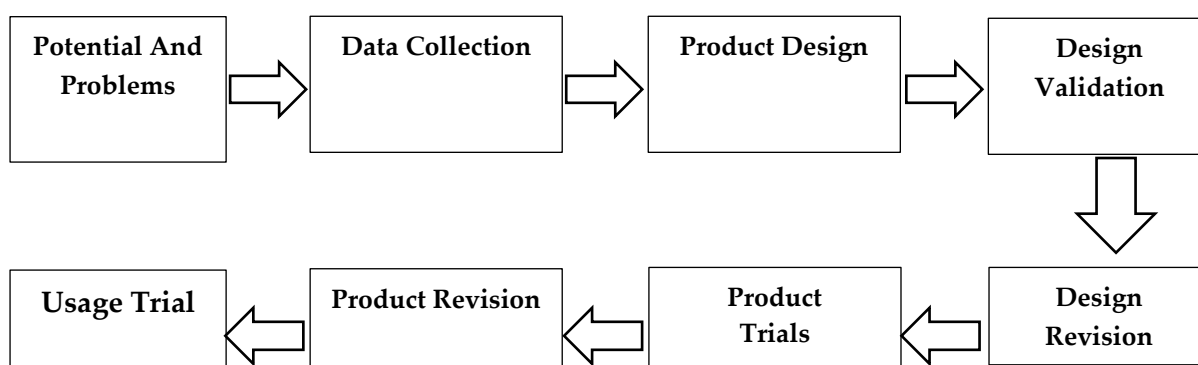
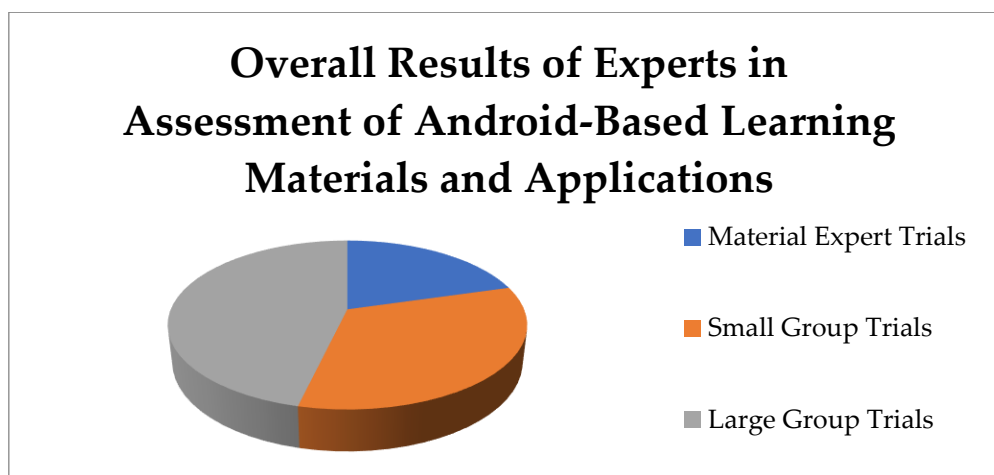


Figure 1. Steps for using the Research and Development Method (R & D)

### 3. FINDINGS AND DISCUSSION

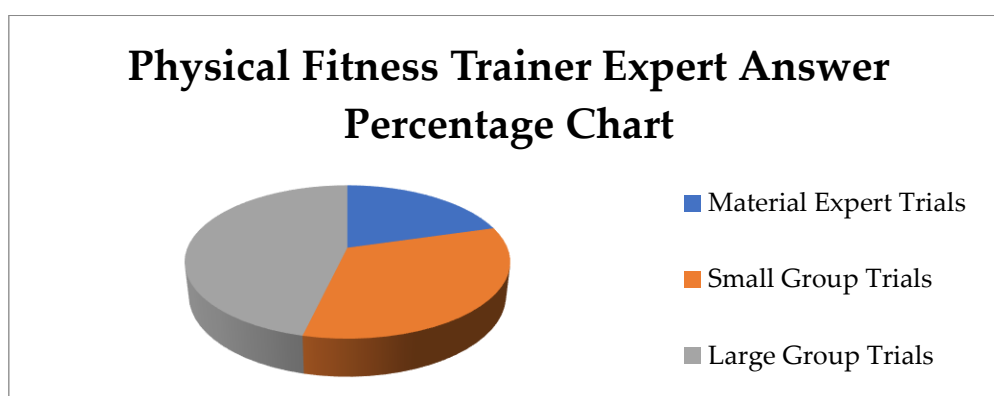
#### 3.1 Findings

The percentage of results from each trial has a difference in the increase in the percentage of material experts trainers of physical fitness activities who have 39% trials requiring 63% small group trials and 88% large group trials. Material experts of physical fitness activity trainers have 43% need trials, 57% small group trials and 91% large group trials. Android application-based media specialists had 53% need trials, 59% small group trials and 87% large group trials. These results can be seen from the pictures and results of the research discussion below.



**Figure 2.** Diagram of the Results of the Percentage of Expert Overall Answers to Android-Based Learning Applications

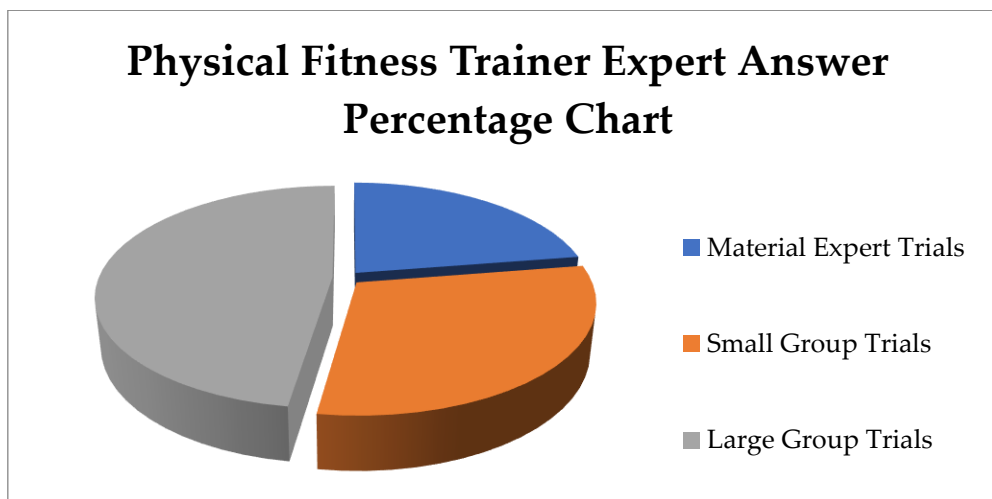
Material expert validation data for physical trainers in physical fitness activities shows 39% unfavourable ratings in the needs analysis trial, 63% fairly good ratings in the small group trial, and 88% very good ratings. Extensive group experiments were conducted by Kasih & Sembiring (2022). This proportion was derived from the responses collected through a survey completed by expert physical trainers specialising in physical fitness activities. Below are the results of the diagram from the material expert assessment of physical fitness activity trainers.



**Figure 3.** Results Diagram Answers Percentage of Material Expert Physical Trainer Physical Fitness Activity

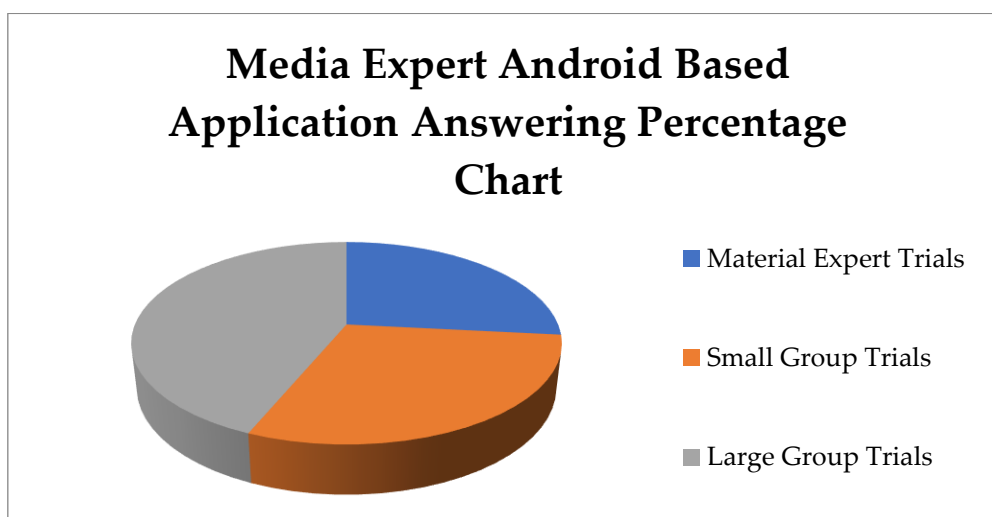
Data generated from material expert validation of physical trainers for physical fitness activities has a percentage of 43% in the unfavorable category in the needs analysis trial, a percentage of 57% in the fairly good category in the small group trial and a percentage of 91% in the very category. well in

large group trials. This percentage was obtained from the results of filling out a questionnaire/questionnaire for material expert physical trainers for physical fitness activities (Baharuddin et al., 2021). Below you can also see the results of the diagram from the material expert assessment of physical fitness activity trainers (Rodriquez et al., 2020).



**Figure 4.** Results Diagram Answers Percentage of Material Expert Physical Trainer Physical Fitness Activity

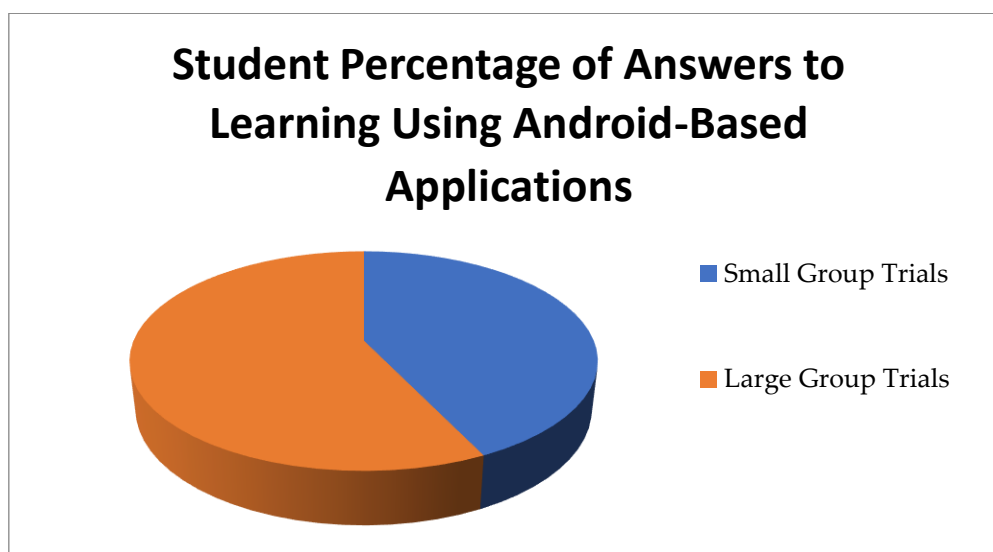
From validating media experts on Android applications, the data shows a 53% rate in the needs analysis trial, 59% in the small group trial, and 87% in the large group trials. The percentage was derived from surveying media experts through an Android application questionnaire (Erianti et al., 2022). Here are the findings of the assessment conducted on Android applications by media experts, as shown in the diagram below.



**Figure 5.** Diagram of Results Percentage of Answers by Android-Based Application Media Experts

At this stage, there were 16 students who conducted small group trials on learning physical fitness activity courses at Medan State University with a percentage of 66%, with the category obtained being good. After conducting a small group trial, the researchers carried out the next stage, namely a large group trial with a total of 32 students taking part in physical fitness activity courses at Medan State University with a percentage of 88% with the category obtained being very good (Sakti, Heynoek, &

Kurniawan, 2022). Below you can see the results of student answers that have been formed like a diagram (Heynoek et al., 2022).



**Figure 4.** Results of Percentage of Student Answers to Learning Using Android-Based Applications

### Discussion

Based on the results of observations and brief interviews, the facts found in the field show that in the learning process of physical fitness activity courses, it is necessary to use learning application programs to assist students in getting maximum results in the material using android-based learning applications (Iskandar, 2021). The learning application contains lecture materials in each number of face-to-face sessions in the form of lecture descriptions, videos of learning variations, preparation of fitness programs and other instructions that support the blended learning process (Mustafa, 2021). This idea arose when researchers felt the need to anticipate learning with an independent learning curriculum as a source for students to carry out the 20 SKS Thematic KKN program off campus (Warda et al., 2023). Facilitate students in accessing all lecture material conducted during the Thematic KKN period (Firdaus, 2020).

The selection of instructional materials that are presented appropriately is a crucial aspect that determines course achievement. Choosing appropriate instructional materials might be based on feedback from the users or recipients of the resources (Pet et al., 2019). When creating technology-based products to influence behaviour change, the discussion is often lacking in detail (Bopp et al., 2016). Studies indicate that mobile application-based products are becoming prevalent and efficient (Harjanta & Herlambang, 2018).

An investigation conducted by Almusawi et al. (2021) aimed to delve into physical education teachers' viewpoints regarding their preparedness to utilise and incorporate wearable technology as an innovative tool in physical education. The study included semi-structured interviews with 38 public school physical education teachers. Through thematic analysis of interview data, this study highlights technology that can be utilised in physical education. Research by Gorozidis et al. (2020) suggests that educators are more likely to be self-motivated when their working conditions and training support the fulfilment of their psychological needs.

Researchers conducted this study to enhance the effectiveness of physical fitness activity courses in the Department of Physical Education, Sports and Health at Medan State University. Creating educational apps for Android can empower students to learn on their own. It is crucial to utilise educational tools to achieve optimal learning outcomes.

#### 4. CONCLUSION

Developing educational resources using an Android-based app is extremely advantageous for promoting self-directed learning. Students can practise and interact with the material even when the lecturer is not around. The learning app provides lecture materials for each face-to-face session, including lecture descriptions, learning variation videos, fitness programme preparation, and other instructions to improve the learning process. This idea originated from the necessity of getting ready for student learning with a self-directed curriculum to assist in implementing the 20 SKS Thematic KKN programme beyond campus boundaries. Assist students in accessing all lecture material from the Thematic KKN period. For the progression of technology-enhanced learning, upcoming studies could concentrate on conducting longitudinal research to evaluate the lasting effects of Android-based teaching materials on student academic performance. Furthermore, delving into customising the app for specific subject areas or student preferences could provide valuable insights into personalising educational resources to meet individual learning needs.

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