

Impact of Blended Learning, Flipped Learning and Gamified Learning on Students' Academic Performance

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Abstract—The study examines the impact of blended learning, flipped learning, and gamified learning on students' academic performance. In the present educational environment, traditional teaching methods are gradually being supported by technology-based and student-centred learning approaches. Blended learning combines classroom teaching with online learning resources, flipped learning encourages students to study basic concepts before class and engage in active classroom activities, while gamified learning uses game-based elements such as points, badges, rewards, quizzes, and challenges to improve student motivation and participation. These modern learning approaches are considered important for enhancing students' understanding, engagement, and academic outcomes. The study is based on primary data collected from 120 students through a structured questionnaire. Descriptive statistics were used to analyse demographic factors, while Pearson correlation was applied to test the relationship between different learning approaches and students' academic performance. The findings revealed that blended learning, flipped learning, and gamified learning all have a significant positive relationship with students' academic performance. Among these, blended learning showed the strongest correlation with academic performance, followed by gamified learning and flipped learning. The study concludes that innovative teaching-learning methods play an important role in improving students' academic achievement and should be effectively adopted in higher education institutions.

Index Terms—Blended Learning, Flipped Learning, Gamified Learning, Academic Performance, Student Engagement

I. INTRODUCTION

Education has undergone a major transformation in recent years due to the rapid growth of digital technology, internet access, online learning platforms,

and innovative teaching methods. Traditional classroom teaching, which mainly depends on lectures and textbook-based learning, is no longer sufficient to meet the changing needs of students in the modern academic environment. Today's students require learning methods that are flexible, interactive, engaging, and student-centred. In this context, blended learning, flipped learning, and gamified learning have emerged as important approaches that combine technology with pedagogy to improve the teaching-learning process. These methods aim to make students more active participants in learning rather than passive receivers of information. Therefore, studying the impact of blended learning, flipped learning, and gamified learning on students' academic performance is highly relevant in the present educational scenario.

Blended learning refers to a teaching approach that combines traditional face-to-face classroom instruction with online learning activities. In this method, students learn partly through direct classroom interaction with teachers and partly through digital tools such as online videos, e-content, learning management systems, online quizzes, virtual discussions, and recorded lectures. This approach provides students with the advantage of both physical classroom learning and digital learning. Classroom teaching helps students receive direct guidance, clarification, and interaction, while online learning allows them to study at their own pace and revisit learning material whenever required. Blended learning is particularly useful because it supports flexibility, independent learning, continuous access to resources, and better engagement with course content. As a result, it can play an important role in improving students' understanding, retention, and academic performance.

Flipped learning is another innovative teaching method that changes the traditional classroom pattern. In the conventional method, teachers explain concepts in class and student's complete assignments or revision at home. However, in flipped learning, students first study the basic concepts before coming to class through videos, reading materials, presentations, or online modules. Classroom time is then used for discussion, problem-solving, doubt clarification, group activities, case studies, and practical application of knowledge. This method helps students come prepared to class and allows teachers to focus more on higher-level learning activities. Flipped learning promotes active learning because students are encouraged to think, ask questions, participate in discussions, and apply concepts rather than only listen to lectures. This approach can improve academic performance by strengthening conceptual clarity and encouraging deeper learning.

Gamified learning involves the use of game-based elements in the teaching-learning process to make learning more interesting and motivating. It does not mean converting education fully into games, but it uses features such as points, badges, rewards, levels, leaderboards, quizzes, challenges, missions, progress tracking, and instant feedback to encourage student participation. Gamified learning helps reduce boredom and increases students' interest in academic activities. When students receive rewards or recognition for completing learning tasks, they become more motivated to participate and perform better. It also creates a sense of healthy competition and achievement among students. Gamified learning can be especially useful in improving attention, participation, motivation, and engagement, which are important factors influencing academic performance. Students' academic performance is one of the most important indicators of educational success. It reflects the level of knowledge, understanding, skills, and learning outcomes achieved by students during their academic journey. Academic performance is generally measured through examination scores, assignments, class participation, internal assessments, projects, and overall achievement. However, academic performance is not influenced only by intelligence or study habits; it is also affected by teaching methods, learning environment, motivation, access to resources, teacher support, and student engagement. Therefore, modern learning approaches such as blended learning, flipped

learning, and gamified learning can have a significant role in improving students' academic performance by making learning more flexible, interactive, and meaningful.

The importance of these learning methods has increased further after the expansion of digital education and online learning. The COVID-19 pandemic made educational institutions more dependent on digital platforms and highlighted the need for flexible learning systems. Even after the pandemic, many schools, colleges, and universities have continued using online tools along with classroom teaching. This has encouraged teachers and institutions to adopt blended, flipped, and gamified methods to improve learning outcomes. These approaches help students become more responsible for their own learning and develop important skills such as self-learning, time management, digital literacy, problem-solving, collaboration, and critical thinking. Such skills are essential not only for academic success but also for future employability and lifelong learning. In the competitive academic environment, institutions are expected to improve the quality of education and ensure better student outcomes. Blended learning, flipped learning, and gamified learning provide practical solutions for improving student engagement and academic achievement. Blended learning provides flexibility and resource accessibility, flipped learning promotes active classroom participation and conceptual understanding, while gamified learning increases motivation and interest. All three approaches shift the focus from teacher-centred learning to student-centred learning. Therefore, the present study on the impact of blended learning, flipped learning, and gamified learning on students' academic performance is significant because it helps to understand how these modern teaching-learning methods influence students' achievement and whether they can be effectively used to improve educational outcomes in higher education.

II. REVIEW OF LITERATURE

Means, et.al (2013), in the research paper titled "The Effectiveness of Online and Blended Learning: A Meta-Analysis of the Empirical Literature", concluded that blended learning has a positive effect on students' academic performance when compared with fully face-to-face learning. The study found that students

performed better when online learning materials were combined with classroom teaching, because blended learning provides flexibility, repeated access to content, and opportunities for self-paced learning. The paper also highlighted that the success of blended learning depends on proper instructional design, teacher support, and effective use of digital resources. Overall, the study concluded that blended learning can improve academic achievement when it is meaningfully integrated with classroom interaction rather than used only as a substitute for traditional teaching.

Bernard, et.al (2014), in the research paper titled “A Meta-Analysis of Blended Learning and Technology Use in Higher Education: From the General to the Applied”, concluded that blended learning produces a moderate positive effect on students’ academic achievement in higher education. The study analysed many achievement-based studies and found that combining face-to-face instruction with online learning activities improves students’ performance more effectively than traditional classroom instruction alone. The authors observed that blended learning supports independent study, interaction, and better access to learning materials. The conclusion emphasized that blended learning is most effective when online components are not added mechanically, but are carefully planned to support learning objectives and student engagement.

Cao, Zhang, et.al (2023), in the research paper titled “A Meta-Analysis of Effects of Blended Learning on Performance, Attitude, Achievement, and Engagement across Different Countries”, concluded that blended learning has a significant positive impact on students’ academic performance across different educational contexts. The study showed that students exposed to blended learning generally achieved better results because they received both teacher-guided instruction and digital learning support. The findings also indicated that blended learning improves student attitude, participation, and engagement, which indirectly supports better academic achievement. The paper concluded that blended learning is a useful instructional model, especially when technology is accessible and teachers are trained to manage both online and offline learning effectively.

Kumar (2023), in the research paper titled “Effectiveness of Blended Learning Approach on the Academic Achievements of Learners: A Meta-

Analytical Study”, concluded that blended learning has a favourable influence on learners’ academic achievement. The review found that students benefit from the combination of classroom explanation, digital content, online assignments, and flexible learning opportunities. The study emphasized that blended learning encourages active participation, improves retention, and allows students to revise concepts at their own pace. The conclusion suggested that blended learning should be adopted as a supportive teaching strategy, particularly in higher education and school settings where digital infrastructure and teacher preparedness are available.

Thai and Valcke (2017), in the research paper titled “The Impact of a Flipped Classroom Design on Learning Performance in Higher Education: Looking for the Best ‘Blend’ of Lectures and Guiding Questions with Feedback”, concluded that flipped classroom design improves students’ learning performance when it is supported by proper guidance and feedback. The study compared flipped classroom, blended learning, traditional learning, and e-learning settings, and found that students performed better when pre-class learning materials were combined with in-class activities. The conclusion stated that flipped learning is effective because students come prepared before class and use classroom time for discussion, problem-solving, and clarification. However, the paper also stressed that flipped learning should include guiding questions and feedback to ensure meaningful academic improvement.

Alten and Kester (2019), in the research paper titled “Effects of Flipping the Classroom on Learning Outcomes and Satisfaction: A Meta-Analysis”, concluded that flipped classroom learning has a positive effect on students’ learning outcomes, especially when face-to-face class time is not reduced. The study found that students in flipped classrooms achieve better academic results when pre-class learning is followed by active classroom engagement, quizzes, discussions, and teacher feedback. The authors also observed variation in results across studies, indicating that flipped learning is not automatically successful unless it is well structured. The conclusion highlighted that flipped classroom is a promising pedagogical approach for improving academic performance and satisfaction when implemented with proper planning.

Monrouxe et.al (2018), in the research paper titled “Academic Outcomes of Flipped Classroom Learning: A Meta-Analysis”, concluded that flipped classroom learning improves academic outcomes compared with lecture-based teaching, particularly in examination scores and course grades. The study found that students benefit from reviewing learning material before class and applying knowledge during classroom activities. The conclusion indicated that flipped learning supports deeper understanding, active participation, and better academic achievement. However, the authors also noted that the impact may differ depending on discipline, study design, and teaching quality. Overall, the study supported flipped classroom as an effective approach for enhancing students’ academic performance.

Zainuddin (2018), in the research paper titled “Students’ Learning Performance and Perceived Motivation in Gamified Flipped-Class Instruction”, concluded that gamified flipped-class instruction improves students’ learning performance and motivation. The study compared gamified flipped learning with non-gamified flipped learning and found that the use of game elements such as points, rewards, challenges, and feedback made learning more engaging. The conclusion stated that gamification strengthens flipped learning by increasing student interest, participation, and responsibility for learning. The paper suggested that combining gamification with flipped classroom methods can create an active and motivating learning environment that supports better academic performance.

Sailer and Homner (2020), in the research paper titled “The Gamification of Learning: A Meta-Analysis”, concluded that gamification has a significant positive effect on cognitive, motivational, and behavioural learning outcomes. The study found that gamified learning improves students’ academic performance by increasing motivation, engagement, participation, and persistence in learning tasks. The authors explained that game elements such as badges, leaderboards, points, goals, and feedback encourage students to remain actively involved in the learning process. The conclusion emphasized that gamification is effective when it is linked to learning objectives and designed carefully, rather than used only for entertainment.

Hamari and Sarsa (2014), in the research paper titled “Does Gamification Work? — A Literature Review of Empirical Studies on Gamification”, concluded that

gamification generally produces positive effects on learning, engagement, and motivation, although its success depends on the context and implementation. The study reviewed empirical research and found that gamification can improve students’ involvement in learning activities, which may lead to better academic outcomes. However, the authors also noted that gamification does not work equally in all situations, as results depend on student characteristics, subject area, learning environment, and the type of game elements used. The conclusion suggested that gamified learning should be planned according to educational goals to improve academic performance meaningfully.

III. RESEARCH GAP

The review of previous studies shows that blended learning, flipped learning, and gamified learning have positive effects on students’ academic performance, motivation, engagement, and learning satisfaction. However, most studies have examined these learning approaches separately, while very few studies have compared the combined or individual impact of all three approaches in a single research framework. Many existing studies are conducted in higher education, medical education, or technology-based courses, whereas limited research is available in regular school and college classroom settings, especially in the Indian educational context. There is also a lack of studies that examine how student characteristics such as gender, academic level, digital skills, learning style, and access to technology influence the effectiveness of these methods. Further, many studies focus mainly on achievement scores, but give less attention to long-term academic performance, retention, classroom participation, and student satisfaction. Therefore, there is a clear research gap in studying the comparative and combined impact of blended learning, flipped learning, and gamified learning on students’ academic performance in a structured educational setting.

Research Methodology: The study is based on a descriptive and analytical research design to examine the impact of blended learning, flipped learning, and gamified learning on students’ academic performance. The study used primary data collected from 120 students through a structured questionnaire. The respondents included male and female students from 1st Year, 2nd Year, and 3rd Year, belonging to Arts,

Commerce, and Science streams. The sampling method used for the study was convenience sampling, as respondents were selected based on their availability and willingness to participate. The questionnaire included questions related to demographic profile, adoption of blended learning, flipped learning, gamified learning, and students' academic performance. The collected data were analysed using descriptive statistics such as frequency

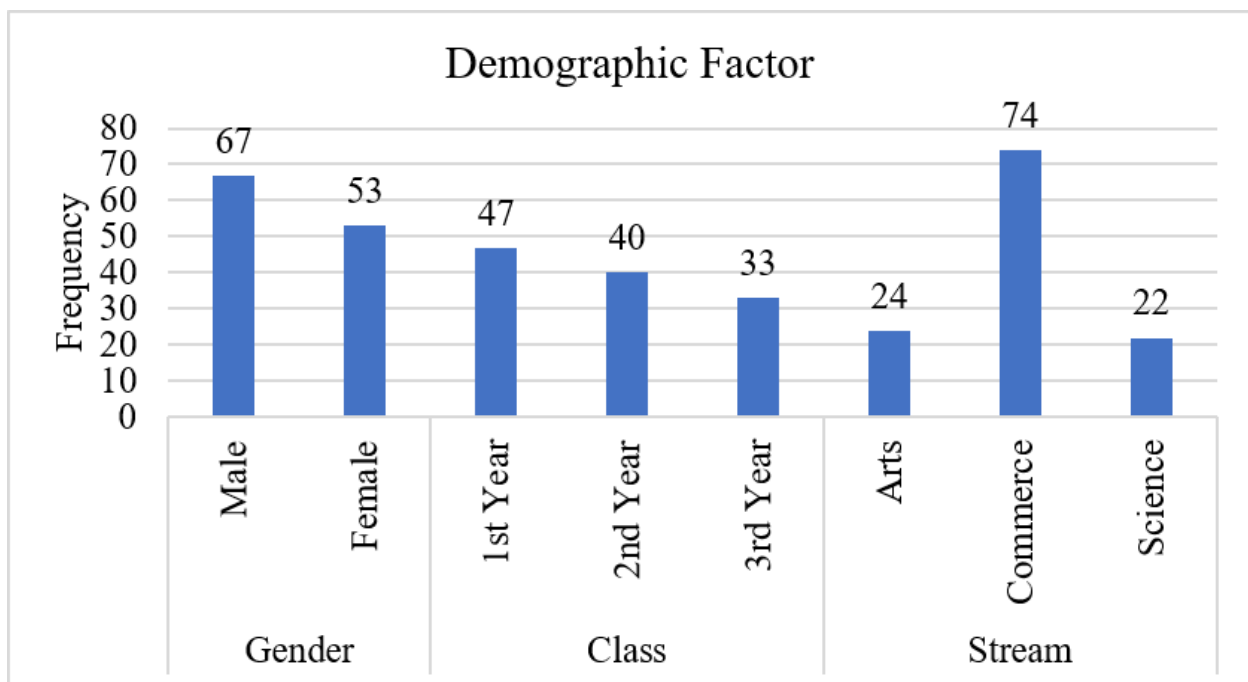
and percentage, and inferential statistics, mainly Pearson correlation test, to test the hypotheses. The correlation test was applied to identify the relationship and impact of each learning method on students' academic performance. The results helped in understanding whether modern learning approaches significantly influence students' academic achievement.

IV. DATA ANALYSIS

The following table indicates the demographic factor of the study:

Sr.no	Demographic Factor	Category	Frequency	Percent
1	Gender	Male	67	55.8
		Female	53	44.2
2	Class	1st Year	47	39.2
		2nd Year	40	33.3
		3rd Year	33	27.5
3	Stream	Arts	24	20.0
		Commerce	74	61.7
		Science	22	18.3

The demographic profile of the respondents shows that the study included a total of 120 students. In terms of gender, 67 respondents were male and 53 respondents were female, indicating that male students were slightly higher in number than female students. According to class, 47 students belonged to 1st Year, 40 students belonged to 2nd Year, and 33 students belonged to 3rd Year, showing that the highest participation was from 1st Year students. With respect to stream, the majority of respondents were from Commerce stream with 74 students, followed by Arts with 24 students and Science with 22 students. Overall, the sample represents students from different genders, academic years, and streams, with comparatively higher representation from male students, 1st Year students, and Commerce stream students.



V. OBJECTIVE AND HYPOTHESIS

Objective 1 To study the impact of blended learning on students' academic performance.

Null Hypothesis H_{01} : There is no impact of blended learning on students' academic performance.

Alternate Hypothesis H_{11} : There is an impact of blended learning on students' academic performance.

To test the above null hypothesis Correlations Test is applied and obtained and results are as follows.

Correlations			
		Students' Academic Performance	Blended Learning Adoption
Students' Academic Performance	Pearson Correlation	1	.781**
	P-value		.000
	N	120	120
Blended Learning Adoption	Pearson Correlation	.781**	1
	P-value	.000	
	N	120	120

** . Correlation is significant at the 0.01 level (2-tailed).

Interpretation: The above results indicate that calculated p-value is 0.000. It is less than 0.05. Therefore, correlation test is rejected. Hence Null hypothesis is rejected and Alternate hypothesis is accepted.

Conclusion: There is an impact of blended learning on students' academic performance.

Findings: The correlation analysis shows that there is a strong positive relationship between Blended Learning Adoption and Students' Academic Performance. The Pearson correlation value is $r = 0.781$, which indicates a high degree of positive association between the two variables. This means that as the adoption of blended learning increases, students' academic performance also tends to improve. The p-value is 0.000, which is less than the 0.05 level of significance, showing that the

relationship is statistically significant. Therefore, it can be concluded that blended learning adoption has a significant positive impact on students' academic performance. The result suggests that the use of both online and classroom-based learning methods helps students understand concepts better, access learning materials more easily, and improve their overall academic achievement.

Objective 2 To examine the effect of flipped learning on students' academic performance.

Null Hypothesis H_{02} : There is no impact of flipped learning adoption on students' academic performance.

Alternate Hypothesis H_{12} : There is an impact of flipped learning adoption on students' academic performance.

To test the above null hypothesis Correlations Test is applied and obtained and results are as follows.

Correlations			
		Students' Academic Performance	Flipped Learning Adoption
Students' Academic Performance	Pearson Correlation	1	.729**
	P-value		.000
	N	120	120
Flipped Learning Adoption	Pearson Correlation	.729**	1
	P-value	.000	
	N	120	120

** . Correlation is significant at the 0.01 level (2-tailed).

Interpretation: The above results indicate that calculated p-value is 0.000. It is less than 0.05. Therefore, Pearson Correlation test is rejected. Hence Null hypothesis is rejected and Alternate hypothesis is accepted.

Conclusion: There is an impact of flipped learning adoption on students' academic performance.

Findings: The correlation analysis shows that there is a strong positive relationship between Flipped Learning Adoption and Students' Academic

Performance. The Pearson correlation value is $r = 0.729$, which indicates that when flipped learning adoption increases, students' academic performance also tends to improve. The p-value is 0.000, which is less than the 0.05 level of significance, meaning that the relationship is statistically significant. Therefore, it can be concluded that flipped learning adoption has a significant positive association with students' academic performance. This result suggests that when students study basic concepts before class and use classroom time for discussion, problem-solving, clarification, and active learning, their understanding

improves, which positively supports their academic achievement.

Objective 3 To analyse the influence of gamified learning on students' academic performance.

Null Hypothesis H_{03} : There is no impact of gamified learning adoption on students' academic performance.

Alternate Hypothesis H_{13} : There is an impact of gamified learning adoption on students' academic performance.

To test the above null hypothesis Correlations Test is applied and obtained and results are as follows.

Correlations			
		Students' Academic Performance	Gamified Learning Adoption
Students' Academic Performance	Pearson Correlation	1	.748**
	P-value		.000
	N	120	120
Gamified Learning Adoption	Pearson Correlation	.748**	1
	P-value	.000	
	N	120	120
**. Correlation is significant at the 0.01 level (2-tailed).			

Interpretation: The above results indicate that calculated p-value is 0.000. It is less than 0.05. Therefore, Pearson Correlation test is rejected. Hence Null hypothesis is rejected and Alternate hypothesis is accepted.

Conclusion: There is an impact of gamified learning adoption on students' academic performance.

Findings: The correlation analysis shows that there is a strong positive relationship between Gamified Learning Adoption and Students' Academic Performance. The Pearson correlation value is $r = 0.748$, which indicates a high positive association between the two variables. This means that as the adoption of gamified learning increases, students' academic performance also tends to improve. The p-value is 0.000, which is less than the 0.05 level of significance, showing that the relationship is statistically significant. Therefore, it can be concluded that gamified learning adoption has a significant positive association with students' academic performance. This result suggests that the use of game-based elements such as points, badges, rewards, challenges, quizzes, leaderboards, and instant feedback increases students' motivation, interest, participation, and engagement, which ultimately supports better academic achievement.

VI. CONCLUSION

The study concludes that blended learning, flipped learning, and gamified learning have a significant positive impact on students' academic performance. The demographic profile shows that the study was conducted on 120 students, with representation from male and female students, different academic years, and Arts, Commerce, and Science streams. The correlation results indicate that blended learning adoption has the strongest positive relationship with academic performance with a correlation value of $r = 0.781$, followed by gamified learning adoption with $r = 0.748$, and flipped learning adoption with $r = 0.729$. Since the p-value for all three tests is 0.000, which is less than 0.05, all three null hypotheses are rejected and the alternate hypotheses are accepted. This confirms that the use of modern learning approaches improves students' academic outcomes. Blended learning supports students through a combination of classroom teaching and online resources, flipped learning improves understanding through pre-class preparation and active classroom discussion, and gamified learning increases motivation, participation, and engagement through game-based elements. Overall, the findings suggest that these innovative teaching-learning methods are effective in enhancing

students' academic performance and should be encouraged in higher education institutions.

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