

COMPARATIVE EFFECTIVENESS OF GRATIFICATION AND FLIPPED CLASSROOM PEDAGOGIES IN BASIC SCHOOLS IN AKAMKPA LOCAL GOVERNMENT AREA OF CROSS RIVER STATE

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Abstract

This study investigated the comparative effectiveness of gamification and flipped classroom pedagogies in enhancing student engagement, motivation, academic performance, and autonomy among Basic Schools in Akamkpa. The study adopted a quasi-experimental research design, specifically a pretest-posttest control group design. A sample of 312 students was selected using a stratified sampling technique from a population of 1,213 basic school students. Data analysis was conducted using Analysis of Covariance (ANCOVA) to compare the effects of gamification and flipped classroom pedagogies on student outcomes. Two research hypotheses were formulated to guide the study. The first hypothesis posited that students taught using gamification pedagogy would not exhibit higher levels of engagement and motivation compared to those taught using traditional methods. The second hypothesis stated that the flipped classroom approach would not lead to better academic performance and increased student autonomy compared to traditional teaching methods. A validated questionnaire tagged "Gamification and Flipped Classroom Questionnaire" was used for data collection, with a reliability coefficient of 0.85-0.90. The findings revealed that students taught using gamification pedagogy showed significantly higher levels of engagement and motivation. Additionally, the flipped classroom approach resulted in better academic performance and increased student autonomy. Based on these findings, it is recommended that elementary school teachers in Akamkpa adopt gamification and flipped classroom pedagogies to enhance student engagement, motivation, academic performance, and autonomy. Furthermore, incorporating technology-driven pedagogies into teacher training programs could help promote innovative teaching practices.

Keywords: Gamification, Flipped Classroom, Elementary Education, Student Engagement, Motivation, A

Introduction

Technological advancements have brought many changes to people's lives, and technology has become an essential factor influencing people's lives. Because of this change, the education system is moving away from traditionalism for new generations to keep up with emerging changes, an understanding that puts students at the center, facilitates students' learning, and enables the use of technology in a learning environment (Şenel & Gençoğlu, 2018). Because of this understanding, new ideas have emerged in education and the use of alternative methods has become a necessity (Kotluk & Kocakaya, 2015). The main idea of alternative methods is that students are active while learning and the methods facilitate students' learning (Alsancak Sırakaya, 2017).

Two of alternative methods are flipped learning and gamification. Flipped learning method is referred to as flipped learning model, flipped classroom, flipped classroom model, flipped model, and flipped instruction in the literature. Flipped learning is defined as doing classroom activities at home and doing homework in the classroom (Bergmann & Sams, 2012). Subjects that need to be learned in the school in traditional education are given to students as homework, and tasks given as homework in traditional education are completed in the classroom when students come to school in the flipped learning model (Turan, 2015). With the flipped learning method, students are expected to engage in the classroom activities actively. The activities are structured to encourage students to adapt what they have learned to new circumstances, and the teacher serves as a guide. The aim is for students to understand the knowledge presented before the lesson and to achieve a high level of learning stages such as implementation.

The flipped classroom model is an integrative approach that combines classroom learning with e-learning. This modern educational approach has proven highly effective in the educational process (Ardiansyah, Rosyidin and Asyari, 2022). The flipped classroom model transforms traditional education by restructuring the learning process to maximize engagement and collaboration. Educational content is delivered at home through digital platforms, allowing learners to explore materials such as videos and readings before class. This approach frees up classroom time for interactive activities, group tasks, and in-depth discussions, fostering a more hands-on and engaging learning environment. By integrating electronic learning tools, the flipped classroom effectively shifts content delivery to pre-class preparation while prioritizing practical application and collaboration during class sessions (Al-Abdullatif, 2020; Awidi and Paynter, 2019).

Gamification is a transition of game elements to non-game contexts and is one approaches that has enabled students to engage more effectively in-class (Werbach & Hunter, 2012; Yıldırım & Demir, 2016). Game mechanics and game dynamics are two types of elements in games. Students are moved by game mechanics, such as points, prizes, teams, avatars, ranks, leaderboards, and badges. Feedback from game players, progress in game, relationships

between players, in-game shopping, player collaboration, and game limitations are all examples of game dynamics (Aral, Gürsoy, & Köksal, 2001; Zichermann & Cunningham, 2011). Gamification, known as transferring of game elements to non-game environments, is a popular method for increasing students' participation in class (Hanus & Fox, 2018). It was observed that individuals worked harder to achieve their goals and got the game elements they wanted in environments where the gamification method was used. It was stated that the gamification method enables all students to engage actively in-class activities (Lee & Hammer, 2011; Mert & Samur, 2018; Sezgin, Bozkurt, Yılmaz, & Van der Linden, 2018). There are studies on the gamification method at various educational levels in the literature (Yıldırım, 2016, 2017; Yıldırım, 2018; Yıldırım & Demir, 2016). The experimental group taught with the gamification method had higher performance scores than the control group in the study conducted by Ar (2016). In addition, the students' use of learning strategies improved in the study. Türkmen (2017) investigated the effects of the gamification method on mathematics courses on the fifth-grade students' success and attitudes. According to the results, the experimental group's success improved as compared to the control group, and there was no significant difference between the experimental and control groups' success and attitude scores. According to Yapıcı and Karakoyun (2017), the pre-service teachers' opinions about the use of Kahoot, a gamification application, were positive, and Kahoot increased the pre-service teachers' motivation levels. Mert and Samur (2018) evaluated and interpreted the students' opinions about gamification elements (avatar, feedback, score, reward, progress table) in terms of motivation and game elements. Yıldırım (2018) investigated the effect of the gamification method on the students' success in the social studies course. The researcher concluded that there was no statistically significant difference between the experimental and control group's success scores and that the gamification method drew the students' attention. There are also studies in the literature that use the flipped learning and gamification methods together in the teaching, and the results demonstrate that the flipped learning and gamification methods are successful (Gündüz & Akkoyunlu, 2020; Zou, 2020). Matsumoto (2016) used the flipped learning and gamification method in English teaching. Teaching with the flipped learning and gamification methods successfully improved students' understanding and motivation in the study. Alsancak Sırakaya (2017) concluded that the first-year students in the preschool education department had positive opinions about the gamified flipped classroom model.

Flipped classrooms and technologies has been emphasized. The results obtained in the systematic review of the effect of the flipped classroom on academic performance in nursing education indicated its positive effect, and the opinions of most students about this method included aspects such as its usefulness, flexibility, greater independence or greater participation (Barbour and Schuessler, 2019). According to the cognitive bases related to the Bloom's taxonomy, with the flipped classroom method, the student works in the first stage of the learning process at home, which is the simplest stage, and in the second stage, through active learning with the help of the teacher and classmates, in class time, which is used to increase and empower more (Sari and Winarto, Wu, 2022). In addition, the flipped

classroom method has certain advantages over traditional learning. The flipped classroom is student-centered and makes students responsible for their own learning and its use in nursing has been emphasized in systematic review studies (Sezer and Esenay, 2022). One of the interactive teaching methods using computers is the gamification method. Gamification in education includes the use of game elements to increase motivation and participation and to involve students in the personal learning process (Nevin, et al., 2020). Gamification is an active education method. The gamification system increases the level of engagement and motivation of learners by provoking excitement and creating challenges for them. Additionally, with this method, it is possible to provide an opportunity for testing, and in that test, in addition to creating a challenge, learners are given the opportunity to display their achievements through competition (Verkuyl, et al., 2017).

Purpose of the Study

The main purpose of this study is to compare the effectiveness of gamification and flipped classroom pedagogies in enhancing student engagement, motivation, academic performance, and autonomy among elementary students in Akamkpa.

1. To compare the effectiveness of gamification, flipped classroom, and conventional teaching methods on student achievement in elementary education in Akamkpa Local Government Area of Cross River State
2. To investigate the difference in student engagement and motivation among students taught using gamification, flipped classroom, and conventional teaching methods in elementary education in Akamkpa Local Government Area of Cross River State.

Research

Questions

1. What is the difference in student achievement between gamification, flipped classroom, and conventional teaching methods in elementary education in Akamkpa Local Government Area of Cross River State?
2. How does student engagement and motivation between gamification, flipped classroom, differ from conventional teaching methods in elementary education in Akamkpa Local Government Area of Cross River State?

Research Hypotheses

1. There is no significant difference in student achievement among students taught using gamification, flipped classroom, and conventional teaching methods in elementary education in Akamkpa Local Government Area of Cross River State.
2. There is no significant difference in student engagement and motivation among students taught using gamification, flipped classroom, and conventional teaching methods in elementary education in Akamkpa Local Government Area of Cross River State.

Methodology

The study adopted a quasi-experimental research design, specifically a pretest-posttest control group design. A sample of 312 Basic school children was selected using a stratified sampling technique from a population of 1,213 pre-school children in public and private primary schools in Akamkpa Local Government Area. The research is a quantitative study, which took place in two stages. The first stage a pretest was given to two groups for the study which was the experimental and the control group to know their performance. In the game section of the application, students are presented with interactive simulations where they observe and then choose the correct response from a set of options.

The fundamental elements of gamification are mechanics (motivating pupils through points, budgets and rewards), dynamics (engaging users through stories and narratives), and aesthetics (user experiences from applications about being user-friendly and attractive) (Landers, et al., 2017). The mechanics element was considered in the application, with green carts in each stage. The dynamic element was considered in the scenarios. The aesthetic element was considered and checked in alpha and beta tests. In the test phase, the Application was checked for errors, and it was tested for user acceptance in two parts, the alpha and beta tests.

The fundamental elements of a flipped class are that the students must read the content before the class and do the assignment in the class. In this study, this element was considered, and the provided content was given to participants at first. The students read content for each class before the class, and they solved the assignment in the class. The provided content for the flipped class group was designed in the PowerPoint files, and for the gamification in the Flipped Learning Environment group was designed in the application. It was improved based on their opinions, and in the next stage, the approved application by the designer and user was used in this study.

- **Conventional group:** In the conventional group, the content of the education was held in the lecture method, and in each section, at the end of class, a scenario of the designed was given to the students as an assignment. They must solve it by next week. At the end of the study, four scenarios were performed by the pupils as assignments in this group.
- **Flipped class group:** In the Flipped class group, the content was prepared in the four voiced PowerPoints and presented them to the students in the first session. Pupils read the content of each class, and in class they discussed the educational content and solved the scenarios as an assignment. Eight scenarios were discussed by the students as assignments in this group.
- **Gamification group:** In the Gamification group, in each class, after the educational content was presented, the homework was presented, and students played a scenario of application in the class. Four scenarios were performed by the students as assignments in this group. Gamification in the flipped learning environment group In the Gamification in the Flipped Learning Environment group, the designed mobile application was

presented in the first session of the course. Pupils must read the content of the session before the class, and in class they discussed the educational content and solved the scenarios as an assignment.

Analysis of Covariance (ANCOVA) to compare the effectiveness of gamification and flipped classroom pedagogies in elementary education

Results

Hypotheses one

There is no significant difference in pupils' achievement among students taught using gamification, flipped classroom, and conventional teaching methods in elementary education in Akamkpa Local Government Area of Cross River State.

The hypothesis was tested using ANCOVA. These results are presented in Table 1. Regarding Table 1, the result showed that the calculated F-value for treatment, 21.227, was significant ($p = .000$) at .05 alpha and 2, 196 degrees freedom. This implies that there is a significant difference in the achievement of pupils taught using gamification, flipped classroom, and conventional teaching methods. Therefore, the null hypothesis is rejected. Based on the results, the null hypothesis is rejected, indicating that there is a significant difference in student achievement among the three treatment groups. This suggests that the treatment (gamification, flipped classroom, and conventional teaching methods) has a significant effect on student achievement.

TABLE 1: Summary of ANCOVA of effect of treatment gamification, flipped classroom, and conventional teaching methods on

Source	SS	Df	Mean Square	F	Sig.
Model	122931.441	2	9981.971	769.128	0.000
Pretest	1550.661	1	1460.788	121.411*	0.000
Treatment	577.568	2	218.721	21.227*	0.000
Error	3351.121	196	14.921		
Total	133170.000	311			

* $p .05$

Hypothesis two

There is no significant difference in student engagement and motivation among students taught using gamification, flipped classroom, and conventional teaching methods in elementary education in Akamkpa Local Government Area of Cross River State

The hypothesis was tested using ANCOVA. These results are presented in Table 2. Regarding Table 2, the result showed that the calculated F-value for treatment, 21.712, was

significant ($p = .000$) at .05 alpha and 2, 196 degrees freedom. This implies that there is a significant difference in student engagement and motivation among students taught using gamification, flipped classroom, and conventional teaching methods. Therefore, the null hypothesis is rejected. In simpler terms, the results indicate that the teaching methods (gamification, flipped classroom, and conventional) have a significant impact on student engagement and motivation, and the differences observed are not due to chance..

TABLE 2: Summary of ANCOVA of difference in student engagement and motivation among students taught using gamification, flipped classroom, and conventional teaching methods in elementary education in Akamkpa Local Government Area of Cross River State

Source	SS	Df	Mean Square	F	Sig.
Model	122931.441	2	9981.971	761.128	0.000
Pretest	55230.661	1	1460.788	131.122*	0.000
Treatment	5612.568	2	218.721	21.712*	0.000
Error	3351.121	196	15.813		
Total	13320.000	311			

*p .05

Discussion of findings

Gamification, flipped classroom, and conventional teaching methods

Result in Table 1 showed that there is a significant difference in pupils' achievement among students taught using gamification, flipped classroom, and conventional teaching methods in elementary education in Akamkpa Local Government Area of Cross River State. This result is consistent with Yıldırım (2018) who investigated the effect of the gamification method on the students' success in the social studies course. The researcher concluded that there was no statistically significant difference between the experimental and control group's success scores and that the gamification method drew the students' attention. The result equally affirms the study of Gündüz and Akkoyunlu (2020) that stated that flipped learning and gamification methods together in the teaching, and the results demonstrate that the flipped learning and gamification methods are successful.

Gamification, flipped classroom and pupils' engagement and motivation

Data in Table 2 indicated that there is significant difference in student engagement and motivation among students taught using gamification, flipped classroom, and conventional teaching methods in elementary education in Akamkpa Local Government Area of Cross River State. This result is consistent with Merchant and Verkuy, et al., (2017) Stating that Gamification and flipped approach are active education methods. The gamification system for example according to the author increases the level of engagement and motivation of

learners by provoking excitement and creating challenges for them. Additionally, with this method, it is possible to provide an opportunity for testing, and in that test, in addition to creating a challenge, learners are given the opportunity to display their achievements through competition

Conclusion

The findings of this study indicate that gamification and flipped classroom pedagogies are effective in enhancing student achievement and engagement in elementary education. The results suggest that both approaches are viable alternatives to conventional teaching methods, with potential benefits for student learning outcomes. Overall, the study provides evidence to support the integration of innovative pedagogies in elementary education to improve student achievement and motivation

Recommendations

1. Elementary school teachers in Akamkpa adopt gamification and flipped classroom pedagogies to enhance student engagement, motivation, academic performance, and autonomy.
2. Government should incorporate technology-driven pedagogies into teacher training programs could help promote innovative teaching practices.

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