

Effectiveness of Flipped Classroom Method in Improving Students Academic Skills: Scoping Review

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Abstract:

The quality of students' academic skills is one of the important indicators in the success of the higher education process, but traditional learning methods are often less effective in encouraging active student involvement. The purpose of this study is to analyze the effectiveness of flipped classroom method in improving students academic skills: scoping review. The research method used is a scoping review with databases from PubMed, Sage Journals, and ScienceDirect. The results obtained were 10 articles that were reviewed, with the main themes being the effectiveness of the flipped classroom method, student involvement in learning, student perceptions of the flipped classroom learning method, and challenges and obstacles in implementing this learning method. The research findings indicate that academic skills—which include critical thinking skills, analytical skills, creative skills, communication skills, and collaboration skills—significantly improved. Students feel more prepared when taking part in learning because they have previously studied the material to be discussed. The application of this learning method is highly recommended for educational institutions to improve the quality of students and educational institutions.

Keywords: Learning Method, Flipped Classroom, Academic Skills, Students

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INTRODUCTION

Higher education currently faces great challenges in adapting the learning process to technological developments, changes in student characteristics, and competency demands. Students are no longer only required to master theories but are also expected to have critical thinking skills, communication skills, collaboration, and independence in learning (Ma, 2023). Currently, traditional learning methods are still widely applied in universities. This method is less effective in encouraging student active involvement, which can impact the lack of understanding of concepts and student skills (Mengesha et al., 2024).

Therefore, innovative learning methods are needed to overcome this problem. The flipped classroom method is a learning method where students will learn the material before class starts through various sources, such as videos, books, articles, or other reading materials, and then conduct discussions, collaboration, and share the knowledge they have learned during class hours (Lucena et al., 2019).

Jonathan Bergmann and Aaron Sams first introduced the flipped classroom method with the aim of increasing student engagement so that the learning process does not only focus on memorization but also on thorough understanding of concepts, communication skills, and critical thinking. In this way, discussion, problem solving, practical application, and communication with classmates are the best ways to spend time in class (Chen et al., 2024).

Traditional learning methods have been changed to flipped classroom learning methods that bring the material outside the classroom. Whereas during the application of traditional methods, lecturers become the center of information and students are only passive recipients (Dong et al., 2021). During lectures, students only listen to lectures, take notes, and have little opportunity to be actively involved in learning. This can make students' skills not develop. The change to a flipped classroom method is helpful in improving the quality of teaching as it allows classroom time to be used for more interactive and collaborative activities (Zhao et al., 2021). The flipped classroom method plays an important role in improving the quality of teaching in education (Joseph et al., 2021).

The flipped classroom method is a student-focused learning method where students have to study before the class starts. Students also use class time to conduct collaborative activities and communicate with each other. It is expected that this method will enable in-depth learning as the learning process does not only focus on memorization but emphasizes a thorough understanding of concepts and the ability to apply them in various situations (Bıyık Bayram et al., 2023). In this learning, students are encouraged to explore the relationships between concepts as well as reflect on their understanding. Activities such as discussion, problem solving, and collaboration are important as they help students actively build knowledge (Cevikbas & Kaiser, 2020). This method also helps students learn to collaborate and think critically (Youhasan et al., 2021).

In Indonesia, research by Purnomo et al. (2020) examined the effect of flipped classroom on students' math skills. The results of a meta-analysis of 44 primary studies showed that this method had a significant positive effect on improving math skills, with an effect size of 0.73 ($p < 0.01$). This finding indicates that the flipped classroom is an effective alternative in mathematics education in higher education.

In a study conducted by Murillo Zamorano et al. (2019), it was found that the flipped classroom learning method improved students' knowledge and skills, including the ability to work in groups, listen to other people's opinions, and learn independently. In addition, according to Cortez et al. (2019), flipped classroom encourages students to participate more actively in learning, facilitates students' understanding of module materials or teaching materials, and prepares students to learn before class starts.

In addition, research by Fakhri et al. (2020) examined the impact of flipped classroom implementation on students' knowledge, skills, and engagement. The study involved 84 students and found that the flipped classroom method had a significant impact in improving all three aspects. Students became more active and engaged in the learning process, which contributed to the improvement of learning outcomes. Research that has been conducted with results showing that the flipped classroom method can increase student participation, better understanding of the material, and critical thinking skills was also conducted by Hinojo Fang et al. (2022).

The flipped classroom method has significant benefits in the learning process, especially at the higher education level, where it significantly increases student engagement in learning activities. Since the material is delivered before the class meeting, the face-to-face time can be utilized for discussion, question-and-answer, and collaboration activities. This makes students more active, not only as recipients of information but also as participants in a

dynamic learning process (Chikeme et al., 2024).

This flipped classroom method encourages students to learn independently and flexibly. Learning materials can be accessed through various media, such as videos, articles, or digital modules, so students have the freedom to determine the time, place, and pace of learning that suits their individual needs and learning styles. This condition provides space for students to build understanding more personally (Mohseni et al., 2024). This method also contributes greatly to the development of students' academic skills. By participating more in discussions, group work, and problem solving in class, students indirectly practice critical thinking skills, collaboration skills, and effective communication skills. These skills are competencies needed in the world of work (Ge et al., 2020).

Students' academic skills include the ability to think critically, analytically, and creatively, as well as the ability to interact and cooperate with others (Kaplan et al., 2023). The flipped classroom method is intended to enhance these skills by giving students the opportunity to participate in more interactive and independent learning activities. Therefore, students can prepare themselves to face challenges that exist in the world of work, such as lack of communication skills, inability to think critically and analytically in problem solving, inability to socialize, and collaborate with colleagues (Gopalan, 2025).

However, despite the many benefits offered by the flipped classroom method, challenges in its implementation exist, such as the readiness of lecturers and students in adapting to changes in learning methods. Not all lecturers are familiar with or adept at designing attractive digital learning materials, such as learning videos, interactive modules, or other self-learning resources. Students also face challenges in terms of discipline and time management. Since the materials are delivered before class, this method requires students to learn independently and have high responsibility for their own learning process. However, not all students have strong learning independence. Some students have difficulty following the material before class, which ultimately makes them unprepared during the discussion session (Cho et al., 2021).

This study aims to comprehensively analyze and map the effectiveness of flipped classroom method in improving students academic skills: scoping review in higher education through a scoping review approach, focusing on improving critical thinking, analytical, creative, communication, collaboration, and student involvement and learning readiness. The benefits of this research are to make a theoretical contribution to the development of innovative pedagogic studies by presenting a synthesis of the latest scientific evidence related to the advantages and challenges of implementing flipped classrooms, as well as providing practical benefits for lecturers, educational institutions, and policymakers as a basis for consideration in designing learning strategies that are more student-centered, adaptive to technological developments, and relevant to the demands of 21st-century competencies. At the same time, it is an initial reference for further research in identifying research gaps and developing more effective learning models.

RESEARCH METHOD

This research uses the scoping review method because it has a broad scope of literature and there is evidence to find and map concepts, clarify understanding in this domain, identify

and analyze knowledge gaps in the literature, and develop ideas or theoretical approaches suitable for future research. The five stages are as follows:

As shown in Table 1, a structured Population, Concept, and Context (PCC) analysis was used to frame the research questions. The use of PCC to achieve the broad research objective was to offer a thorough analysis of the literature relating to educators and students. Research question: Can the flipped classroom method improve students' academic skills.

Table 1. Development of research questions using the PCC method

Population	Student
Concept	Flipped Classroom Method
Context	Improved academic skills

A comprehensive keyword search strategy was used to identify relevant studies in Pubmed, Sage journal, and ScinceDirect databases, conducted with a time limit of 2019 to 2024, to understand how the flipped classroom learning method can improve student skills. (((("Learning method "[MeSH term]) OR teaching style AND (flipped classroom"[MeSH term])) AND ("academic skills" [MeSH term])) AND ("student"[MeSH term])).

The selection of articles was based on the inclusion criteria, namely articles from the last five years from 2019-2024, original articles, types of quantitative, qualitative and mixed method research, articles in English and easily accessible articles. Some research articles were considered relevant from their abstracts. All relevant material was accessible. After duplicates were removed, titles and abstracts were screened. At this point, a large number of data sources (n = 940) were eliminated because they did not meet the inclusion requirements.

Explaining the search results related to the application of the flipped classroom learning method in improving student academic skills. Data extraction in table 3 includes author, year of publication, article title, country, research methodology objectives and research results. A total of 940 citations were collected through database searches and organized in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart (Figure 1). The authors then analyze, summarize, and report the results. The scope of this review follows PRISMA standards and the full PRISMA checklist is included where relevant.

RESULTS AND DISCUSSION

Of the 10 articles reviewed, there are 1 article from the African continent, 1 article from the European continent and the most dominant from the Asian continent, 8 research articles. So that the application of the flipped classroom learning method has begun to be applied in various countries in the Asian contine.

Table 2. Article analysis results

No	Theme	Sub Theme
1	Effectiveness of the flipped classroom method	a. Improvement of academic skills b. Comparison with traditional teaching methods
2	Student engagement in learning	a. Level of student engagement in class b. Factors affecting student engagement

3	Student perceptions of the flipped classroom learning method	a. Improved understanding of the material b. Improved critical thinking skills c. Benefits of pre class materials d. Development of learning skills
4	Challenges and barriers	a. Workload b. Learning motivation c. Evaluation of student engagement participation

The discussion section is separate from the results, describing the findings logically, linking with relevant reference sources. The discussion section explains the findings logically and relates them to relevant reference sources.

1. Effectiveness of The Flipped Classroom Method

Improved academic skills

A study by Mengesha et al. in Ethiopia showed that the use of flipped classroom learning method can significantly improve students' academic performance. In the group that studied with this method, the average pretest score was 65.2 and increased to 78.6 in the posttest. Meanwhile, the group that used the traditional teaching method only increased from 62.8 to 74.2. This proves that when applying the flipped classroom method, students are better able to understand the material being taught. Another study by Lu et al. (2023) also found the same thing. They concluded that the flipped classroom method was able to improve students' final exam scores and overall daily performance. Students who attended classes with this approach also showed a better understanding of physiology material, which had a positive impact on their academic achievement.

Another study by Huang & Yu, 2022 was also conducted by showing that the application of the flipped classroom method in teaching education in higher education has resulted in a significant improvement in Students academic skills. After the implementation of this learning method, the proportion of students who showed interest in learning increased to 82.4%. This shows that students are more actively involved in the learning process, which contributes to the improvement of their understanding and skills.

Research by Khadawardi et al., 2025 found that the application of the flipped classroom method significantly improved students' academic skills. The average student exam score increased from 13.25 ± 2.36 before intervention to 16.08 ± 1.5 after learning, with a P value <0.05 , indicating that this method is effective in improving learning outcomes. Qutob, 2022 in his research results showed that students who attended the flipped classroom session received high scores (81%) compared to students who followed the traditional teaching method which only reached 73%. The p value <0.001 indicates that this difference is statistically significant, indicating that the flipped classroom method better improves students' academic skills.

The flipped classroom method is designed to develop students' various academic abilities, such as critical, analytical, and creative thinking, as well as skills in interacting and cooperating with others (Sezer & Esenay, 2022). Through this approach, students are encouraged to be more active and independent in the learning process through engagement in interactive and collaborative activities (Ruzafa Martínez et al., 2023).

Comparison with traditional teaching methods

Research conducted by Mengesha et al. in Ethiopia showed that students who studied using the flipped classroom method had higher posttest scores compared to those who attended traditional lectures. The same thing was also found in the study of Lu et al. (2023), which showed that students who studied with the flipped classroom method had higher average final exam scores and other exams compared to students who studied in the traditional way.

The flipped classroom method has been proven to be more effective in helping students improve their learning outcomes compared to traditional teaching methods, where students are usually just listeners (Torres-Cano et al., 2025). In this method, students learn the material first outside of class, so that when in class they can be more actively involved in discussions and learning activities (Ho et al., 2024). Another study by Huang and Yu (2022) also showed that the flipped classroom approach was able to increase student participation and learning achievement better than the traditional lecture method

Student Engagement in Learning***Level of student engagement in class***

Research conducted by Mengesha et al., 2024 in Ethiopia showed that students who followed the flipped classroom method had higher levels of engagement. Student engagement scores in the flipped classroom group were higher than those in the traditional lecture group, indicating that this method encourages active participation and interaction in the classroom. Students' engagement in learning increased significantly after the implementation of the flipped classroom method. Students more actively participated in group discussions and interactive activities, which allowed them to apply previously learned knowledge (Lu et al., 2023). Students involved in the flipped classroom method show higher levels of engagement during learning sessions (Wang et al., 2022). Group discussions and interaction with the instructor increase students' active participation, which contributes to a more immersive learning experience (Bhavsar et al., 2022).

Factors affecting student engagement

Some factors affecting student engagement include the provision of interesting and relevant pre-class materials, as well as opportunities to collaborate in group discussions (Ng, 2024). Higher engagement can also be influenced by an interactive learning environment and support from teachers in facilitating discussions (Mengesha et al., 2024). Research conducted by states that student engagement includes interesting teaching design, creative use of learning resources, and a classroom environment that supports interaction.

Students reported that collaborative learning and diverse teaching methods contributed to their increased engagement (Lu et al., 2023). Some of the factors that influence student engagement include interaction with the instructor, use of technology in learning, and opportunities to collaborate with peers. Classes designed to encourage discussion and group work also contribute to increased student engagement (Khadawardi et al., 2025).

Students Perceptions of The Flipped Classroom Method

Improved understanding of the material

Students reported that the flipped classroom method improved their understanding of the material. With the pre-class materials, students feel more prepared to participate in class discussions and activities (Mengesha et al., 2024). Most students felt that the flipped classroom method improved their understanding of the learning materials. They reported that pre-class learning through videos and reading materials helped them prepare for in-class discussions (Lu et al., 2023). By studying independently before class, students can prepare questions and topics to be discussed, thus improving their understanding of the material (Huang & Yu, 2022). Students who reported an increased understanding of the material after participating in the flipped classroom with a perception score of this method increasing from 41.91 before the intervention to 69.71 after the intervention, indicating that students felt they understood the material better (Khadawardi et al., 2025).

Improved critical thinking skills

This method also helps students develop critical thinking skills, as they are required to understand, analyze, and apply the material they have learned before entering the class (Katona & Gyonyoru, 2025). Activities such as discussions and problem solving during class meetings provide opportunities for students to practice deeper and more critical thinking (Mengesha et al., 2024). Students also perceived an improvement in their critical thinking skills. Group discussions and problem solving in class encouraged them to think more deeply and analyze information in a more critical way (Lu et al., 2023). The flipped classroom method also contributed to the improvement of students' critical thinking skills. By engaging in discussions and case analysis, students can develop the ability to analyze and solve problems more effectively (Bhavsar et al., 2022).

Benefits of pre class materials

Students recognize that pre-class materials, such as videos and reading materials are helpful in preparing them for class sessions. These materials make students learn at their own pace and understand basic concepts before engaging in active learning (Mengesha et al., 2024). The pre-class materials provided before the learning session were considered very useful by students. They felt that this preparation helped them be better prepared to participate in class discussions (Bhavsar et al., 2022). Good pre-preparation will make students very ready to learn (Rincón et al., 2025).

Development of learning skills

The flipped classroom method also helps students develop their ability to learn independently (Mengesha et al., 2024). With this approach, students learn to manage their time and utilize learning resources more effectively. This encourages them to take more responsibility for their own learning process (Pimdee et al., 2024).

Challenges and Obstacles

Workload

One of the challenges that students face is a higher workload, as they are required to prepare materials before class. This can be an additional burden for students who have other duties (Mengesha et al., 2024). Some students report feeling pressured by the amount of material that must be studied before high classes (Lu et al., 2023). Research conducted with the results that one of the challenges faced by students is an increased workload, because they are required to prepare material before class. This can be an additional burden for students who already have a busy schedule (Khadawardi et al., 2025).

Learning motivation

Learning motivation is also an important factor in the success of the flipped classroom method. Students who lack motivation may not utilize the pre-class materials optimally, which may affect their learning outcomes (Mengesha et al., 2024). Learning motivation is also an important factor. Students who are less motivated may have difficulties in following the flipped classroom method, especially in completing high level pre-class assignments (Lu et al., 2023). Students' learning motivation also plays an important role in the successful implementation of the flipped classroom method. If students are not motivated to learn independently, the effectiveness of this method may be reduced. Research shows that lack of motivation can hinder their engagement and participation in learning (Huang & Yu, 2022).

Evaluation of student engagement participation

Evaluation of student participation in classroom activities is also a challenge. Effective methods are needed to assess student engagement fairly and accurately, in order to provide constructive feedback and encourage active participation (Mengesha et al., 2024). Evaluation of student participation in classroom activities is a challenge. A better evaluation system is needed to ensure that all students actively contribute to discussions and group activities, so that no student is left behind in the learning process (Lu et al., 2023).

CONCLUSION

Results from ten studies consistently demonstrate that the flipped classroom method outperforms traditional learning approaches in higher education, yielding significant enhancements in students' academic outcomes, critical thinking skills, material comprehension, learning motivation, and engagement. This approach fosters active, collaborative, and independent learning, leading to deeper understanding and greater student satisfaction, positioning it as a highly relevant and adaptive strategy for modern educational demands. For future research, longitudinal studies could explore the long-term retention of these skills and the method's scalability across diverse disciplines and cultural contexts, such as in Indonesian universities, to address potential implementation barriers like digital access inequities.

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