The Use of Gamification in Improving Student Engagement When Learning the Standard Marine Communication Phrases (SMCP)

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ABSTRACT

This paper highlights the use of gamification with the aim of improving student engagement when they learn the Standard Marine Communication Phrases (SMCP). So far, records have shown that the learning of SMCP has been facilitated by the use of Learning Management Systems (Mohd Rosedi, 2021), merchant ship's bridge simulators (Ferreira, 2019; Noble and Peters, 2019), merchant ship's engine simulators (Ferreira, 2019; Ishida et al., 2019), role-plays, and simulated dialogues (Jurkovic et al., 2019; Witt, 2019, 2021), past test papers (Decancq, 2019; Simbolon, 2021) and SMCP publications (Cardeno, 2018; Simbolon, 2021). This initial study was conducted in Malaysia's premier maritime academy on 128 respondents (purposive sampling) who were learning the SMCP from June to July 2022. The main data collection instruments used were pre and post-tests and the student course engagement questionnaire (SCEQ) adapted from Handelsman et al. (2005). The results of study reveal a moderate-high level of engagement of cadet officers when learning the SMCP via gamification and show a significant increase in post-test scores of participants. There are also significant levels of correlation between the desire to learn SMCP (internal motivation) and the efforts in memorizing the SMCP; active participation in class and getting good grades; doing well in assignments/quizzes and having fun in class and lastly, assessing own learning/progress and the desire to learn SMCP (internal motivation).

Key words : gamification, student engagement, Standard Marine Communication Phrases, Maritime English, Kahoot!

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1. Introduction

When it comes to learning, student engagement with the lessons is educators' utmost importance. Student engagement has been regarded as one of the primary factors that lead to effective learning and improved performance (Bergdahl et al., 2018; Buckley and Doyle, 2016; Doyle et al., 2021). In defining engagement, Hamari et al. (2016) state that engagement is a condition where one experiences a complete absorption in a learning activity without any distraction. In this situation, attention is given to the learning tasks or stimuli as provided by the teacher/instructor. Therefore, in classroom learning, student engagement can be referred to as students' active involvement and commitment in educational activities which leads to the learning objectives (Hamari et al., 2016; Oliveira et al., 2023). Accordingly, student engagement is the result of motivational process; which becomes a force that drives students to be engaged in their learning (Keller, 2006; Ryan and Deci, 2020) Therefore, student engagement is considered as a crucial factor for the overall success in learning.

The aim of this study is to explore the use of gamification i.e., Kahoot! in improving student engagement in learning the Standard Marine Communication Phrases (SMCP), which is the working language of merchant ship officers. This gamification technique, more specifically, Kahoot! in this study, has been developed based on the framework of ARCS Model of Motivation developed by Keller (Keller, 2006). It focuses on the elements of Attention, Relevance, Confidence and Satisfaction in defining intrinsic and extrinsic motivation of students in learning. The outcomes of this study will justify whether or not the student engagement has improved, and so with their performance. Handelsman et al. (2005) conclude that student engagement is an important predictor of student achievement but not many researchers have successfully measured it. Therefore, this study attempts to evaluate student engagement in learning SMCP via Kahoot! application by adapting Handelsman et al.'s (2005) student course engagement questionnaire (SCEQ). The findings of this investigation will be discussed at length in order to address all the research concerns.

2. Literature Review

Student engagement has long been considered as a fundamental part of learning (Alsawaier, 2018; Handelsman et al., 2005; Licorish et al., 2018; Oliveira et al., 2023). Accordingly, engagement is defined as 'using time and energy to carry out an action or task which has been affected by many circumstances' (Alsawaier, 2018, p. 2). The scope of engagement is extensive, as it also includes exemplary attendance to class, commitment to study, student interaction, satisfaction, success,

enjoyment in lesson, competence, patience, motivation, and success (Jayalath and Esichaikul, 2022; Khaleel et al., 2020; Samah and Ismail, 2021).

Keeping students' attention is not an easy task as there are mixed learning styles, mixed proficiencies and also numerous backgrounds of learners. Moreover, there are also levels of difficulties that may affect students' attention and participation in classroom. Wut et al. (2023) and Xiangze and Abdullah (2023) assert that student engagement is not an issue in conventional lectures or classrooms but may be seriously affected by lecturer's pedagogical approaches and therefore, the emphasis should always be on the different techniques and methods used in teaching. As earlier claimed by Keller (2006) that engagement is significantly associated with motivation, this study has been instrumental in looking at the relationship between engagement and learning. This is also to address the limited amount of research in highlighting the relationship between engagement and learning especially in maritime education and training (MET) institutions and of course, the SMCP (Noble and Peters, 2019).

In the merchant shipping industry, the language of communication between ship to ship and ship to shore is none other than the SMCP (International Maritime Organization, 2002; Pritchard, 2002; Trenkner, 2000). More importantly, these two types of primary communication at sea are conducted over ship's very high frequency (VHF) Radio which involve non-face to face communication. This leads to the developmental nature of the SMCP as being a reduced version of Maritime English mostly in grammatical and sentence structure/patterns with the aims of preventing ambiguity in communicating essential information (International Maritime Organization, 2002). In other words, SMCP has been developed to reduce misunderstanding in exchanging crucial information on-board merchant vessels (ship to shore and ship to ship communication). This could contribute further to the safety of navigation, crew members, cargo and even the environment.

Since the use of SMCP is mandatory in merchant shipping industry, it must always be used in all ship operations especially in ship's navigation, cargo operations, pilotage, marine engineering, maintenance, berthing, unberthing, anchorage and etc. (International Maritime Organization, 2002). To ensure its continuity and effectiveness, the International Conventions on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) has mandated SMCP to be taught in all maritime institutions throughout the world with its instruction to be based on 'practices in the shipping operations and via appropriate modern language teaching methods.' (International Maritime Organization, 2002, p. 2). The practices in shipping operations as mentioned before cover four common types of VHF radio messages such as distress, urgency, safety, and routine that focus on ship's maneuvering, navigational watch, helm orders, position reporting, berthing, anchoring, pilotage, and other navigational situations at sea (Pritchard, 2002; Trenkner, 2000).

In this research, the primary reason to select gamification as learning interventions/lessons is based to its potentials in affecting, modifying and most importantly, enhancing student engagement (Chernov et al., 2021; Hu, 2023; Kumar,

2022; Licorish and Lötter, 2022). Gamification has been generally defined as using games elements in non-games setting or in real world contexts for the purpose of motivating participants (Kapp, 2012). This generic definition of Kapp (2012) has initiated many prominent studies in this decade on gamification especially in tertiary learning. However, even though there have been extensive studies on the use of gamification as learning interventions, the researcher has not found any gamification study on SMCP to date. As a result, this research transforms SMCP into gamification lessons via Kahoot! and then evaluates its effects on student engagement in its attempt to close the gap in knowledge.

According to Ibrahim et al. (2023), Licorish and Lötter (2022), Omar et al. (2023), Pearson (2023) and Johnson (2023), classroom quizzes on Kahoot! enhance teacher-students interaction and also peer interaction via gameshow like environment. On Kahoot!, students complete teacher constructed interactive quizzes of knowledge in highly competitive setting with the use of most convenient tools such as students' smart phones, teacher's laptop, internet connection, LCD projector and white screen. Quiz participants score points by correctly answering questions on SMCP which feature navigational situations at sea. Besides lessons, these Kahoot! quizzes are also played as formative assessments at the same time, indicating students' progress in real time. This addresses the issue of engagement as Kahoot! utilizes images, videos, audio files (music and sounds), peer competition (in the forms of scores, leaderboards), problem-solving challenges, limited time requirement and instant feedback (Figuccio and Johnston, 2022; Kohnke and Moorhouse, 2022 and Licorish and Lötter, 2022). Due to these attractive and engaging features, this study proposes an alternative pedagogy for more effective teaching of SMCP.

3. Methods

The research method that was used in this study is known as quasi-experimental pre and post-test one group design (Creswell, 2012). Creswell (2012) reports that in tertiary education, researchers need to utilize intact groups since there have been many experiment situations exist. The sampling technique of respondents involved purposive sampling which resulted in 128 respondents in total. All respondents were Semester 2 cadet officers from Diploma in Marine Navigation Studies whose age ranging from 18 to 24 years old. At the point of experiment and data collection, they were undertaking a 3-year preparatory course to become merchant ship navigation officers which was conducted in conventional mode of delivery (face to face). This study was conducted in the second half of Semester 2 which had been allocated for SMCP in the Malaysian Marine Department's approved syllabus of Maritime English subject. Suffice to note also that all respondents were Malaysians who hailed from all over Peninsular and Sabah Sarawak

states. The experiment took 4 weeks to complete and Figure 1 shows the whole process of investigation of this study.

The investigation began in the first week with a Pre-test being administered on all 128 respondents via MsForms platform. This Pre-test contained 30 questions on SMCP specially tailored to the four topics which had been identified earlier. The four topics were VHF Radio General Procedure (Introduction to SMCP), Message Markers 1 and Message Markers 2 and VHF Radio Communication. The pre-test was meant to evaluate respondents' knowledge on SMCP, even though the topics were entirely new to them. The average scores of all respondents in this pre-test would be compared with post-test scores in Week 4 later. Learning interventions in the form of Kahoot application started in Week 2 and ended in Week 3. There were 2 sessions per week with two hours for each session respectively. The gamified learning interventions used in the experiment were developed via Kahoot!, which is one of the most popular gamification applications to educators. There were 4 lessons on SMCP in the forms of Kahoot Challenges and Kahoot quizzes in this experiment. Altogether, respondents attempted 8 Kahoot quizzes (4 Kahoot Challenges and 4 Live class quizzes). Kahoot Chal-lenges were assigned to students before the formal facilitation whereby they were attempted asynchronously by all respondents. Meanwhile, Kahoot Live class quizzes were attempted by all respondents in their respective classes with the researcher/trainer. These SMCP topics were new topics and new experience to all respondents as they are shipping industry-based competencies.

The conduct of learning interventions (gamified learning by Kahoot!) in

Figure 1. Research procedure.
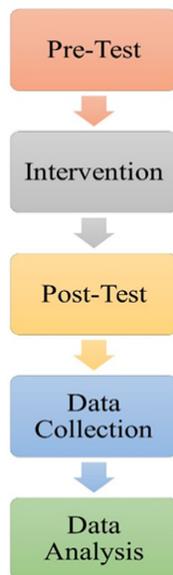
this study has been influenced by the fundamental of Constructivist Learning Theory (Vygotsky, 1978). This theory stresses the knowledge discovery and knowledge creation by the learners first before they proceed for formal classroom learning. Hence, this resulted in Kahoot Challenges being assigned to respondents in this study before they had their formal learning on SMCP in classroom. These Kahoot Challenges were assigned to all respondents in Week 1, after taking pre-test. All respondents went through the Kahoot Challenges asynchronously, which means during time and place which were convenient to them (weekends). The purpose of this knowledge creation stage was to enable all respondents/learners to experience SMCP without any teaching or facilitation while constructing SMCP knowledge on their own and discussing with peers before they proceeded to formal learning in Week 2.

The Kahoot gamified learning assigned both as Challenges and Quizzes as in Figure 2 below were developed according to the frameworks of ARCS Model of Motivation (Keller, 2006). In this model, four domains are being emphasized namely Attention, Relevance, Confidence and Satisfaction. It is important to design the gamified quizzes according to these domains as they have potential to engage learners with their lessons. In both Kahoot Challenges and Gamified Quizzes, the four domains are closely associated with the attractive gamification features such as competition, animation, sound, image, music, scores, leaderboards, peer interaction, constructive feedback, and fun learning in order to further boost engagement and motivation of learners. Lessons are conducted solely on Kahoot rather than in other methods of delivery known before this such as lecture, ship simulator, engine room simulator, PowerPoint presentations, SMCP documents,

Figure 2. SMCP quizzes on Kahoot application.

SMCP, Standard Marine Communication Phrases.

Learning Management System (LMS), role-plays, simulated dialogues, and drills. Figure 2 shows the screenshots of these Kahoot quizzes.

Week 4 began with the administration of post-test on all respondents. Even though the same questions were being administered, the order or questions and options had been randomized to prevent familiarization. A link to MsForms was provided to all respondents via WhatsApp message for this post-test. After that, for data collection, this study adopted Handelsman et al.'s (2005) SCEQ. The questionnaire itself contains 20 items which focuses on behavioral, cognitive, and emotional traits. A reliability and validity test on the questionnaire resulted in a Cronbach's Alpha value of 0.963 for all 20 items that had been tested. Nunnally (1978) proposed a high value of 0.7 for research reliability and validity and hence, the value for this research was much higher than Nunnally's proposal (1978). It can also be considered that from the alpha value tested, this research has a very high reliability. Table 1 presents the Cronbach's Alpha value for the survey questionnaire in this study.

A link to Handelsman et al.'s (2005) SCEQ on MsForms was provided to all respondents via WhatsApp message after they completed the post-test. The researcher adapted the questionnaire by inserting the word, 'SMCP' in order to be more meaningful and direct. Other than this minor change, the instrument is considered comprehensive because it covers all the constructs under student engagement. Previous related studies by experts who used Handelsman et al.'s (2005) SCEQ reported that the instrument had been successful in identifying and evaluating all essential domains in student engagement. All 128 responses had been successfully obtained from respondents and were valid for data processing and analysis. Data were then processed and analyzed by SPSS Statistical Software application version 27.

The main objective of this research is to measure student engagement level when they learn SMCP via gamification (Kahoot!). In achieving this main objective, several related aims have been developed in order to obtain more conclusive findings. Therefore, a research question and four hypotheses have been formulated to further guide this investigation. They are presented as follows:

1. What was the overall level of student engagement when they learned SMCP via gamification?
2. Did the engaged learners perform better in SMCP assessments via gamification?
3. H_o : There is no significant relationship between the desire to learn SMCP with the efforts in memorizing the SMCP.
   H_1 : There is a significant relationship between the desire to learn SMCP

Table 1. Cronbach's Alpha value for survey questionnaire

N	Items	Cronbach's α
128	20	0.963

with the efforts in memorizing the SMCP.

4. H_o: There is no significant relationship between participating actively in pair work, small-group or group discussions with getting good grades.

H_2 : There is a significant relationship between participating actively in pair work, small-group or group discussions with getting good grades.

5. H_o : There is no significant relationship between doing well on homework, assignments, Kahoot! quizzes, MS Forms tests etc. with having fun in class activities and discussions during IMO SMCP lessons.

H_3 : There is a significant relationship between doing well on homework, assignments, Kahoot! quizzes, MS Forms tests etc. with having fun in class activities and discussions during IMO SMCP lessons.

6. H_o: There is no significant relationship between assessing own learning/progress with the desire to learn SMCP.

H_4: There is a significant relationship between doing well in assignments/quizzes with the desire to learn SMCP.

Based on the above, it is obvious that there are basically six objectives that need to be fulfilled by this study. The outcomes of the study based on the enquiries as established above are presented in the following Results section. The discussion section will further highlight the findings which then help to arrive at the conclusion of this study whether gamification has been instrumental in increasing student engagement when they learn the SMCP.

4. Results

The results of the investigation are presented in this section which are based on respective research objectives and hypotheses as presented earlier. This is to be more objective in nature in terms of supporting the findings with evidence from the analyzed data. Hence, the research questions, hypotheses, and their respective findings (analyzed data) are aligned as follows:

Research question 1
1. What was the overall level of student engagement when they learned SMCP via gamification?

To answer Research question 1, it is important to refer to Table 2. Table 2 lists down the findings for Research question 1 which aimed to identify respondents' overall level of student engagement when they learned SMCP via gamification. Table 2 gives a straightforward answer to this research question. Handelsman

Table 2. Means scores of student course engagement questionnaire (SCEQ)

Question	Mean scores	Standard deviation
Making sure to read SMCP notes on a regular basis.	3.55	.719
Putting forth effort in learning phrases in SMCP via pair work or group work.	3.70	.845
Reading about IMO SMCP (online or offline resources).	3.67	.843
Looking over SMCP notes between classes to make sure I understand the material/lesson.	3.88	.784
Being organized in my study, learning and class.	3.70	.845
Taking good notes over readings, PowerPoints, or video/live lectures.	3.55	.719
Listening/reading carefully.	3.88	.790
Finding ways to make the course material easier to be understood.	3.72	.851
Applying course material to my life.	3.72	.851
Finding ways to make the course interesting to me.	3.55	.719
Really desiring to learn the IMO SMCP.	3.88	.790
Having fun in class activities and discussions during IMO SMCP lessons.	3.88	.784
Participating actively in pair work, small-group, or group discussions (online, offline, WhatsApp etc.) on SMCP.	3.56	.729
Helping fellow students to learn SMCP better.	3.88	.790
Getting a good grade/scores (LAs, MS Forms, Kahoot! quizzes etc.)	3.72	.851
Doing well on homework, assignments, Kahoot! quizzes, MS Forms tests etc.	3.88	.790
Asking questions in both online and face-to-face classes.	3.88	.790
Show effort in memorizing SMCP (words, message markers, safety phrases etc.)	3.88	.784
Show effort in knowing other students' progress in learning SMCP.	3.70	.856
Assessing my own learning and progress in class.	3.88	.790

SMCP, Standard Marine Communication Phrases.

et al.'s (2005) SCEQ contains 20 items which focuses on behavioral, cognitive, and emotional traits in student engagement.

From Table 2, it is found that the mean scores of all 20 questions in the instrument range from the lowest 3.55 to the highest 3.88. The lowest mean score was obtained by the 3 questions, 'Making sure to read SMCP notes on a regular basis', 'Taking good notes over readings, PowerPoints, or video/live lectures', and 'Finding ways to make the course interesting to me'. Meanwhile, the highest mean scores of 3.88 was obtained by 9 questions, 'Looking over SMCP notes between classes to make sure I understand the material/lesson', 'Listening/reading carefully', 'Really desiring to learn the IMO SMCP', 'Having fun in class activities and discussions during IMO SMCP lessons', 'Helping fellow students to learn SMCP better', 'Doing well on homework, assignments, Kahoot! quizzes, MS

Table 3. Means scores interpretation table

Mean score	Interpretation
1.00 to 2.00	Low
2.01 to 3.00	Moderate–low
3.01 to 4.00	Moderate–high
4.01 to 5.00	High

Source: Nunnally and Bernstein (1994).

Forms tests etc.', 'Asking questions in both online and face-to-face classes', 'Show effort in memorizing SMCP (words, message markers, safety phrases etc.)' and 'Assessing my own learning and progress in class'.

From Table 2, in overall, it is evident that the mean scores were between 3.55 to 3.88 for all 20 questions and to determine the overall level of student engagement in this study, Table 3 which depicts Mean Scores Interpretation Table by Nunnally and Bernstein (1994) is included here as a reference. Based on Table 3, it is therefore conclude that the overall level of student engagement in this study, when they learned SMCP via gamification was at Moderate-High level (mean scores between 3.01–4.00=3.55–3.88 in this study). Hence, Research question 1 has been successfully answered and addressed.

Research question 2
2. Does gamification assist learners to perform better in SMCP assessment?

In Week 1, the average scores of pre-test that had been conducted on all 128 respondents in this study was 5 out of 30 (total marks). This poor performance was expected since all of them did not have any knowledge on SMCP. Moreover, all standard and safety related phrases used in SMCP are merchant ship navigation based and hence, respondents did not have any sound knowledge or experience in their principle and practical use. However, after receiving learning interventions by Kahoot! in Week 2 and 3, the results of post-test that was administered in Week 4 showed a significant increase. All 128 respondents recorded a tremendous increase in scores which was 27 out of 30 in average, compared to 5 in the pre-test earlier. There had been a significant increase by 22 marks in the post-test which represented the improved performance in the said assessment. Suffice to mention here that there was a gap of at least 6 days after the lessons ended before the post-test was conducted. Table 4 presents the findings for pre-test and post-test for better comparison.

Based on the data in Table 4, it can be asserted that the Research question 2 has been properly addressed that the gamification in this study has significantly assisted learners to perform better in SMCP assessment.

Hypothesis testing (Research questions 2, 3, 4 & 5)
Four null hypotheses have been formulated in this study and have been

Table 4. Pre and post−test scores

Pre−test	Post−test	Total scores for SMCP	Number of respondents
05		30	128
	27	30	128

SMCP, Standard Marine Communication Phrases.

tested using Pearson (r) statistics; at 0.01 and 0.05 level of significance. The results of the hypotheses are as follows:

Hypothesis one (Research question 3):
There is no significant relationship between the desire to learn SMCP with the efforts in memorizing the SMCP.
Table 5 shows the Pearson Product Moment correlation that was used to test the hypothesis between the two variables in Hypothesis One as shown earlier. From Table 5, the results indicated that the calculated r-value of 0.383 is greater than $p=0.000<0.01$. This showed that there was a significant positive relationship between the desire to learn SMCP and efforts in memorizing SMCP. Hence, the null hypothesis is rejected.

Hypothesis two (Research question 4):
There is no significant relationship between participating actively in pair work, small-group, or group discussions with getting good grades.
Table 6 presents the Pearson Product Moment correlation that was used to test the hypothesis between the two variables in Hypothesis Two. From Table 6, the results showed that the calculated r-value of 0.366 is greater than $p=0.000<0.01$. This proved that there was a significant positive relationship between participating actively in pair work, small-group, or group discussions with getting good grades in the study. Therefore, it has been decided that the null hypothesis is rejected.

Hypothesis three (Research question 5):
There is no significant relationship between doing well on homework, as-signments, Kahoot! quizzes, MS Forms tests etc. with having fun in class activities

Table 5. Pearson (r) statistics showing the relationship between the desire to learn SMCP with the efforts in memorizing the SMCP

Variables	N	Mean	SD	Cal. r	p−value
Desire to learn SMCP	128	3.88	.790		
				.383[*]	0.000
Efforts in memorizing SMCP	128	3.88	.856		

[*]$p < 0.01$.
SMCP, Standard Marine Communication Phrases.

Table 6. Pearson (r) statistics showing the relationship between participating acti-vely in pair work, small-group, or group discussions with getting good grades

Variables	N	Mean	SD	Cal. r	p-value
Participating actively in pair work, small-group, or group discussions	128	3.56	.729		
				.366*	0.000
Getting good grades	128	3.72	.851		

*p <0.01.

and discussions during IMO SMCP lessons.

Table 7 shows the Pearson Product Moment correlation that was used to test the hypothesis between the two variables in Hypothesis Three as stated above. From Table 7, the results indicated that the calculated *r*-value of 0.374 is greater than *p*=0.000<0.01. This proves that there was a significant positive relationship between doing well on homework, assignments, Kahoot! quizzes, MS Forms tests etc. with having fun in class activities and discussions during IMO SMCP lessons in this study. Due to this significant relationship, the null hypothesis is therefore rejected.

Hypothesis four (Research question 6):
There is no significant relationship between assessing my own learning and progress in class with the desire to learn SMCP.
Table 8 shows the Pearson Product Moment correlation that was used to test the hypothesis between the two variables in Hypothesis Four as outlined above. From Table 8, the results indicated that the calculated *r*-value of 0.495 is greater than *p*=0.000<0.01. This proves that there was a significant positive relationship between assessing my own learning and progress in class with the desire to learn SMCP in the study. The null hypothesis is therefore rejected due to this significant relationship.

Table 7. Pearson (r) statistics showing the relationship between doing well on homework, assignments, Kahoot! quizzes, MS Forms tests etc. with having fun in class activities and discussions during IMO SMCP lessons

Variables	N	Mean	SD	Cal. r	p-value
Doing well on homework, assignments, Kahoot! quiz-zes, MS Forms tests etc.	128	3.88	.790		
				.374*	0.000
Having fun in class activities and discussions during IMO SMCP lessons.	128	3.88	.784		

*p <0.01.
SMCP, Standard Marine Communication Phrases.

Table 8. Pearson (r) statistics showing the relationship between assessing my own learning and progress in class with the desire to learn SMCP

Variables	N	Mean	SD	Cal. r	p–value
Assessing my own learning and progress in class	128	3.88	.790		
				.495[*]	0.000
Desire to learn SMCP	128	3.88	.719		

[*]p ⟨0.01.
SMCP, Standard Marine Communication Phrases.

5. Discussion

The findings of Research question 1 show that the level of student engagement in this study when they learned SMCP via gamification was at Moderate-High level based on the Mean Score Interpretation Table. Indeed, this is a promising indicator for an inaugural study conducted on the effects of gamification on learning. To date, MET institutions have been relying on conventional methods of facilitation in their academic operations. Hence, the introduction of gamification via Kahoot! applications as evident in this investigation deserves some praises and further serious consideration. If properly planned and systematically implemented, more significant results and better findings could be obtained in near future when gamification is used in learning, not only in the teaching and learning of SMCP per se. This discovery also may pave the way to more usage of gamification especially Kahoot! in other maritime and shipping subjects such as Principles of Navigation, Ship Construction, Ship Stability, Cargo Operations and etc.

The findings of this study is in conjunction with the study of Moliner-Heredia and Abellán Nebot (2023) that gamification (Kahoot!) has significantly increased student engagement and eventually, has increased test scores from 38% to 66%. The researchers used Kahoot! application in teaching manufacturing engineering course at tertiary level and the reported results have indicated significant findings due to attractive elements in Kahoot! quizzes. In another related research, Pardim et al. (2023) also reported similar findings that gamification has significantly increased student engagement which resulted in improved performance in terms of test scores/exam results. An interesting highlight in this study was the student competition which had been cited as the primary reason for engagement and increase in performance. This warrants more investigation and future studies as both research propose the use of gamification as an active methodology to address engagement and performance issues in higher education.

Even though the majority of findings in Fauziah Saadah and Turisiana's (2022) research are the same as this study, however, they highlighted that leaderboard was the one factor that truly influenced engagement. This was not surprising

as leaderboard was part of competitive elements together with scores, short quiz duration and randomized options that have been reported to arouse student interest and enhance engagement with gamified lessons. The study of Jokisch et al. (2023) also reported a significant factor that differs from this study, which was formative feedback. The authors emphasized that continuous peer feedback have high influence on engagement as students themselves could quickly reflect from the feedback they provided to their peers during gamification intervention lessons.

The rejection of all null hypotheses in this study also proves that gamification has potential in engaging students while motivating them to achieve the learning objectives of the lessons. This is due to the vibrant nature of gamification that are not only entertaining (sounds, video, animation, picture, music and etc.), but also engaging (suspense, competition, scores, leaderboards, trainer's immediate feedback etc.). These are the advantages that can break up the monotony of conventional teaching thus bringing fun learning in maritime classrooms.

6. Conclusion

More coordinated efforts and planning need to be done since gamification in maritime education and training (MET) is still in its infant stage. The initiative to integrate gamification especially Kahoot! in maritime classrooms may also require special trainings to maritime educators on the most convenient yet effective ways to use Kahoot!. This is due to the absence of gamification blueprint in maritime education and training for reference and benchmarking purposes. Consequently, this study, to some extent, provides a clear direction to maritime educators to seriously include gamification (Kahoot!) in teaching, learning and assessments of their respective subjects, especially technical and difficult subjects.

Unlike Kahoot!, there have been quite a number of emerging gamification applications nowadays that can be utilized or even experimented with by educators in order to induce engagement, motivation, and performance of learners. It is not that troublesome to experiment with any of these applications as they can be obtained as freeware and hassle-free applications. More research in similar capacity should also be encouraged especially in maritime education and training. This will not only enrich know-how skills but also to offer teaching-learning-assessment resources that can be instantly emulated or adopted/adapted by many.

As for the SMCP, it is about time for all subject matter experts in SMCP to intensify the use gamification (Kahoot!) so as to achieve optimum results in learning, memorizing, and recalling all the safety related phrases that are mandatorily used on board merchant vessels. Since Kahoot! has provided the anticipated results as demonstrated by this study, more intensive and extensive studies should be conducted to discover more potentials and best practices. Lastly, there should also be a network of sharing by all aspired maritime educators for sharing knowledge and

research data in gamification and active pedagogical approach in SMCP for continuous quality improvement.

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