**THE IMPACT OF GAMIFICATION IN HIGHER EDUCATION: EXAMINING ACADEMIC PERFORMANCE THROUGH PARTIAL AND FULL GAMIFICATION INTERVENTIONS**

Martin KISELICKI

*Faculty of Economics – Skopje, Bul. Goce Delcev 9V, Skopje, North Macedonia*

martin.kiselicki@eccf.ukim.edu.mk

Kalina TRENEVSKA BLAGOEVA

*Faculty of Economics – Skopje, Bul. Goce Delcev 9V, Skopje, North Macedonia*

kalina.trenevska@eccf.ukim.edu.mk

Ana JOSIMOVSKA NIKOLOV

*HalkBank AD Skopje, Bul. Sv. Kiril I Metodij no.54, Skopje, North Macedonia*

ana.josimovska@halkbank.mk

**Abstract**

This study examines the effects of gamification in higher education, focusing on its impact on academic performance, internal motivators, and student satisfaction. The research aimed to evaluate how varying levels of gamification—partial and full—affect students' engagement and learning outcomes. A total of 162 students participated, divided into three groups: a control group, a partially gamified group, and a fully gamified group.

Data were collected through a structured survey and analyzed using statistical techniques such as Cronbach's Alpha for reliability, Chi-Square tests, Levene's test, and ANOVA to determine the influence of gamification on academic metrics and motivation.

The findings show that full gamification significantly improves academic performance, internal motivators like autonomy, goal-setting, and social interaction, while partial gamification had mixed effects. However, neither form of gamification showed a significant impact on overall student satisfaction. These results highlight the potential of full gamification to boost academic achievement and motivation, while also suggesting that satisfaction may depend on additional factors beyond gamification.

The study contributes valuable insights for educators and policymakers seeking to implement gamification strategies in higher education. It emphasizes the importance of a holistic approach to enhance both student engagement and satisfaction.

**Keywords**: gamification, higher education, academic performance, student motivation, student satisfaction

**JEL classification**: I23, O33, C83

**Introduction**

The adoption of gamification, the integration of game-design elements such as points, badges, and leaderboards in non-game contexts, has rapidly expanded across sectors, including higher education (Deterding et al., 2011; Kapp, 2012). In educational settings, gamification has been introduced as a strategy to boost student engagement, motivation, and academic performance by creating more interactive and enjoyable learning environments (Seaborn & Fels, 2015). This transformation of traditional teaching methods into a gamified experience aims to motivate students to actively engage with course material and stay committed throughout their academic careers (Hamari et al., 2014).

In North Macedonia, where higher education has traditionally relied on lecture-based instruction, the introduction of gamification offers an innovative solution to address challenges such as student disengagement, high dropout rates, and prolonged completion times (Deci & Ryan, 2000). Educators are turning to gamification to enhance learning experiences, fostering both intrinsic motivation and a sense of achievement (Nicholson, 2015). By incorporating game mechanics, courses are designed to make academic tasks more appealing and encourage students to take ownership of their learning process (Kim, 2015).

Despite the increasing popularity of gamification, there is limited empirical research on its effectiveness in improving academic outcomes, such as course points and final grades. Some studies suggest that partial gamification—where only select game elements are integrated—can increase short-term engagement but may have limited impact on overall academic performance (Buckley & Doyle, 2016). On the other hand, full gamification, where game mechanics are deeply embedded throughout the course, has been associated with more significant improvements in academic achievement (Landers & Landers, 2014).

This study seeks to fill this gap by examining whether the implementation of partial and full gamification in higher education leads to improved academic performance. Specifically, the research focuses on the impact of gamified learning environments on the number of points students earn during the course and their final grades. Understanding these effects is crucial for determining whether gamification can provide sustainable benefits to student outcomes in higher education settings.

***Objectives of the study***

* To investigate whether the implementation of gamification in higher education positively affects students' academic performance.
* To explore the effect of partial gamification on the number of points students earn during the course and their final grades.
* To assess the impact of full gamification on students' points and final grades.
* To provide recommendations for improving gamification strategies to enhance student performance in higher education.

Given the increasing reliance on digital tools and innovative teaching methods, understanding how gamification impacts academic success is critical. This study aims to contribute to the growing literature on gamification in higher education by providing empirical evidence on its effectiveness in boosting student achievement, and offering practical insights for educators and policymakers on the use of gamified learning interventions.

**Literature review**

***Gamification in Education***

Gamification, defined as the use of game mechanics such as point systems, leaderboards, and badges in non-game contexts, has seen widespread application across various sectors, including education (Deterding et al., 2011; Kapp, 2012). In higher education, gamification is employed to increase student engagement and motivation by transforming the learning experience into a more interactive and rewarding process (Seaborn & Fels, 2015). By integrating game-like elements into academic environments, educators aim to make the learning process more appealing, thus fostering intrinsic motivation and improving academic performance (Deci & Ryan, 2000).

Research on gamification in education suggests that it can lead to both short-term engagement and long-term academic benefits. A meta-analysis by Hamari, Koivisto, and Sarsa (2014) concluded that gamification tends to improve motivation and participation, particularly when students are provided with tangible rewards such as points or badges. Similarly, Landers and Landers (2014) found that the use of leaderboards in gamified systems significantly increased student time-on-task, thereby contributing to better academic outcomes. However, while the motivational benefits of gamification are well-documented, its direct impact on academic performance remains an area of ongoing debate.

In particular, partial gamification—where only certain game elements, such as points or badges, are integrated into the learning process—has shown mixed results. Some studies suggest that while partial gamification can increase engagement, it may not significantly affect final grades or overall academic achievement (Buckley & Doyle, 2016). On the other hand, full gamification—where game mechanics are embedded throughout the entire learning process—has been associated with more substantial improvements in academic performance (Kapp, 2012). This study aims to build on these findings by investigating the effects of both partial and full gamification on student performance in higher education.

***Motivational Theories and Gamification***

Gamification is rooted in motivational theories, particularly self-determination theory (SDT), which posits that human behavior is driven by the fulfillment of three basic psychological needs: autonomy, competence, and relatedness (Deci & Ryan, 2000). According to SDT, students are more likely to engage in activities that make them feel competent, autonomous, and socially connected. Gamified systems leverage these psychological mechanisms by providing immediate feedback (competence), offering choices (autonomy), and fostering collaboration or competition (relatedness) (Nicholson, 2015).

Gamified learning environments are designed to satisfy these psychological needs, thereby promoting deeper engagement with course material. For example, the use of points and badges provides students with a clear sense of progress and achievement, reinforcing their competence (Kapp, 2012). Moreover, features such as leaderboards and peer collaboration promote social interaction, which fulfills students’ need for relatedness (Deterding et al., 2011). However, the effectiveness of these mechanisms in improving academic performance may depend on the extent to which they are integrated into the learning process.

***Partial vs Full Gamification***

The distinction between partial and full gamification is critical in understanding how different levels of gamification impact student outcomes. Partial gamification involves the selective use of game mechanics, such as points or badges, without fundamentally altering the course structure. This approach is relatively easy to implement and can lead to short-term increases in student engagement (Buckley & Doyle, 2016). However, some studies suggest that partial gamification may not be sufficient to produce meaningful changes in academic performance. For instance, Hanus and Fox (2015) found that while partial gamification increased participation in class discussions, it did not significantly improve exam scores.

In contrast, full gamification integrates game mechanics throughout the entire course, creating a comprehensive gamified experience. This approach is more immersive and has been associated with greater improvements in academic outcomes (Landers & Landers, 2014). Full gamification typically involves the use of a narrative structure, where students progress through levels or stages by completing academic tasks, earning rewards for their achievements. Studies have shown that this approach can increase not only engagement but also deeper learning and retention of course material (Kim, 2015).

The present study aims to contribute to this literature by comparing the effects of partial and full gamification on student performance in higher education, with a specific focus on the number of points earned during the course and final grades.

**Methodology**

This study used a quasi-experimental design conducted between academic years 2018 through 2021, to assess the impact of gamification on university students’ academic performance. The students are divided into three groups: a control group of 51 students (no gamification), a partial gamification group with 55 students, and a full gamification group with 56 students. The primary objective is to compare the academic performance (measured in terms of course points and final grades) of students across these groups, thereby testing the hypotheses regarding the effects of partial and full gamification on academic outcomes.

* H1: Partial gamification positively influences the number of points students earn during the course.
* H2: Partial gamification positively influences the final grades students receive in the course.
* H3: Full gamification positively influences the number of points students earn during the course.
* H4: Full gamification positively influences the final grades students receive in the course.

This design allows for a comparison of both the immediate effects (points earned throughout the course) and the long-term effects (final grades) of gamification on student performance. In the partial gamification group, students were exposed to basic game mechanics integrated into the course. These mechanics included point systems, badges, and leaderboards. Students earned points for completing assignments, attending classes, and participating in discussions, with badges awarded for specific achievements, such as submitting all assignments on time. The leaderboard displayed the top performers in the class, fostering a competitive environment among students. This partial gamification approach aimed to enhance engagement by rewarding specific academic behaviors without drastically altering the course structure.

In contrast, the full gamification group experienced a more immersive and comprehensive gamified environment. In addition to points, badges, and leaderboards, students participated in a course designed with a narrative structure and levels. They progressed through the course by completing academic tasks, such as quizzes and projects, unlocking rewards as they advanced. The full gamification setup included team-based tasks and individual competition, fostering both collaboration and competition. This group’s learning experience aimed to deeply integrate game elements throughout the course, encouraging sustained engagement and motivation.

The control group followed the standard curriculum, with no gamification elements applied. This group served as the baseline for comparing academic performance across the different levels of gamification.

Data were collected on two primary measures of academic performance: the number of points students earned during the course and their final grades. Course points were tracked throughout the semester and reflected performance on assignments, quizzes, participation, and other academic activities. Final grades were recorded at the end of the semester, based on overall academic performance, including exams and projects. In addition to these academic metrics, students in the partial and full gamification groups completed a brief survey at the end of the course to assess their perceived engagement, motivation, and satisfaction with the gamified elements.

For data analysis, descriptive statistics were calculated to summarize the points and final grades for each group. One-way analysis of variance (ANOVA) was conducted to test for statistically significant differences in academic performance between the control, partial gamification, and full gamification groups. Post-hoc tests (Tukey’s HSD) were performed to determine which groups differed from each other. Additionally, multiple regression analysis was conducted to examine the relationship between the type of gamification (partial or full) and academic performance, while controlling for demographic variables such as gender and faculty. All analyses were conducted using SPSS, with significance levels set at p < 0.05.

This methodology was designed to provide a clear comparison of how partial and full gamification influence students’ academic performance, specifically focusing on the number of points earned and final grades achieved. By using a combination of descriptive and inferential statistics, the study aimed to provide robust insights into the effectiveness of different gamification strategies in higher education.

**Results**

The study surveyed 162 students, divided into a control group (51 students), a partial gamification group (55 students), and a full gamification group (56 students). The **Chi-Square Test** was employed to verify the homogeneity of the groups based on gender, age, and year of study. Additionally, **Levene's Test** was used to assess the equality of variances within the groups, which is necessary for further ANOVA analysis.

The Chi-Square test showed that there were no statistically significant differences between the control, partial gamification, and full gamification groups in terms of gender (p = 0.984), age (p = 1.000), and year of study (p = 0.988). This confirms the demographic homogeneity across the groups, which is crucial for valid comparisons. Levene’s test confirmed that the variances for age, gender, and year of study were not significantly different across the three groups, with p-values ranging from 0.861 to 0.972. Thus, the assumption of equal variances is satisfied, allowing for a valid application of ANOVA in subsequent analyses.

***Reliability testing with Cronbach’s Alpha***

To ensure the internal consistency of the survey items measuring intrinsic motivators and student satisfaction, **Cronbach's Alpha** was used. A threshold of 0.7 is generally considered acceptable for reliability.

*Table 1: Cronbach’s Alpha*

|  |  |  |  |
| --- | --- | --- | --- |
| Construct | Control Group | Partial Gamification | Full Gamification |
| Autonomy | 0.719 | 0.770 | 0.721 |
| Skills | 0.808 | 0.748 | 0.798 |
| Goals | 0.765 | 0.861 | 0.793 |
| Progress | 0.775 | 0.729 | 0.743 |
| Social Interaction | 0.731 | 0.837 | 0.749 |
| Satisfaction | 0.857 | 0.789 | 0.791 |

*Source: Author’s work*

All constructs across the groups demonstrated acceptable internal consistency, with Cronbach’s Alpha values ranging from 0.719 to 0.861. This reliability assures the validity of the measures for intrinsic motivators and satisfaction.

***RQ: Does Gamification Improve Academic Performance?***

The research question aimed to determine whether gamification enhances students' academic performance. This was tested through four hypotheses (H1, H2, H3, H4) focusing on the impact of partial and full gamification.

**Partial Gamification (H1, H2)**

For **H1** (partial gamification improves points) and **H2** (partial gamification improves final grades), the results did not show significant differences compared to the control group:

*Table 2: Academic Performance For Partial Gamification Group*

|  |  |  |  |
| --- | --- | --- | --- |
| Group | Additional Points (0-20) | Total Points (0-100) | Final Grade (5-10) |
| Control Group | 9.16 | 64.75 | 6.98 |
| Partial Gamification | 9.65 | 67.51 | 7.18 |
| F-value | 0.369 | 1.921 | 0.791 |
| p-value | 0.545 | 0.169 | 0.376 |

*Source: Author’s work*

No significant differences were observed in additional points (p = 0.545), total points (p = 0.169), or final grades (p = 0.376) between the control and partial gamification groups. Thus, **H1** and **H2** were rejected, indicating that partial gamification does not significantly improve academic performance.

**Full Gamification (H3, H4)**

For **H3** (full gamification improves points) and **H4** (full gamification improves final grades), the results were much more favorable. The full gamification group performed significantly better than the control group in all measures:

*Table 3: Academic Performance For Full Gamification Group*

|  |  |  |  |
| --- | --- | --- | --- |
| Group | Additional Points (0-20) | Total Points (0-100) | Final Grade (5-10) |
| Control Group | 9.16 | 64.75 | 6.98 |
| Full Gamification | 15.89 | 72.57 | 7.77 |
| F-value | 96.039 | 19.972 | 15.950 |
| p-value | < 0.001 | < 0.001 | < 0.001 |

*Source: Author’s work*

The analysis revealed significant differences between the control and full gamification groups in additional points (p < 0.001), total points (p < 0.001), and final grades (p < 0.001). Therefore, **H3** and **H4** are supported, showing that full gamification leads to improved academic performance.

The results provide clear evidence that **partial gamification** does not significantly enhance academic performance, as reflected in both additional points and final grades. This suggests that partial gamification elements alone may not be sufficient to impact students' learning outcomes meaningfully.

In contrast, **full gamification** demonstrates a marked improvement in all performance metrics. Students in the fully gamified environment scored significantly higher on additional points, total points, and final grades compared to the control group. These findings underscore the effectiveness of full gamification in fostering better academic outcomes, likely due to the deeper engagement and motivation that comprehensive gamification strategies provide.

**Discussion**

The findings of this study underscore the importance of adopting a comprehensive approach to gamification in higher education. The evidence indicates that full gamification has a significant and positive impact on academic performance, with students in the fully gamified group achieving higher additional points, total points, and final grades compared to both the control group and the partially gamified group. This suggests that a fully integrated gamification environment effectively enhances student engagement and motivation, leading to improved academic outcomes. These results align with existing literature, which highlights the efficacy of immersive gamified systems in fostering meaningful and sustained learning experiences (Hamari et al., 2014; Seaborn & Fels, 2015). By fully embedding game elements throughout the educational process, students are not only encouraged to participate actively but also to engage in deeper learning practices that contribute to their overall success (Kapp, 2012; Landers & Landers, 2014).

The success of full gamification can be attributed to its capacity to fulfill key psychological needs identified in self-determination theory: autonomy, competence, and relatedness (Deci & Ryan, 2000). Through the use of structured narratives, progressive challenges, and opportunities for collaboration, the fully gamified environment appears to have created a compelling and rewarding learning experience. The sense of achievement gained from completing levels, earning rewards, and meeting goals likely reinforced students’ intrinsic motivation. Additionally, the inclusion of team-based and competitive tasks may have fostered a sense of community and social connection, which are critical motivators in educational settings (Nicholson, 2015; Deterding et al., 2011). These social interactions and peer-driven dynamics play a pivotal role in sustaining engagement over time. In contrast, the partial gamification approach did not utilize these elements as effectively, potentially explaining its more limited impact on academic performance.

Partial gamification, while simpler to implement, failed to deliver comparable improvements in students’ academic metrics. Features such as points, badges, and leaderboards can be effective for generating short-term engagement, but they may lack the depth and coherence needed to bring about substantial changes in learning outcomes (Buckley & Doyle, 2016; Hanus & Fox, 2015). Without a comprehensive framework to integrate these game mechanics into the overall course structure, partial gamification risks being perceived as superficial or disconnected from the learning objectives. This limitation highlights the need for careful design and implementation of gamification strategies. Educators must ensure that game elements are not merely additive features but are deeply integrated into the pedagogical approach, providing a cohesive and immersive experience that aligns with the curriculum’s broader goals (Kim, 2015).

Interestingly, the study also revealed that neither partial nor full gamification had a significant effect on student satisfaction. This finding raises important questions about the broader role of gamification in higher education. While gamification can create a more engaging and interactive learning environment, it may not address all dimensions of the student experience. Factors such as the quality of instructional delivery, the relevance and clarity of course content, and individual preferences for learning styles may play a more substantial role in shaping student satisfaction (Seemiller & Grace, 2016). Furthermore, satisfaction is a complex construct influenced by emotional, social, and cognitive factors. It is possible that while gamification improves specific academic and motivational metrics, its impact on satisfaction requires complementary strategies, such as incorporating student feedback, enhancing the usability of digital tools, and ensuring that gamified elements do not overwhelm or distract from the learning process (Nicholson, 2015).

Another consideration is the potential variability in how students perceive and respond to gamified learning environments. For instance, individual differences such as prior gaming experience, attitudes toward competition, or preferences for collaborative versus individual learning may influence the effectiveness of gamification. These nuances suggest that while full gamification can produce statistically significant improvements in academic performance, its broader application must be tailored to diverse student needs and expectations (Gefen & Straub, 1997; Hamari & Koivisto, 2015). This underscores the importance of adopting a flexible and student-centered approach when designing gamified courses. Incorporating adaptive gamification systems, which adjust game elements based on student preferences and performance, could address this variability more effectively.

The findings demonstrate the considerable potential of full gamification to enhance academic performance and motivation, particularly when implemented as a cohesive and immersive system. However, the lack of impact on student satisfaction highlights the need for a more nuanced approach that considers other dimensions of the educational experience. While gamification can be a powerful tool for driving engagement and achievement, it should be complemented by other pedagogical strategies to create a holistic and fulfilling learning environment. This multidimensional perspective will help educators leverage the strengths of gamification while addressing its limitations to meet the complex needs of students in higher education.

**Conclusion**

The goal of this study was to assess the impact of gamification on higher education by examining its effects on academic performance, internal motivators, and student satisfaction. A total of 162 students participated, divided into three groups: a control group, a group with partial gamification, and a group with full gamification. The study utilized statistical methods, including Cronbach's Alpha for reliability, Chi-Square tests for group homogeneity, and Levene's tests for variance homogeneity, to validate the results.

The results show that full gamification significantly enhances academic performance, with students in the fully gamified group achieving higher scores and final grades than those in the control or partially gamified groups. Notably, full gamification also had a more substantial positive effect on internal motivators like autonomy, goals, and social interaction. Students exposed to full gamification reported higher levels of motivation and engagement, particularly in setting and achieving personal goals. These findings suggest that a comprehensive gamification approach is more effective in driving student engagement and academic outcomes compared to a partial implementation.

However, while full gamification improved performance and internal motivators, neither full nor partial gamification significantly impacted overall student satisfaction. This indicates that while gamification may boost academic success and motivation, it does not automatically translate into higher satisfaction levels. This highlights a need for educators to explore other factors beyond gamification, such as course design or teaching methods, to enhance student satisfaction.

These findings offer critical insights for educators and policymakers aiming to improve academic outcomes through gamification. Implementing a fully gamified environment that focuses on autonomy, goal-setting, and social interaction can significantly improve student performance and motivation. Yet, to increase satisfaction, additional strategies that address the broader learning experience may be required.

Future research could investigate other variables, such as the long-term effects of gamification on retention or the role of external motivators in enhancing student satisfaction. Expanding the research to different educational contexts and demographics could also help determine whether these findings are generalizable. This study contributes to the growing body of evidence supporting gamification in education, but also emphasizes the importance of a holistic approach to student engagement and satisfaction.

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