

Effectiveness of Android-based learning in Physical Education: A literature review study

M. Agung Al Fatah^{1A-D}, Leni Apriani^{*2BD}

¹²Physical Education, Faculty of Teacher Training and Education, Islamic University of Riau, Riau, Indonesia

ABSTRACT

This literature review aims to review the scientific literature on the effectiveness of android-based learning research in physical education. Two databases (Google Scholar) were used to select articles on the effectiveness of Android-based learning in physical education. After the exclusion criteria, only 11 articles were categorized. The results show the types of research used: qualitative, quantitative, and development. Almost all studies used questionnaires and interviews in data collection. Research on the effectiveness of android-based learning in physical education is divided into two groups: (i) the effectiveness of android-based learning in physical education and (ii) online learning. Several limitations inherent in the review have been noted. First, despite a thorough literature search, some published studies may have been overlooked because the keywords may differ from those currently used. Second, the database (Google Scholar) was used to search for articles. Third, the search for articles from more than one country, namely Indonesia and England.

Keywords: learning; android; physical education

Corresponding author:

*Leni Apriani, Islamic University of Riau, Indonesia. Email: leniapriani@edu.uir.ac.id

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INTRODUCTION

Android-based application development has become a significant focus on learning media development, as shown by previous studies (Firlando et al., 2020). As an open operating system, Android provides flexibility in presenting various educational content through mobile devices such as smartphones and tablets (Helmi & Aditya, 2020). Android technology is becoming increasingly important in Physical Education, an integral aspect of education that involves psychomotor, cognitive, affective, and social-behavioral activities (Isman et al., 2023). The importance of education as an effort to gain expertise, knowledge, and positive values cannot be ignored (Milenianto et al., 2022). Education positively impacts individual development and significantly contributes to the welfare of the nation and state (Maranthika, 2022). By engaging in education, humans can become valuable and mature individuals, overcome illiteracy, and develop developmental skills and abilities (Setiawan et al., 2022).

Physical Education has an important role in shaping humans holistically, as explained by (Effendi et al., 2022). A systematic approach to involving students in the environment through physical activities reinforces the concept that physical education develops physical



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aspects and aspects of individual attitudes and behavior. Physical education, sports, and health are integral to human development, where movement as a physical activity is the basis for knowing the world and oneself, along with the development of the times (Triningsih, 2020). Physical education contributes comprehensively to the affective, cognitive, and psychomotor aspects, making it an inseparable part of the education program (Darmawan et al., 2021). Physical education treats children as a whole unit, a total being, rather than just considering them as someone separate from their physical and mental qualities (Irawati et al., 2024). According to Mora et al. (2021), Sport is necessary for humans. This is because humans are creatures that move. Humans, in carrying out their activities, are never separated from the process of movement because there is no life without movement.

Literature studies have shown that various Android-based applications have succeeded in increasing the effectiveness of Physical Education learning. Floor gymnastics products, such as those developed by (Titling, Fellyson, Hidayah, Taufik, Pramono, 2016), as well as the D'Volleyball Learning application (Ani et al., 2022), and my psilat for pencak silat material (Huda, 2016), have all been proven effective in supporting learning. Although several studies highlight the success of Android-based applications in Physical Education learning, no systematic review thoroughly investigates the effectiveness of Android-based learning in this context. Therefore, this study aims to summarize previous studies and fill the knowledge gap in the related scientific literature. Through this systematic review, we can gain a deeper understanding of the contribution of Android technology to increasing the effectiveness of learning in the field of Physical Education, providing valuable contributions to education practitioners, and enriching the scientific literature.

METHOD

Search Strategy

The search began using the Google Scholar database. Google Scholar is a search engine that helps academics search for scientific papers, such as journal articles published anywhere (Allo & Ismail, 2020). The search strategy included a combination of keyword variations (“android-based learning”) AND (“physical education”). The search followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Shaffril et al., 2019). In addition, PRISMA emphasizes review reports that evaluate randomized trials that can be used as a basis for reporting systematic reviews for other types of research (Moher et al., 2009).

Exclusion Criteria

The exclusion criteria used were: (1) articles in languages other than Indonesian, (2) articles that did not explicitly mention the effectiveness of android-based learning in physical education.

Procedure

Initially, 165 publications were obtained from the Google Scholar database. After following the exclusion criteria, only 11 articles remained. Most of the items were discarded because they did not touch on the effectiveness of Android-based learning in physical education. All articles were extracted from the database and analyzed through Mendeley software.

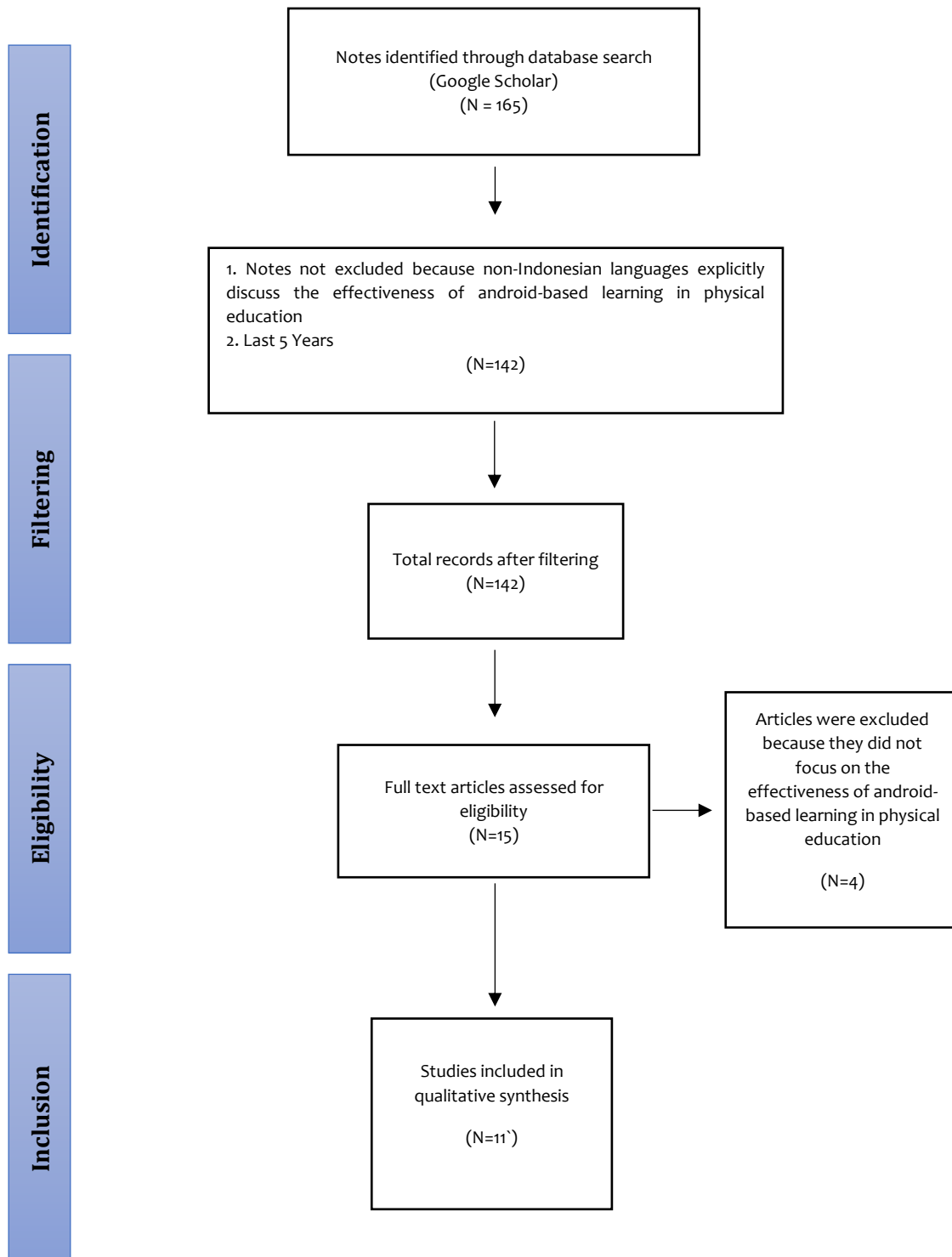


Figure 1. Research Flowchart
(Shaffril et al., 2019)

RESULTS AND DISCUSSION

The 11 articles compiled describe and discuss the five categories (Author and Year excluded) listed in Table 1. The country category is not shown because all articles focus on two countries, Indonesia and England.

Table 1. Article Summary About the Effectiveness of Android-Based Learning in Physical Education

Author and Year	Method and Type of Research	Content	Research Objectives	Research Results
(Haryanti et al., 2021)	Research using qualitative survey methods	Students' Perceptions About the Use of Android-Based Learning Media in Physical Education Learning	The purpose of this study was to determine students' perceptions in the use of Android-based learning media in physical education learning during the Covid-19 pandemic.	The use of mobile learning in physical education, sports and health during the current pandemic conditions is quite helpful and improves the quality and effectiveness of learning.
(Rubian et al., 2022)	The quantitative research used is an experimental method with a pretest-posttest design.	The effectiveness of using Android-based learning media in improving understanding and basic techniques of playing basketball	This study aims to determine the effect of using Android-based learning media called Penjas Unsil Panduan Bola Basket (PUBbG)	There is a significant difference in the application of Android-based learning media compared to conventional learning in terms of student understanding results, but there is no significant difference in the results of students' basic basketball playing techniques.
(Ani et al., 2022)	This quantitative research uses the type of data collection research is testing and observation.	Effectiveness of Using D'volleyball Learning Application in Physical Education Learning	This study aims to determine the effectiveness of using D'Vollyball learning Application in physical education learning	D'Volleyball Learning Application is effectively used in physical education learning
(Milenianto et al., 2022)	This research is a Descriptive Research and Development (R&D) Research and Development Procedures research (research) and development (development).	Development of learning media based on android swimming class for class 7 physical education subjects at junior high school 5 jepara	This study aims to create a physical education media swimming module for class 7 students	The results of this research and development are the results of the evaluation of module experts for the quality aspect of the learning resource module classified as "Very Eligible"
(Huda, 2016)	This study uses a quantitative research method Pre-experimental one-group pretest-posttest experimental design	The effectiveness of using android-based learning media my psilat in physical education learning of pencak silat material at junior high school 1 bawen	This study aims to test the effectiveness of the media by comparing students' understanding before and after being given therapy	The my psilat application is effective in learning pencak silat material

(Ngandhika et al., 2018)	This qualitative research includes product analysis, initial product, expert validation, trial, product revision, final results, and effectiveness test. The instruments used are questionnaires and interviews.	Development of Android-Based Rhythm Activity Learning Media in Physical Education in High Schools	This study aims to produce android-based rhythm activity learning media and the effectiveness of its products	The development of Android-based rhythm activity learning media products is effective in the learning process of Physical Education, Sports and Health (PJOK) in High Schools (SMA) in Pekalongan Regency
(Cahya et al., 2022)	This study uses development research. Potential and problems, data collection, product design, design validation, usage test, product revision, trial, design revision, product revision, and Data collection using product validation questionnaires, respondent questionnaires and documentation. The data analysis method of this study includes descriptive percentages.	Development of Android-Based Let's Teach Learning Media in Curriculum 13 Physical Education Learning	This study aims to: (1) analyze the development of Android-based Let's Teach learning media on smartphones for PE (Penjas) class XI learning documents; (2) analyze the effectiveness of the application of android-based learning media development and teacher administration in class XI sports learning; and (3) analyze the level of feasibility of using Android-based learning media in PE learning materials for class XI.	The Let's Teach application product at the trial stage can be categorized as very good. The next Let's Teach application product in a large-scale trial can be categorized as very good, meaning it can be used and mass-produced.
(Ketaren 2021)	Qualitative researchers collect data through observation, interviews, surveys, and blended learning methods	Physical Education Learning Media Based on Revolution 4.0 to Improve Student Learning Outcomes During the Covid-19 Pandemic	This researcher aims for Android-based learning media to improve thematic learning outcomes carried out online	The results of the study assessed that using Android-based learning media was effective (97%), some of them considered it ineffective (3%) and using PowerPoint learning media effectively (60%), some of them

				considered it ineffective (40%).
(Destriani et al., 2021)	This qualitative research method uses a survey by filling out a questionnaire distributed via Google Form	Analysis of the need for developing learning media based on Android applications in volleyball games	This study aims to analyze the need for developing learning media based on Android applications in learning volleyball games.	The development of learning media based on Android applications in volleyball games can facilitate educators and students during the learning process and can increase student motivation and learning achievement.
(Prasetyo et al., 2019)	This research is a development research that produces learning media on healthy lifestyle teaching materials	Development of Android-Based Mobile Learning Media on Healthy Lifestyle Teaching Materials for High School Students	The purpose of this study is to analyze Android-based mobile learning applications produced to support subjects	Android-based mobile learning media development products are effective in improving student learning outcomes.
(Ilahi et al., 2022)	This qualitative research with research data collection using a questionnaire based on the Likert scale. There are three questionnaires that will be distributed in this study, namely the material expert questionnaire, the media expert validation questionnaire, and the user response questionnaire.	Development of Android-Based Practical Learning Media with VR Commando 3D on Handball Learning Materials	This study aims to develop Android-Based Practical Learning Media with VR Commando 3D on Handball Learning Materials to Improve Students' Critical Thinking.	Android-Based Handball Learning Media with VR Commando 3D that the researcher developed is worthy of being used in learning activities

Based on the review of the category of methods and types of research, five articles exclusively use a qualitative approach (Haryanti et al., 2021; Ngandhika et al., 2018; Prawira, 2021; Destriani et al., 2021; Ilahi et al., 2022). Furthermore, three articles use quantitative research (Rubian et al., 2022), 2023; Ani et al., 2022; Huda, 2016). Moreover, three more articles use development research (Milenianto et al., 2022; Cahya et al., 2022; Prasetyo et al., 2019). Most of these articles use questionnaires and interviews or observations to collect data.

The research results show various types of content implemented with Android-Based Learning Effectiveness such as; Student Perceptions About the Use of Android-Based Learning Media in Physical Education Learning (Haryanti et al., 2021), Effectiveness of using Android-based learning media in improving understanding and basic techniques of

basketball (Siliwangi, 2023), Development of Android-based learning media swimming class for grade 7 physical education subjects at SMP Negeri 5 Jepara (Milenianto et al., 2022), Effectiveness of Using D'volleyball Learning Application in Physical Education Learning (Ani et al., 2022), Effectiveness of using Android-based learning media my psilat in physical education learning material pencak silat at SMP Negeri 1 Bawen (Huda, 2016), Development of Android-Based Rhythmic Activity Learning Media in Physical Education in High School (Ngandhika et al., 2018), Development of Android-Based Let's Teach Learning Media in Curriculum 13 Physical Education Learning (Cahya et al., 2022), Analysis of the need for developing Android-based learning media applications in ball games volleyball (Destriani et al., 2021), Development of Android-Based Mobile Learning Media on Healthy Lifestyle Teaching Materials for High School Students (Prasetyo et al., 2019), Development of Android-Based Practical Learning Media with VR Commando 3D on Handball Learning Materials (Ilahi et al., 2022). Furthermore, content related to online learning, such as Sports Physical Education Learning Media Based on Revolution 4.0 to Improve Student Learning Outcomes During the Covid-19 Pandemic (Ketaren, 2021).

Based on this review, it can be seen that the objectives and results of the research they developed are divided into two groups. The Effectiveness of android-based learning in Physical Education; In this group, there are ten articles discussing Student Perceptions About the Use of Android-Based Learning Media in Physical Education Learning (Haryanti et al., 2021), Effectiveness of using Android-based learning media in improving understanding and basic techniques of basketball (Rubian et al., 2022), Effectiveness of Using D'volleyball Learning Application in Physical Education Learning (Ani et al., 2022), Development of Android-based learning media swimming class for grade 7 physical education subjects at SMP Negeri 5 Jepara (Milenianto et al., 2022), Effectiveness of using Android-based learning media my psilat in physical education learning material pencak silat at SMP Negeri 1 Bawen (Huda, 2016), Development of Android-Based Rhythmic Activity Learning Media in Physical Education in High School (Ngandhika et al., 2018), Development of Android-Based Let's Teach Learning Media in Curriculum 13 Physical Education Learning (Cahya et al., 2022), Analysis of the need for developing learning media based on Android applications in volleyball games (Destriani et al., 2021), Development of Android-Based Mobile Learning Media on Healthy Lifestyle Teaching Materials for High School Students (Prasetyo et al., 2019), Development of Handball Learning Media (Ilahi et al., 2022).

The first article aims to determine students' perceptions of using Android-based learning media in physical education learning during the COVID-19 pandemic (Haryanti et al., 2021). The second article aims to determine the effect of using Android-based learning media, Penjas Unsil Panduan Bola Basket (PUBbG) (Rubian et al., 2022). The third article aims to determine the Effectiveness of using the D'Vollyball learning Application in physical education learning (Ani et al., 2022). The fourth article aims to create a physical education media swimming module for grade 7 students (Milenianto et al., 2022). The fifth article aims to test the Effectiveness of the media by comparing students' understanding before and after therapy (Huda, 2016). The sixth article aims to produce Android-based rhythm activity learning media and the Effectiveness of its products (Ngandhika et al., 2018). The seventh article aims to (1) analyze the development of Android-based Let's-Teach learning media on smartphones for PE (Physical Education) learning documents for class XI; (2) analyze the Effectiveness of the application for developing Android-based learning media and teacher administration in class XI sports learning; and (3) analyze the level of feasibility of using Android-based learning media in class XI PE learning materials (Cahya et al., 2022).

The eighth article analyzes the need to develop Android-based learning media in volleyball learning (Destriani et al., 2021). The ninth article aims to analyze the Android-based mobile learning application produced to support subjects (Prasetyo et al., 2019). The tenth article aims to develop Android-based practical Learning Media with VR Commando 3D on Handball Learning Materials to Improve Students' Critical Thinking (Ilahi et al., 2022).

In the second group, there is one article on online learning that discusses the use of Media for Learning Physical Education and Sports Based on Revolution 4.0 to Improve Student Learning Outcomes During the COVID-19 pandemic (Ketaren, 2021). This article aims to make Android-based learning media capable of improving thematic learning outcomes carried out online (Ketaren, 2021).

The purpose of this article is to describe the research on the Effectiveness of Android-based learning in physical education. This can be seen in research articles published in Indonesia and England. Based on this review, it is divided into five categories, namely (i) Author and Year, (ii) Research Method and Type, (iii) Content, (iv) Research Objectives, and (v) Research Results. Country categories are not displayed; all articles focus on two countries, namely Indonesia and England. This review is divided into two groups: (i) the Effectiveness of Android-based learning in Physical Education and (ii) online learning.

Based on the findings above, Android-based learning is very well applied in physical education. Other researchers have also explained in their research findings that Android-based mobile learning media development products effectively improve student learning outcomes (Prasetyo et al., 2019). Another study also revealed that developing Android-based rhythm activity learning media products is effective in learning Physical Education, Sports, and Health (PJOK) (Ngandhika et al., 2018). The results of the study assessed that using Android-based learning media was effective (97%); some of them considered it ineffective (3%), and using PowerPoint learning media effectively (60%), some of them considered it ineffective (40%) (Ketaren, 2021).

CONCLUSION

This review has provided an update of the literature on the effectiveness of android-based learning in physical education. Initially, many studies were found, but after applying exclusion criteria, the number was reduced to 11 articles. The final results reflect that the number of studies on the effectiveness of android-based learning in physical education is relatively small and shows the need to translate theory into educational practice and to promote consistent research that can produce new knowledge about the real possibilities of implementing the effectiveness of android-based learning in physical education.

The results show that the types of research used in the research on the effectiveness of android-based learning in physical education are diverse: quantitative, qualitative research, and development. Almost all studies use questionnaires and interviews in data collection. Research on the effectiveness of android-based learning in physical education is also divided into two groups: (i) Effectiveness of android-based learning in physical education), and (ii) online learning. Several limitations inherent in the review have been noted. First, despite a thorough literature search, some published studies may have been overlooked because the keywords may differ from those currently used. Second, the database (Google Scholar) was used to search for articles. Third, the search for articles is in more than one country, Indonesia and England.

CONFLICT OF INTEREST

There were no conflicts that occurred in this study.

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