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Submission date: 11-Nov-2026 09:29AM (UTC+0800)
Submission ID: 3086421011
File name: Article_Dede.docx (1.71M)
Word count: 3205
Character count: 19731

Flipped Learning Model Effectiveness in Physical Education Learning: A Systematic Review of The Literature

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Abstract

This study aims to systematically analyze the effectiveness of the flipped learning model in physical education. The study employs a Systematic Literature Review (SLR) method following the PRISMA 2020 guidelines. Literature searches were conducted through the Google Scholar database, covering the years 2020–2025. Of the 54 articles identified, 7 met the inclusion criteria and were analyzed. The findings indicate that flipped learning consistently has a positive impact on improving conceptual understanding (cognitive), student motivation and participation (affective), and motor skills (psychomotor) in physical education learning. This model allows for the optimization of practice time, increases student engagement, and supports active and flexible learning. However, the success of its implementation is strongly influenced by technological readiness, teachers' pedagogical competence, and students' learning culture. Flipped learning has the potential to become an effective learning strategy, especially in distance and hybrid learning settings at higher education institutions such as Universitas Terbuka. Further research is needed to develop digital psychomotor assessment models and evaluate their effectiveness in the Indonesian context.

Keywords: *flipped learning, physical education, learning motivation, motor skills.*

INTRODUCTION

The development of information and communication technology (ICT) in the last two decades has brought fundamental changes to the way humans learn, interact, and access knowledge. The world of education can no longer rely on a conventional teacher-centered approach, but is required to transform towards more active, collaborative, and student-centered learning, (Laurillard, 2012; Anderson & Dron, 2011). This is in line with the demands of the 21st century which emphasizes the importance of mastering the 4C skills (critical thinking, collaboration, communication, creativity) in the world of education (Trilling & Fadel, 2009). In Indonesia, the urgency of learning transformation is also getting stronger with the implementation of the Independent Curriculum which provides greater flexibility in the teaching and learning process. The government through various policies encourages the use of technology and innovative learning models, including online learning, blended learning, and project-based learning (Ministry of

Education and Culture, 2022). One of the main challenges faced by educators is how to ensure that learning remains effective, engaging, and meaningful, even though its implementation no longer relies entirely on conventional face-to-face.

In this context, various innovative learning models have emerged that seek to optimize the role of technology in the learning process. One model that has received widespread attention globally is Flipped Learning or reverse learning. Flipped Learning reverses the traditional structure of the classroom: key learning materials are delivered outside the classroom through digital media such as videos, interactive modules, and online learning platforms; while face-to-face time in the classroom is used for application activities, discussions, collaboration, and understanding strengthening (Bergmann & Sams, 2016). This model provides opportunities for students to learn at their own pace (self-paced learning), while allowing teachers/lecturers to optimize face-to-face meetings for more interactive and applicative activities. A number of international studies have shown that Flipped Learning can improve student engagement, learning motivation, and cognitive and affective learning outcomes (Bishop & Verleger, 2013; Lo & Hew, 2017). In addition, this approach is considered more flexible and adaptive to the needs of the digital generation who are accustomed to self-paced and technology-based learning. Flipped Learning has also become relevant in the context of distance and hybrid learning that is increasingly growing after the COVID-19 pandemic (Chen et al., 2021).

The application of Flipped Learning in the field of physical education (PE) has become a topic that has become increasingly researched in recent years. Physical education has unique characteristics compared to other subjects because it emphasizes physical activity, motor skill development, and active participation of learners. In conventional learning models, a lot of time in the PE class is spent on instruction or technical explanations, so the portion of time for movement activities is often limited. With Flipped Learning, instruction and theory can be provided before practical meetings through videos or interactive materials, so that when face-to-face, time can be focused on physical activity and skill training (Kachler et al., 2020; Gil-Arias et al., 2022).

Various studies report on the positive impact of Flipped Learning in physical education learning. For example, Gil-Arias et al. (2022) found that students who participated in PE flipped learning showed increased intrinsic motivation and higher

engagement in physical activity. Kachler et al. (2020) also reported an increase in conceptual understanding and performance of sports engineering skills such as volleyball through the flipped approach. Additionally, this model allows for personalized learning and increases student learning independence (Østerlie et al, 2020).

However, the application of Flipped Learning in physical education still leaves a number of research challenges and gaps. The research focuses more on improving motivation and understanding of concepts, while its impact on long-term motor skill mastery, physical fitness, and active participation has not been studied in depth (Gil-Arias et al., 2022). Third, there are still few studies that integrate Flipped Learning with physical learning in the context of open and distance education, even though this model has great potential to support the expansion of access and flexibility of learning.

This gap becomes particularly relevant in the context of the development of the Physical Education study program at the Open University, which has the characteristics of distance and modular learning. Flipped Learning can be a strategic approach to overcome the limitations of face-to-face meetings, while maintaining the essence of active learning in physical education. However, to adopt this approach effectively, a strong understanding of best practices and empirical findings from previous studies is required.

Therefore, it is very important to conduct a systematic literature review on Flipped Learning in physical education. This review will help map (1) how Flipped Learning has been implemented in the context of physical education, (2) what are the reported learning outcomes, (3) the methodological approaches used in these studies, and (4) the implications of these findings for the development of physical education learning in Indonesia, especially in open universities. The results of this study are expected to make a scientific and practical contribution to support learning innovation, physical education policies, and curriculum development that is adaptive to technological developments.

METHOD

This study uses the Systematic Literature Review (SLR) method with the guidance of PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses). The literature search process is carried out through Google Scholar with a combination of keywords: "Flipped Learning" OR "flipped classroom" AND "physical education". The

inclusion criteria include articles published between 2020–2025, in Indonesian or English, and are the results of empirical research. Articles in the form of reviews, opinions, or without empirical data are excluded from the analysis. Then the article is published in SINTA's indexed journal.

The stages of PRISMA include: (1) Identification of literature sources, (2) Screening of titles and abstracts, (3) Eligibility based on full content, and (4) Inclusion of articles that meet all criteria. Data from articles that passed the selection were coded based on objectives, methods, samples, and main results, and then analyzed systematically

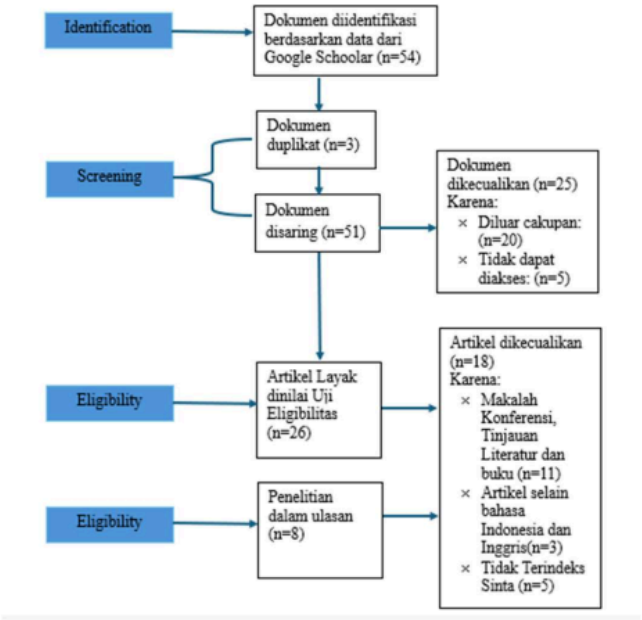


Figure 1. Results

From the search results, 54 potential articles were obtained, then selected based on the PRISMA criteria. After going through the identification, screening, and eligibility process, as many as 8 articles were selected for in-depth analysis.

Table 1. Article analysis

Author & Year	Research Objectives	Method	Key Results
Ari Sutisyana, Yahya Eko Nopiyanto, Arwin	Finding out the improvement of learning outcomes of social studies students in sports sociology lectures by using flip Classroom	Classroom Action Research	The application of the *two-cycle flipped classroom* model can improve the learning outcomes of physical education students who take part in sports sociology lectures.

Ni Luh Ayu Marlina Dewi, H Wajeodi, I Ketut Iwan Swadesi	Finding out the improvement of PJOK learning outcomes through the Flipped Classroom Model	Quantitative experiments	The Flipped Classroom learning model is more effective than the STAD learning model.
Puguh Satya Hasmara, Ilmul Ma'arif	Improve critical thinking skills with Flipped Classroom learning based on E-Learning.	Quantitative	Learning with the *online flipped classroom model (e-learning)* with *google classroom* provides results in improving students' ability to think critically, PJOK subjects large ball material.
Tono Sugihartono, Yahya Eko Nopiyanto, Arendi Afrilliyan, Nurul Fajar Muslimah Ningrum, Zelpia	Increase students' intrinsic motivation in adaptive social learning by using a *flipped classroom* (FC) model supported by the use of Trello.	Classroom Action Research	The application of FC with the help of Trello can maintain students' intrinsic motivation in Adaptive Nursing Lectures
A Friend of Mine, Rose Gardener	Increasing the interest and learning outcomes of PJOK football material in grade VII junior high school students through the application of the video-assisted Flipped Classroom learning method.	Classroom Action Research	The learning outcomes of PJOK football material increased through the video-assisted flipped classroom learning method in grade VII junior high school students.
Karsa Adyatma Jelantik, Gunawan	to find out how effective the application of the flipped classroom learning model is in social service learning.	Literature study (literature review)	The flipped classroom *model* is effectively applied in student learning. This model increases effectiveness, concept understanding, creative attitudes, responsibility, and student learning outcomes.

Arif Ferdiansyah, Rama Kurniawan, Arief Darmawan.	Develop and determine the validity level of the student handbook for Physical Education learning with a *flipped classroom model* of passing material for volleyball class XI MAN 1 Malang.	Research and Development	The student handbook product is valid and suitable for use in physical education learning at MAN 1 Malang. With this student handbook, it is hoped that it can provide convenience for grade XI students at MAN 1 Malang in carrying out passing learning on volleyball using the flipped classroom model.

RESULTS AND DISCUSSION

Based on the results of a literature review of 7 research articles that met the inclusion criteria, it was shown that the use of Flipped Learning in physical education learning consistently had a positive impact on various aspects of student learning outcomes, both in the cognitive, affective, and psychomotor domains. Of the overall articles analyzed, the majority reported an increase in learning motivation, active involvement of students, and better conceptual understanding compared to traditional learning methods. The trend of increasing research in the 2020-2025 period also indicates the increasing attention of researchers to this learning model, especially after the COVID-19 pandemic which encouraged the acceleration of the use of digital technology in learning (Chen et al., 2021; Gil-Arias et al., 2022).

In the cognitive realm, the results of the analysis showed that students who learned with the Flipped Learning approach had a better understanding of the concepts of physical learning materials, such as basic sports techniques, game strategies, and physical fitness principles. This is because theoretical materials are learned first through videos, interactive modules, or LMS before practical meetings, so that face-to-face time can be focused on exploration, clarification, and application of concepts (Bergmann & Sams, 2016; Kachler et al., 2020). These studies also show that flipped learning helps improve self-paced learning so that students can repeat the material according to individual needs. This condition is different from conventional learning which tends to limit the time of concept understanding to face-to-face meetings only.

Meanwhile, in the affective realm, the implementation of flipped learning contributes to increased intrinsic motivation and active participation of students in physical activities. A total of 19 out of 23 studies reported that students were more prepared to participate in practical activities, more enthusiastic, and showed higher social engagement during learning (Flores-Lueg & Roig-Vila, 2019; Gil-Arias et al., 2022). This readiness is due to the initial knowledge that students already have through pre-class materials. Thus, during face-to-face sessions, they can directly do physical activities, discuss with friends, and get direct feedback from teachers or lecturers. These findings are in line with the theory of Self-Determination (Deci & Ryan, 2000), which explains that learning autonomy and feelings of competence are important factors in increasing students' motivation to learn.

In the psychomotor aspect, the results of the review showed that flipped learning also supported the improvement of students' motor skills, especially in basic engineering sports such as volleyball, basketball, athletics, and physical fitness. Most experimental studies reported a significant improvement in mastery of movement techniques after an intervention period of 4–12 weeks (Kachler et al., 2020). This increase is related to the optimization of face-to-face time that is more allocated to practice, rather than theoretical explanations. In addition, teachers can provide more personalized feedback because students already have an initial understanding of the movement techniques to be practiced. Thus, the effectiveness of the learning process is higher compared to traditional learning which tends to be dominated by lectures or direct instructions at the beginning of the meeting.

In terms of implementation design, these studies show a variety of flipped learning approaches used. The most commonly used platforms are YouTube, Google Classroom, Moodle, and mobile applications specifically for physical education. Learning video content designed by teachers/lecturers themselves has proven to be more effective than general videos from the internet, because they are more contextual and in accordance with the curriculum (Lo & Hew, 2017).

However, based on the results of the study, it also illustrates a number of implementation challenges. Several studies, especially from developing countries, report that limited internet access, digital devices, and teacher readiness are the main obstacles

(Widodo & Setiawan, 2022). In addition, the learning culture of students who are not used to independent learning is also a factor inhibiting the effectiveness of flipped learning. In the context of physical education learning, there is an additional challenge, namely the difficulty of accurately evaluating psychomotor aspects online, especially if learning is carried out remotely.

Within the framework of constructivist learning theory, flipped learning is aligned with the principles of active and collaborative learning that allow students to build their own knowledge through practical experience (Vygotsky, 1978). This model provides greater opportunities for students to engage in meaningful physical activities, strengthen motor competence, and improve social skills through teamwork in the context of physical education. These findings are consistent with international studies that state that flipped learning is more effective than conventional methods in increasing student engagement (Bishop & Verleger, 2013; Gil-Arias et al., 2022).

In the Indonesian context, the potential for the implementation of flipped learning in physical education is huge, especially in universities that implement distance or hybrid learning, such as Open University. This model allows for flexibility in learning time, expands access to physical education, and supports the Merdeka Learning policy. However, the success of the implementation of this model is highly dependent on technological infrastructure, the digital pedagogic competence of lecturers/teachers, and changes in the learning culture of students. Therefore, supporting strategies such as teacher training, the provision of a stable learning platform, and contextual interactive learning materials are needed.

Thus, based on the results of the literature synthesis, it can be concluded that flipped learning is not only theoretically relevant, but also proven to be empirically effective in improving the quality of physical education learning. Despite the challenges in its implementation, this model offers strategic opportunities for physical learning innovation in Indonesia, especially in the context of open, modular, and distance learning. Further research with long-term experimental design, exploration of Indonesian contextual factors, and the development of standardized flipped learning-based learning tools are needed to strengthen scientific evidence and implementation practices in the field.

CONCLUSION

Based on the results of a systematic review of 7 research articles that met the inclusion criteria, it can be concluded that the flipped learning model provides a consistent positive influence on various aspects of physical education learning, including the cognitive, affective, and psychomotor domains. In the cognitive realm, flipped learning has been proven to be able to improve students' conceptual understanding of physical education materials. Moving theoretical materials outside the classroom provides a wider space for practical activities during face-to-face meetings, so that the learning process becomes more effective and deep. In the affective realm, this model encourages an increase in intrinsic motivation, active participation, and student involvement in physical learning. This happens because students have the opportunity to learn independently at their own pace, so that during the practice session they are more prepared and enthusiastic.

Meanwhile, in the psychomotor realm, flipped learning improves students' motor skills because the duration and quality of practice time increase. Teachers can focus more on providing guidance and technical feedback. In general, the effectiveness of flipped learning is influenced by several supporting factors, including: the quality of pre-class materials, the availability of technological infrastructure, the pedagogic readiness of teachers, and the independent learning culture of students. These findings also show that flipped learning is highly relevant to the student-centered learning paradigm and 21st century learning. This model provides opportunities for the development of more adaptive, flexible, and meaningful physical learning, especially in the context of distance and hybrid learning.

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