International Journal of Advanced Education and Research
www.multidisciplinaryjournals.net
ISSN: 2455-5746
Received: 28-11-2022, Accepted: 13-12-2022, Published: 31-12-2022
Volume 7, Issue 4, 2022, Page No. 92-95

A comparison of flipped learning versus typical learning on students' satisfaction in a new technology physical education course

Maria Giannousi, Nikolaos Vernadakis, Charalampos Liakos, Efthimis Kioumourtzoglou
Department of Physical Education and Sports Science, Democritus University of Thrace, University Campus, Komotini, Greece

Abstract
The purpose of this study was to assess student satisfaction with a flipped learning approach in achieving the goals of the course N119 - New Technology in Physical Education, comparing it to a conventional learning approach at the Democritus University of Thrace. Ninety-three (n=93) first-year undergraduate Physical Education students, aged 18 to 20, were assigned to two teaching method groups by a random draw: a flipped instructional (FI) group with 47 students and a typical instructional (TI) group with 46 students. The instructional period, practical exercises (activities), and testing occurred over six consecutive weeks, involving five 90-minute training sessions for the participants. At the beginning and at the end of the experimental procedure, students completed a satisfaction survey as pre- and post-test measurements, respectively. A two-way analysis of variance (ANOVA) with repeated measures was conducted to assess the impact of teaching methods and measurements over time on students' satisfaction. The analysis of the data showed no noteworthy disparities in satisfaction scores between students in the FI and TI groups for this course content. Notably, the findings suggested that both instructional methods significantly influenced students' satisfaction, as FI students obtained comparable scores to those in the TI teaching approach. In conclusion, this study has revealed valuable interventions and perspectives for ensuring satisfaction in flipped learning environments.

Keywords: Satisfaction, flipped classroom, typical learning, blended environment, physical education

Introduction

The instructional model known as the flipped classroom has witnessed increased attention in recent years, as indicated by several studies (Akçayir & Akçayir, 2018 [1]; Barbour & Schuessler, 2019 [2]; Karabulut-Ilgu, Jaramillo Cherrez & Jahren, 2018) [3]. Despite the popularity, there is a scarcity of robust evidence endorsing specific design features of this model (DeLozier & Rhodes, 2016). Previous implementations deviating from the conventional lecture-based approach have been labeled as inverted (Strayer, 2012) [5], hybrid (Foldnes, 2016) [6], or blended learning (Olapiriyakul & Scher, 2006) [7]. The flipped instructional model is categorized under the broader umbrella of blended instruction, involving various technology levels (O'Flaherty & Phillips, 2015) [8].

While the flipped classroom is relatively new in primary and secondary education, its version emerged in higher education in the early 1990s, pioneered by Eric Mazur (O'Flaherty & Phillips, 2015) [8]. Despite its diverse implementations, there lacks a standardized definition or instructional design to guide effective implementation (Lee, Lim & Kim, 2017 [9]; McLaughlin, White, Khanova & Yuriev, 2016) [10]. Nonetheless, educators are adopting this model and reshaping their classes, even in the absence of rigorous research investigating its design effectiveness (DeLozier & Rhodes, 2016; Karabulut-Ilgu *et al*., 2018 [3]; McNally *et al*., 2017 [11]; O'Flaherty & Phillips, 2015 [8]; Lo & Hew, 2017) [12].

The flipped classroom, while not a novel instructional model, lacks a standardized design (DeLozier & Rhodes, 2017 [4]; Karabulut-Ilgu *et al*., 2017). However, two consistent features characterize these models. Firstly, the learning activities are inverted, presenting new content before the corresponding class meeting, utilizing various materials such as readings and videos. Secondly, the in-class time emphasizes applying acquired knowledge through interactive activities involving collaboration with peers or the instructor (Karabulut-Ilgu *et al*., 2017; Zainuddin & Halili, 2016) [13].

The evolving definition and increasing popularity of flipped learning as a potential tool for enhanced student benefits have prompted a surge in studies focusing on content delivery (Eppard & Rochdi, 2017) [14]. Recent examinations of class time allocation for interactive, student-centered activities and the availability of improved technological tools for teachers have led to a growing body of research on flipped learning (Castro, 2019 [15]; Chellapan, Van der Meer, Pratt & Wass, 2018) [16]. Challenges persist in relying solely on the learning framework due to the dynamic integration of technology into the delivery method (DeLozier & Rhodes, 2017 [4]; Eppard & Rochdi, 2017) [14] and the need to understand how to foster engagement among constructive learners with ample support from teachers for success in their courses (Eppard & Rochdi, 2017) [14]. Studies stemming from this approach have highlighted both benefits and hindrances to flipped learning (Akçayir & Akçayir, 2018 [1]; Chellapan *et al*., 2018 [16]; Eppard & Rochdi, 2017 [14]; Helyer & Corkill, 2015 [17]; Lo & Hew, 2017 [12]; Nouri, 2016) [18].

The benefits, supported by engagement theory and the theory of involvement, encompass the ability of students to be more constructive (Eppard & Rochdi, 2017) [14], leading to improved satisfaction, engagement, motivation, knowledge, critical thinking skills, confidence, creativity, problem-solving skills, retention, application skills, enjoyment, and interest (Akçayir & Akçayir, 2018) [1].

Overall, students reported better experiences, increased engagement, and greater success (Helyer & Corkill, 2015) [17]. Hindrances include reduced time for instructor preparation and a perceived lack of effort from students (Chellapan *et al*., 2018 [16]; Eppard & Rochdi, 2017) [14], reliance on generalizations by instructors for the best strategies for flipped learning (Akçayir & Akçayir, 2018) [1], and general obstacles faced by instructors in effectively implementing the delivery method (Huang, Hew & Warning, 2018) [19].

Despite the existing evidence base, a notable limitation in current research is its focus on assessing the impact of the flipped classroom model primarily on specific aspects of students' learning, such as cognitive outcomes and overall motivation (Lo & Hew, 2017) [12]. This paper contends that there is an additional dimension requiring investigation, which has not received proportional research attention. Specifically, while the impact of the flipped classroom model in enhanced blended environments on cognitive learning outcomes and motivation has been extensively studied, there is a dearth of insights into the potential underlying reasons for this impact. In particular, there remains limited understanding of how flipped classroom model-enhanced blended learning environments can influence students' level of satisfaction.

Therefore, the purpose of this study was to assess student satisfaction with a flipped learning approach in achieving the goals of the course N119 - New Technology in Physical Education, comparing it to a conventional learning approach at the Democritus University of Thrace. The research questions guiding this investigation were as follows:

1. Are there differences in mean satisfaction scores between the flipped Instructional (FI) group and the Typical Instructional (TI) group?
2. Do students, on average, report differently on the satisfaction for the pre-test and post-test measurements?
3. Do the differences in means for the satisfaction between the FI and the TI groups vary between the pre-test and post-test measurements?

Methods

Participants

Ninety-three (n=93) first-year undergraduate students, aged 18 to 20 (M=19, S.D. =1.03), from the Department of Physical Education and Sport Science at Democritus University of Thrace participated in this study during the winter semester of 2021. Among them, 49 were male (52.7%) and 44 were female (47.3%). These students were enrolled in the N119 - New Technologies in Physical Education course. Through a random draw, students were assigned to either the flipped instructional group (47 students, 24 males, 23 females) or the typical instructional group (46 students, 25 males, 21 females). Before the experiment, students received information about the research purpose, their assigned group, the teaching methodology, and their responsibilities, ensuring voluntary participation without affecting their grades.

Instruments

Student satisfaction was assessed using the satisfaction subscale of the Instructional Materials Motivation Survey (Keller, 2010) [20], which was adapted for the Greek audience by Giasiranis & Sofos (2020) [21]. This particular subscale comprises six statements designed to measure students' perspectives, evaluated on a 5-point Likert scale with corresponding scores: not true = 1, slightly true = 2, moderately true = 3, mostly true = 4 and very true = 5. Sample statements include: “I really enjoyed studying this lesson” and “It was a pleasure to work on such a well-designed lesson”.

To calculate scores, responses for the entire subscale are averaged. The satisfaction subscale demonstrates strong internal consistency, as indicated by a Cronbach’s alpha of 0.92 (Keller, 2010) [20].

Procedure

This study compared two instructional approaches, examining activities conducted before, during, and after class. In the flipped model, pre-class activities involved readings and EDpuzzle videos, introducing new concepts. In-class sessions included a cognitive check review, short lectures, and interactive quizzes with web-based responses. Group discussions followed if responses were below 90%, facilitated by the instructor. Approximately 6-10 questions were covered in each class, with students submitting a 10-question handout for self-explanation via eClass after class.

The traditional model shared pre-class activities and cognitive check reviews, with direct instruction using a slide show. The video, watched by flipped students during EDpuzzle, was shown at the end of the lecture. Instructors occasionally asked questions during lectures, allowing student participation. Notes were taken using handouts, and the second weekly session included a lecture, video, and cognitive check. Students submitted a 10-question handout for self-explanation via eClass after class.

The instructional period spanned six weeks with five 90-minute sessions. Students completed satisfaction surveys as pre- and post-test measurements at the study's onset and ending.

Statistical analysis

The experimental design employed in this study was a pre-test/post-test design. Prior to analysis, the data underwent screening for violations of statistical assumptions, and none were detected (Green & Salkind, 2017) [22]. A two-way analysis of variance (ANOVA) with repeated measures was conducted to assess the impact of teaching methods and measurements over time on students’ satisfaction. The dependent variable in this analysis was satisfaction scores. The within-individual factors comprised teaching method groups with two levels (FI, TI) and time with two levels (pre-test, post-test). Significance of differences between means across time was evaluated at the 0.05 alpha level. An effect size was computed using the eta-squared statistic ($\eta 2$) to gauge the practical significance of findings. Cohen's guidelines were employed for $\eta 2$ effect size interpretation: 0.01=small, 0.06=medium, and 0.14=large (Cohen, 1988) [23].

The hypotheses for this study were as follow:

H01: There will be no statistically significant difference in the mean scores of satisfactions between the experimental groups (FI and TI).

H02: There will be no statistically significant difference in the mean scores of satisfactions between the pre- and post-test measurements.

H03: There will be no statistically significant difference in the mean scores of satisfactions between the experimental groups (FI and TI) in the pre- and post-test measurements.

Results

An independent samples t-test was executed to examine the hypothesis that there would be no significant difference in satisfaction measures at the pre-test stage between the two experimental groups (FI and TI). The results indicated no significant initial distinctions in mean satisfaction scores between the two method groups, $t(91) = -0.309$, $p = 0.758$.

A two-way analysis of variance (ANOVA) with repeated measures was performed to assess Hypotheses H1, H2, and H3. Contrary to expectations, the H2 hypothesis was not supported. A significant main effect was observed for Time, $F(1, 91) = 764.83$, $p < 0.001$, partial $\eta 2 = 0.894$, while the Teaching methods x Time interaction effect was not significant, $F(1, 91) = 0.209$, $p = 0.295$, partial $\eta 2 = 0.012$. The univariate test associated with the Teaching method group's main effect was also not significant, $F(1, 91) = 0.564$, $p = 0.454$, partial $\eta 2 = 0.006$.

Pairwise comparisons using t-tests with a Bonferroni adjustment were employed to analyze the main effect of Time. The findings revealed significant mean differences in satisfaction scores between pre-test and post-test (MD = -1.76, $p < 0.001$) in both experimental groups (FI, TI). As illustrated in Figure 1, the post-test satisfaction scores were notably higher than pre-test satisfaction scores for both experimental groups.

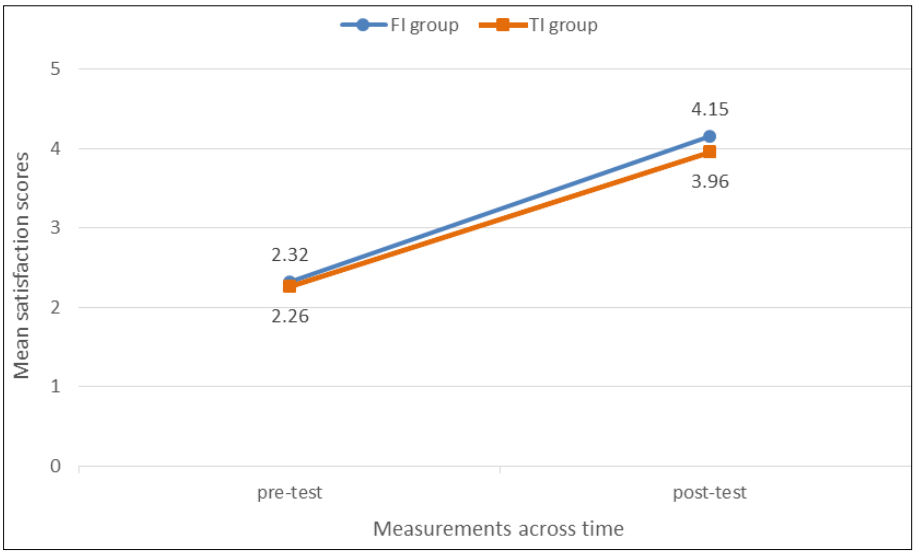

Fig 1: Mean scores of the experimental groups (FI and TI) on satisfaction scores.

Discussion

Although the impact of the flipped classroom model in enhanced blended environments on cognitive learning outcomes and motivation has been thoroughly explored, there is a lack of insights into the potential underlying reasons for this impact. Specifically, there is still limited understanding of how flipped classroom model-enhanced blended learning environments can influence students' level of satisfaction. Therefore, the purpose of this study was to contribute to the blended learning literature by assess student satisfaction with a flipped learning approach in achieving the goals of the course N119 - New Technology in Physical Education, comparing it to a conventional learning approach at the Democritus University of Thrace. To achieve this objective, specific questions were formulated, thoroughly examined, and the study's outcomes pertaining to these questions are detailed below.

The research question sought to explore possible differences in mean satisfaction scores between the FI and TI groups and between pre-test and post-test measurements. The study's data aim to support the hypothesis that there will be no statistically significant difference in mean satisfaction scores between the experimental groups (FI and TI) in both pre-test and post-test measurements.

The analysis of the data indicated that there were no significant differences in satisfaction scores between students in the FI and TI groups in the N119 - New Technology in Physical Education course objectives. Furthermore, both groups exhibited an enhancement in their level of satisfaction within this course content. In essence, the findings suggested that both instructional methods had a noteworthy impact on students' satisfaction, with FI students attaining scores comparable to those in the TI teaching approach. This consistent trend suggests that FI can be leveraged to create learning environments that enhance students' sense of accomplishment and stimulate internal motivation to engage in the learning process. When interpreting this finding, it is reasonable to assert that FI has the potential to enhance students' overall performance and experiences by facilitating a holistic shift in their attitudes toward the learning process, fostering contentment and active participation.

The congruence in satisfaction scores across classes may be attributed to the absence of distinguishable instructional benefits between the models. Both classes were exposed to identical content presented in the same sequence, with the intention of isolating differences associated with effortful retrieval and peer interaction in the flipped classroom. This finding aligns with earlier studies that have suggested flipped learning as a promising pedagogy capable of enhancing students' satisfaction with their learning environment (Akçayir & Akçayir, 2018 [1]; O'Flaherty & Phillips, 2015) [8]. However, it contrasts with a meta-analysis conducted by van Alten, Janssen, Phielix & Kester (2019) [24], which reported no significant effect of flipped learning on students' satisfaction.

Future research in this domain should strive to expand upon the reported findings and address the primary limitations of this study. Specifically, caution is warranted in generalizing the results as they were derived from small-scale study. To enhance the robustness and applicability of the findings, there is a need for more extensive longitudinal studies involving larger sample sizes and extended investigation periods. Additionally, the reliance on data collection methods such as questionnaires, while common in the literature, may introduce common method biases. Hence, there is a call for further research that supplements these findings, incorporating a broader array of data sources, including in-depth student interviews, interaction analyses, and behavioral patterns.

Conclusions

In conclusion, this study has revealed valuable interventions and perspectives for ensuring satisfaction in flipped learning environments. However, several challenges were encountered, and future researchers should take them into account. Particularly, the study focused solely on four first-year undergraduate classes in physical education participating in the flipped and traditional learning environments of the N119 - New Technology in Physical Education course. Future studies could enhance generalizability by including a more diverse student population across various professions or subjects, age groups, instructional approaches, educational levels, or different institutions to draw comparative insights.

References

1. Akçayır
2. G, Akçayır M. The flipped classroom: A review of its advantages and challenges. Computers & Education,2018:126:334-345.
3. Barbour C, Schuessler JB. A preliminary framework to guide implementation of the flipped classroom method in nursing education. Nurse Education in Practice,2019:34:36-42.
4. Karabulut-Ilgu A, Jaramillo Cherrez N, Jahren CT. A systematic review of research on the flipped learning method in engineering education. British Journal of Educational Technology,2018:49(3):398-411.
5. DeLozier SJ, Rhodes MG. Flipped classrooms: a review of key ideas and recommendations for practice. Educational Psychology Review,2017:29(1):141-151.
6. Strayer JF. How learning in an inverted classroom influences cooperation, innovation and task orientation. Learning Environments Research,2012:15(2):171–193.
7. Foldnes N. The flipped classroom and cooperative learning: Evidence from a randomised experiment. Active Learning in Higher Education,2016:17(1):39-49.
8. Olapiriyakul K, Scher JM. A guide to establishing hybrid learning courses: Employing information technology to create a new learning experience, and a case study. The Internet and Higher Education,2006:9(4):287-301.
9. O'Flaherty J, Phillips C. The use of flipped classrooms in higher education: A scoping review. The Internet and Higher Education,2015:25:85-95.
10. Lee J, Lim C, Kim H. Development of an instructional design model for flipped learning in higher education. Educational Technology Research and Development,2017:65(2):427-453.
11. McLaughlin JE, White PJ, Khanova J, Yuriev E. Flipped classroom implementation: A case report of two higher education institutions in the United States and Australia. Computers in the Schools,2016:33(1):24-37.
12. McNally B, Chipperfield J, Dorsett P, Del Fabbro L, Frommolt V, Goetz S, *et al*. Flipped classroom experiences: student preferences and flip strategy in a higher education context. Higher Education,2017:73(2):281-298.
13. Lo CK, Hew KF. A critical review of flipped classroom challenges in K-12 education: Possible solutions and recommendations for future research. Research and Practice in Technology Enhanced Learning,2017:12(1):4.
14. Zainuddin Z, Halili SH. Flipped classroom research and trends from different fields of study. International Review of Research in Open and Distributed Learning,2016:17(3):313-340.
15. Eppard J, Rochdi A. A framework for flipped learning. International Association for Development of the Information Society. In 13th International Conference of Mobile Learning,2017:33-40. https://files.eric.ed.gov/fulltext/ED579204.pdf
16. Castro R. Blended learning in higher education: Trends and capabilities. Education and Information Technologies,2019:1(4):1-24.
17. Chellapan L, Van der Meer J, Pratt K, Wass R. To flip or not to flip, that's the question: Findings from an exploratory study into factors that may influence tertiary teachers to consider a flipped classroom model. Journal of Open, Flexible, and Distance Learning,2018:22(1):6-21.
18. Helyer R, Corkill H. Flipping the academy: Is learning from outside the classroom turning the university inside out? Asia-Pacific Journal of Cooperative Education, Special Issue,2015:16(2):121-135.
19. Nouri J. The flipped classroom: for active, effective and increased learning–especially for low achievers. International Journal of Educational Technology in Higher Education,2016:13(1):33-42.
20. Huang B, Hew KF, Warning P. Engaging Learners in a Flipped Information Science Course with Gamification: A Quasi-experimental Study. In International Conference on Technology in Education. Springer, Singapore,2018:130-141.
21. Keller JM. Motivational Design for Learning and Performance: The ARCS Model Approach. New York: Springer, 2010. https://doi.org/10.1007/978-1-4419-1250-3
22. Giasiranis S, Sofos L. The Influence of Instructional Design and Instructional Material on Learners' Motivation and Completion Rates of a MOOC Course. Open Journal of Social Sciences,2020:8:190-206.
23. Green SB, Salkind NJ. Using SPSS for Windows and Macintosh: Analyzing and understanding data (8th ed.). Upper Saddle River, NJ: Pearson, 2017.
24. Cohen J. Statistical power analysis for the behavioral sciences. Hillsdale, NJ: Lawrence Erlbaum, 1988.
25. Van Alten DCD, Janssen JJHM, Phielix C, Kester L. Effects of flipping the classroom on learning outcomes and satisfaction: A meta-analysis. Educational Research Review,2019:28:1-18.