



Assessing the Effectiveness of Game-Based Learning V/S Traditional Learning: A Student-Based Perception in Higher Education

¹Harapriya Sarangi, ²Ambika Sankar Mishra

¹ Research Scholar, ² Associate Professor

¹Journalism and Mass Communication,

¹Rama Devi Women's University, Bhubaneswar, India

Abstract: **Background:** Game-based learning (GBL) is increasingly implemented in higher education to counteract student cognitive fatigue and low engagement associated with traditional lecture-based instructional models. However, its comprehensive pedagogical utility from the student perspective requires further investigation.

Methodology: This study employed a descriptive survey design to evaluate undergraduate student perceptions regarding the effectiveness of GBL versus traditional learning. Data were collected from college student cohort using a structured questionnaire measuring factors such as engagement, learning outcomes, skill development, adaptability, and assessment.

Results: The descriptive analysis revealed high positive consensus for GBL as an affective-cognitive catalyst, with a dominant cumulative majority confirming its success in heightening active classroom engagement and clarifying complex concepts. Conversely, positive consensus decreased when evaluating GBL's capacity to develop professional skills, leaving a large block of students completely neutral. High volatility was observed regarding system adaptability and accessibility, alongside widespread student skepticism toward gamified grading structures.

Findings: The findings indicate a critical gap between GBL's motivational capabilities and its perceived long-term professional or evaluative utility. While students value digital interactivity and conceptual visualization, they remain highly protective of the structural transparency, objective accountability, and academic rigor provided by conventional exam frameworks.

Conclusion: This research concludes that higher education institutions should avoid entirely replacing traditional lecture models with casual gamification. Instead, the study recommends a hybrid pedagogical framework that strategically leverages GBL for initial motivation and application, while maintaining traditional instruction and assessment to guarantee rigorous academic validation and professional workforce preparation.

1. Introduction

There is a paradigm shift in instruction in higher education. Passive teaching, teacher-centered master classes and un-interactive slide presentations, which are mainly used in traditional pedagogy, are facing a challenge to meet the learning needs of students in the modern university. Modern undergraduate students are used to working in multi-modal and immediate feedback settings. Thus, teachers are moving towards active learning models, Game Based Learning (GBL) and the gamification framework strategies (Balaskas et al., 2023).

Traditional teaching approaches work well when there is a lot of complex theory to be covered in a brief span, but are often ineffective at engaging students and retaining their interest. By contrast, GBL is based on complete educational games, containing explicitly programmed educational parameters which serve to meet the requirements of student autonomy, cooperation among peers and conceptual understanding (Pisal et al., 2022). Knowing how students in higher education institutions find the value in GBL when compared with traditional teaching is important to assessing its strategic implementation.

As the amount of digital education resources continues to grow, a significant issue remains: do the game elements really aid learning or do they just distract from it? The cognitive processing, analysis and collaboration required by higher education curricula demand a high level of skills. The use of interactive structures is a highly resource-intensive process, and there is a need for empirical evidence to confirm that the students' perception of the effectiveness of this process is positive.

A clear absence of granular data reveals the difference between students' enjoyment of GBL and its perceived academic rigor relative to traditional methodology which has long proven itself. In this study, a data set of student evaluations obtained from a game-based learning environment and a traditional learning environment was analyzed, which includes Likert Scale ratings on multiple aspects of each environment.

2. Literature Review

The active teaching model of GBL is based on Self-Determination Theory (SDT) that emphasizes that the needs of autonomy, competence, and relatedness are fundamental human needs and that are most conducive to optimal learning (Chen et al., 2025). In the traditional lecture mode, students' autonomy is often limited and their peers are separated from them, thus leading to passive learning behaviors. On the other hand, game mechanics are using active variables like interactive problem solving, immediate structural feedback, competitive and cooperative dynamics etc., to meet these intrinsic psychological needs (Eltahir et al., 2021).

The pedagogical value of playful educational environments has been repeatedly emphasized in recent literature. Balakrishna, (2023) found that non-digital game environments in higher education classrooms substantially improve academic integration, socialization with peers and engagement. At the same time, Juárez-Varón et al., (2024) conducted automatically controlled studies of the neuro-technological aspects of learning, which confirmed that active gamified pedagogies engage the learners' attention in a quantifiable way, stimulate their interest and extend their cognitive excitement beyond that of traditional master classes. Second, systematic research conducted in the specific professional streams (such as education in healthcare or project management) shows greater self-efficacy and group problem solving capabilities when the simulation environments are employed (Adipat et al., 2021; Gunduzalp, 2024; Hussein et al., 2019).

However, there are serious questions. They warn that games, if not properly designed to meet the core curriculum standards, miss the key learning goals. This suggests that GBL should be used as a structural supplement instead of the replacement of the traditional structure of basic mechanics.

3. Methodology & Results

To systematically gauge student sentiments, a quantitative dataset was analyzed. The responses record descriptive frequencies, percentages, mean values, and standard deviations (N = 377 total student respondents). The factors of effectiveness of GBL considered in this research are includes General Attitude towards Game-Based Learning, Learning and Retention, Motivation and Participation, Preferred Types of

Games for Learning, Skill Development and Challenges in Game-Based Learning. The complete evaluation spectrum, ranging from "Strongly Agree" to "Strongly Disagree," is captured within the provided file.

For quantitative analysis, total populations of students were 27002 and out of these 500 students were approached and the questionnaires were distributed. In order to calculate sample size, follow calculations have been conducted-

Population size (N) = 27,002

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=

$n =$

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

$$\frac{384.16}{1 + \left(\frac{384.16 - 1}{27002}\right)}$$

$$\frac{384.16}{1 + 0.01418}$$

$$\frac{384.16}{1.01418}$$

~377.4

~377

Thus, 377 were used as the sample size. The researcher collected 377 completely filled and noise free questionnaires from students. Thus a response rate of 75.4% was obtained.

The item-by-item structural evaluation reveals distinct descriptive metrics for each of the six surveyed statements as discussed in next section.

4. Results and Data Interpretation

The empirical data matrix (Table 1) provides a structural foundation for understanding how higher education students evaluate the efficacy of GBL relative to traditional academic methodologies.

Table 1: Descriptive Analysis Results for Considered Factors of Effectiveness of Game Based Learning

Factors		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean± Standard Deviation
Engagement and Motivation	Frequency	51	202	84	35	5	2.31±0.87
	Percent	13.5	53.6	22.3	9.3	1.3	
Learning Outcomes	Frequency	104	148	85	17	23	2.22±1.088
	Percent	27.6	39.3	22.5	4.5	6.1	
Skill Development	Frequency	64	118	142	48	5	2.50±0.96
	Percent	17.0	31.3	37.7	12.7	1.3	
Adaptability and Accessibility	Frequency	99	140	84	26	28	2.32±1.15
	Percent	26.3	37.1	22.3	6.9	7.4	
Assessment and Feedback	Frequency	27	154	152	39	5	2.58±0.82
	Percent	7.2	40.8	40.3	10.3	1.3	
Overall Effectiveness	Frequency	33	195	120	27	2	2.38±0.77
	Percent	8.8	51.7	31.8	7.2	.5	

The distribution of frequencies, mean scores (M) and standard deviations (SD) in Table 1 shows how students manage experiential engagement and long-term pedagogical utility.

The data shows that although the classroom environment is vastly improved using playful structures, students from the undergraduate level have a much more pragmatic perspective when talking about performance, skill measurement and assessment structures. Engagement and Motivation (M = 2.31, SD = 0.868): A dominant cumulative majority of 67.1% (13.5% strongly agree and 53.6% agree) confirm that GBL heightens pupils' active engagement with classroom content. This motivational 'kicker' is directly connected with students' perceptions of core comprehension (M = 2.22, SD = 1.088) Majority (66.9%) agree that game elements help to make complex concepts easier to understand. Interestingly, this factor had the lowest mean score across all items (M = 2.22), indicating the highest overall positive consensus skew. It also showed the largest percentage of absolute endorsement (27.6 per cent of respondents strongly agreed).

The results demonstrate the affective-cognitive catalytic potential of GBL. Traditional lecturing can cause students to get cognitive fatigue when they try to understand abstract theories. GBL has a significant effect on reducing this barrier. Games reduce passive cognitive load (focusing on understanding abstract schemas) and provide immediate feedback to students as they engage in rule-governed digital interactions.

The standard deviation of Learning Outcomes is quite wide, however (SD = 1.088). This difference draws our attention to the fact that there is a clear reality in the teaching process: most of the students will gain a sudden insight into the concept, while a much smaller, dependent sub-group is unable to get explicit learning outcomes without the direct assistance of teachers.

To rate the effectiveness of game mechanics in developing professional or academic skills (M = 2.50, SD = .962): The overall number of positive ratings decreases to 48.3% when considering professional or academic skills. In particular, the largest statistical group for this indicator is Neutral (37.7%). However, 63.4% of the cohort does say that interactive games are very valuable because they are adaptable and accessible (M = 2.32, SD = 1.153). What is important to note, however, is that this dimension had the highest standard deviation (SD = 1.153) and the largest total disagreement rate (14.3% combined disagree/strongly disagree) in the entire study.

The disparity between Skill Development and Adaptability is illustrative of one of the trends. Students are aware that games are flexible and can be made accessible, but are also very wary about whether or not they are really developing real-life professional skills.

In addition, there is significant statistical difference between the Adaptability scores ($SD = 1.153$), indicating a distinct instructional gap. Games are not all created equal, and thus do not provide an equal user experience, either by usability, rules or technical layout. A small minority of tech-savvy or cooperative students is very comfortable in the digital classroom, but for others there can be some interface challenges, rules confusion, or accessibility issues. It is a clear example of how if not done with clear and explicit support for onboarding, GBL can easily disaffirm certain learners.

The last two dimensions chart the students' journey through institutional performance demands and future curriculum design. Assessment and Feedback ($M = 2.58$, $SD = .822$): The highest mean score in the study was obtained for Assessment and Feedback with a clear trend towards absolute agreement. 7.2% strongly agrees that GBL offers better grading systems or feedback than regular testing. However, it is actually a huge stationary block of data in the Neutral zone at 40.3%. Despite this strong critique of grading, the overall aspiration for curricular change is strong ($M = 2.39$, $SD = .768$). The student population is very positive about the long-term effect and integration of GBL with 60.5% of the students showing active support. This is the last factor and has the smallest standard deviation ($SD = .768$) and the fewest strong disagreements (0.5%).

This setup shows an amazingly practical student population. There is a distinct lack of institutional accountability from the higher education student side. The overwhelmingly negative reaction to Assessment and Feedback demonstrates a healthy skeptical attitude: students are not completely convinced that casual gaming can accurately assess a complex academic skill, nor that it will be sufficient preparation for a typical university exam.

The very low variance ($SD = .768$) and little disagreement about Overall Effectiveness, however, suggest that students are not seeking a total shift to a more passive approach to teaching. Instead, they're pushing for a hybrid approach. While undergraduates find GBL to be an extremely effective motivational, visualization and application tool, they continue to seek traditional lecture-based models for formal assessment, the rigor of structure and transparency and measurable accountability.

5. Discussion

The statistical data explicitly demonstrates that higher education students hold a overwhelmingly positive perception of GBL, though with nuanced reservations regarding formal assessment outcomes.

The descriptive analysis results presented in Table 1 provide an empirically-rich description of students' experiences in the tension between experiential engagement and structural, academic accountability in higher education. This finding reveals that undergraduate students have a very pragmatic way of acquiring professional skills and evaluating institutions, although, implementation of GBL shows clear benefits compared to the traditional model of lectures in terms of immediate motivation to learn and visualization of concepts. These results are discussed in the light of the most recent empirical literature that has compared GBL with traditional instruction in higher education settings.

The results suggest that GBL is an effective affective-cognitive catalyst. More than half of the respondents agreed that GBL promotes active engagement over the long-term. This motivational boost directly overlaps with the very high overall positive consensus skew of learning outcomes.

This is a positive endorsement that has been supported by recent systematic evidence as an interactive, game-based method for lowering foreign language and general classroom anxiety, and inducing significant increases in intrinsic motivation (Al-Khresheh, 2025). The traditional models of teaching and learning often make students feel tremendous cognitive fatigue when trying to understand highly abstract, abstracted schemas (Beldjenna & Saaid, 2025). By presenting complex ideas in bite-sized tasks with graphics and stage indicators, GBL reduces the passive cognitive load and turns the working memory space available for the brain.

The relatively high standard deviation for the Learning Outcomes, however, suggests that this 'sudden insight' effect is not experienced by everyone. A large portion of the cohort is successful when exploring digitally on their own, but there is a sub-group who are vulnerable to explicit scaffolding. This separation from the basic claims of recent pedagogical research, which also states that purposeful, structured guidance

is necessary to develop digital learning environments that are based on digital structures or challenges, and that without mediation by teachers, less independent learners will fall behind (Isfold Sigurdardottir, 2025; Porubän et al., 2024).

A clear instructional gap appears after one has conceptualized the visualization and then applied it to the outside world. The overall positive rating for GBL's adaptability and flexibility is high, but the overall positive rating for its ability to develop specific professional or academic skills is low with a large proportion of students being neutral. Moreover, Adaptability and Accessibility had the highest overall volatility and combined disagreement rate.

This imbalance highlights a core challenge in today's higher education landscape: students value the contemporary and flexible digital learning spaces that they are used to, yet they are quite skeptical when it comes to the correlation between casual gamified learning activities and real work skills. Modern educational research cautions that a change in instructional delivery system is not sufficient to ensure development of content and transfer of skills. Authentic surrounding learning ecosystem is the basis of the true professional capability (Rekalde-Rodríguez, 2025).

Furthermore, there are high fluctuations in the adaptability of a system, which demonstrates that games are not identical. When digital interfaces lack clarity on the rules, poor usability, or no structured on-boarding, there's immediate friction in GBL. This difference heavily favors tech-savvy or co-operative students and alienates or disaffirms traditional students who are not that good at navigating the interface (Isfold Sigurdardottir, 2025).

The final dimensions outline a quite functional and consumer oriented perspective on evaluation. The highest mean score in the study was for the factor Assessments and Feedback, with a neutral zone block of data remaining stationary. However, the need for "structural curriculum integration" as the overall theme, that is, the need for the system to be changed in order to accommodate this integration, is generally strong and shows the least overall variance with the least number of strong disagreements (Wisaeng, 2026).

This data pattern shows one of the themes: Undergraduates do not feel that digital Gaming can be a suitable alternative to more rigorous academic testing. This skepticism is backed up by recent experimental examination of gamified platforms in higher education which reveal that gamified models of testing can markedly raise engagement but not consistently result in better short-term academic outcomes than traditional tests. Undergraduates are aware of this limitation. They understand that soft skills and exploration through interaction are required for contemporary working skill. At the same time, they are extremely sensitive to measurable accountability, structural transparency and concrete rigor of traditional lecture and exam model.

The students are not calling for a wholesale rejection of the traditional teaching approaches in favor of unstructured, informal "gamification. Finally, the students are not asking to completely replace the traditional approaches to instruction with unstructured, ad hoc "gamification. In contrast, the data suggest strongly that a blended pedagogical approach is in use (Beldjenna & Saaid, 2025). Higher education institutions are encouraged to use GBL as an experiential motivating tool to render visualization and interactive application, and to rely on traditional models with a structure for providing formal assessment, academic rigor and professional definitive validation.

6. Conclusion

The practical results of this research provide essential evidence that contributes to the existing pedagogical discussion in the Higher Education arena in which game-based learning (GBL) is a part of the day-to-day pedagogical discourse. This research findings suggest that although gamified structures were found to be very effective in inducing student engagement in the classroom and overcome conceptual barriers, they were not seen by the students as a complete replacement of the traditional academic framework. Rather, higher education students have a very practical perspective on their educational processes, and they differentiate between the motivational properties of an electronic environment and the organizational requirements of learning to be a good worker and a good student.

The data clearly indicates a threshold for using GBL. Students overwhelmingly support the use of gamification as an affective-cognitive catalyst that stimulates interest and helps visualize the initial concept; thus, reducing the cognitive fatigue which can often accompany passive models centered on lectures. Students are skeptical and distinctly return to traditional university norms however, when assessing longer-term utility – in developing workforce competencies and when it comes to carrying out objective testing – testing that is rigorous. In addition, the uncertainty found within the dimensions of adaptability and accessibility provide a valuable caution to teachers: digital learning resources can also exclude some sub-groups of students if they are not carefully approached and structured, and this may create a new set of learning gaps.

Finally, the thesis of this research is the following: The most ideal course of action for curriculum design in higher education is not about a complete overhaul of the system towards casual gamification, but rather intentional development of a hybrid pedagogical system. In higher education institutions, the games-based learning methodology should be strategically adopted to start curiosity, present complex schemas and inspire active learning. At the same time, the academic institutions need to maintain such a strict structure as lectures and examinations with transparent accountability and measurable standards that enable students to be fully trained for formal assessment and the workforce. Further study of this hybrid model is needed to develop the specific integration points that will yield optimal student performance in various subject areas.

References

- Adipat, S., Laksana, K., Busayanon, K., Asawasowan, A., & Adipat, B. (2021). Engaging students in the learning process with game-based learning: The fundamental concepts. *International Journal of Technology in Education*, 4(3), 542–552.
- Al-Khresheh, M. H. (2025). The cognitive and motivational benefits of gamification in English language learning: A systematic review. *The Open Psychology Journal*, 18(1).
- Balakrishna, C. (2023). The impact of in-classroom non-digital game-based learning activities on students transitioning to higher education. *Education Sciences*, 13(4), 328. <https://doi.org/10.3390/educsci13040328>
- Balaskas, S., Zotos, C., Koutroumani, M., & Rigou, M. (2023). Effectiveness of GBL in the engagement, motivation, and satisfaction of 6th grade pupils: A Kahoot! approach. *Education Sciences*, 13(12), 1214. <https://doi.org/https://doi.org/10.3390/educsci13121214>
- Beldjenna, A., & Saaid, Y. (2025). Implementing games as an online assessment method on Moodle. *Passerelle*, 14(2), 585-600.
- Chen, Y., Guo, Q., Qiu, Q., Qiao, C., & Wang, J. (2025). The Impact and Pathways of Digital Game-Based Learning on STEM Undergraduates' Engineering Concepts: Integrating Self-Determination Theory and Flow Theory. *Computer Applications in Engineering Education*, 33(4), e70066.
- Eltahir, M. E., Alsahhi, N. R., Al-Qatawneh, S., AlQudah, H. A., & Jaradat, M. (2021). The impact of game-based learning (GBL) on students' motivation, engagement and academic performance on an Arabic language grammar course in higher education. *Education and Information Technologies*, 26, 3251–3278. <https://doi.org/https://doi.org/10.1007/s10639-020-10396-w>
- Gunduzalp, C. (2024). The effects of digital game-based learning in technology-oriented course: A case study in the biochemistry department. *Journal of Education in Science Environment and Health*, 10(1), 42–59. <https://doi.org/https://doi.org/10.55549/jeseh.1419320>
- Hussein, M. H., Ow, S. H., Cheong, L. S., Thong, M. K., & Ebrahim, N. A. (2019). Effects of digital game-based learning on elementary science learning: A systematic review. *IEEE Access*, 7, 62465–62478. <https://doi.org/10.1109/ACCESS.2019.2916324>
- Isfold Sigurdardottir, H. D. (2025). Mediating and managing: Envisioning digital game-based learning in schools. *Nordic Journal of Digital Literacy*, 20(2), 75–89.
- Juárez-Varón, D., Juárez-Varón, M. Á., Mengual-Recuerda, A., & Andres, B. (2024). A neurotechnological study to quantify differences in brain activity using game-based learning: Gamification vs. traditional teaching. *International Journal of Game-Based Learning*, 14(1), 1–20. <https://doi.org/10.4018/ijgbl.349219>
- Pisal, E., Bommanavar, S., Agarwal, R., Baad, R., Vibhute, N., & Belgaumi, U. (2022). Game Based Learning Approach (Gbl) To Improve Student's Learning Performance In Dental Academics. *Journal of Positive School Psychology*, 6(8), 4951–4959.
- Porubän, J., Nosál', M., Sulír, M., & Chodarev, S. (2024). Teach programming using task-

driven case studies: Pedagogical approach, guidelines, and implementation. *Computers*, 13(9), 221–238.

- Rekalde-Rodríguez, I. (2025). Challenge-based education methodology within sustainable development environments: From ocean i3 to EmPACT i3 experience. *Frontiers in Education*, 10(1), 169–184.
- Wisaeng, K. (2026). *The influence of AI competency and soft skills on innovative university competency: An integrated SEM*. 3(2), 45–59.

