

The Impact of Implementing Gamification Elements on Motivation, Engagement and Academic Achievement

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Abstract: This study investigates the influence of gamification on students' motivation, engagement, and academic achievement in a managerial communication course at a large Australian university. Amidst growing concerns about student disengagement in traditional educational settings, gamification has emerged as a promising instructional approach. Utilising game elements like points, and leaderboards, this quasi-experimental study sought to create a more engaging and motivating learning environment. The intervention was conducted in weeks 5-8 of the semester, with students participating in gamified online activities and in-class challenges that contributed to a team-based leaderboard. The research design included pre- and post-gamification surveys using the Higher Education Student Engagement Scale (HESES), the Gameful Experience Questionnaire (GAMEFULQUEST), and the Questionnaire on Motivation for Cooperative Learning Strategies (CMELAC). Independent samples t-tests were conducted to analyse the data, focusing on five engagement variables: academic engagement, cognitive engagement, social engagement with teachers, social engagement with peers, and affective engagement. The results, based on responses from 665 students (410 pre-intervention and 255 post-intervention), indicated significant increases in cognitive engagement and social engagement with teachers post-gamification. Cognitive engagement scores showed a notable improvement, with students reporting higher satisfaction, enjoyment of intellectual challenges, and motivation to study. Similarly, social engagement with teachers improved, with students feeling more understood and supported by their instructors. However, there was no significant change in academic engagement and social engagement with peers. This suggests that while gamification can enhance specific aspects of the learning experience, its effects on overall academic performance may vary. The study concludes that gamification has the potential to positively impact certain dimensions of student engagement, particularly cognitive and social aspects, but its influence on academic outcomes remains complex. These findings underscore the need for further research into the nuances of gamification and its role in educational contexts. Educators are encouraged to consider the implementation of gamified elements to foster a more dynamic and interactive learning environment.

Keywords: Gamification, Engagement, Motivation, Higher education, Gameful experience, Academic performance

1. Introduction

Management education often fails to engage students effectively, with traditional lecture and tutorial formats proving tedious and disconnected from real-world experience (Gosling and Mintzberg 2006; Lindorff and McKeown 2013). Students' lack of interest in learning poses a significant challenge for educators (Zichermann and Cunningham 2011). Gamification has emerged as a potential solution to address this disengagement.

Gamification involves applying game-like elements (such as points, badges, and leaderboards) to non-game contexts, using mechanics, aesthetics, and game thinking to engage people and promote learning (Kapp 2012; Dicheva et al. 2015). It is the "use of game design elements in non-game contexts" (Dicheva et al. 2015).

As an emerging instructional approach, gamification has shown promising results. Studies have reported increased motivation, engagement, and information retention among students (Qiao et al. 2022; Raju et al. 2021). Gamified systems provide immediate feedback and foster a growth mindset (Dichev and Dicheva 2017). They create a relaxed atmosphere where students feel safe to take risks, reducing anxiety and encouraging participation (Sanchez et al. 2020; Bouchrika et al. 2021). Gamification has the potential to positively impact demotivated and disengaged students. Its applications extend beyond education to areas such as business, marketing, wellness, and ecology (Dicheva et al. 2015). However, there is a scarcity of scientific studies on gamification in management education. Existing research lacks robust conclusions and scope, highlighting the need for further investigation in this area (Silva et al. 2019).

2. Literature Review

2.1 Gamification and Academic Performance

Research has consistently shown a positive relationship between student engagement and various learning outcomes, including academic performance (Zhoc and Webster 2019). Understanding how gamification affects academic performance can help educators design more effective learning experiences. Bai et al. (2020) conducted a meta-analysis that examined 24 quantitative studies investigating the impact of gamification on

academic performance and found an overall significant medium effect that gamification can increase students' academic performance. They highlight three reasons for this result - gamification's ability to promote goal-setting, its ability to fulfil the student's need for recognition, and its ability to provide feedback on the student's performance (Bai et al. 2020). Researchers also argue that gamification elements (such as points, badges and leaderboards), improve student motivation to engage more deeply with the material which can lead to better learning outcomes (García-López et al. 2023; Tsay et al. 2018; Dicheva et al. 2015).

Gamification increases engagement through several mechanisms.

2.2 Academic Engagement

Gamification can enhance academic engagement by incorporating game elements that motivate students to participate actively in learning activities. For instance, the use of points, badges, and leaderboards can encourage students to attend classes, complete assignments, and engage with course materials (Seaborn & Fels, 2015). Academic engagement refers to observable behaviours directly related to the learning process, such as class attendance, preparation for class, and persistence in study (Zhoc et al. 2019). It is essential for achieving the minimum threshold level of learning and is linked to higher academic achievement. However, the effectiveness of gamification in promoting academic engagement can vary based on context and individual differences. Some studies indicate that while gamification may initially boost motivation, it may not always lead to sustained academic engagement or improved academic performance (Seaborn and Fels. 2015).

2.3 Cognitive Engagement

Cognitive engagement, defined as the psychological investment in learning and understanding complex ideas, is crucial for academic success. It requires students to be intellectually inspired beyond minimum study requirements (Zhoc et al. 2019). Gamification has been shown to increase cognitive engagement by encouraging deeper understanding of complex concepts. Game mechanics stimulate critical thinking and problem-solving skills, as students strategize and apply knowledge in gamified environments (Sanchez et al. 2020; Ding et al. 2018). Gamified learning often incorporates complex problems or real-world scenarios that promote higher order thinking skills and content connections (Alt 2023). Additionally, gamification fosters metacognitive skills by encouraging reflection on thinking processes (García-López et al. 2023). It provides immediate feedback, allowing students to evaluate and adjust their strategies critically. This process enhances critical thinking and promotes adaptive learning approaches (García-López et al. 2023).

2.4 Social Engagement With Teacher

Gamified learning environments can also enhance social engagement with teachers by creating more interactive and dynamic classroom experiences. Teachers can use gamification to provide immediate feedback and recognition, which can strengthen the student-teacher relationship, fostering a supportive learning atmosphere (Seaborn and Fels. 2015). Social engagement refers to the interaction with teaching staff, which takes place in the institution. There is an abundance of research evidence supporting that student-staff relationships are critical to the improvement of student learning and development (Guenther and Miller 2011).

2.5 Social Engagement With Peers

Social engagement with peers is crucial in student development, influencing cognitive, affective, psychological, and behavioural aspects (Thomas 2012). Gamification fosters healthy competition and collaboration, encouraging excellence while building community (Raju et al. 2021; Bouchrika et al. 2021). Group challenges and team activities enhance student interaction, creating a more connected learning environment (Zhoc et al. 2019). Collaborative gamified designs promote positive learning behaviours as students work towards shared goals (Alsawaier 2017). However, the impact on academic performance can be mixed. While social engagement through gamification can enhance learning, it may also reduce individual study time, potentially affecting GPA negatively (Zhoc et al. 2019).

2.6 Affective Engagement

Gamification positively influences affective engagement by making learning more enjoyable and motivating. Affective engagement relates to a level of emotional response characterised by feelings of involvement in the institution as a place and a set of activities worth pursuing (Finn and Zimmer 2012). Research into the significance of affective connections at school has examined students' sense of belonging, identification with school and sense of relatedness, which are factors influential to student motivation and participatory behaviours (Appleton et al. 2008). The incorporation of game elements can lead to increased interest and enjoyment in learning

activities, which are crucial for emotional investment in education (Ding et al. 2018; Alsaweir 2017; Seaborn and Fels 2015). Studies have shown that when students feel a sense of achievement through gamified elements, their overall satisfaction with the learning experience increases, which can lead to higher levels of affective engagement (Seaborn and Fels 2015).

2.7 Motivation

An area of research that emerges from the literature is the significant relationship between gamification and student motivation. Various studies have reported a positive correlation between the use of gamified elements, such as leaderboards, badges, and points, and increased motivation levels in students (Dicheva et al. 2015; Hamari et al. 2014). Gamification taps into intrinsic motivating factors, such as autonomy, competence, and relatedness by providing students with meaningful challenges, instant feedback, and a sense of accomplishment. By further exploring the mechanisms through which gamification enhances student motivation, researchers can develop more effective gamified interventions and tailor them to individual student needs, ultimately leading to improved learning outcomes (Landers et al. 2017).

2.8 Self-determination theory

Self-Determination Theory (SDT) is widely used to explain how gamification fosters engagement in education (Silva et al. 2020). SDT posits three basic psychological needs for motivation and engagement: autonomy, competence, and relatedness (Ryan and Deci 2002). Gamification can satisfy these needs - autonomy: badges and points give students control over their learning; competence: leaderboards allow students to gauge their performance against peers; relatedness: storylines create shared experiences, fostering connection. For example, a hero's adventure storyline can provide a sense of relatedness by creating a shared experience for all participants (Frost et al. 2015). Research demonstrates SDT's applicability across cultures, with the fulfilment of these psychological needs positively correlating with achievement (Nalipay et al. 2020). By addressing these fundamental needs, gamification can potentially enhance student motivation and engagement in educational settings.

2.9 Gameful experience

Högberg et al. (2019) distinguishes between game experience and gameful experience. Game experience involves emotions, perceptions, thoughts, behaviours in traditional gaming contexts (Ermi and Mäyrä 2005), Gameful experience, however, refers to motivational affordances integrated into non-game contexts, aiming to evoke game-like experiences while extending into real-world behaviours and interactions (Högberg et al. 2019). Gameful experiences often target specific outcomes like increased engagement with learning materials or class participation. Understanding these experiences helps in designing effective gamification strategies for meaningful behaviour change, unlike traditional game experiences (Högberg et al. 2019). There are seven aspects to gameful experience according to Högberg et al. (2019) which include 1. accomplishment - drive for successful performance, goal achievement, and progress; 2. challenge - perception of tasks difficulty; 3. competition - experience of competing against others or oneself; 4. guided - feeling supported guided through the gamified experience; 5. immersion - depth of engagement and focus; 6. playfulness - enjoyment and fun associated with the experience; 7. social experience - social interactions and connections within the gamified system.

3. Methodology

The study was implemented in the first year Managerial Communication (MGF1100) unit at a large Australian University in semester 2 2023. Ethics approval was obtained from the University Human Research Ethics Committee (Project ID: 39370). The project team gamified the online content and classroom activities in weeks 5-8. Gamification elements such as conditional activities, progress bars and leaderboards were integrated in Moodle. During the gamified weeks, the completion of Moodle online activities earned students points which they accumulated for their team. In the classroom, student teams had to complete challenges which included tasks that apply the specific knowledge and skills in managerial communication that the students learned from that week. Completing the in-class challenges earned the team points which was reflected in the leaderboard. The top team for the semester received prizes and had their photo taken and displayed in Moodle.

The research used a quasi-experimental design specifically using the pre- and post-test evaluation of the gamification intervention. All students enrolled in the unit were invited to complete the pre-gamification survey and the post-gamification survey via an email in week 4 and week 8 respectively. The survey used the Higher Education Student Engagement Scale (HESES) (Zhoc et al. 2019). It includes 28 items broken down into the

following subscales: academic engagement, cognitive engagement, social engagement with tutor, social engagement with peers, and affective engagement. The survey also included the Gameful Experience Questionnaire (GAMEFULQUEST) composed of 56 items, measuring seven dimensions - accomplishment, challenge, competition, guided, immersion, playfulness, and social experience (Högberg et al. 2019). Lastly, the Questionnaire on Motivation for Cooperative Learning Strategies (CMELAC) developed by Manzano-León et al. (2021) was also included in the survey. CMELAC included 16 Likert-type questions designed to assess various aspects of motivation and learning in the context of playful activities.

Independent samples t-tests were calculated to determine whether there are significant differences between the response's pre-gamification (week 4) and post-gamification (week 8). Students were asked to write a reflection on their gamification experience as part of their group report submission. These reflections were extracted, and a thematic analysis was conducted to identify how students perceive their gamification experience in relation to engagement. To prevent students from writing overly positive or insincere reflections, the assessment brief had clear set expectations of the value of honesty and thoughtful evaluation and provided specific prompts that encourage critical thinking by asking students to reflect on both the strengths and areas for improvement in applying gamification in teaching managerial communication.

4. Results and Discussion

A total of 665 students responded to the questionnaire, with 410 students (62%) completing it before the gamification intervention, and 255 students (38%) completing it post intervention. Around 35% of the pre-test respondents were first year, 34% were second year, 23% third year, 8% fourth year and the rest were fifth year students. In the post test, there were an equal number of first- and second-year respondents (35% each), 24% third years, 6% fourth years.

The study used the Cronbach alpha value to test for internal consistency, and the generally agreed lower limit is 0.6 (Field, 2024). The Cronbach's alpha coefficient (α) for the HESES instrument was 0.905. For the GAMEFULQUEST instrument it was 0.972 and 0.931 for the Motivation scale. Therefore, on all the instruments, the results showed very high levels of reliability.

To test the hypothesis that there are significant differences between the pre-Gamification and post-Gamification activities, an independent sample t-test was performed. Levene's test was performed to determine homogeneity of variances due to unequal sample sizes (Field, 2024). Results indicated that both groups were sufficiently normal for t-test analysis. For all seven variables (academic engagement, cognitive engagement, social engagement with teachers, social engagement with peers, and affective engagement), Levene's test showed equal population variances ($p > .05$). Comparison of these variables between the two groups using t-tests yielded significant results on several variables.

Table 1: Comparison of pre- and post-gamification on student engagement variables

Variables	Levene's F	Sig.	t-test	df	p	Cohen's D
Academic Engagement	.069	.793	-1.165	632	.244	6.19
Cognitive Engagement	.424	.515	-2.798	639	.005	4.57
Social Engagement with Teachers	.085	.771	-3.037	634	.002	4.43
Social Engagement with Peers	2.249	.134	-1.574	632	.116	9.87
Affective Engagement	.165	.684	-.898	632	.369	5.28

On the variable *academic engagement*, the results indicate NO significant difference between the two groups, the pre-gamification ($M = 41.28$, $SD = 6.18$) and post-gamification group ($M = 41.87$, $SD = 6.21$), [$t(632) = -1.165$, $p = .224$, $d = 6.19$]. The 95% confidence interval of the difference between means ranged from $[-1.58299$ to $-.40391]$ and did not indicate a difference between the means of the sample. The results show that for only one item under this variable (I usually come to class having completed readings or assignments), there was significant difference in the means ($Mean_{pre} = 4.64$; $Mean_{post} = 4.88$) between the two groups.

On the variable *cognitive engagement*, the results indicate significant difference between the two groups, the pre-gamification ($M = 18.08$, $SD = 4.51$) and post-gamification group ($M = 19.12$, $SD = 4.66$), [$t(639) = -2.798$, $p = .005$, $d = 4.57$]. The 95% confidence interval of the difference between means ranged from $[-1.76831$ to $-.30992]$ and did not indicate a difference between the means of the sample. The results show that there was significant difference in the means between the groups on three of the four items. These questions include: /

enjoy the intellectual challenge of courses I am studying (Mean_{Pre} = 4.87; Mean_{Post} = 5.09); I get a lot of satisfaction from studying (Mean_{Pre} = 4.38; Mean_{Post} = 4.68), and I am usually motivated to study (Mean_{Pre} = 4.05; Mean_{Post} = 4.40). On all the items, the post gamification group had a higher mean score for all questions.

On the variable *social engagement with teachers*, the results indicate a significant difference between the two groups, the pre-gamification (M = 19.09, SD = 4.40) and post-gamification group (M = 20.19, SD = 4.48), [t (634) = -3.037, $p = .002$, $d = 4.43$]. The 95% confidence interval of the difference between means ranged from [-1.80898 to -.38836] and did not indicate a difference between the means of the sample. The results show that there was significant difference in the means between the groups on all items. These questions include: *Staff make a real effort to understand difficulties I may have in my work* (Mean_{Pre} = 4.62; Mean_{Post} = 4.94); *Academic staff take an interest in my progress* (Mean_{Pre} = 4.47; Mean_{Post} = 4.74); *Teaching staff usually give helpful feedback on my progress* (Mean_{Pre} = 4.80; Mean_{Post} = 5.12); and *Staff are usually available to discuss my work* (Mean_{Pre} = 5.19; Mean_{Post} = 5.49); On all the items, the post gamification group had a higher mean score for all questions.

On the variable *social engagement with peers*, the results indicate NO significant difference between the two groups, the pre-gamification (M = 31.82, SD = 9.53) and post-gamification group (M = 33.09, SD = 10.41), [t (632) = -1.574, $p = .116$, $d = 9.87$]. The 95% confidence interval of the difference between means ranged from [-2.86196 to -.31506] and did not indicate a difference between the means of the sample. The results show that there was significant difference in the means between the groups on only one item. This question was: *I am involved in university extracurricular activities* (Mean_{Pre} = 2.84; Mean_{Post} = 3.25).

Lastly, on the variable *affective engagement*, the results indicate NO significant difference between the two groups, the pre-gamification (M = 18.40, SD = 5.52) and post-gamification group (M = 18.79, SD = 5.37), [t (632) = -.898, $p = .369$, $d = 5.287$]. The 95% confidence interval of the difference between means ranged from [-1.23646 to -.46024] and did not indicate a difference between the means of the sample.

Thematic analysis of student reflections provided insight into the impact of gamification on various aspects of engagement. The results are categorised into academic engagement, cognitive engagement, social engagement, and affective engagement, aligning with the literature findings.

Students reflected positively on the impact of gamification on their academic engagement. They noted the use of the points and leaderboards motivated them to attend classes regularly, complete the assignments and participate actively in learning activities. One group noted, *"Competition and rewards... were helpful in motivating and boosting our engagements and efforts... the marshmallow challenge utilised the healthy competition system... These rewards and competitiveness provide a sense of achievement and incentivize continued participation (T8 G1)."* This aligns with research indicating that gamification elements competition can increase motivation and engagement in academic settings (Zhoc et al. 2019; Seaborn and Fels 2015).

Cognitive engagement involves the investment in learning tasks that require higher order thinking. Participants reported that gamification facilitated active learning and critical thinking - *"Gamification places learners in active scenario-based roles, forcing them to apply, adapt, and critically appraise academic principles in context. This active participation promotes a deeper, more layered understanding (T11 G4)."* This supports the notion that gamification requires students to use higher order thinking skills (Sanchez et al. 2020; Ding et al. 2018).

Gamification also enhances engagement with the teacher. One team remarked, *"The gamification elements allowed for more dynamic interactions with our instructor, who provided immediate feedback and recognition... This made the learning process more engaging but also helped build a stronger student-teacher relationship (T3 G2)."* This highlights the role of gamification in creating a supportive learning environment, where teachers actively engage with students, give timely feedback and foster an interactive classroom (Seaborn and Fels 2015).

The importance of teamwork and collaboration was a recurring theme. One group reflected, *"Through teamwork, the gamification activities allowed us to actively see where we failed or succeeded in our use of collaboration and communication (T3 G5)",* evidencing gamification fostering social engagement between peers while competition pushed students to do better (Raju et al. 2021; Bouchrika et al. 2021). A group notes, *"When individuals are pitted against each other in a friendly contest... this competitive edge fosters a heightened level of engagement as participants strive to outperform one another (T5 G2)."*

Participants expressed that gamification improved affective engagement and made learning enjoyable and less stressful. One group pointed, *"The inherent enjoyment of gamified activities motivated us to invest time and effort in mastering managerial communication concepts (T3 G6)."* The gamified elements of the activities led to increased enjoyment and learning (Ding et al. 2018; Seaborn and Fels 2015).

The analysis of the GAMEFULQUEST also yielded significant results across all seven dimensions.

Table 2: Comparison of pre- and post-gamification on gameful experience variables

Variables	Levene's F	Sig.	t-test	df	p	Cohen's D
Accomplishment	.515	.473	-4.574	619	.001	8.44
Challenge	.004	.950	-4.555	615	.001	8.95
Competition	16.721	.001	-11.129	613	.001	9.24
Guided	.555	.457	-3.998	606	.001	7.50
Immersion	.832	.362	-7.810	604	.001	11.05
Playfulness	.159	.691	-8.135	604	.001	10.62
Social experience	.595	.441	-5.463	606	.001	8.32

Referring to the variable *accomplishment*, the results indicate significant difference between the two groups, the pre-gamification (M = 39.77, SD = 8.75) and post-gamification group (M = 42.96, SD = 7.91), [t (619) = -4.574, $p = .001$, d = 8.44]. The 95% confidence interval of the difference between means ranged from [-4.55257 to -1.81770] and did indicate a difference between the means of the sample. The results show that there was significant difference in the means between the groups on all eight items.

On the variable *challenge*, the results indicate significant difference between the two groups, the pre-gamification (M = 36.78, SD = 9.01) and post-gamification group (M = 40.16, SD = 8.85), [t (615) = -4.555, $p = .001$, d = 8.95]. The 95% confidence interval of the difference between means ranged from [-4.83270 to -1.92272] and did indicate a difference between the means of the sample. The results show that there was significant difference in the means between the groups on all eight items.

On the variable *competition*, the results indicate a significant difference between the two groups, the pre-gamification (M = 28.95, SD = 10.06) and post-gamification group (M = 37.55, SD = 7.68), [t (613) = -11.129, $p = .001$, d = 9.24]. The 95% confidence interval of the difference between means ranged from [-10.06137 to -7.04307] and did indicate a difference between the means of the sample. The results show that there was significant difference in the means between the groups on all items.

On the variable *guided*, the results indicate significant difference between the two groups, the pre-gamification (M = 33.90, SD = 7.54) and post-gamification group (M = 36.40, SD = 7.44), [t (606) = -3.998, $p = .001$, d = 7.50]. The 95% confidence interval of the difference between means ranged from [-3.72886 to -1.27242] and did indicate a difference between the means of the sample. The results show that there was significant difference in the means between the groups on all items.

Furthermore, on the variable *immersion*, the results indicate significant difference between the two groups, the pre-gamification (M = 35.43, SD = 10.99) and post-gamification group (M = 42.66, SD = 11.14), [t (604) = -7.810, $p = .001$, d = 11.05]. The 95% confidence interval of the difference between means ranged from [-9.04552 to -5.41041] and did indicate a difference between the means of the sample. The results show that there was significant difference in the means between the groups on all items.

Furthermore, on the variable *playfulness*, the results indicate significant difference between the two groups, the pre-gamification (M = 36.29, SD = 10.67) and post-gamification group (M = 43.53, SD = 10.53), [t (604) = -8.135, $p = .001$, d = 10.62]. The 95% confidence interval of the difference between means ranged from [-8.98369 to -5.48953] and did indicate a difference between the means of the sample. The results show that there was significant difference in the means between the groups on all items.

Lastly, on the variable *social experience*, the results indicate significant difference between the two groups, the pre-gamification (M = 37.95, SD = 8.33) and post-gamification group (M = 41.74, SD = 8.31), [t (606) = -5.463, $p = .001$, d = 8.32]. The 95% confidence interval of the difference between means ranged from [-5.14850 to -2.42571] and did indicate a difference between the means of the sample. The results show that there was significant difference in the means between the groups on all items.

Table 3: Comparison of pre- and post-gamification on motivation variable

Variables	Levene's F	Sig.	t-test	df	p	Cohen's D
Motivation	.827	.364	-7.172	581	.001	14.86

Referring to table 3, on the variable *motivation*, the results indicate significant difference between the two groups, the pre-gamification (M = 42.72, SD = 9.07) and post-gamification group (M = 48.41, SD = 8.99), [t (595) = -7.504, $p = .001$, $d = 9.04$]. The 95% confidence interval of the difference between means ranged from [-7.18483 to -4.20399] and did indicate a difference between the means of the sample.

Table 4: Comparison of pre- and post-gamification on motivation items

Item	Levene's F	Sig.	t-test	df	p	Cohen's D
In general, I have enjoyed the activities	.006	.940	-6.512	607	<.001	1.185
I would repeat these types of activities	3.927	.048	-7.320	606	<.001	1.293
I have felt motivated	.260	.610	-6.063	606	<.001	1.299
I improved my knowledge of the subject	3.297	.070	-2.695	601	<.001	1.098
My interest in the subject has increased	.151	.697	-5.721	604	<.001	1.280
This activity format has been appropriate to check my knowledge of the subject	3.532	.061	-3.801	598	<.001	1.119
Helped me identify my weaknesses in the subject	4.884	.027	-4.013	597	<.001	1.131
It helped me understand the content of the subject	1.323	.251	-4.820	596	<.001	1.106
With these types of activities, I learn more than in traditional classes	.245	.621	-6.430	596	<.001	1.175
I feel like I was able to connect with my teammates to learn	1.415	.235	-4.407	597	<.001	1.194
I learned from my classmates during the activity	.341	.559	-4.953	598	<.001	1.209
I found the game elements fun	1.187	.276	-6.762	604	<.001	1.174
The game elements have motivated me to carry out the activity	.785	.376	-5.115	604	<.001	1.237
While doing the activities, I was not aware of what was happening around me	.072	.789	-6.638	604	<.001	1.403
I felt capable of carrying out the proposed activities	2.715	.100	-5.063	602	<.001	1.120
I found the activities comforting and valuable to me	.001	.981	-5.236	603	<.001	1.220

Table 4 presents the 16 items in the motivation instrument. On all items, there was a significant difference between the pre- and post-gamification groups with the mean being significantly higher in the post-gamification group. The results show a significant positive impact of gamification on student motivation across all 16 items measured. In all items, from enjoyment of activities to perceived learning outcomes, the post-gamification group reported significantly higher scores compared to the pre-gamification group.

Table 5: Comparison of quiz results across the 10 weeks (gamification in weeks 5 – 8)

Quiz & week number	Completed	Mean score (%)	Std Dev (%)	Skewness	Kurtosis
Quiz 3	218	78	13	-0.53	0.15
Quiz 4	211	77	15	-0.34	-0.52

Quiz & week number	Completed	Mean score (%)	Std Dev (%)	Skewness	Kurtosis
Quiz 5	189	84	13	-0.97	1.34
Quiz 6	220	83	18	-0.35	-0.37
Quiz 7	219	81	15	-1.13	2.01
Quiz 8	205	84	13	-0.67	-0.04
Quiz 9	198	83	15	-0.94	0.54
Quiz 10	177	83	16	-1.09	0.92
Quiz 11	176	86	15	-1.62	4.20
Quiz 12	164	85	15	-1.43	2.72

Referring to table 5 above, the data shows a noticeable improvement in quiz performance during and after the gamification period (weeks 5-8). The average quiz scores increased from around 77-78% in weeks 3-4 to 81-84% during the gamified weeks (5-8). This improved performance was maintained in subsequent weeks, with scores remaining in the 83-86% range. Additionally, there was a general increase in the number of students completing the quizzes during the gamified period.

5. Conclusion

This study provides compelling evidence for the positive impact of gamification on student engagement, motivation, and academic performance in higher education. By implementing gamified elements such as competition, rewards, and interactive challenges in a managerial communication course, we observed significant improvements across multiple dimensions of student engagement and motivation.

Our findings reveal that gamification particularly enhanced cognitive engagement and social engagement with teachers. Students reported higher levels of intellectual satisfaction, enjoyment of challenges, and motivation to study. They also felt more understood and supported by their instructors. While academic engagement and social engagement with peers did not show significant changes, the overall impact on the learning experience was notably positive. The study's results on gameful experience and motivation were especially striking, with significant improvements across all measured dimensions. Students reported higher levels of accomplishment, challenge, competition, guidance, immersion, playfulness, and social experience after the gamification intervention. This comprehensive improvement in the learning experience translated into better academic performance, as evidenced by the increased quiz scores during and after the gamified period.

These findings have important implications for educational practice. They suggest that carefully designed gamification strategies can create a more engaging, motivating, and effective learning environment. By tapping into students' intrinsic motivation and fostering a sense of achievement and social connection, gamification can potentially address issues of student disengagement in traditional educational settings. However, it's important to note that while gamification showed clear benefits, its implementation should be thoughtful and aligned with learning objectives. The lack of significant change in some areas, such as academic engagement, indicates that gamification is not a panacea and should be part of a broader, well-rounded educational strategy. Future research could explore the long-term effects of gamification on academic performance and engagement, as well as investigate how different types of gamified elements impact various aspects of the learning experience. Additionally, studies across different disciplines and educational levels could provide insights into the broader applicability of these findings.

In conclusion, this study adds to the growing body of evidence supporting the use of gamification in education. It demonstrates that when implemented effectively, gamification can significantly enhance student engagement, motivation, and learning outcomes, paving the way for more innovative and student-centred approaches in higher education.

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