

Impact of Gamified Learning on the Academic Performance of Foreign Medical Students in the Philippines

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Abstract:

This study utilized a quasi-experimental research design with a quantitative approach to investigate the influence of gamified learning on the performance and perceptions of foreign medical students in PCM classes. The research focused on two sections of PCM classes, comparing traditional teaching methods (control group) with gamified teaching methods (experimental group). A total of 415 freshman medical students participated. Data was collected through a Teacher-Made Test and a Survey on Perception about Gamification Questionnaire (SPGQ). Statistical analyses included descriptive statistics, t-tests, and Cronbach's Alpha reliability analysis. The results indicated that the gamified teaching method significantly improved PCM performance, suggesting its potential effectiveness in medical education. Additionally, foreign medical students expressed positive perceptions of gamification, citing its effectiveness in enhancing learning experiences, motivation, engagement, enjoyment, concept retention, sense of achievement, and learning outcomes. This aligns with previous research, indicating the suitability of gamification in catering to modern learners' preferences and improving their educational journey. The results provided valuable insights for educators and institutions seeking to enhance teaching methods and foster positive learning environments.

Keywords: foreign medical students, gamification, quasi-experimental research design, traditional teaching methods.

INTRODUCTION

Preventive and Control Medicine (PCM) is a crucial component of medical education, emphasizing the prevention and management of diseases at the population level. However, medical foreign students often face challenges in adapting to the PCM curriculum due to language barriers, cultural differences, and unfamiliarity with the local context. The goal of teaching is to improve learning, but how do we know that students are learning in the proper way? How do medical students learn? In the paper of Makki Alshok (2016), most of the first-year medical students have poor knowledge about style & learning techniques, and that learning how to learn must be a standard part of the curriculum in medical school. With this, the current research study aims to investigate the impact of incorporating gamified learning in the PCM course on the academic performance of medical foreign students in the Philippines.

Gamified learning has gained significant attention as a potential innovative approach to enhance the academic performance (AP) of students across various disciplines. Dichev & Dicheva, (2017) described this as an educational strategy by integrating certain aspects of a particular game in the teaching and learning process. It is a strategy implemented by educators where some features of a particular game are used without compromising the teaching and learning process, thereby not converting it into a full-blown game (Rivera & Garden, 2021). This technique was utilized by Smiderle et al. (2020) to evaluate the effects of gamification on students' learning behavior, and engagement in web-based programming learning. Additionally, Tan et al. (2023) reported that gamification has the power to effectively improve the underachievers' learning interest. Li & Chu (2020) explored the effect of gamification pedagogy on children's reading. Gamified learning has been also applied in English Language Learning (Chan & Lo, 2022; He Hwang, 2018), Reading Assessment (Reed et al., 2020), Tourism Education (Adukaite et al., 2017), and online learning course (Kyewski & Krämer, 2018). These studies span different disciplines demonstrating the versatility of gamification as an educational tool and contribute collectively to our understanding of how gamification can enhance various aspects of education, including engagement, motivation, and Learning outcomes. Considering that gamified learning has been found to be an invaluable instructional approach for nursing students in terms of harnessing their interests and mastery of skills (Elzeky et al., 2022), it is essential to investigate a similar group of respondents but with foreign status. To the best of the researchers' knowledge, there are limited studies reported in literature that investigates the impact of gamified learning on the AP of foreign medical students studying in the Philippines. The study will not only assess the level of AP but also explore the students' perceptions and experiences regarding the implementation of gamified learning in the PCM course.

This study aimed to provide invaluable insights into the potential impact of gamified learning on the AP of foreign medical students. The results may inform medical education practices, especially in the context of international students, and help enhance learning experiences and outcomes. By investigating the impact of gamified learning on the AP of foreign medical students in the Philippines, this study will contribute to the existing literature on innovative educational approaches. The findings may have implications for medical education institutions aiming to improve student engagement, motivation, and academic performance through the integration of gamified learning strategies and may have the potential to extend its reach to other countries with similar contexts of having foreign medical students.

OBJECTIVES

To examine the impact of gamified learning on AP of foreign medical students in the Philippines.

Specific Objectives:

1. To determine the profile of the participants in terms of:
 - 1.1. Sex
 - 1.2. Age
 - 1.3. Highest Educational Attainment
 - 1.4. Nationality
2. To determine the level of AP of foreign medical students exposed to gamified learning and those who are not
3. To determine whether there is a significant difference on the AP between the control and experimental group
4. To explore the perceptions and experiences of foreign medical students regarding the implementation of gamified learning in the PCM course

METHODOLOGY

Research Design

This study followed a quantitative approach in research, particularly employing a quasi-experimental research design. This type of design is prominently used in the field of education which mainly imitates certain experimental aspects where some participants are subjected to a treatment i.e., gamified learning and others are not (Gopalan et al., 2020). Quasi-experimental research designs resemble experimental designs but lack complete control over the independent variable(s), in contrast to true experimental designs. Because of the absence of random assignments, making conclusions about cause and effect is more challenging compared to a genuine experiment. Nevertheless, quasi-experimental designs prove valuable in situations where randomization isn't feasible or ethical. Executing a true experimental design might be unattainable or excessively costly, particularly for researchers with limited resources. Quasi-experimental designs offer the opportunity to explore a topic using data that has been acquired or funded by other sources, often governmental. Due to their enhanced control over confounding variables when contrasted with other study types, quasi-experimental designs boast higher external validity than most true experiments and greater internal validity (though less than true experiments) compared to other non-experimental research approaches.

Research Participants

The target population of the study was all foreign medical students enrolled in the Preventive Control Medicine (PCM) course at University of the Visayas – Gullas College of Medicine, located at Banilad Street in Cebu City, Philippines. The sample or the participants of the study involved 415 freshman medical students who were enrolled during the Second Semester of 2022-2023 and were labeled as the January 2023 Batch. In this investigation, two sections of PCM classes were selected to participate in the study. These were students who belonged to PCM 1D and PCM 1F. The investigators assigned PCM 1D as the control group, that is, using the Traditional Method of teaching. On the other hand, the students in PCM 1F were assigned to the experimental group, that is, employing Gamification.

Inclusion Criteria

1. Must be a foreign medical freshman student at UV-Gullas College of Medicine
2. Must be currently enrolled during the First Semester of 2023-2024
3. Must be enrolled at PCM class

4. Must belong to either Section PCM 1D or Section PCM 1F

Exclusion Criteria

1. Foreign medical students enrolled in other medical education institutions
2. Medical students at UV-GCM who are non-freshman students
3. Freshman students who did not take the PCM Long Quiz

Research Instruments

The researchers utilized the following research instruments for data collection: (1) Teacher-Made Test and (2) Survey on Perception about Gamification Questionnaire (SPGQ). Typically, educators create and use teacher-made assessments to gauge students' academic progress within the classroom, assess effectiveness of their teaching techniques, and appraise the school's curriculum initiatives. Such tests are an invaluable tool for teachers, serving as a potent means to accomplish their objective. The Teacher-Made Test used in this study is a 70-item multiple choice type of test that included the topics that were discussed from July 15, 2023 to August 5, 2023. The table below specified the topics with other relevant information.

Table 1. Information on the Number of Items and Topics Detailed of the TMT

Date	Time	Topic	Number of Items
July 15, 2023	8:00 - 10:00 AM	Rates and Types of Epidemiologic Studies Part 1	18
July 22, 2023	8:00 - 10:00 AM	Rates and Types of Epidemiologic Studies Part 2	18
July 29, 2023	8:00 - 10:00 AM	Types of Biostatistics Descriptive and Inferential Statistic	16
August 5, 2023	8:00 - 10:00 AM	Determining Types of Variables Statistical Relationship	18

These items were submitted to the Test Evaluator Office of UV-GCM who did the reproduction, administration, and checking of the test.

To be able to determine the perceptions of the medical students who were assigned to the Gamification Method, the researchers constructed the survey questionnaire through literature review on gamification. This instrument was labeled as - Survey on Perception about Gamification Questionnaire (SPGQ). It contains a 7-item Likert Scale that measures perception on the use of gamification by the respondents by specifying their level of agreement to each of the items, that is, whether they: Strongly Agree (5), Agree (4), Uncertain (3), Disagree (2), and Strongly Disagree (1). The instrument was pilot tested with 20 respondents.

The reliability analysis of perception items was done using Cronbach's Alpha (α). It is utilized by researchers to gauge the interconnection between items of an instrument as well as the regularity of the tool in measuring variables (Mat Nawi et al., 2020). Table 2 shows that the reliability of the items is greater than 0.80, indicating that the reliability is acceptable. This implies that all items demonstrated a valid internal consistency. Cronbach's α between 0.8 to 1 shows good reliability, between 0.6 to 0.79 indicates the reliability is acceptable, and less than 0.6 indicates poor reliability (Taber, 2018).

Table 2. Reliability of the Perception Items.

Reliability Statistics

<i>Cronbach's Alpha</i>	<i>N of Items</i>
0.855	7

Data Gathering Procedure

This section discusses the nature and process of data gathering to answer the research questions. In the preparation stage, the researchers developed the TMT and the lesson sequences for the gamified learning. For the experimental group, the students have classes once a week, and each session runs two hours duration which is divided into 1-hour lecture and 1-hour games. The experimental group was introduced to gamification, which included exercises and activities that were presented on the LCD projector and two big Smart TVs inside the lecture room. The gamification included grouping of students, and the first three groups who gave the correct answer were given credits. Individual activities were also provided, and the lecturer or learning facilitator asked volunteers to provide answers with explanations at times.

At the end of four (4) weeks, post evaluation using the Teacher-Made Test was administered. The learning facilitator provided the test items to the Office of Test Evaluator of Gullas College of Medicine, the office, which is assigned to evaluate the contributed items, the reproduction of all examinations as well as in its administration. Testing or post evaluation was conducted last August 7, 2023. Medical students in the control group and experimental group were given the same set of questions. Results of the test were provided to the researchers, three days after administration, that is, last August 10, 2023. Results of the groups were then compared, in terms of any observed difference in AP that can be attributed to the introduction of the gamified learning.

Moreover, right after incorporating gamified learning, the SPGQ was prepared to be answered by the students about their evaluation of the Gamified Learning Method or Gamification. The SPGQ also included items that pertains to the demographic characteristics of the study participants. These are: sex, age, education, and nationality. SPGQ was administered online through Google Form, and the link was provided to the students where gamification was employed.

Data Analysis

After all the data were collected from the Test Evaluator of GCM, and from the survey questionnaire, they were encoded separately in Microsoft Excel for ease of data management using codes. These were then imported to IBM-SPSS for final data analyses.

The demographic profile of the medical students was presented using percentage distribution.

The performance of the medical freshman students assigned to both groups - Traditional and Gamification, were presented using descriptive statistics, particularly, the number of respondents in the control and experimental groups, the minimum, the maximum, the mean, and the standard deviation.

To determine whether there is a significant mean difference in the performance in PCM 1 between the experimental group (Gamification) and control group (Traditional Method), the t-test for independent samples or uncorrelated samples, were employed.

The perceptions on the use of gamification were presented using the mean and standard deviation, and were interpreted using the following guide:

Table 3. Interpretation Guide for Mean Perception

Mean Range	Item Interpretation	Overall Interpretation
4.20 - 5.00	Strongly Agree	Very Satisfied

3.40 - 4.19	Agree	Satisfied
2.60 - 3.39	Uncertain	Uncertain/Undecided
1.80 - 2.59	Disagree	Dissatisfied
1.00 - 1.79	Strongly Disagree	Very Dissatisfied

Moreover, the distribution of respondents in terms of the 7-items were presented using graphs. All statistical calculations were performed using IBM-SPSS and Microsoft Excel. Statistical significance was evaluated using the 0.05 level.

Ethical Considerations

This study is adherence to the Data Privacy Act of 2012. Scientific integrity, human rights and dignity, and science-society collaboration depend on research ethics. These principles ensure that research subjects' involvement in this study is voluntary, informed, and safe. All the elements of informed consent were clearly explained in the introductory part of the form questionnaire. Only those who agreed to participate were given the research survey questionnaire.

This investigation employed the quasi-experimental which means that intact groups or existing classes are already in place, there was no treatment or drug that was administered to the participants. The sole intervention that was applied to this investigation, particularly to the experimental group, was the Gamified Teaching Method that was employed by the lecturer.

Information that was collected from the participants were treated with utmost confidentiality and anonymity.

RESULTS AND DISCUSSION

Demographic Profile of the Medical Freshman Students

Table 4. Personal Profile of the Medical Freshman Students

Characteristics	Number of Respondents	Percent (%)
<i>Sex</i>		
Male	236	56.9
Female	179	43.1
<i>Age</i>		
Below 18 years old	16	3.9
18-29	371	89.4
30 years & above	28	6.7
<i>Education</i>		
College Graduate	364	87.7
College Level	51	12.3
<i>Nationality</i>		
Indian	327	78.8
Thai	34	8.2
Nigerian	41	9.9
Siamese	13	3.1
<i>n = 415</i>		

Table 4 shows that the sample consists of 236 male students (56.9%) and 179 female students (43.1%). This sex distribution suggests a balanced representation of male and female students in the study. The study appears to have achieved a reasonable gender balance in its sample, which can enhance the generalizability of the findings across both male and female medical students. The age distribution indicates that a small proportion (3.9%) of the respondents are below 18 years old, while the majority (89.4%) falls within the 18-29 age range. A smaller group (6.7%) comprises students who are 30 years old and above. The study mainly focuses on young adult medical

students, which is typical for medical school populations. The distribution of respondents across age groups allows for age-related analyses and considerations in the study's results.

Moreover, many respondents (87.7%) are college graduates, while a smaller portion (12.3%) is at the college level. The high percentage of college graduates among respondents suggests that the study mainly involves students who have already completed some level of education before entering medical school. This could potentially influence their learning approaches and attitudes toward gamification. The participants of the study are predominantly composed of Indian students (78.8%), with smaller groups representing Thai (8.2%), Nigerian (9.9%), and Siamese (3.1%) students. The study involves a diverse group of students from different nationalities. The inclusion of students from various cultural backgrounds could enrich the study's findings by accounting for potential cultural influences on learning and gamification.

The demographic profile presented in Table 4 reflects a diverse group of medical freshman students in terms of gender, age, education, and nationality. This diversity is beneficial for the study's external validity, as findings may be applicable to a broader range of medical students, potentially enhancing the generalizability of the results. However, it is important to acknowledge that the demographic characteristics could also introduce some variability in responses and outcomes, given the potential influence of factors like age, education level, and cultural background. To fully comprehend the impact of gamification on PCM 1 performance, it is crucial to consider how these demographic factors might interact with the teaching method. Analyzing subgroup differences and potential interactions could provide deeper insights into whether gamification is equally effective across different demographic groups.

Performance of Medical Students in the the Use of Gamification and Traditional Method

Table 5. Performance in the PCM Long Exam.

Teaching Method	n	Minimum	Maximum	Mean	Std. Deviation
Traditional	214	8	41	23.95	4.81
Gamification	201	11	47	26.80	5.31

Table 5 displays the descriptive statistics for the performance of two groups of medical freshman students involved in this quasi-experimental research. It compares the performance of the Traditional Method (control group) with the Gamified Teaching Method in the context of PCM 1 long exam. The column specifies the teaching method used for each group – “Traditional” for the control group and “Gamification” for the experimental group. As shown in the above table, there were 214 and 201 students who were involved in the study, respectively, for the traditional and gamification methods. The lowest and the highest scores for the Traditional Methods are 8 and 41, respectively, while it is 11 and 47 in the Gamified Teaching Method. The mean score for the control group is 23.95 ± 4.81 , while the mean score for the experimental group is 26.80 ± 5.31 . The higher standard deviation from the experimental group suggests that the performance of the students in the PCM long exam is more dispersed or showed more variability compared to the performance of the students in the control group.

Significant Differences in PCM Performance of Medical Students in the Use of Gamification and Traditional Method

Table 6. Independent Sample t test in PCM Performance of Medical Students.

Levene's Test for Equality of Variances		t-test				
		t	df	Significance		Mean
F	Sig.			One-Sided	Two-Sided p-	

						p-value	value	Difference
PPCM Performance	Equal variances assumed	1.43	0.23	-5.72	413.00	0.00	0.00	-2.85
	Equal variances not assumed			-5.70	400.51	0.00	0.00	-2.85

Table 6 illustrates the results of the independent sample t-test conducted to compare the PCM performance of the medical students in two groups. The test shows that there is a statistically significant difference in means between the control group (Traditional Method) and the experimental group (Gamified Teaching method), with the group means differing by approximately 2.85, in favor of the experimental group. The p-values suggest that this difference is highly significant, indicating that the gamified teaching method (experimental group) might have led to better PCM performance compared to the traditional teaching method (control group). The assumption of equal variances is met, as indicated by the non-significant Levene's test result.

The p-values reported in the table (both for equal variances assumed and not assumed) are extremely low (0.00), indicating a highly significant difference in PCM performance between the traditional teaching method (control group) and the gamified teaching method (experimental group). The mean difference of approximately -2.85 indicates that, on average, students exposed to the gamified teaching method performed better in PCM performance compared to those in the traditional teaching method. While the statistical significance is established, it's also important to consider the practical significance of the mean difference. Further investigation is needed to assess whether this difference is practically meaningful and can lead to tangible improvements in medical education outcomes. The results suggest that incorporating gamification into teaching methods could have a positive impact on PCM performance. Institutions and educators might consider integrating elements of gamification into their curriculum design to enhance student engagement and learning outcomes. Given that the t-test results are significant, it's important to recognize that individual student responses to the gamified approach could vary. Further research could explore the factors influencing student responses and adapt teaching strategies accordingly.

Students' Perception Towards Gamification

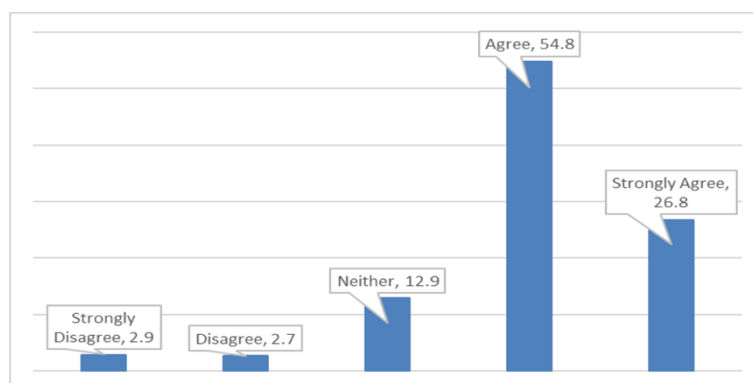


Figure 1. The use of gamification in this course enhances my overall learning experience.

Among the foreign student respondents, 81.6% indicated positive perception towards the enhancement of overall learning experience through gamification and only 5.6% disagree (Figure 1). The results are like the study of Chan & Lo (2022) where a vast majority (87%) of university and college students indicate positive perception towards the effectiveness of learning in classrooms through gamification. Moreover, in the context of e-learning, Kashive & Mohite (2022) divulged how gamification manifested promising results where students experienced satisfaction while

learning. This concretely implies the essence of the integration of gamification in the teaching and learning process to enhance learners' overall learning experience. On the other hand, only 1.4% disagree that learning through games is effective. Nonetheless, these results underline the widespread belief that gamification contributes positively to the efficacy of classroom learning, bridging the gap between traditional teaching methods and modern learners' preferences. Hence, as far as foreign medical students are concerned, the integration of gamification in their learning was favorable to them and contributed to a more meaningful learning engagement.

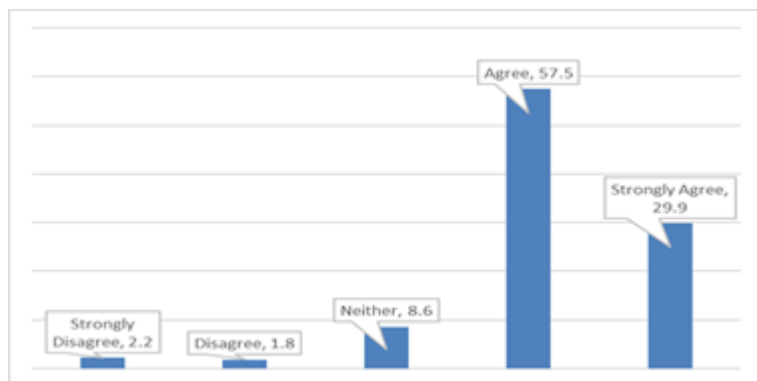


Figure 2. Gamification elements in the course motivate me to actively participate and engage with the content.

More than half (57.5%) of the foreign student respondents totally agree that the gamification elements in the course motivated them to actively participate and engage in the lessons, while 29.9 % strongly agree. On the other hand, only 4.0% of the foreign students disagree that learning through games is motivational (Figure 2). In classes where gamification of learning is established, especially for contents having abstract concepts, one of the elements that motivated students to actively participate and engage with the lesson content is the provision of additional points system (Chans & Portuguese Castro, 2021). Relative to this, Chan & Lo (2022) reiterated that more than half of local students strongly agreed that gamification was effective in motivating engagement. These findings were in consonance with the study of Çakiroğlu et al. (2017) indicating a positive moderate correlation between students' engagement and academic achievement, with gamification dynamics having a key positive effect on engagement. This alignment of result suggests that gamification's immersive and interactive nature can effectively stimulate students' interest and participation, thereby boosting their drive to be attentive and increasing their attention span.

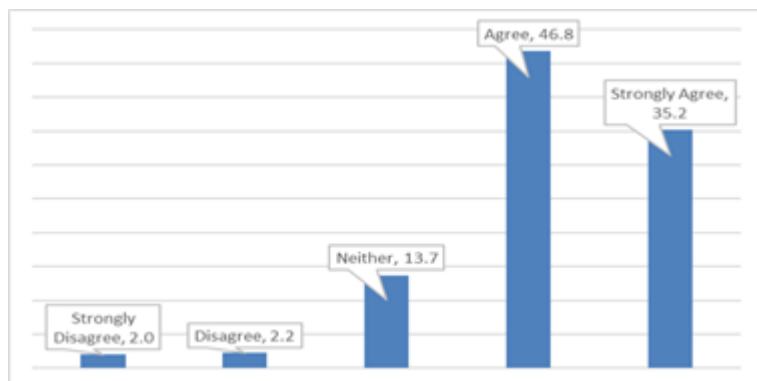


Figure 3. I find the gamified activities to be enjoyable and entertaining.

A vast majority (82.0%) of the foreign student respondents believe that leaning through games is enjoyable and entertaining. Interestingly, Borrás-Gené et al. (2019) revealed that students who were able to sustain in finishing their lessons until the very end demonstrate huge percentage of having

fun doing them because of gamification. This means that when lessons are equipped with gamification elements, students go through the entire learning process since they take pleasure in it. Moreover, gamification has extended its reach to different forms of learning. With the advancement of technology and as the current educational landscape entered the digital age, the incorporation of online games for learning has been utilized by many educators and was sought out by learners which dramatically increased their student participation because they were having fun (Zainuddin, 2023). Conversely, only 4.2% of the foreign students disagree that learning through games is enjoyable and entertaining (Figure 3). Overall, foreign medical students in the present study perceived that the gamified activities implemented by their teachers were enjoyable and entertaining. Even if their course is highly content based, they positively engaged in this type of learning despite having different cultural backgrounds as foreign nationals.

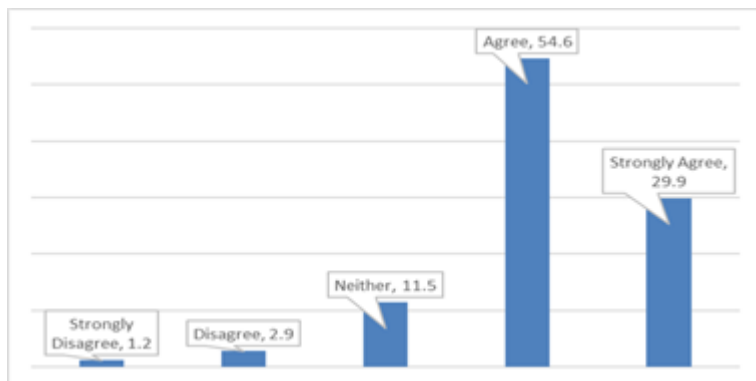


Figure 4. The use of gamification helps me better understand and retain course material.

More than half (54.6%) of the foreign student respondents totally agree that the gamification helps them better understand and retain the concepts taught in the course material, while 29.9 % strongly agree. Indeed, the integration of gamification in the teaching and learning process boosted students' participation, thereby scaffolding them to better absorb the topics that they need to learn (Mee Mee et al., 2020). On the contrary, only 4.1% of the foreign students disagree that learning through games is helpful in topic retention and understanding of the lessons (Figure 4). Chan and Lo (Chan & Lo, 2022) and this study both indicated that a significant proportion of students agreed that gamification aids in better understanding and retention of course concepts. Generally, this shared perception highlights the potential of gamification to create a positive and memorable learning experience that facilitates concept comprehension and long-term knowledge retention, especially for foreign medical students.

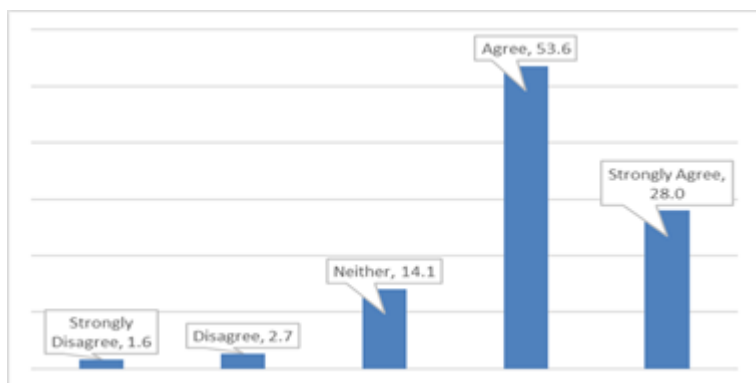


Figure 5. Gamification enhances my sense of achievement and progress in the course.

A huge percentage (81.6%) of the foreign student respondents believe that learning through games enhances their sense of achievement and progress in the course. Regardless of their age,

gamification significantly contributes to students' learning. Smiderle et al. (2020) divulged how this type of mechanism i.e., gamification unleashes university students' potential by increasing their participation during classroom encounters. Being able to learn while competing in a fun way amplify students' sense of achievement. In terms of students' progress during gamification of learning, it is recommended that educators using online platforms must look into game elements such as leaderboards, point systems, etc. so that students will be more engaged in participating in the games (Suh & Li, 2020). In contrast, only 4.3% of the foreign students disagree that learning through games enhances their sense of achievement and progress in the course (Figure 5). Furthermore, Chan & Lo, (2022) and this study indicated positive perceptions towards the attainment of learning outcomes through gamification. Clearly, these findings emphasize that the integration of game-like elements fosters a sense of accomplishment and achievement, promoting positive learning outcomes.

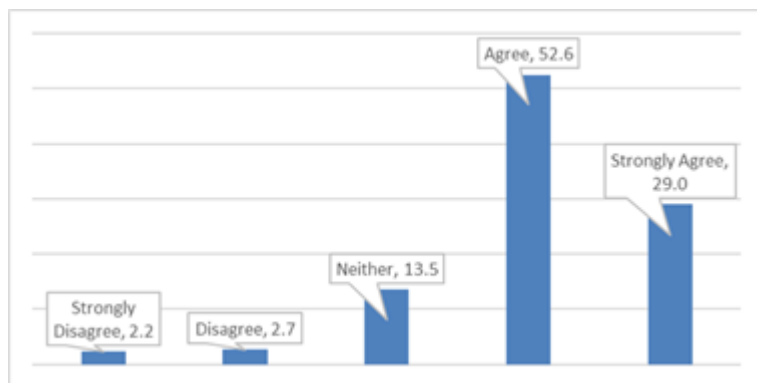


Figure 6. I believe that gamification positively contributes to my learning outcomes in this course.

Majority (81.6%) of the foreign student respondents indicate a positive perception towards the attainment of learning outcomes through gamification. Nurtanto et al. (2021) discussed that the utilization of gamification in the educational realm subscribes to the idea that it addresses the different learning outcomes set by the learning content as disclosed by the different studies analyzed in their study. This implies that gamification does not compromise the learning goals of a specific course despite the incorporation of game elements in delivering instruction. However, only 4.9% of the foreign students disagree that learning is effective (Figure 6). Generally, foreign medical students supported gamification's positive impact in the attainment of the learning outcomes in their course subject.

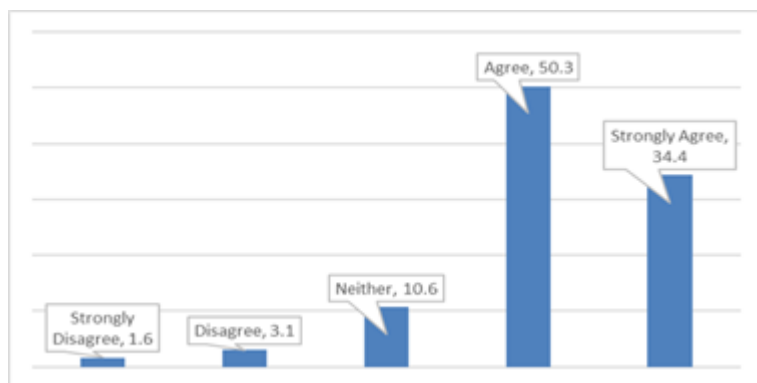


Figure 7. Integrating gamification makes the course content more interesting and interactive.

A large proportion (84.7%) of the foreign student respondents believe that leaning through games is interesting and interactive, reinforcing the findings of Chan & Lo (2022). Clearly, many studies

have concurred how gamification boosts students' interests in learning their lessons. This process makes the teaching and learning process more meaningful since some game components are infused in delivering lessons to make it more enticing and engaging to the students (Ghai & Tandon, 2023). Although only 4.7% of the foreign students disagree that learning through games is interesting and interactive (Figure 7). This shared perspective underscores gamification's potential to inject excitement and interactivity into educational content, promoting engagement and participation.

The results from both the study conducted by Chan & Lo (2022) and the present study indicate a strong positive perception among students towards the effectiveness of gamification in enhancing learning experiences, motivation, engagement, enjoyment, concept retention, sense of achievement, and achievement of learning outcomes. These parallel findings emphasize the significance of gamification as an innovative pedagogical approach that aligns with students' preferences and positively impacts their learning journey.

Table 7. Perceptions on Gamification by the Experimental Group

Perception Items	Mean	Std. Deviation	Item Interpretation
The use of gamification in this course enhances my overall learning experience.	4.00	0.87	Agree
Gamification elements in the course motivate me to actively participate and engage with the content.	4.11	0.81	Agree
I find gamified activities to be enjoyable and entertaining.	4.11	0.87	Agree
The use of gamification helps me better understand and retain course material.	4.09	0.79	Agree
Gamification enhances my sense of achievement and progress in the course	4.04	0.82	Agree
I believe that gamification positively contributes to my learning outcomes in this course.	4.03	0.86	Agree
Integrating gamification makes the course content more interesting and interactive.	4.13	0.84	Agree
<i>Overall Perceptions</i>	<i>4.07</i>	<i>0.63</i>	<i>Satisfied</i>

The quantitative analysis of the survey data in Table 7 revealed the students' overall perceptions of gamified learning. The mean scores and standard deviations demonstrate a high level of agreement among foreign medical students regarding the positive impact of gamified learning. The students reported enhanced learning experiences, motivation and engagement, and better understanding of course materials through the integration of gamification. The students perceived the gamified activities as enjoyable and entertaining, contributing to a sense of achievement and progress. Consequently, the students perceived that interactive nature of gamified activities can make the course content more interesting, leading to improved learning outcomes.

The high mean scores for each perception item suggest that the experimental group has positive perceptions of gamification in the course. These perceptions indicate that the students view gamification as a valuable and effective approach in enhancing their learning experience.

The consistently high mean scores across different perception items, along with relatively low standard deviations, suggest a high level of agreement and consistency in the experimental group's

opinions about gamification. This indicates that the positive perceptions are widespread among the students. The overall perceptions mean of 4.07 and low standard deviation of 0.63 further emphasize the group's satisfaction with the incorporation of gamification into the course.

The findings of this study align with previous research (Borrás-Gené et al., 2019; Çakıroğlu et al., 2017; Chan & Lo, 2022; Chans & Portuguese Castro, 2021; Kashive & Mohite, 2022; Mee Mee et al., 2020; Suh & Li, 2020; Zainuddin, 2023) suggesting that gamification can motivate and engage learners, enhance their understanding and retention of material, and contribute to a sense of achievement and progress. The results imply that integrating gamification in the teaching approach positively influences students' engagement, motivation, and learning outcomes in the course. This information can be valuable for educators and institutions seeking to enhance their teaching methods and improve student learning experiences.

Overall, the table provides insights into the experimental group's positive perceptions of gamification, suggesting its effectiveness in enhancing learning outcomes and engagement among medical students.

CONCLUSION

The utilization of Gamification within the PCM course has a positive influence on the learning experience and academic performance of the foreign medical students in UV-GCM. The incorporation of Gamification benefited foreign medical students by boosting their academic performance and enriching their learning encounters and examination results while fostering collaborative efforts and interactions. Despite lingering challenges within the PCM classroom, recognizing the significance of Gamification not only assesses the level of AP but also delves into students' perceptions and experiences regarding the integration of gamified learning in the PCM course. This approach empowers foreign students to take charge of their own learning through various initiatives. The means and standard deviations exhibit a strong consensus among foreign medical students about the favorable influence of gamified learning. Students have conveyed improved learning experiences, heightened motivation and engagement, and a better grasp of course materials owing to the infusion of gamification. The students find enjoyment and entertainment in the gamified activities, fostering feelings of accomplishment and advancement. Nevertheless, it is important to approach educational interventions with caution. Successful implementation of Gamification in the PCM course requires aligning objectives and goals along with establishing formal assessment criteria selecting appropriate tools can lead to positive behavioral changes. Furthermore, the field of Gamification and its impact on AP still requires further investigation to amass adequate empirical evidence for substantiating theories.

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