Which Strategy is more efficient in Business Education: Gamified Flipped classroom (GFC) or Standard Classroom Learning (SCL)?

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Abstract

Traditional classes have been shown to be successful with the use of flipped classrooms and gamification. However, the combination of these methods to learning is unknown. Studying the effectiveness of GFCs and regular classroom learning approaches is the focus of this study. This study has two student groups throughout six-week management and IT course at an institution. A survey of 98 students (control and experimental), as well as two student focus groups, was used to obtain information. Methodological complexity, task orientation, and student participation were shown to be more efficient when using the GFC learning technique. It found a little difference in student skill development between the two methods. The control group's course learning ratings were higher than the experimental group's using GFC because the content was regarded to be more relevant. Rather than depending just on university professors and learning improvement units, this study provides further evidence to the growing body of knowledge that a range of learning approaches is better for students.

Keywords: GFC, SCL, Business Education, Teaching Strategy, Online Learning,

Introduction

Technology-aided teaching (TAT) methods have become more popular in recent years as a substitute for conventional classroom instruction. Researchers say these techniques have a major influence on students' academic progress as well as their interest, motivation and speed at which they study (Lyn & Pryor, 2019; Zheng et al, 2020; Partovi and Razavi, 2019). As a result, the popularity of game-based learning (GBL) in schools has grown significantly over the last several decades (Eryilmaz & Cigdemoglu, 2019). Flipped learning (FL) has been shown to improve student satisfaction, motivation, and achievement in a number of studies (Lo & Hew, 2020), but it's not clear whether this effect varies across subject areas or when FL is used in conjunction with game-based learning, which emphasizes the importance of context and individual motivation (Segura-Robles, et al., 2020). Due to the findings from previous studies, this study aims to find out the impact on student learning in the management discipline by combining (FL) (Parra-Gonzalez, et al., 2021) and gamification Developing a connection between course content and students' backgrounds is just as crucial as using a variety of teaching methods (Durrani, et al., 2022).

Research Question

This study explored If GFC is more effective at promoting student participation, lowering method complexity, offering clear task direction and enhancing student contentment than a TC then this will be worth investigating (Barral et al., 2018). As a part of our study, it looked at the question if GFC more effective than TC in terms of content relevance?

Related studies and hypotheses development

The effectiveness of FL

The term "flipped learning" was coined by Birgili & Demir (2022) to describe a strategy of enhancing students' learning effectiveness and teaching experience in higher education. For Dooley et al. (2018), there are three major pieces and four pillars that make up the FL. Prior to class, students should get acquainted with the study content and receive incentives to do so, as well as time to understand classroom activities. To qualify as an FL, according to Haidov and Bensen (2021), a student must be present in class and understand the study material given to them in advance of the session. Different data collection approaches were used to examine the successful application of FL in different nations and educational fields such as medical technology engineering the arts and business (Birgili, et al., 2021; Lin, et al., 2021). According to Fadol et al. (2018), students' excitement, knowledge, general talents, and engagement all contribute to the efficacy of the FL method. Another Middle Eastern business school study found that online and flipped parts performed better than conventional and flipped classroom sections when it came to management classes (Jdaitawi, 2020). Student absenteeism was higher in the traditional classroom than in the flipped one. Teachers and students are encouraged to work together in a flipped classroom environment to aid students' learning.

In the study of Yan, et al., (2018), they discovered that using the FL technique in two business management courses improved student satisfaction and learning performance. Furthermore, this research demonstrated that relationships between coworkers and students and instructors were much tighter and more spontaneous because of this methodology. According to Shaw & Patra (2022), when comparing Florida students to TC students, those in FL put in more effort, are less satisfied, and are less interested in a career in the Sunshine State. According to Lo & Hew (2021), employing FL increased course learning outcomes and outperformed TC settings. FL, on the other hand, requires a greater level of effort on the part of both instructors and pupils than in conventional methods. Chan, et al., (2020) found similar outcomes, with pupils hesitant to use new technologies due to poor academic performance.

According to Gren (2020), students in pharmaceuticals were unenthusiastic about the FL approach, which she blamed on the insufficient utilization of FL and the increasing burden for students. Ngereja et al. (2020) discovered the same thing, as well. Students at one US university discovered that only project learning outperformed other types of project-based learning, including problem-based learning (PBL), service learning (FL), and others. The efficacy of alternative pedagogies and regular classroom education was evaluated by students in the same way, with the same results. While most of the research found that FL is more successful than TC in terms of perceived learning results, it remains to be seen if this holds true across topic areas and when combined with gamification.

Game-based learning (GBL) and gamification

Apostolopoulos & Potsiou (2021) were the first to propose game-based learning (GBL) to bring game-like elements into the educational setting. In the last decade, these methods have become more popular as a means of digitally engaging and motivating individuals to accomplish their objectives (Liao, et al., 2019). The impact of the GBL methodology, according to Troiano, et al., (2019), is dependent on setting objectives and difficulties, delegating responsibility for completing the work, and monitoring progress to see whether the techniques are effective in accomplishing the goal. While using GBL to educate and engage students/players has many benefits, there are various barriers to overcome, including students' technical abilities and the building of a tailored game, especially if the teacher is not a game designer (Treiblmaier, et al., 2018). Gamification was subsequently defined by Mee, et al., (2021) as the use of digital game mechanics in non-gaming contexts. Gamification is used to engage students, encourage them to complete tasks, improve their learning, and solve issues (Subhash & Cudney, 2018). Points systems, leaderboard positions, badges, trophies, accomplishments, contests, and levels are some of the most frequent gaming mechanisms employed (Korkealehto & Siklander, 2018). Barbosa & devila Rodrigues, 2020, claim that gamification learning

techniques allow students to be more engaged, motivated, and enjoy studying.

As Buil et al (2019) found, students prefer a gamified learning experience to other methods while assessing a gamified strategy for MBA students to learn about project portfolio management (PPM). They were able to put what they had learned about project management into practice because of gamification. Nurtanto, et al., (2021) observed the same thing in a study of undergraduate business students who used business simulation games to inspire and engage participants. Because of intrinsic motivation, players are more likely to engage in business simulation games and build generic skills. By incorporating gaming into the classroom, students may improve their ability to collaborate, communicate orally, think critically, and socialize.

However, according to Belet (2018), although there is evidence that gamification may motivate certain students, it is very dependent on the sorts of games utilized and the situations in which they are employed. People and their circumstances have the greatest influence on the effects of game-based learning; thus, the emphasis should be on cooperation rather than competition in game-based learning strategies, according to Boso et al. (2021).

Efficacy factors, GFC and TC (hypotheses development)

How well a course's content, delivery method, and overall educational value are perceived by its participants is a key determinant of the course's educational value (Wilujeng, 2021). How a subject is presented to students determines how relevant it is to them, regardless of their prior experiences and knowledge (Olivier, et al., 2021). According to Keller's method, instructors should first attract students' interest by introducing new learning methodologies or technologies, and then highlight activities or information targeted to their unique needs (Sung, et al., 2021).

There are two types of students: those who are actively engaged in their education and those who are passive participants (Tadesse, et al., 2021). When compared to students who are disinterested in school, those who are actively

involved devote more time and effort to learning and maintaining relationships with their teachers and peers on and off-campus (Alhadabi & Karpinski, 2020). the greatest number of well-structured and perfectly completed tasks given to students by their teacher (Desan, et al., 2021). Task orientation and educational quality have been linked, according to Ramrez-Hurtado et al. As stated by Gay (2022), a favorable attitude toward learning activity leads to student happiness; this includes students' attitudes toward lecturers, study materials, instructional strategies, and learning methodologies. Analysis of the relationship between student satisfaction and learning effectiveness is a must during in service. As Shepard et al. (2018) characterize service quality as consumers' total perception of the organization and its services relative inferiority/superiority, learning effectiveness transfers to service quality.

Complexity may be determined by looking at the amount of time it takes for both students and instructors to master the method, how much-advanced knowledge they need, the number of technology resources they will need, and how much their grades will be affected by the technique (Ors et al., 2014). If an innovative teaching technique like FL is used, it does not guarantee success; teachers must also devise and implement ongoing assessment methods that enable students to learn and grow (Pérez Ruiz et al., 2019). Innovative pedagogy techniques like FL, according to recent research on the efficacy of learning approaches, are more exciting and engaging than previous ones (Hooshyar, et al., 2019). General skills (critical thinking, synthesis), course subject comprehension, and the student's willingness to study are all subcategories of effectiveness. Research by Khairani et al. (2020) found comparable results, which were drawn from the study of Khairani et al (Chen, et al., 2021). As stated by Myers et al. (2019), the ability to think creatively is becoming more important in today's changing workplaces. Students are more engaged and better able to comprehend themselves as learners when they use a variety of cognitive processes in curriculum design. From the perspective of a business education program, Hallifax et al. (2019) argues that learning through failure (FL) helps students to 'fail forward' and that FL facilitates experiential learning.

Although there is evidence that gamification stimulates certain students in a GBL environment, it is mostly reliant on the kind of games used and the settings in which they are deployed (Murillo-Zamorano, et al., 2019). in combination with FL, may lead to a shift in the way students learn. Flipped classrooms and gamification strategies have been shown to be effective in earlier studies. That's why there isn't much information on the effectiveness of student learning when these two types of education are combined: gamification and game-based learning (GFL). A comparison between the effectiveness of GFC (gamified flipped classroom) instruction and regular classroom learning is made. Based on the explanation above, it will conduct interviews with two different groups of students from the experimental cohort to support the following hypotheses for our quantitative analysis:

H1.   Students' levels of involvement aren't affected considerably differently by the GFC or the TC.

H2.   Students' task orientation is not dramatically altered by GFC or TC.

H3.   There is no substantial difference between GFC and TC when it comes to student satisfaction.

H4.   GFC and TC have no substantial impact on students' perceptions of the technique's difficulty.

H5.   In terms of their overall abilities, GFC and TC have no noteworthy difference.

H6.   GFC and TC do not have a substantial impact on kids' learning.

H7.   GFC and TC have no discernible impact on pupils' incentives.

H8.   In terms of students' course learning results, GFC and TC show no substantial difference between the two.

Methods

Using Structural Equation Modelling (SEM), it investigated how characteristics such as activity complexity and task orientation impact the perceived efficacy and pleasure of the flipped classroom approach. A 5-point Likert scale and 30 questions were used to perform an online survey based on current variables and sub-scale. A scale of one to five was used to assess the level of disagreement between two parties. To examine the efficiency of different teaching techniques, utilized quantitative data was collected. The scales of measurement and the numerous latent variables that have been employed are all shown. The scales used in the illustration are more clearly explained. It outlines the characteristics of the chosen groups of students. As academic personnel at that institution, all three co-authors had contact with those students. For this reason, they used students' prior knowledge and background as a foundation for selecting and assigning control/experimental groups with programs for evaluation. Some courses might be more useful to students in the IT/IS program than others, such as an IT foundation class.

There were fewer students present since the summer semester has a lighter teaching load than the other two. Using GFC necessitated a wide range of activities and objectives to keep students engaged over the summer semester. A gamified test and lecture materials supplemented by supplemental supporting information were used to provide subjects and assignments for the students prior to each GFC session. Each of these talks required a significant amount of time to organize and prepare. There were 10 quizzes in all for the course, eight of which were gamified while the other two were paper-based exams. Students were also required to complete assignments and take official assessments.

Several GFC occurrences are expected in the near future: Aside from Moodle-supplied texts and PowerPoint presentations, students utilize various internet resources to prepare for each class. Student groups were allocated 15–20 minutes of lecture time to present and explain 15–20 minutes of subjects or issues to the rest of the class throughout the session. In the end, the presenter and the participants will engage in an open discussion together. Speakers often summarize their remarks by drawing on what has been said in previous sessions. All students were obliged to take a gamified online quiz based on their past reading of certain lecture

slides utilizing Kahoot, Socrative, or our own custom-built Cross Question educational game.

The survey data was collected using Moodle and processed using Moodle as a data warehouse. Only faculty and technical workers with the correct credentials were allowed to enter this area. As a condition of participation, students received an online permission form and were given the option to join or withdraw from the study. All our research, presentations, and publications have been kept totally confidential to preserve the personal information of our students.

A Moodle survey was utilized to gather data from participants in GFC and TC sessions who had previously participated in both types of sessions. There were 47 valid questionnaires filled out by 90 students in the control group, which resulted in a response rate of 55.30% In the experimental group, it had a response rate of 59%, which meant that it is gathered 58 questionnaires from the 97 students. A total of 20 students from the experimental group were also surveyed for their thoughts and ideas. As can be seen in Figure 4, the whole process of conducting this research, from literature review to data collection and analysis, to results and suggestions, has been quantitatively planned out.

Results

Quantitative results

A flurry of statistical tests were run on our data in SPSS 2020. Outliers in the Kolmogorov-Smirnov and Shapiro-Wilk tests for the latent factors and subfactors (p 0.05) were eliminated. (As seen in the following table.) There were non-normalities in the GFC and TC cohort distributions. When looking into GFC's latent components (M 3,79, SD 1,061), it can see that the latent components have the following characteristics: (SE 0.749). Expand this figure to understand how the TC determines skewness and kurtosis (mean 2.97, standard deviation 1.359) This is the case (SE 1.118). D(58) 0.492, p = 0.000 for ENG in GFC. There were also P-values of 0.38 and 0.88 in Table D(47). A non-parametric Mann-Whitney U test was performed after a parametric one to better investigate the data. Table 1 and Figure 1 display the results of the Mann-Whitney U test. As part of a U test, the GFC cohort's results were analyzed and compared to see if they were better than those of the TC cohort. Figure 1 shows the mean scores and p-values for the GFC and TC cohorts, as well as the importance of each latent component. All the null hypotheses were disproved, suggesting a statistically significant difference with a p-value larger than 0.05. Student involvement (H1) was not significantly different from zero, z 1.52, p > 0.05. The mean rank of the GFC cohort was 29.37, while the mean rank of the TC cohort was 20.69. Because student involvement was higher in GFC than in TC, the null hypothesis for H1 was rejected. For the student orientation (H2) test result, z 1.53, p > 0.05, was not significant. The average rank for the GFC cohort was 28.77, but the average rank for the TC cohort was 22.65. As a consequence of this, GFC outperformed TC in terms of student orientation. The Mann-Whitney U test for student satisfaction (H3) similarly returned a non-significant result of z 1.43, p > 0.05. The average rank of the GFC cohort was 28.41, whereas the TC cohort was 20.06. The GFC strategy outperformed TC, according to the results. Mann-Whitney U was not significant for the technique's complexity (H4) (z = —1.12, p > 0.05). Average ranks for the GFC and TC cohorts were 27.98 and 19.96 respectively. That's why TC came out on top, even though the intricacy of GFC was greater.

Table 1

Mann-Whitney U Test Results – GFC vs. TC

| Latent Factors	Gamified	Traditional	Z	P-value	Hypotheses	Result
	Avg. Mean Rank	Avg. Mean Rank			Outcome	
Engagement	29.37	20.92	-1.52	0.06	H1-Rejected	GFC > TC
Orientation	28.77	22.65	-1.53	0.06	H2-Rejected	GFC > TC
Satisfaction	28.41	20.06	-1.43	0.07	H3-Rejected	GFC > TC
Complexity	27.98	19.96	-1.12	0.13	H4-Rejected	GFC > TC
Skill	27.54	21.43	-1.05	0.15	H5-Rejected	GFC > TC
Knowledge	26.84	27.15	-0.14	0.44	H6-Rejected	TC > GFC
Motivation	29.67	18.86	-1.04	0.15	H7-Rejected	GFC > TC
CLO	25.37	30.01	-0.64	0.26	H8-Rejected	TC > GFC
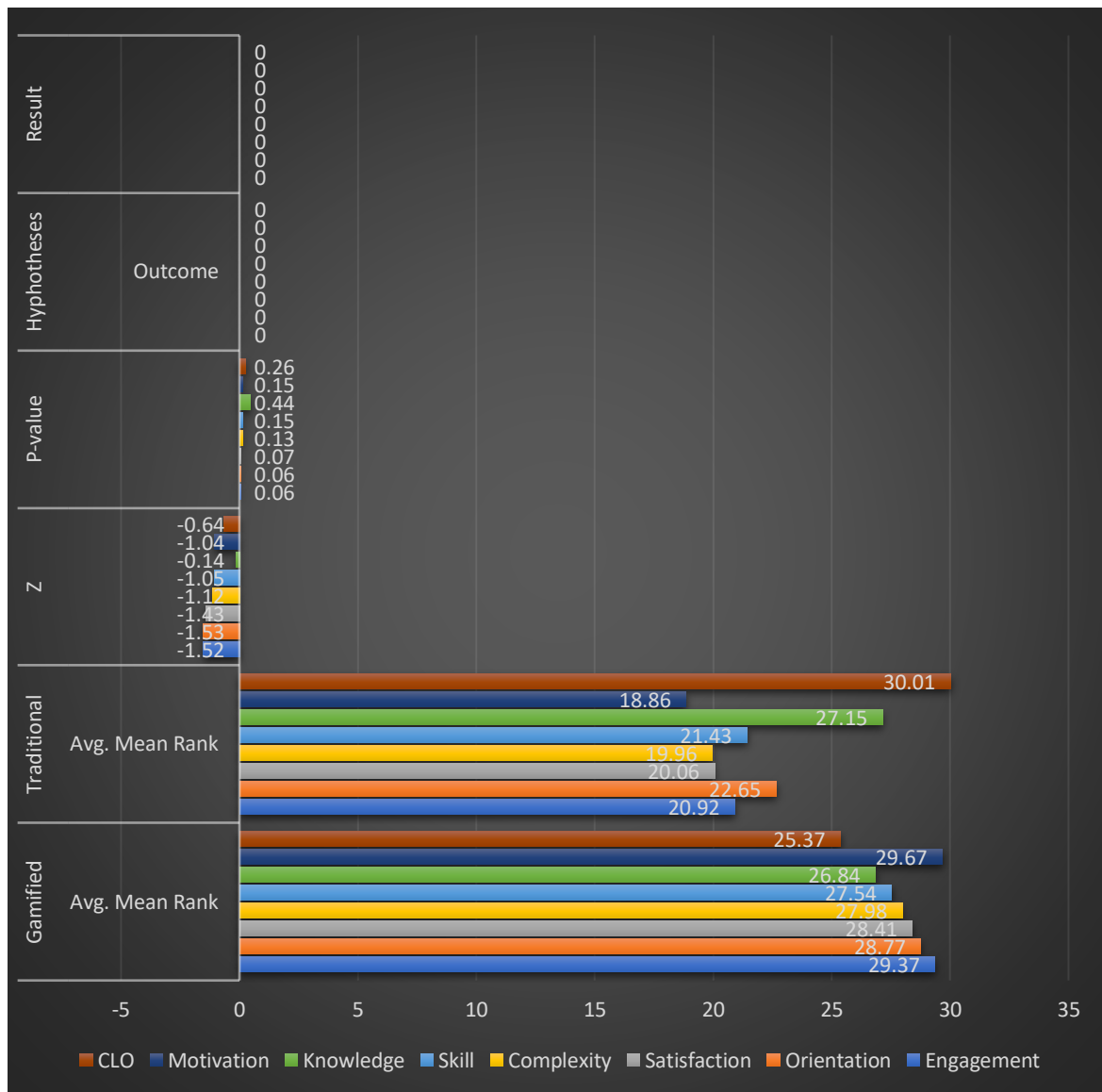
Figure 1. Mann-Whitney U Test Results – GFC vs. TC

Effectiveness has been shown in three ways: 1) a student's ability to learn due to the way the course is taught. 2) The techniques of instruction utilized in the class aid in the acquisition of information by the students. Students' enthusiasm to study throughout the course's duration and presentation (Sailer & Sailer, 2021). 3) Efficacy of learning approaches is the focus of three hypotheses: H5, H6, and H7. Skills (H5) were not significant in the Mann-Whitney U test, with an alpha of 0.105. For the GFC cohort, the average rank was 27.54, which was higher than the TC cohort's average rank of 21.43. A z-score of 0.14 and a p-value of > 0.05 indicated that the knowledge (H6) U test was not significant. Because of this, the GFC cohort's average rank was 26.84, whereas the TC cohort's average rank was 27.05. The U test did not indicate any significance (z = 1.04) for motivation (H7), and the p-value was larger than 0.05. The GFC cohort's average rank was 29.67, whilst the TC cohorts were 18.86. When it comes to both ability and motivation, It is found GFC to be more successful than TC. When it came to general knowledge, TC came out on top a little bit more often than GFC did. The Mann-Whitney U test for course learning outcomes (H8) was insignificant, z0.64, p 0.05. As a result, the GFC cohort ranked 25.37 out of 32, whereas the TC cohort was ranked 30.01. TC ratings for CLO (H8) have been higher than GFC (H6), which is similar to H6.

Qualitative Results from focus group interviews

It performed in two focus groups with 40 students from the experimental cohort to verify our quantitative findings. Students overwhelmingly agreed with our quantitative findings. Students' opinions on GFC and TC are seen in the following statements:

Theme 1. Motivation and Self-Paced Learning

Student A raised *"What I like the most about the course was how the in-class activities added to the pleasure and allowed us to learn in an engaging manner. I feel that many chapters will be really beneficial in future classes or even in my personal life since technology is ubiquitous and pervasive today."* In like manner student A also noted *"As a finance student, this subject required a great deal of memorization, which* *was not my favorite aspect. Nevertheless, I found Tuesday's class activities to be beneficial and enjoyable. It assisted in acclimating us to the notion and added to the enjoyment. I enjoyed the gamified flipped classroom exercises and would want to express my gratitude to the doctor for the time and work he took to create them for us."*

As the process of probing is going deeper, Student C said *"I appreciate this course because I noticed something new, which is the game activities that assist us in studying each chapter via the game, which is a novel and intelligent method to enjoy class."*

Theme 2. Effective Teaching

Moreover, Student C affired *"I learnt new information technology skills, and the manner the Dr taught us was incredible. I really appreciated the class activities and teamwork."* Another said, *"In general, it was a fantastic experience. I've learnt a lot from this training."* One also narrated *"What I did not like was that the classroom activities with the flipped room were not done in a specific group, which means that some students will do the work while others will not, and the professor did not inquire as to who did what, which made some students dislike the classroom activity. The professor should have really been watching and observing the students' processes to determine who should receive credit and who should not. And the time restriction for submitting the work was too short; as students, they have several courses and projects to do, and after the class is completed, they immediately have another. As a result, I wanted he would extend our time."*

Theme 3. Effective Learning

In this theme, effective learning emerged as a factor. To narrate students' experiences, one said *"I loved it since it makes the lecture less dull, and as a result, I tend to retain more information and get more points."* In like manner, one another also said *"I appreciated the manner in which information was conveyed."* Further, one also said *"The course was straightforward, but it may be enhanced by adding lab lectures or structured tutoring sessions."* Looking further at the responses of

the students, one said *"I liked the instructor's method of implementing the course, but it would have been better if it were a face-to-face session. The greatest experience in this course was the tutorial."* One also said *"There was a lot of material to absorb, but it was simple to stay up and grasp ERP systems in general via the many activities and presentations that took place."* Further, one said "An outstanding performance by the teacher, with several classroom exercises and group work, is worth recognizing. It aided in my learning of the material" also one student said *"For the simple reason that it provided me with a glimpse into what my professional future may hold."* And finally, the students unanimously narrated that "The way the course requirements were presented helped me like the course as well as the activities."

Discussion

This study's primary goal was to compare the perceived efficacy of GFC with TC. Student participation in classroom activities, task clarity, method complexity impact, course efficacy, course learning outcomes, and overall student satisfaction were all taken into consideration in this study. It was a comprehensive endeavor. Students in the control group had to take an IT and management foundation course, while students in the experimental group had to complete an IT and management foundation course.

Theory implications

For the theory of teaching and learning in general, our findings show that GFC is more effective in increasing student engagement, increasing motivation and improving task orientation, lessening the complexity of the technique, and allowing for more opportunities to discuss relevant topics during and after classroom sessions. Our findings corroborate those published before (Lestari & Noer, 2021; Aguiar-Castillo, et al., 2020). However, Moria's (2019) research found that students favored gamification mostly due to the platform's simplicity of use, rather than the advantages associated with gamification. Additionally, our research established a link between involvement and motivation. In our study, they interviewed two focus groups of students and discovered

favorable enthusiasm, engagement, and attentiveness for both learning modalities (Su & Chen, 2018). As with our research, Asiksov (2018)'s findings indicated that the link between engagement and motivation demonstrated the usefulness of the FL learning strategy in their setting. Gamification has been shown to be a successful training method in every way. Findings from our study reveal that in terms of course learning outcomes, our research shows that students from the GFC cohort are superior to those from the TC cohort (Zamora-Polo, et al., 2019). It's probable that this unexpected result was caused by the fact that TC was given to the IT/IS majors in the control group, while GFC was given to the AFMM majors in the experimental group. Gamifying classroom experiences may have increased students' interest and drive, but the experimental group still had difficulty grasping the material covered in the traditional IT foundation course (originally developed for IT students). While lecturers should have taken into consideration students' prior knowledge in accounting, finance, and marketing when planning their lectures, they did not. Tsay et al. (2018) developed the question "what's in it for me?" as a starting point. A study by Sargent and Casey (2020) found that the FL approach is more successful when theory and practice are combined than when practice is utilized alone. There were theoretical as well as practical components to our instructional design approach. GFC helps students with task orientation and the delivery of complex ideas, but it does not instantly contribute to students' overall enjoyment, skill development, or knowledge acquisition. TC students outperformed or were on par with their GFC counterparts in terms of course learning outcomes.

Practical implications

Teachers and designers could consider applying the GFC model, which stresses the relevance of material presented to students based on their past experiences and histories. This is our recommendation. The GFC approach calls for instructors to include both intellectual and practical components into their classes. The scenario suggests that designers experiment with adjusting the balance of traditional and flipped activities and assessments to see whether

their mixed delivery models work. Lecturers and course designers should consider the CAST Universal Design for Learning (UDL) principles, which are founded on three core ideas: engagement, representation, and action and expression. CAST has established teaching and learning guidelines based on the Universal Design for Learning concepts. These resources are available to anybody interested in using the Universal Design for Learning paradigm in a classroom, including teachers, curriculum designers, researchers, and parents.

Limitations and suggestions for future research

This results contribute to the body of knowledge, are equally aware of our research's limitations. When reviewing the data presented by this study, future academics and researchers should be aware of its shortcomings. There is a flaw in the research since it relies on a very small sample of students who are enrolled in an undergraduate IT foundation course. It doesn't distinguish between different courses, programs, establishments, or degrees of education. Therefore, it would be difficult to extrapolate the findings of this study to other research contexts. To confirm and generalize the GFC's perceived usefulness in domains other than university teaching of an IT foundation course, future research should replicate the study's delivery model with diverse student populations, course types, nature of programs, degree levels and geographic variety. Research at the program, degree, or university level may be able to get around the sample size limitation. Conventional activities and evaluations were also employed in this study, which included 40% FL activities and 30% gamification activities and assessments (30 percent). Alternative weightings for different learning methods should be utilized to generalize results from future studies. The same instructor taught IT fundamentals to both the GFC and TC cohorts as part of this study. When several instructors or students with various traits are present, future study should evaluate the impact that GFC has.

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