

Original Article



The effectiveness of the flipped learning approach on classroom perception and academic attitude in university students

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Abstract

Background: Traditional lecture-based teaching methods are prevalent in universities, but there's a growing interest in exploring alternative approaches. Flipped learning (FL) is one such method, where students learn the core material independently before class, allowing in-class time to focus on active learning activities. This study aimed to examine the effectiveness of FL on classroom perception and academic attitude among university students.

Methods: The research employed a quasi-experimental design with a pre-test, post-test, and control group. The target population for this study was female counseling students at Farhangian University in Ahvaz, Iran, in the year 2021. A convenience sample of 40 students enrolled in the statistics course was selected. Participants were randomly assigned to either the FL group or the control group (n=20). Data were collected using the Classroom Perception and Academic Attitude questionnaires. The intervention group received the FL program in eight 120-minute sessions once a week, while the control group received traditional instruction. Data were analyzed using analysis of covariance (ANCOVA) in SPSS-22.

Results: The findings revealed a significant difference between the FL and control groups in terms of classroom perception and academic attitude ($P < 0.001$). FL significantly improved classroom perception and academic attitude in university students compared to the control group ($P < 0.001$).

Conclusion: The findings of this study demonstrate that FL can effectively enhance classroom perception and academic attitude among university students.

Introduction

The rapid advancements in information technology have significantly transformed the educational landscape, integrating technology as an integral component of the learning process.¹ The emergence of affordable cloud-based storage, advanced computing capabilities, and the proliferation of personal devices such as smartphones, tablets, and other mobile technologies have revolutionized the digital experiences of students, prompting a shift in their daily lives and learning habits.² Today's students are increasingly tech-savvy and less tolerant of traditional teaching methods.³ Consequently, they have distinct needs and expectations from educational systems. Conventional teaching approaches no longer adequately address the demands of modern learners, necessitating a shift from traditional instructor-centered pedagogy to active student-centered learning.⁴

The classroom environment serves as a critical cornerstone in shaping student learning experiences.⁵

The specific content delivered in a classroom is only one piece of the puzzle. Students' perceptions of the classroom environment, encompassing their feelings about the physical space, the quality of interactions within it, and the overall learning experience, can significantly impact their motivation, engagement, and ultimately, their academic achievement.^{6,7} Positive classroom perceptions are characterized by feelings of safety, support, and intellectual stimulation.⁸ Students who feel comfortable taking risks, asking questions, and actively participating in discussions are more likely to be engaged in the learning process. Conversely, negative classroom perceptions, where students experience anxiety, a lack of support, or disengagement, can hinder learning and lead to negative academic outcomes.⁹ Understanding students' perceptions of the classroom is vital for educators. By identifying both positive and negative aspects of the learning environment, teachers can make informed decisions about their teaching practices, classroom

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management strategies, and overall learning activities.¹⁰ By fostering a positive classroom perception, educators can create a more enriching and successful learning environment for all students.^{11,12}

Student performance and overall success are significantly influenced by another critical factor: their academic attitude.¹³ This encompasses a range of beliefs, emotions, and behaviors students hold towards learning and academics. Positive academic attitudes are characterized by motivation, curiosity, a willingness to work hard, and a belief in one's ability to succeed.¹⁴ Students with such attitudes are more likely to approach challenges with a growth mindset, readily engage in learning activities, and persevere through academic difficulties. Conversely, negative academic attitudes, marked by feelings of apathy, anxiety, or a lack of self-efficacy, can hinder academic achievement.¹⁵ Students with these attitudes may be less motivated to participate in class, struggle to maintain focus and give up easily in the face of challenges.¹⁶ Understanding the factors that shape academic attitudes and fostering positive ones is crucial for educators. By creating a supportive and stimulating learning environment, encouraging a growth mindset, and providing opportunities for success, educators can support students in achieving positive academic attitudes that will contribute to their success in achieving academic achievement and lifelong learning.¹⁷

Flipped learning (FL) has emerged as a transformative pedagogical approach that emphasizes student-centered learning, transforming the traditional classroom setting from a passive knowledge repository to an active learning environment.¹⁸ In FL, students are provided with diverse digital tools and resources, such as instructional videos, to engage with foundational knowledge as part of their pre-class preparation. This allows class time to be utilized more effectively for interactive activities, encouraging students to apply their understanding through practice exercises and receive personalized feedback from instructors.¹⁹ The essence of FL lies in reversing the traditional classroom dynamic, where content delivery occurs during class sessions and independent work is relegated to the outside of class. Unlike the lecture-based model, FL fosters an active learning environment where students engage with foundational concepts before class, allowing class time to be dedicated to interactive activities, discussions, and personalized feedback.²⁰

Traditional classroom instruction typically follows a teacher-centered approach, where the instructor delivers information through lectures, demonstrations, and explanations. The teacher plays a pivotal role in guiding the learning process, often assuming control over the pace and content delivery. Students primarily engage in passive learning, listening, and taking notes to absorb the information presented.²¹ This lecture-based approach emphasizes the transmission of knowledge from the teacher to the students, with limited opportunities for

active engagement and personalized learning. In contrast, the FL methodology adopts a student-centered approach, shifting the focus from passive knowledge acquisition to active learning and application. Students are provided with pre-class materials, such as instructional videos or readings, to engage with foundational concepts independently. This allows class time to be utilized more effectively for interactive activities, discussions, and problem-solving exercises.²² The teacher acts as a facilitator, guiding students through the application of their understanding and providing personalized feedback.²³ In the FL, the teacher transitions from a sole content deliverer to a facilitator and guide, empowering students to take ownership of their learning journey. By providing pre-class materials, teachers encourage students to engage with the content independently and come to class prepared for active participation. This shift in the teacher's role promotes student autonomy and fosters a more engaging learning environment.²⁴

The FL approach caters to diverse learning styles and abilities by providing students with personalized access to learning resources. Students can revisit pre-class materials at their own pace, rewinding or pausing instructional videos to fully grasp the concepts. This flexibility allows students to progress according to their individual needs without feeling pressured or embarrassed in front of their peers.^{25,26} The FL approach revolutionizes the traditional learning environment by shifting the focus from passive knowledge acquisition to active engagement and application. In this model, students actively engage with pre-class materials, such as instructional videos or readings, to gain a foundational understanding of the concepts. This allows class time to be utilized more effectively for interactive activities, discussions, and problem-solving exercises.²⁷

Traditional lecture-based teaching methods, while widely used in universities, have faced criticism for their limitations in fostering active learning and engagement among students. This can lead to negative classroom perceptions and hinder the development of positive academic attitudes. This study aims to address this gap in knowledge by examining the effectiveness of FL as an alternative teaching approach. Accordingly, this study aimed to examine the effectiveness of FL on classroom perception and academic attitude among university students.

Materials and Methods

This quasi-experimental study employed a pre-test, and post-test design with a control group to assess the efficacy of FL instruction on undergraduate counseling students' statistics knowledge. The population comprised 150 undergraduate counseling students at Farhangian University in the 2021 academic year. A convenience sample of 40 students enrolled in the statistics course was selected. To minimize selection bias, students

were randomly assigned to either the experimental (n=20) or control (n=20) groups. The experimental group received FL instruction, while the control group followed a traditional lecture-based approach. Both groups completed pre-and post-tests to measure statistics knowledge. To ensure data quality and comparability, standardized testing procedures, including identical test content and administration conditions, were implemented for both groups. To further mitigate information bias, researchers were blinded to group assignments during data collection and analysis. Additionally, strict protocols were adhered to regarding data handling and storage to prevent unauthorized access. The inclusion criteria for the study were being a first-year student enrolled in the statistics course, having familiarity with social media and the internet, and providing informed consent. Participants with more than two absences from FL sessions or demonstrating unwillingness to cooperate were excluded.

Flipped learning approach

The FL approach was implemented in two distinct phases: (1) Pre-class phase: In a departure from traditional classroom instruction, the pre-class phase shifted the focus of learning to individual study outside of the classroom setting. Students were assigned electronic course materials, specifically prepared by the instructor from the statistics textbook, for each session. These materials included videos and interactive multiple-choice questions based on the assigned content. Students had the flexibility to access and review the electronic materials at their own pace, allowing them to personalize their learning experience. (2) In-class phase: The in-class phase served as a dynamic platform for active engagement and collaborative learning. The instructor began the session with a brief overview of the electronic materials, providing supplementary explanations and clarifications. This was followed by a thorough discussion of the multiple-choice questions assigned in the pre-class phase, addressing any lingering doubts or misconceptions among the students. To further promote active participation and knowledge sharing, the instructor formed small groups of three to four students. These groups were tasked with engaging in discussions and collaborative problem-solving activities based on questions derived from the statistics textbook. The instructor circulated throughout the classroom during group work, providing guidance and support as needed. This implementation of the FL approach aimed to transform the traditional passive learning environment into an interactive and engaging learning experience, fostering deeper understanding and application of statistical concepts among students.

Instruments

Classroom Perception Questionnaire: This questionnaire was developed by Fraser et al²⁸ and consists of 54 items that assess seven dimensions of classroom perception:

student-teacher interaction, student support, task involvement, cooperation, goal structure, fairness, and academic emphasis. Responses are made on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The total score ranges from 54 to 270. In this study, the overall score of the questionnaire was considered. Nikdel et al²⁹ conducted a study in Iran and found the Persian version of the questionnaire to have acceptable internal consistency, with a Cronbach's alpha coefficient of 0.79. They also established the validity of the questionnaire through confirmatory factor analysis, obtaining adequate fit indices (CFI=0.94, TLI=0.96). In the present study, the Cronbach's alpha for the entire questionnaire was 0.87.

Academic Attitude Questionnaire: To assess academic attitude, the Academic Attitude Questionnaire developed by Akbarzadeh³⁰ was employed. This questionnaire measures academic attitude through 30 five-point Likert scale items, with response options ranging from "almost never" to "almost always." The total score ranges from 30 to 150, with higher scores indicating a more positive academic attitude. In this study, the overall score of the questionnaire was considered. The reliability of the questionnaire was determined using Cronbach's alpha, yielding a value of 0.82 in the study by Momeni Mahmoei and Safdari.³¹ In the present study, the instrument's reliability was again assessed using Cronbach's alpha, resulting in a value of 0.85.

Data analysis

Data analysis was conducted using both descriptive and inferential statistics. Descriptive statistics, including means and standard deviations, were employed to summarize the data. Inferential statistics, specifically the analysis of covariance (ANCOVA), were used to examine the relationship between the independent variable (FL vs. traditional instruction) and the dependent variables (classroom perception and academic attitude) while controlling for the covariate (pre-test scores). The statistical analyses were performed using SPSS version 22.

Results

The study participants consisted of 40 university students with an average age of 20.45 ± 2.69 years. The means and standard deviations of the pre-test and post-test scores for classroom perception and academic attitude for the FL and control groups are presented in Table 1. The table also includes the results of the Kolmogorov-Smirnov test to assess the normality of the distributions of the variables in each group. The results of the Kolmogorov-Smirnov test indicated that the distributions of the research variables were normal, confirming the assumption of normality for the pre-test and post-test scores concerning the classroom perception and academic attitude variables in both the FL and control groups.

Table 1 presents the means and standard deviations

of classroom perception and academic attitude in the FL and control groups at the pre-test and post-test stages. Classroom perception scores were similar between the FL and control groups at the pre-test ($M = 194.11 \pm 15.81$ vs. 196.02 ± 16.27 , $P = 0.709$). However, at the post-test, the FL group demonstrated significantly higher classroom perception scores ($M = 212.25 \pm 16.79$) compared to the control group ($M = 191.52 \pm 17.81$, $P = 0.001$). However, while the average classroom perception score in the control group was slightly lower in the post-test phase compared to the pre-test phase, this difference was not statistically significant. Academic attitude scores did not differ between the two groups on the pre-test ($M = 111.78 \pm 11.31$ vs. 111.61 ± 11.21 , $P = 0.959$), but the FL group exhibited significantly higher scores on the post-test ($M = 128.77 \pm 11.14$) compared to the control group ($M = 111.16 \pm 10.56$, $P = 0.001$).

To assess the homogeneity of variance assumptions for classroom perception and academic attitude between the experimental and control groups, Levene’s test was employed. The results of Levene’s test indicated no significant difference in the variances of classroom perception ($F = 1.68$, $P = 0.195$) and academic attitude ($F = 0.46$, $P = 0.637$) between the two groups. These findings suggest that the homogeneity of variance assumption was met, allowing for the validity of the ANCOVA results.

To examine the impact of FL on classroom perception and academic attitude, an ANCOVA was conducted. Pre-test scores for classroom perception and academic attitude were used as covariates to control for initial differences between the groups. The results of the ANCOVA revealed a significant main effect for the group on classroom perception ($F = 22.96$, $P < 0.001$), indicating that the FL group had a significantly higher mean score on classroom perception compared to the control group. The effect size for this finding was moderate, with an eta squared value of 0.49. The results also demonstrated a significant main effect for the group on academic attitude ($F = 27.48$, $P < 0.001$), suggesting that the FL group had a significantly

higher mean score on academic attitude compared to the control group. The effect size for this finding was also moderate, with an eta squared value of 0.61 (Table 2).

Discussion

The objective of this study was to investigate the effectiveness of FL on classroom perception and academic attitude among university students. The findings of the study revealed that FL implementation led to a significant improvement in students’ classroom perception. These results align with previous research that has demonstrated the positive impact of FL on classroom perception.^{25,27} FL pedagogy stands in contrast to traditional instructional approaches, where content delivery is primarily confined to class time. The FL model disrupts this convention by shifting content delivery outside of the classroom. This allows educators to transform class time into a more dynamic and engaging learning environment. This shift empowers instructors to dedicate a greater portion of in-class time to facilitating activities that promote deeper understanding and application of course concepts. These activities often include hands-on experiences, collaborative projects, and problem-solving exercises.²³

In the FL approach class time is transformed into a hub for active learning, where students engage in a variety of hands-on activities, collaborative discussions, and problem-solving exercises.¹⁸ Instructors act as facilitators, guiding students through the application of concepts, fostering critical thinking, and promoting peer-to-peer learning.²⁰ The FL approach aims to increase student engagement and promote deeper understanding by shifting the focus from passive content reception to active knowledge construction. By engaging with material before class, students come to class prepared to ask questions, seek clarification, and actively participate in learning activities.

FL methodology allows for a more personalized learning experience, as students can progress through pre-class content at their own pace and revisit materials as needed.²⁶ This flexibility caters to individual learning

Table 1. Means and standard deviations (SD) of classroom perception and academic attitude in FL and control groups at pre-test and post-test stages

Variables	Phases	FL Group	Control group	P (within-groups comparison)	Kolmogorov-Smirnov test	
		Mean ± SD	Mean ± SD		Z	P
Classroom perception	Pre-test	194.11 ± 15.81	196.02 ± 16.27	0.709	0.17	0.200
	Post-test	212.25 ± 16.79	191.52 ± 17.81	0.001	0.18	0.200
Academic attitude	Pre-test	111.78 ± 11.31	111.61 ± 11.21	0.959	0.13	0.200
	Post-test	128.77 ± 11.14	111.16 ± 10.56	0.001	0.14	0.200

Table 2. Results of the analysis of covariance on classroom perception and academic attitude in FL and control groups

Variables	SS	df	MS	F	P	η²
Classroom perception	4988.83	1	4988.83	22.96	0.001	0.49
Academic attitude	2683.39	1	2683.39	27.48	0.001	0.61

MS: the mean sum of squares; SS, the sum of squares.

styles and preferences. By engaging with content before class, students gain a foundational understanding that prepares them for more in-depth exploration and application during class sessions. This active engagement promotes deeper comprehension and fosters the ability to apply concepts to real-world scenarios. FL instruction often incorporates collaborative activities and group discussions, encouraging students to work together, share ideas, and build communication skills.²⁷ This collaborative learning environment promotes active participation and fosters a sense of community among students. Project-based learning activities play a pivotal role in the FL approach, enhancing student comprehension of the content while simultaneously encouraging active engagement in their learning endeavors. Assignments, repetition and practice, question-and-answer sessions, and discussions on instructional topics replace traditional lecturing, transforming the classroom dynamic and fostering deeper learning and heightened motivation.²⁶

The study findings further revealed that FL implementation led to a significant improvement in students' academic attitudes. These findings align with previous research that has demonstrated the positive impact of FL on academic attitude.¹⁴

Learner-centered learning in the FL environment occurs when learners have increased opportunities for interaction and engagement in the learning process. In a learner-centered learning environment, the instructor serves as a facilitator of learning rather than dictating knowledge to learners. To implement learner-centered learning among learners, instructors can employ various methods such as peer learning, collaborative learning, and cooperative learning.¹⁴ A common feature of these methods is the emphasis on interaction and learner engagement with the learning process. In other words, these methods assume that learners must actively participate, interact, and seek knowledge for themselves rather than passively receive information. In this context, it is crucial to recognize that the FL is a learner-centered model where learners take responsibility for viewing pre-recorded lectures before class and preparing themselves for the corresponding learning activities upon entering the classroom. FL involves preparing learners ahead of time; therefore, the effectiveness of the FL hinges on learners being adequately prepared before class.¹⁸

A positive learning environment plays a pivotal role in fostering a favorable attitude toward learning among students. In progressive educational systems, the primary objective of education is to promote learning and bring about a transformative change in students' knowledge and perspectives.² Traditional education models, characterized by a lecture-based approach, often position students as passive recipients of knowledge disseminated by instructors.²⁶ In such settings, instructors hold the sole authority to determine what, how, and when course

content is delivered, as well as the assessment methods employed. This instructor-centered approach can be characterized as formal, controlled, and autocratic.

In contrast, the FL, a learner-centered pedagogical model, promotes a participatory and democratic approach to learning, where both students and instructors share responsibility for determining the 'what', 'how', and 'where' of learning. This collaborative approach minimizes student resistance and fosters a positive attitude towards learning within the classroom environment.²⁹ FL, as a student-centered teaching methodology, utilizes group projects, exploratory activities, and hands-on experiments throughout class time, transforming the classroom into an information-rich environment. Direct instruction in the form of lectures is delivered outside the classroom, typically through online or offline videos. During class time, students engage in experiential activities that are embedded within a collaborative learning context. In simpler terms, the FL approach shifts direct instruction from a group learning environment to a personal learning space, transforming the group space into a dynamic and interactive learning environment.

Conclusion

The results demonstrated a statistically significant difference between the FL and control groups. Students in the FL group reported a significantly improved perception of the classroom environment and a more positive academic attitude compared to their counterparts in the control group. These findings suggest that the implementation of FL can be a beneficial pedagogical approach for enhancing students' overall learning experience in higher education. Future research efforts could explore the long-term impact of FL on student learning outcomes, such as academic achievement and knowledge retention. Additionally, investigating the effectiveness of FL across diverse disciplines and student populations can provide valuable insights into the generalizability of this approach. Moreover, examining factors that contribute to the successful implementation of FL, such as instructor training and instructional design strategies, can guide educators in maximizing the benefits of this pedagogical method.

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Competing Interests

The author declared no conflict of interest.

Ethical Approval

The study was approved by the Ethics Committee of the Islamic Azad University-Ahvaz Branch (code: IR.IAU.AHVAVZ.REC.1399.006).

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