

Assessing the Effectiveness of Game-Based Learning vs. Traditional Learning: A Teacher-Based Perception in Higher Education

¹Harapriya Sarangi, ²Dr. Ambika Sankar Mishra

¹²Rama Devi Women

harapriyasarangi@gmail.com, ambikasankar@rdwu.ac.in

Abstract—Background: Game based learning (GBL) is steadily gaining popularity in higher education to improve learning environments in the classroom and to overcome conceptual obstacles. For this to be successful, however, it is necessary to be aware of the views of the teachers who create such settings. The focus of this study is on teachers' perceptions about the effectiveness of GBL and that of traditional lecture-based instruction.

Methodology: The method of the study was descriptive survey which was used to gather data from faculty of higher education through a structured questionnaire. The instrument contained six key pedagogical dimensions of educators' attitudes rated on a five-point agreement scale: engagement, learning outcomes, skills development, adaptability, assessment, and effectiveness.

Results: The analysis showed that there was a significant clustering of positive responses to the agreement spectrum, suggesting a moderate level of dispersion or non-polarization of responses. Teachers were overwhelmingly in agreement that GBL would be more effective than traditional teaching methods to engage the students' interest and motivate them. The two areas that had the strongest consensus were conceptual retention and academic achievement. In contrast, endorsement added to the cautious stance on application of external skills and adaptability in institutions, and assessment plus feedback was found to be the weakest, most conflicted aspect.

Findings: Educators believe that GBL is an effective affective-cognitive catalyst which could be a very effective way to improve the motivation and information retention of students over traditional models. But they are not very confident of its ability to conduct formal, summative evaluation, and they have identified as structural barriers, digital readiness, and infrastructure, as well as various concerns related to replacing traditional approaches completely.

Conclusion: Teacher perceptions strongly advocate a hybrid pedagogical framework, rather than an outright replacement of traditional teachers' lectures. Higher education institutions need to use GBL as a way of engaging, visualizing and obtaining quick formative evaluation for experience, while maintaining the structural rigour and established assessment techniques of the traditional approaches.

Index Terms—Game based learning, Higher Education, Teachers, Traditional Learning

I. Introduction

Given the growing demand for active and technology-rich, student-centered learning in higher education, game-based learning (GBL) has emerged as a popular teaching method. Recent studies characterize GBL as a strategy involving learning outcomes that are clearly defined and that can be reached through digital or non-digital game elements, which are not commonly used for content delivery, but more likely challenge, feedback, interaction and problem-solving. In higher education, this has been driven by

the wider digital transformation, growth of blended and online learning, and looking for solutions that could enhance the motivation and alleviate dropout from traditional lecture classrooms (Hussein et al., 2019).

Conventional teaching is the prevalent mode of education in many universities, due to its structure, curriculum coverage and familiar assessment procedures. But, in modern times, literature is increasingly questioning the effectiveness of traditional teacher-led instruction without these other elements, particularly for digitally oriented student groups (Gunduzalp, 2024). The use of GBL is therefore considered a teaching method that can be used in conjunction with conventional teaching or used to enhance this approach by providing more interaction and involvement of students (Fatoye et al., 2022)

The present paper explores the subject of whether game-based learning is effective for higher education students compared to learning from a teacher-based perception. The attached results give a quantitative overview of teachers' perceptions on six aspects: engagement and motivation, learning outcomes, skill development, adaptability and accessibility, assessment and feedback and overall effectiveness. These results can be used to interpret the results of recent scholarship on post-2020 in order to understand how educators' perceptions influence the success of GBL: If GBL is perceived as pedagogically promising, but impractical, unhelpful or incompatible with higher education goals, it will not be implemented and will not be successful (Wang & Zheng, 2021).

II. Problem Statement

Higher education institutions are facing the challenge of engaging students, enhancing learning and shaping transferable learning skills, while many teaching contexts continue to make use of traditional practices that may not be responsive to the needs of today's diverse and digitally immersed students. Meanwhile, there has been an increase in the interest in GBL, as well as an uneven uptake due to the fact that teachers need to determine if game-based teaching methods are actually effective in boosting the effectiveness of teaching or just being a novelty. This poses a real problem and a research problem for universities: they should have evidence on whether teachers think GBL is more effective than traditional learning with respect to important aspects of teaching and learning in terms of dimensions.

It is not just that games are enjoyable; it is that teachers think that they help to improve meaningful educational outcomes. In the higher education sector, teachers are gatekeepers of curriculum design, classroom strategy, and assessment practice and therefore their perceptions have a great effect on the integration, continuity, or rejection of GBL. Teachers' perceptions of the potential for GBL to enhance motivation and learning, which may be strong, but its potential for assessment and accessibility may be weak, mean that implementation efforts need to focus on the latter rather than assume universal impacts.

In this paper, the authors raise the following analytical question: What is teachers' perception of the effectiveness of game-based learning versus traditional learning in the major pedagogical factors? The attached dataset provides a specific foundation for responding to this question because it has both teacher responses in a structured Likert-type response format and allows interpretation of the predominant agreement patterns as well as relative hesitation.

III. Literature Review

Research in post 2020 literature suggests that GBL and gamification can enhance engagement and participation in higher education, with the level of support depending on the discipline, design, and implementation context. A recent systematic review of gamification in higher education revealed that game-oriented approaches are often tied to enhancing engagement and learning experiences, with variability in both theoretical underpinnings and implementation models among studies (Hooshyar et al., 2021). Likewise, a systematic review of gamification in higher-education e-learning has shown that most common features, such as points, badges, leaderboards, levels, feedback and challenges, are used to encourage participation and that the level of personalization and richer motivational design has grown over the years (Adipat et al., 2021).

Studies since 2020 reinforce the notion that teachers' perceptions are as important as student perceptions. In a study about teachers' experience of the application of game-based learning methods, the teachers noted that the application of these learning methods had a positive impact on student interest, memorable learning, knowledge achievements, and the readiness of teachers, besides contextual fit (Ke & M. Clark, 2020). In the field of health sciences higher education, faculty and students report that GBL is a technique that can improve the classroom learning process, complement conventional teaching, boost students motivation, facilitate peer learning, and provide a safe learning space for practice, but they also found time, training, connectivity and resource limitations as barriers to using GBL (Hafeez, 2022).

It has also been suggested in the literature that care should be taken in interpreting learning outcomes. The findings of many studies have indicated that GBL can be used to improve attention, participation and short-term reinforcement, but the positive results regarding deep learning or the universal effectiveness of GBL over conventional approaches have been moderated by the quality of the implementation, the subject matter, and the amount of entertainment and pedagogy (Fatoye et al., 2022; Gunduzalp, 2024; Hussein et al., 2019). This is because some educational applications of GBL are effective not as substitutes for lectures or seminars, or even practical teaching, but as support for formative assessment, revision or engagement (Shrimal, 2024).

A second constant feature in recent scholarship is the concept of skill development. GBL is also linked to content learning, as well as communication, collaboration, problem solving and self-regulation, especially if the game task is one that must involve communication and prompt decision making (Jääskä & Aaltonen, 2022; Pisal et al., 2022). The added value of these higher level skills in higher education is that it is now more important than just the exam results to the academic institution that students have developed some transferable skills and applied these to their studies. However, thoughtful instructional design and alignment with course outcomes are also necessary for those benefits to be automatic, as the literature indicates (Gris & Bengtson, 2021; Shohel et al., 2022).

Last but not least, there are several studies showing that the main drawbacks of GBL are not necessarily pedagogical in nature but are barriers to implementation. All of these factors have been cited as barriers to regular use: limited time, poor information technology facilities, subscription costs, internet issues, and poor training capacity (Gordillo et al., 2022). This implies that a teacher might think that GBL is pedagogically useful, but not necessarily concerned about the accessibility, assessment, or classroom management process. This is particularly important when reading the attached findings, which indicate strong support in some areas and more conservative support in others.

IV. Material and Methods

The population of research was faculty of higher education institutions based in Odisha, India. The method of the study was descriptive survey which was used to gather data from faculty of higher education through a structured questionnaire. The instrument contained six key pedagogical dimensions of educators' attitudes rated on a five-point agreement scale: engagement, learning outcomes, skills development, adaptability, assessment, and effectiveness.

Total populations of teachers were 482 and out of these 275 teachers were approached and the questionnaires were distributed. In order to calculate sample size, follow calculations have been conducted-

Population size (N) = 482

Confidence level = 95%

$Z=1.96$

Margin of error (M) = 5% = 0.05

Initial sample size (for infinite population):

$n_0 =$

$$\frac{Z^2 * P(1 - P)}{M^2}$$

$$\frac{1.96^2 * 0.5(1 - 0.5)}{0.05^2}$$

$$\frac{1.96^2 * 0.25}{0.0025}$$

384.16

Adjusting for finite population=

$n =$

$$\frac{n_0}{1 + \left(\frac{n_0 - 1}{N}\right)}$$

$$\frac{384.16}{1 + \left(\frac{384.16 - 1}{482}\right)}$$

~214.024

~214

Thus, 214 were used as the sample size. The researcher collected 214 completely filled and noise free questionnaires from students. Thus a response rate of 78% was obtained.

V. Results

Table 1: Descriptive Results

| Factors | | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree | Mean | Standard Deviation |
|--------------------------------|------------|----------------|-------|---------|----------|-------------------|------|--------------------|
| Engagement and Motivation | Frequency | 76 | 126 | 8 | 2 | 2 | 1.73 | .665 |
| | Percentage | 35.5 | 58.9 | 3.7 | .9 | .9 | | |
| Learning Outcomes | Frequency | 103 | 99 | 8 | 2 | 2 | 1.60 | .696 |
| | Percentage | 48.1 | 46.3 | 3.7 | .9 | .9 | | |
| Skill Development | Frequency | 48 | 122 | 36 | 4 | 4 | 2.04 | .798 |
| | Percentage | 22.4 | 57.0 | 16.8 | 1.9 | 1.9 | | |
| Adaptability and Accessibility | Frequency | 39 | 139 | 28 | 8 | 0 | 2.02 | .681 |
| | Percentage | 18.2 | 65.0 | 13.1 | 3.7 | 0 | | |
| Assessment and Feedback | Frequency | 25 | 108 | 61 | 14 | 6 | 2.38 | .879 |
| | Percentage | 11.7 | 50.5 | 28.5 | 6.5 | 2.8 | | |
| Overall Effectiveness | Frequency | 120 | 80 | 10 | 2 | 2 | 1.53 | .716 |
| | Percentage | 56.1 | 37.4 | 4.7 | .9 | .9 | | |

These results are based on teacher perceptions of six factors, and are presented on five-point scales from strongly agree to strongly disagree. The mean scores are generally very positive ranging from 1.53 to 2.38, which suggests that the responses are concentrated around the agreement area, if lower scores indicate

greater agreement. The ranges of the standard deviations (0.665 – 0.879) indicate moderate dispersion, with the majority of responses not being polarized.

On the question of engagement and motivation, 35.5% strongly agreed and 58.9% agreed, to give a total positive response of 94.4% with a mean of 1.73 and standard deviation of 0.665. This suggests that the teachers strongly believe that GBL is more effective than conventional learning in stimulating students' interest, attention and motivation. The outcome is very similar to recent literature that suggests that one of the benefits of game-based learning is its ability to provide an interactive and motivating learning environment.

The learning outcomes, with a lower mean of 1.60, higher standard deviation of 0.696 and a higher percentage of positively answered questions of 48.1% (46.3% agreed), also received a high percentage of positive answers of 94.4%. This is the strongest result in the data as almost half of the respondents checked the best agreement box. The interpretation is that teachers do not only see GBL as fun; they also feel it is useful in learning, remembering, or achievement when compared to conventional methods.

Skill development: 79.4% said it was a positive response (22.4% strongly agreed, 57.0% agreed), 16.8% were neutral, and a mean of 2.04 was given. This is positive but indicates a bit more caution in teachers' judgments about the contribution of GBL to wider competencies. This discovery suggests that many teachers think that skills are gained from GBL, but may see this as more context-dependent than immediate learning or engagement.

The percentage of strongly agreeing was 18.2% and the percentage of agreeing was 65.0%, so the overall percentage was 83.2%, the mean was 2.02 and there were no strongly disagree answers. For adaptability and accessibility, the percentage was calculated by adding together the percentages of strong agree and agree. The percentages were calculated for strong agree and agree because of adaptability and accessibility. This indicates that most teachers believe that GBL is flexible enough to be used in higher education institutions, although not as strongly as for engagement and learning outcomes. That may be a reflection on the difference between the perceived pedagogical value and ease of use, given recent evidence of the impact of infrastructure, digital readiness, and resource constraints on adoption.

Regarding assessment and feedback, 11.7% strongly agreed, 50.5% agreed, 28.5% were neutral, 6.5% disagreed, and 2.8% strongly disagreed (mean = 2.38 and SD = 0.879). This is the weakest row and most uneven component of the table. There seems to be some of a benefit of GBL for formative checks and instant feedback; however, teachers are less convinced that it is effective for assessment.

56.1% strongly agreed and 37.4% agreed, giving a total of 93.5% positive responses, mean 1.53, and a standard deviation of 0.716 (SDV) for overall effectiveness. This is the best overall rating in the data set. Teachers' perceptions of GBL's effectiveness are more general than others related to traditional learning, although they continue to have some concerns about areas of operation, such as assessment and to a lesser degree, accessibility.

VI. Discussion

Teacher-based perceptions of GBL more accurately explain the effectiveness of GBL compared to the traditional learning in higher education. The results show a general centre around the area of agreement, which suggests positive attitudes towards the implementation of GBL. Standard deviations are in the moderate range suggesting a medium dispersion of responses; that is, most respondents have comparable responses, while not many are very polarized (Hussein et al., 2019).

Intrinsic Motivation and Conceptual Understanding

Teachers are also highly confident that GBL improves student's interest, attention and active participation in terms of engagement and motivation compared to traditional approaches. This conviction is very much in line with existing pedagogical literature which highlights the benefits of a game-based approach to creating a highly motivating and interactive learning environment (Ke & M. Clark, 2020). Understanding that the games are not just for fun, teachers realize the important role of using the game to reinforce conceptual understanding, knowledge acquisition and learning outcomes are superior to the traditional teaching model.

This conceptual area had the highest degree of positive agreement in the data set with a very large proportion reporting the highest level of agreement. The data shows that teachers are at least not seeing GBL as something that is just a passing classroom fad (Hafeez, 2022). The variation among the learning outcome data, however, suggests that although most teachers observe their students' conceptual leaps, achievement is not perfectly consistent, and teachers need to provide consistent instructional support.

Institutional barriers: competency and system infrastructure

Focusing on skill development, the teacher consensus is still positive but with a more qualified assessment of the role GBL is playing in wider professional and/or Academic outcomes. This pattern suggests that for skill building, teachers perceive it as highly contextual, and they believe that this will

require a more explicit instructional plan than what is necessary when taking part in classroom activities or for short-term knowledge.

This is the sense of cautious optimism that is seen in the area of adaptability and accessibility as well. The support for GBL frameworks within HEIs is not as strong as the support offered for motivation and direct learning outcomes, with a clear majority of teachers believing that the frameworks are flexible enough to be implemented in HEIs. This gap highlights a significant conflict between the pedagogical importance and usefulness. As a symptom of the bigger systemic issues in higher education, these include the variation among institutions in terms of infrastructure, digital readiness, and the ongoing challenge of resource constraints impacting real classroom use (López-Fernández et al., 2021; Shrimal, 2024).

Assessment Barrier and need for Hybrid Integration

The areas of operational assessment and feedback are the least consistent and controversial. Teachers feel that gamification of learning has good advantages in formative assessment and immediate feedback, whereas they are not as confident in GBL's success in formal, summative assessment. This dimension had the lowest percentage of affirmative responses and the highest percentage of neutral responses, plus a definite amount of disagreement. Teachers continue to be skeptical of the ability of casual/digital games to take the place of the rigor, accountability, and transparency that structure and measure the traditional testing formats.

However, the overall effectiveness rating is the highest for this data set. The teachers themselves felt GBL as a very valuable learning pedagogy in high impact learning areas is more effective than traditional learning pedagogy (lecturing). However, issues related to formal testing, access and infrastructure pose obstacles to relying on findings for uncritical substitution of conventional learning (Liu et al., 2020).

Finally, a compromise model of instruction is the strongest one. Higher education institutions need to more actively employ game-based learning as a tool for experiential learning to better engage students with and illustrate abstract ideas, as well as provide them with immediate formative feedback. Meanwhile, the system of planned structure, clear direction and strict evaluation of traditional teaching processes should be kept by schools, and comprehensive and measurable professional training should be provided.

VII. Conclusion

The present paper demonstrates teacher perception towards the superiority of game-based learning over conventional learning in higher education courses, particularly in terms of engagement, motivation,

learning outcomes and effectiveness. The results attached also show that teachers strongly believe in GBL pedagogical approach as more than nine out of ten teachers expressed positive views in various essential aspects. This result is similar to post-2020 research, which has identified GBL as a viable educational supplement when properly designed and implemented, and integrated with educational objectives.

Concurrently, the findings are not enough to warrant a non-critical statement that GBL is an alternative to conventional learning. Teacher responses reflected less emphasis on skill development, adaptability and assessment and feedback in particular indicating that skill development, adaptability and in particular assessment and feedback issues continue to be important. Consequently, it is perhaps most accurately said that GBL is seen as more effective in many high impact teaching areas, however, its effectiveness relies on the training, technological support, careful integration of the assessment, and sensitivity for context..

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