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Usefulness of Gamification, Technology Proficiency, and Self-efficacy Among Maritime Faculty: Bases for Development of Instructional Enhancement Program

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Abstract

This descriptive correlational study aimed at finding out the usefulness of gamification, technology proficiency, and self-efficacy for gamification usage. It further aimed at ascertaining the relationship, the usefulness of gamification, technology proficiency, and self-efficacy for gamification usage. The respondents of this study were the faculty/teaching professionals of allied and general education courses from the three maritime higher education (MHEIs) in Zamboanga Peninsula. Three adapted questionnaires by Thug and Hung (2021) on the perceived usefulness of gamification, faculty's technology proficiency by Christensen and Knezek (2017) [10], and faculty's self-efficacy by Schuarser *et al*. (1999) were used to gather the data. Mean, standard deviation, t-test for independent samples, One-way Analysis of Variance (ANOVA), and Pearson's *r* result showed that the use of gamification is extremely useful, and advanced technology proficiency exhibits a high self-efficacy for the faculty. Further, significant differences were found based on program and school affiliation. A strong relationship between the perceived usefulness of gamification, technology proficiency, and self-efficacy suggests that these elements work together to enhance its effectiveness in education. As a result, an instructional enhancement program is recommended to address specific needs by improving faculty perceptions, skills, and confidence.

Keywords: Gamification, Analysis of Variance (ANOVA), Maritime Higher Education (MHEIs)

1. Introduction to the Study

Chapter One covers five parts: (1) Background and Theoretical Framework of the Study; (2) Statement of the Problem and Hypotheses; (3) Significance of the Study; (4) Definition of Terms; and (5) Scope and Limitation of the Study.

Part One, Background and Conceptual Framework of the Study, delineates and discusses the rationale for choosing the problem and the theoretical framework of the study.

Part Two, Statement of the Problem and the Hypotheses, presents the purpose for conducting the investigation and advances the hypotheses tested for significance.

Part Three, Significance of the Study, cites the benefits that could be derived from the results of the study.

Part Four, Definition of Terms, defines the essential terms used in the study.

Part Five, Scope and Limitation of the Study, specifies the scope and coverage of the study.

Background and Theoretical Framework of the Study

Gamification is one of the most popular strategies in 21st century learning that improves and promotes motivation and interest, as well as contributes to knowledge retention and comprehension (Claros-Perdomo *et al*., 2020) [12]. Gamification refers to implementing game-specific components, like design patterns and mechanics, principles, models, and methods, in non-gaming settings, such as educational ones (Deterding *et al*., 2011, cited in Cramariuc *et al*., 2023) [15, 13]. However, despite its potential benefits, there remains a notable gap in the effective utilization of gamification within maritime teaching practices.

Teachers have positive and negative attitudes towards the use of gamification in the learning process. It enhances socio-

emotional skills and the level of competition to manage teachers (Marti-Parreño *et al*., 2021) [23]. To prove that gamified learning is well known (Mee Mee *et al*., 2020) [24], Ortega *et al*. (2019) [29] reported that 82% of the trainee teachers regard gamification as useful in educational settings, enhancing students' motivation, competitiveness, collaboration, and attention. On a similar note, Pektas and Kepceoglu (2019) [33] showed that teachers reported gamification's contribution to students' motivation, task optimization, and creating more equity in the assessment process.

The ability to properly use technological resources to optimize one's activity is referred to as technology proficiency (Messina & Tabone, 2013, cited in Cramariuc *et al*., 2023) [26, 13], which is an important skill in education (Christensen and Knezek, 2017) [10].

In 1977, Bandura introduced the concept of self-efficacy. It refers to an individual's ability to conduct activities. In the educational context, previous research showed that teachers' self-efficacy has an indirect effect on behavioral intentions to use gamification in the classroom (Adukaite *et al*., 2017) [1].

This study holds significant importance in shedding light on the factors inhibiting the effective implementation of gamification in educational settings. By understanding these barriers and challenges, educators can tailor their teaching methodologies to better meet the needs of 21st-century learners.

The study's outcomes are expected to impact various stakeholders within the education sector. These include MARINA, CHED, educators, learners, educational institutions, and industries relying on a skilled workforce. By enhancing teaching strategies through gamification.

This study recognizes the usefulness of gamification, technology proficiency, and self-efficacy in gamification usage among faculty members. By analyzing these factors, the study seeks to provide insights into enhancing teaching strategies and meeting the evolving demands of the maritime education sector.

This research is anchored on the Self-determination Theory by Ryan and Deci (2000) [38], and the Technology Acceptance Model or TAM by Davis (1989) [14]. The self-determination theory is a psychological framework that focuses on intrinsic motivation and the factors that contribute to it. It proposes that individuals have three (3) basic needs, namely: autonomy, competence, and relatedness, which when satisfied yield enhanced self-motivation and mental health and when thwarted lead to diminished motivation and well-being. On the other hand, the technology acceptance model suggests that individual's acceptance and use of technology are influenced by perceived usefulness and perceived ease of use. External variables like social influence also play a role in determining an individual's attitude and intention to use the technology at their perceptions may vary based on personal factors.

This study holds significant importance in shedding light on the factors inhibiting the effective implementation in educational settings. By understanding these barriers and challenges, educators can tailor their teaching methodologies to better meet the needs of 21st-century learners.

Thus, this study analyzes faculty members' gamification, technology proficiency, and self-efficacy in gamification usage within maritime education. By understanding these factors, the study facilitates the development of an instructional enhancement program.

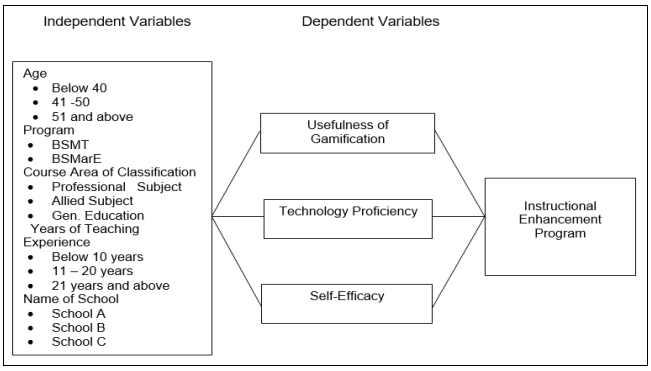

Fig 1: Schematic Diagram Showing the Relationship of the Dependent and Independent Variables

Statement of the Problem and the Hypotheses

The purpose of this study was to analyze the faculty's perceived usefulness of gamification, technology proficiency, and self-efficacy for gamification usage as the bases for development of instructional enhancement program. It further aimed at ascertaining whether or not these variables would significantly relate with each other.

Specifically, this study sought answers to the following questions:

1. What is the faculty's perceived usefulness of gamification when taken as an entire group and classified according to personal factors?
2. What is the faculty's technology proficiency for gamification usage when taken as an entire group and classified according to personal factors?
3. What is the faculty's self-efficacy for gamification usage when taken as an entire group and classified according to personal factors?
4. What is the faculty's perceived usefulness of gamification, faculty's technology proficiency, and self-efficacy when taken as an entire group and classified by school?
5. Are there significant differences in the faculty's technology proficiency for gamification usage when classified according to personal factors?
6. Are there significant differences in the faculty's self-efficacy for gamification usage when classified as to personal factors?
7. Are there significant differences in the faculty's perceived usefulness of gamification, faculty's professional technology proficiency, and faculty's self-efficacy when classified by school?
8. Are there significant relationships among the faculty's usefulness of gamification, technology proficiency, and self-efficacy for gamification usage?
9. Which among the variables will best predict gamification usage?
10. What Instructional Enhancement Program can be proposed to enhance the faculty's perceived usefulness of gamification, technology proficiency, and self-efficacy for gamification usage?

Based on the preceding problems, the following hypotheses were advanced:

1. There are no significant differences in the faculty's technology proficiency for gamification usage when classified according to personal factors.

2. There are no significant differences in the faculty's self-efficacy for gamification usage when classified according to personal factors.
3. There are no significant differences in the faculty's perceived usefulness of gamification, faculty's professional technology proficiency, and faculty's self-efficacy when classified by school.
4. There are no significant relationships among the faculty's usefulness of gamification, technology proficiency, and self-efficacy for gamification usage.

Definition of Terms

To facilitate uniformity and clarity of understanding the different terms used in this study, the researcher defined the following terms conceptually and operationally:

Gamification: This refers to the process of adding games or game-like elements to something to encourage participation (Merriam-Webster, 2023) [25].

In this study, the same definition was used.

Self-efficacy: This refers to a person's belief in their ability to complete a task or achieve a goal (Cherry, 2023) [9].

In this study, "self-efficacy" referred to the faculty's confidence in their ability to utilize gamification effectively.

Technology proficiency: This refers to the ability to use technology to communicate effectively and professionally, organize information, produce high-quality products, and enhance thinking skills (Saad & Sankaran, 2020) [40].

In this study, "technology proficiency" refers to the teachers' ability to utilize digital technological resources to augment their activity.

Significance of the Study

The findings of this study may prove important in the following contexts:

Maritime Industry Authority (MARINA)

The findings of this study may serve as a guide for the Maritime Industry Authority (MARINA) in gaining a deeper understanding of the concept of e-learning through gamification. As this tool plays an important role to allow students to collaborate, communicate, interact and work in teams. Strategic games improve the functioning of brain. Gaming creates a dynamic that can inspire learners to develop skills and build an emotional connection to learning and subject matter.

Commission on Higher Education (CHED)

The study serves as a representation of the Commission on Higher Education (CHED) towards executing and applying best practices to meet the students' needs.

Higher Education Institutions (HEIs)

This study serves as a basis for the Higher Education Institutions (HEIs) instituting educational technology and encouraging educational institution to integrate gamification gradually, as the increased prominence of ICT allows student to access educational materials easy and creatively develop. Thus, its application encourages motivation and increase student engagement.

Curriculum Planners and/or Maritime Education Administrators

The curriculum planners and/or maritime education administrators may utilize this study as an informative way of encouraging their faculty to adapt with the current change in the educational platform and the demands of the maritime industries and market for their graduates as a preparation for preliminary exposure to technology inform of game - based education and simulation during teaching and learning process and evaluation.

Maritime Faculty

The maritime faculty engages in teaching to make the experience more enjoyable and to explore innovative approaches that enhance their instructional methods, thus improving effectiveness. We may encourage but not requiring teachers to integrate gamification to their lesson in order to develop the maritime cadets goal-oriented behavior, interaction, feedback, problem solving, competition, narrative, and fun learning environment.

Maritime Cadets

The maritime cadets may benefit in this study by explaining the nature of gamification, so that they understand the elements that can increase their engagement and sustain motivation. Hence, gamification is not limited to creating games for them to play; it is designing learning activities that can incrementally introduce concepts and ideas. This approach is projected for cadets to have better exposure to technology when the time comes maritime industry requires their technological skills.

The study may provide future researchers and scholars with useful concepts and information, and serve as a guide/tool for future research work towards developing a more enhance teaching strategies with the use of collaborative tools via ICT and the internet, thereby providing a basis for revolutionizing maritime education to achieve a higher competency that is align with the global maritime industry and market for maritime students acquiring the required competencies. Thus, this research allows empirical data to serve as basis for improvement and bridging the gap in technological advancement.

Scope and Limitation of the Study

This descriptive-correlational study was limited in analyzing gamification as 21st century skills of the faculty, technology proficiency, and self-efficacy for gamification usage as the bases for development of instructional enhancement program in three maritime schools in Zamboanga Peninsula for academic year 2023-2024.

This study was conducted in October 2023. The respondents in this research were maritime faculty teaching professionals, allied courses and general education in maritime schools in Zamboanga Peninsula fully recognized by the Commission on Higher Education (CHED) and the Maritime Industry Authority (MARINA) as of 2023.

Data were gathered with the use of an adapted questionnaire-checklist from the following studies (Thuy & Hung, 2021; Christensen & Knezek, 2017) [46, 10]; Items of the said instruments were revised and contextualized to the local setting.

The computer-processed statistics used were means, frequency, and rank for descriptive analysis; and the t-test for independent samples, One-way ANOVA, Scheffe Test, Pearson Product-Moment Coefficient of Correlation (*Pearson's r*), Stepwise Multiple Regression Analysis for inferential analysis. The alpha level was set at .05.

2. Review of Related Literature

Chapter Two provides an overview of literature pertinent to the current study. It is divided in eight parts: (1) Technology-enhanced Teaching, (2) Gamification as a Tool for Teaching and Learning, (3) Usefulness of Gamification, (4) Advantages and Disadvantages of Technological Proficiency, (5) Technology Proficiency, (6) Self-efficacy (7) Challenges on the Adoption of Gamification, Technology Proficiency, and Self-Efficacy for Gamification, and (8) Summary.

Part One, Technology-enhanced teaching, discussed how technology is increasingly integrated into higher education.

Part Two, Gamification as a Tool for Teaching and Learning, highlights the transformative capacity of technology-driven learning, especially through e-learning, to reshape education in accordance with the requirements of the digital economy.

Part Three, The usefulness of gamification, explains how features of gamification impact learners' engagement and motivation in learning.

Part Four, Advantages and Disadvantages of Technological Proficiency, tells about the importance of technology use.

Part Five, Technology Proficiency, presents how skills in the use of technology aid success in the teaching and learning process.

Part Six, Self-efficacy, presents the importance of personal skills in the use of technology.

Part Seven, Challenges to the adoption of gamification, technology proficiency, and self-efficacy for gamification, situates the integration of the different concepts of this study

Part Eight, Summary, demonstrates how the different literate shape this present inquiry.

Technology-enhanced Teaching

As digital technologies become increasingly integrated into higher education, there arises a necessity to comprehend how best to assist university educators in their roles as creators of technology-enhanced learning (TEL) to bolster students' academic achievements. This research delves into the Faculty Pedagogical Developer Initiative at KTH Royal Institute of Technology in Sweden, an innovative endeavor aimed at fostering a grassroots transformation among educators, with the aim of enhancing faculty members' professional pedagogical growth. Data were gathered through interviews and official documentation, with the analysis conducted through the lens of Actor-Network Theory. The findings indicate that the initiative not only facilitated the practical incorporation of digital technologies into educational programs but also prompted discussions regarding educators' roles as creators of TEL among pedagogical developers and other faculty members across various departments. Nonetheless, significant social, organizational, and technical obstacles must be addressed when developing support structures for educators. The study underscores the necessity of comprehensively understanding four interconnected elements: information, technology, organization, and social dynamics, in facilitating this process (Viberg *et al*., 2019) [47].

Gamification as a Tool for Teaching and Learning

By offering personalized learning paths tailored to individual student needs, digital instruction effectively equips a modern workforce to succeed in a technology-driven economy. This educational shift is heavily accelerated by tools such as social networks, video platforms, and web-based learning management systems. While higher education institutions increasingly recognize the necessity of adopting these 21st-century platforms, global integration remains uneven, as institutions in certain countries have yet to fully implement these digital systems (Taslim *et al*., 2023) [45].

A key component of this academic evolution is the integration of edutainment and gamification, which have shifted from pure entertainment to tools that promote cooperative innovation (Taslim *et al*., 2023) [45]. Gamification applies specific game design principles and structural elements to non-gaming environments to boost student engagement and motivation. Rather than simply extending game-based technology, this strategy intentionally embeds core gaming mechanics into educational frameworks to leverage the intrinsic, motivational power of play for better learning outcomes (Taslim *et al*., 2023) [45].

Usefulness of Gamification

According to a study by Rao *et al*. (2022) [36], incorporating gamified elements into sustainability education significantly enhances student motivation and engagement. The research indicates that integrating games into lessons sparks students' curiosity, which in turn optimizes how they absorb information. By making the educational experience more enjoyable, gamification not only helps students grasp complex sustainability concepts more thoroughly but also connects these global issues directly to their personal ethics and decision-making processes.

In another study, Anderle *et al*. (2023) [5] investigated how gamified digital tools impact essential life skills, specifically focusing on reading and writing proficiency among primary school students. Their sample included both typically developing children and those with Special Educational Needs (SEN), such as specific learning disorders. The researchers observed a statistically significant improvement in literacy skills across all student groups after the training. Although motivation did not show a statistically measurable effect on final academic outcomes, the young participants reported high levels of enjoyment and immersion, suggesting that gamification is a highly effective strategy for both mainstream classroom settings and clinical interventions.

Furthermore, Wang (2023) [48] explored the intersection of gamification and News English education using a quasi-experimental, mixed-methods approach. This research employed a collaborative framework comprising educational slides, activity sheets, and card games, measuring academic progress through pre- and post-tests, along with student self-reflections. The findings revealed that the experimental group experienced substantial academic growth, with both high- and low-performing students showing marked improvement in their News English skills. Ultimately, the students found the gamified approach to be a highly interactive, practical, and entertaining way to master the material.

Advantages and Disadvantages of Technology Proficiency

A comprehensive literature review conducted by Zhang and Hasim (2023) [49] investigated the landscape of gamified EFL/ESL instruction. Their primary objective was to map out the defining traits of modern research in this field,

focusing closely on the mechanical components of gamification as well as its practical advantages and disadvantages. To achieve a thorough overview, the authors executed a targeted query across the Scopus and Web of Science databases, utilizing fifteen distinct search terms to capture relevant academic articles.

The findings from this review highlight a surging global interest in integrating game mechanics into English language pedagogy. Specifically, Zhang and Hasim (2023) [49] discovered that gamification is actively utilized across more than ten non-English-speaking nations to bolster various linguistic competencies. This widespread geographical and functional adoption demonstrates that game-based learning has transitioned from a niche experimental technique into a widely accepted strategy for facilitating second-language acquisition.

On the positive side, the integration of these mechanics yields several meaningful educational advantages. According to Zhang and Hasim (2023) [49], it significantly improves students' overall English capabilities while nurturing a broader, more well-rounded communication competence. Furthermore, the researchers noted that game-like environments evoke more favorable emotional reactions and healthier attitudes from learners, largely because these digital setups manage to simulate realistic, authentic contexts for language practice.

Conversely, the study also uncovered distinct challenges that educators must navigate when implementing these strategies. Technical glitches and hardware limitations represent a major hurdle, and researchers noted that the initial boost in student motivation can sometimes be short-lived. Additionally, the aggressive nature of peer-to-peer competition within gamified systems can occasionally trigger adverse behavioral or psychological effects among certain language learners.

To structure these experiences effectively, developers and teachers rely on specific design components. Zhang and Hasim (2023) [49] identified that elements such as digital badges, quizzes, scoreboards, immediate feedback, points, and tangible rewards are the most frequently deployed features in language classrooms. Other supportive tools mentioned in the literature include narrative storytelling, progressive challenges, video integration, strict time constraints, and progress tracking bars, all of which serve to deepen student immersion.

Shifting the lens to the broader tertiary landscape, Khaldi *et al*. (2023) [21] examined the overarching state of gamification within university-level virtual environments. Their systematic investigation, which extracted relevant literature from Google Scholar and Scopus, aimed to catalog theoretical foundations and establish a framework for combining different game elements. Ultimately, this research provides a vital blueprint for instructional designers, offering a state-of-the-art guide to building optimized, highly engaging e-learning systems for modern higher education.

Technological Proficiency

An investigation by Sotos-Martínez *et al*. (2023) [43] analyzed how gamified instructional strategies influence the motivational levels of primary school students within physical education contexts. To execute this, the researchers deployed a specialized teaching framework utilizing the ClassDojo software application. The curriculum design was deeply informed by a combination of Project-Based Learning (PBL) methodologies and the classic Mechanics-Dynamics-Aesthetics (MDA) theoretical architecture.

By conducting assessments before and after the experimental intervention, Sotos-Martínez *et al*. (2023) [43] discovered a clear upward shift in motivation among the children who participated in the game-infused physical education classes. This cohort displayed a noticeable improvement when compared to their peers who learned under conventional, traditional teaching methods. The outcomes strongly suggest that incorporating game elements into physical education successfully fosters an interactive environment tailored directly to the student.

Furthermore, while the gamified model did not achieve a major reduction in amotivation among the participants, its positive impact on learner engagement remains highly valuable. Sotos-Martínez *et al*. (2023) [43] underscored that these active learning methodologies elevate overall educational standards. In doing so, the approach directly aligns with international developmental benchmarks, specifically supporting the United Nations Sustainable Development Goal 4, which champions global access to quality education.

Shifting the focus to higher education and digital platforms, Al-Qaisi (2022) [4] examined the intersection of gamified e-learning systems and student fulfillment within private universities in Jordan. This empirical study focused heavily on how student engagement acts as an intermediary bridge within this dynamic. Similar to the primary school study, the theoretical scaffolding of this research drew inspiration from the MDA framework, examining its core dimensions of game mechanics, game dynamics, and aesthetics to map out the digital experience.

To rigorously test this dynamic, Al-Qaisi (2022) [4] established a structural conceptual model where gamified e-learning served as the independent variable, student satisfaction acted as the dependent variable, and student engagement operated as the core mediating variable. The methodology involved distributing a digital questionnaire to a randomized sample of 1,000 university students via email. This resulted in 239 returned responses, from which a final dataset of 214 valid questionnaires was isolated for rigorous statistical evaluation using SPSS and AMOS 23 software.

The final data analysis—utilizing confirmatory factor analysis (CFA), Cronbach's alpha reliability checks, and structural equation modeling (SEM)—revealed crucial insights into online learning behaviors. Al-Qaisi (2022) [4] determined that gamified e-learning exerts a powerfully positive influence on both student engagement and user satisfaction. Crucially, the data demonstrated that without the inclusion of gamified elements in online environments, a direct relationship between student engagement and overall satisfaction simply does not materialize.

Self-efficacy for Gamification Use

An empirical investigation conducted by Rohmah (2022) [37] explored how gamification strategies and active student involvement impact overall academic performance. This study specifically integrated learner motivation as a moderating factor to see if it altered the strength of these relationships. To gather empirical data, the researcher utilized a quantitative methodology, administering a survey

built around Likert-scale questionnaires to a targeted student population already familiar with game-infused learning environments.

The geographical focus of Rohmah's (2022) [37] research was centered in Central Java, drawing upon a sample size of 174 participants enrolled in vocational secondary institutions. The statistical outcomes demonstrated a clear connection, proving that both gamified methods and student engagement positively shape academic achievement. Additionally, the data indicated that gamification directly drives student engagement, while high levels of motivation serve to further amplify the beneficial impacts that both variables have on final grades.

Beyond purely academic metrics, Rohmah (2022) [37] confirmed that incorporating game-like features into the classroom significantly strengthens peer-to-peer collaboration and social interaction. The study highlights the distinct relevance and practicality of implementing these methods within vocational school systems. Ultimately, because motivationally driven gamification proves crucial for maximizing academic success, institutional leaders are encouraged to adopt these strategies to cultivate highly capable, skilled graduates.

Shifting the educational context to massive digital platforms, Puig *et al*. (2023) [34] investigated the underlying factors responsible for the notoriously poor completion and retention rates in Massive Open Online Courses (MOOCs). The authors noted that these structural failures can be evaluated from two primary angles: institutional course architecture and student-centered obstacles. Looking strictly at the learners' perspective, remote students frequently battle isolation, general fatigue, monotony, time constraints, and a steep drop-off in internal drive.

To counteract these virtual learning hurdles, Puig *et al*. (2023) [34] proposed utilizing adaptive gamification to engineer customized, highly enjoyable learning pathways. While traditional e-learning platforms generally implement standardized, rigid game designs, existing flexible models still tend to view the user through a static, unchanging player profile. In contrast, this paper introduces a groundbreaking, fluidly adaptive gamification strategy that continuously re-evaluates student preferences.

By monitoring how users actively interface with various gaming mechanics and listening to their direct feedback, the system designed by Puig *et al*. (2023) [34] dynamically shifts student profiles to determine which game elements match their ongoing needs. To rigorously evaluate this concept, the researchers built an educational module focused on environmental sustainability—specifically the recycling of marine plastics. This micro-learning course served as the testing ground to measure how effectively customized game mechanics could sustain long-term digital student engagement.

Challenges on the Adoption of Gamification, Technology Proficiency, and Self-efficacy

One of the primary challenges facing maritime education is the limited awareness and adoption of gamification among educators. Many instructors may not fully comprehend the potential benefits and applications of gamified approaches in teaching.

Moreover, resistance to change and entrenched reliance on traditional teaching methods can further impede the adoption of gamification techniques. Additionally, educators may encounter difficulties in integrating gamification into existing curriculum structures and teaching practices, posing further challenges to its implementation. Another significant challenge revolves around the technology proficiency gap among faculty members. Educators may possess varying levels of proficiency with technology tools and platforms relevant to maritime education, reflecting a disparity in skills and knowledge across the teaching workforce.

Furthermore, limited access to training and resources for enhancing technology skills, particularly in the context of teaching and learning, exacerbates this gap. Keeping pace with the rapid advancements in educational technology and digital tools further compounds the challenge of ensuring adequate technology proficiency among faculty members. Moreover, self-efficacy for gamification usage presents a notable obstacle in maritime education. Faculty members may lack confidence in their ability to design, implement, and evaluate gamified teaching strategies effectively. This hesitancy stems from a limited understanding of instructional design principles and the underlying psychology behind gamification techniques. Fear of failure or negative student feedback may also deter educators from experimenting with gamified approaches, hindering the exploration of innovative teaching methods in maritime education.

Summary

Gamification refers to the integration of game design principles into non-game settings, with the goal of motivating users to participate in particular activities by harnessing the motivational and captivating aspects of games. Various definitions have been proposed; for instance, Taslim *et al*. (2023) [45] propose the use of game design elements in non-game contexts. It's important to note that gamification extends beyond merely incorporating playful elements or mechanics into an activity. Rather, it involves applying concepts and dynamics rooted in play to enhance the teaching-learning process and render it more engaging, thus enabling students to delve into specific curriculum content.

Integrating game design components into academic environments—commonly referred to as gamification—represents a widely adopted yet frequently debated movement in modern education (Taslim *et al*., 2023) [45]. When applied to interactive displays and exhibitions, this strategy has been shown to optimize knowledge acquisition, heighten audience immersion, and cultivate a state of psychological "flow" (Taslim *et al*., 2023) [45]. This positive impact is especially pronounced in collaborative settings where multiple groups participate in the shared experiential environment simultaneously (Taslim *et al*., 2023) [45].

The literature on gamification illustrates numerous factors that significantly enhance educators' technological proficiency and self-confidence in employing gamification in 21st-century classrooms. Research indicates a favorable influence on students' knowledge acquisition, enhancement of literacy skills, alteration of attitudes and emotional responses, motivation of teachers, classroom engagement, and confidence in completing challenging tasks (Dicheva & Dichev, 2017) [16].

When employing gamified strategies to enhance learning outcomes, it's crucial to take into account these factors in order to implement any necessary interventions effectively.

The Maritime Higher Education Institutions (MHEIs) must

continue to innovate in the use of media delivery for BSMT and BSMarE programs by conveying the required knowledge, understanding, skills, and competences that a student must acquire and demonstrate at the end of the program. The teaching and learning activities may utilize the use of gamification to make the learning more interactive, participatory, collaborative, and experiential to achieve a seamless integration towards holistic learning. The MHEIs must ensure that the faculties are highly technology-proficient and self-efficacy on the use of gamification in teaching and learning activities. Thus, the Philippines will continue to provide highly competent graduates in the maritime institutions and continue to provide the world fleet.

3. Research Design and Methodology

Chapter Three consists of three (3) parts: (1) Purpose of the Study and Research Design, (2) Method, and (3) Statistical Treatment of Data.

Part One, Purpose of the Study and Research Design, restates the research problem and explains the research design employed and the variables used in the investigation.

Part Two, Method, presents the respondents of the study, the data-gathering instruments, and the research procedure followed.

Part Three, Statistical Treatment of Data, presents and explains the statistical tools used in the investigation. The findings of the study also informed the development of the proposed instructional enhancement program.

Purpose of the Study and Research Design

This descriptive-correlational study aimed to analyze how faculty members perceive the usefulness of gamification, their proficiency with technology, and their self-efficacy in utilizing gamification. These factors were investigated as potential foundations for designing an instructional enhancement program.

The descriptive-correlational method of research was employed in this investigation since the data were collected to answer questions concerning the faculty's perceived usefulness of gamification, technology proficiency, and self-efficacy for gamification usage.

This study likewise attempted to determine the correlation among faculty's perceived usefulness of gamification, technology proficiency, and self-efficacy for gamification usage.

According to Seeram (2019) [42] correlational research is a non-experimental research that facilitates predicting and explaining the relationship among variables.

The data needed for this research were gathered through the use of an adapted questionnaire checklist from the following studies (Thuy & Hung, 2021) [46] and (Christensen & Knezek, 2017) [10]. Items of the said instruments were revised and contextualized to the local setting.

Means, frequency, rank, t-test for independent samples, One-way ANOVA, Pearson Product Moment Correlation (Pearson's r). Alpha was set at .05.

Methods

This part presents in detail the respondents, the data-gathering instrument, and the research procedure employed in this study.

Respondents

The research was conducted among the faculty of the State Universities and colleges offering maritime education. The respondents were the faculty's teaching professionals, allied, and general education courses from the three Maritime Higher Education Institutions (MHEIs) in Zamboanga Peninsula, fully recognized by the Maritime Industry Authority (MARINA) and Commission on Higher Education (CHED) to offer the Bachelor of Science in Marine Engineering (BSMarE) and Bachelor of Science in Marine Transportation (BSMT) as of 2023.

The distribution of respondents is shown in Table 1.

Table 1: Distribution of the Respondents

Category	f	%
Entire Group	117	100
A. Age		
Below 40	48	41
41 - 50	33	28
51 and above	36	31
B. Program		
BSMT	37	32
BSMarE	80	68
C. Course Area of Classification		
Professional Subject	45	38
Allied Subject	15	13
General Education	57	49
D. Years of Teaching Experience		
Below 10 years	78	67
11 - 20 yeas	25	21
21 years and above	14	12
D. Specialization		
School A	52	44
School B	30	26
School C	35	30

The study employed a probability random sampling method to select respondents who meet the following criteria: faculty's teaching professional, allied, and general education courses and who are willing to participate.

The researcher employed a stratified proportional sampling technique, followed by random sampling to select respondents from each school. The respondents in this study consist of maritime education faculties who teach professional, allied, and general education courses across the three (3) Maritime Higher Education Institutions (MHEIs) in the Zamboanga Peninsula.

Sources of Data

The study employed an adapted structured questionnaire checklist to assess faculty members' perceptions of the effectiveness of gamification, their technological proficiency, and their confidence in using gamification techniques.

The instrument underwent reliability testing, with a requirement that the reliability coefficient (α) be equal to or greater than .70, as suggested by Fraenkel and Wallens (2008), to ensure suitability for research purposes. The reliability coefficients for the instruments were .858 for perceived usefulness of gamification, .937 for technology proficiency, and .934 for self-efficacy in gamification usage.

The instrument consisted of two parts: Part I elicited information on the faculty's age (below 40, 41- 50, and 51 above), assigned program (BSMarE and BSMT), name of school (A, B, and C), handled course (Professional, Allied, and General education), and teaching experience (below 10, 11-20, and 21 above).

Part II elicited data on the respondents' perceptions of the usefulness of gamification 31 items in perceived usefulness of gamification, 34 items in technology proficiency, and 10 items in self-efficacy for gamification usage. To answer this portion of the instrument, the respondents were instructed to choose from among the following options: (5) "Strongly Agree", (4) "Agree", (3) "Neutral", (2) "Disagree" and (1) "Strongly Disagree".

For usefulness of gamification, the following mean scale, description, and interpretation were used.

Scale	Description	Interpretation
4.20 – 5.00	Extremely Useful	Gamification is utilized all the time
3.40 – 4.19	Very Useful	Gamification is utilized most of the time
2.60 – 3.39	Moderately Useful	Gamification is utilized sometimes
1.80 – 2.59	Slightly Useful	Gamification is less utilized
1.00 – 1.79	Not Useful	Gamification is not utilized

The faculty's technology proficiency for gamification. The following mean scale, description, and interpretation were used.

Scale	Description	Interpretation
4.20 – 5.00	Advanced	Individuals at this level possess comprehensive and in-depth knowledge and skills in a particular technology domain
3.40 – 4.19	Expert	Individual have a solid understanding and competence in utilizing technology tools and systems
2.60 – 3.39	Intermediate	Individuals at this level demonstrate a satisfactory level of skill and understanding in using technology
1.80 – 2.59	Fundamental	Individual have limited experience and knowledge in the technology domain
1.00 – 1.79	Basic	Individual have minimal to no experience with the technology in question. They require extensive training and supervision to perform even the most fundamental tasks

For faculty's self-efficacy on gamification usage, the following mean scale, description, and interpretation were used.

Scale	Description	Interpretation
4.20 – 5.00	Very high	Extremely confident in their ability to perform tasks and achieve goals, even in difficult situations
3.40 – 4.19	High	Very confident in their ability to accomplish tasks and meet objectives
2.60 – 3.39	Medium	Confident, capable of completing tasks and reaching goals
1.80 – 2.59	Low	Less confidence in their ability to perform tasks and achieve goals
1.00 – 1.79	Very Low	Very less confidence in their ability to accomplish tasks and meet objectives

Data-gathering Procedure

The researcher carried out a study involving faculty from three (3) Maritime Higher Education Institutions in the Zamboanga Peninsula. The total number of maritime faculty was established, and a sample was subsequently drawn from this population.

First, the researcher sought permission from the Presidents' offices of the three (3) Maritime Higher Education Institutions in the Zamboanga Peninsula to administer the research instruments.

Once the permit was approved, detailed oral instructions were provided in both English and Tagalog to ensure that the respondents completed the questionnaires accurately.

The researcher obtained written consent from all respondents, ensuring that all information would remain strictly confidential. Respondents were informed of their right to withdraw and their choice to participate in the study.

The completed questionnaires were scored and analyzed using appropriate computer-processed statistics with the Statistical Package for the Social Sciences (SPSS) software.

Statistical Treatment of Data

The data gathered were subjected to appropriate descriptive and inferential statistical analysis through the SPSS software.

Descriptive Statistics

Means: Mean was used to determine the faculty's perceived usefulness of gamification, technology proficiency, and self-efficacy for gamification usage.

Frequency/ Percentage: Frequency/ Percentage was used to determine the number of respondents.

Rank: Rank was used to determine the order of faculty's perceived usefulness of gamification, technology proficiency, and self-efficacy for gamification usage.

Standard deviation: Standard deviation was used to determine the homogeneity and heterogeneity of faculty's perceived usefulness of gamification, technology proficiency, and self-efficacy for gamification usage.

Inferential Statistics

t-test for independent samples: It was used to determine the significant difference in faculty's perceived usefulness of gamification, technology proficiency, and self-efficacy for gamification usage when classified as to two categories.

One-way Analysis of Variance (ANOVA): It was used to determine the significant difference in faculty's perceived usefulness of gamification, technology proficiency, and self-efficacy for gamification usage when classified as to categories.

***Pearson Product Moment Coefficient of Correlation (Pearson`s r):*** A pearson product moment coefficient of correlation (Pearson`s r) was used to determine the significant relationship among faculty's perceived usefulness of gamification, technology proficiency, and self-efficacy for gamification usage.

Stepwise Multiple Regression Analysis: A stepwise multiple regression analysis was used to determine the predictive ability of certain identified variables towards gamification usage.

A post-hoc test was used for the comparison of means.

All set at the .05 level of significance.

Procedure for the Development of the Instructional Enhancement Program

The instructional enhancement program was developed based on teachers' technological proficiency, the five indicators of gamification use, and teachers' practices. Items that received the highest ratings were specifically identified and maintained in the program.

Continuous evaluation and refinement ensure the program's effectiveness, incorporating feedback and performance

metrics. Sustainability measures, such as continuous professional development and updated technical resources, are integral to the program. This structured approach aims to improve teaching effectiveness and student learning outcomes, making the program beneficial and enduring for the three maritime schools.

4. Results

This chapter presents the descriptive and inferential data gathered by the researcher through the use of a questionnaire checklist with their corresponding analyses and interpretations.

It consists of three (3) parts: Descriptive Data Analysis, Inferential Data Analysis, and the Proposed Instructional Enhancement Program.

Part One discusses the usefulness of gamification, faculty's technology proficiency, and faculty self-efficacy for gamification usage.

Part Two presents the significant difference in the faculty's perceived usefulness of gamification, faculty technology proficiency, and self-efficacy for gamification usage.

Part Three presents the proposed instructional enhancement program, which is anchored on the study's findings and aims to improve teaching effectiveness through the integration of gamification in higher education.

Descriptive Data Analysis

Faculty's Perceived Usefulness of Gamification in terms of Personal Factors

Table 2 presents the faculty's usefulness of gamification when taken as an entire group. The result revealed that when taken as an entire group, the faculty's perceived usefulness of gamification for teaching and learning was "extremely useful," meaning that gamification is utilized all the time (*M*=4.29, *SD*=0.55). A scrutiny of the mean in the same table reveals that faculty obtained a five highest mean score in the indicators were they believe gamification apps provide a rich source of chants and songs that helps their learners to listen and remember the lessons (*M*=4.77), they believe gamification apps make young learners more motivated and confident to interact in class (*M*=4.65), they believe that they have to take time to choose appropriate materials, edit and modify them to fit the contents of the textbooks (*M*=4.47), they believe that the Internet is not stable so it is hard to conduct the lesson fluently with the apps (*M*=4.46), and they believe there is a lack of computers so not all learners can use the apps at the same time (*M*=4.45), described as "extremely useful" which means gamification is utilized all the time.

On the other hand, the items of the questionnaires which got five lowest means score were they believe that they might be nervous and unconfident when using gamification apps in front of the class (*M*=3.79), they believe that they cannot manage the class resulting in student's disinterest and distraction (*M*=3.79), they believe that they may fail to manage time in the class (*M*=3.83), they believe manipulation on computers is not skilled enough to use smoothly in the class (*M*=3.96), and they believe some gamification apps are hard and confusing for them to use (*M*=4.03) described as "very useful" means that gamification is utilized most of the time.

Table 2: Faculty's Perceived Usefulness of Gamification when taken as an Entire Group

Items	*M*	Descriptive Rating	*SD*
They believe gamification apps provide a rich source of chants and songs that helps their learners to listen and remember the lessons.	4.77	Extremely Useful	0.70
They believe gamification apps make young learners more motivated and confident to interact in class.	4.65	Extremely Useful	0.81
They believe that they have to take time to choose appropriate materials, edit and modify them in order to fit the contents of the textbooks.	4.47	Extremely Useful	0.71
They believe the Internet is not stable so it is hard to conduct the lesson fluently with the apps.	4.46	Extremely Useful	0.67
They believe there is a lack of computers so not all learners can use the apps at the same time.	4.45	Extremely Useful	0.68
They believe they can use gamification apps to help young learners get familiar with the lessons.	4.42	Extremely Useful	0.62
They believe gamification apps can provide lively video to help their learners understand the contexts and functions of lessons.	4.41	Extremely Useful	0.62
When young learners use gamification apps, they believe that learners are more active and engaged in the lessons.	4.40	Extremely Useful	0.69
They believe using gamification apps to present new structures helps young learners understand them easily.	4.38	Extremely Useful	0.67
They believe a small projector screen causes difficulty for students in following the lessons.	4.36	Extremely Useful	0.73
They believe gamification apps can draw young learners' attention in the lessons.	4.34	Extremely Useful	0.81
They believe gamification apps can help young learners interact in class while using the apps.	4.34	Extremely Useful	0.67
They believe their learners become more willing to make presentations or video records and send them onto gamification apps.	4.34	Extremely Useful	0.70
They believe gamification apps can help their students to be active to track their progress and make more effort in their learning.	4.32	Extremely Useful	0.70
They believe activities on gamification apps can have young learners repeat the lessons.	4.32	Extremely Useful	0.67
They believe gamification apps can consolidate new knowledge in the pre stage.	4.30	Extremely Useful	0.69
They believe gamification apps can help them to introduce the new topic.	4.30	Extremely Useful	0.69
They believe gamification apps can help them to check learners' background knowledge.	4.30	Extremely Useful	0.68
They believe task on gamification apps such as reading aloud or singing along helps their learners memorize lesson well.	4.29	Extremely Useful	0.73
They believe gamification apps can increase young learners' accuracy.	4.29	Extremely Useful	0.69
They believe their students can become more self-regulated in learning when students are exposed to gamification apps.	4.24	Extremely Useful	0.75
They believe gamification apps create a more comfortable virtual environment for learners to practice.	4.23	Extremely Useful	0.71
They believe gamification apps can help their learners write their ideas down in a brainstorming stage.	4.21	Extremely Useful	0.74

They believe conversations offered by gamification apps help their learners develop self-study skills in learning.	4.21	Extremely Useful	0.72
They believe the class is noisy when learners use gamification apps.	4.07	Very Useful	0.94
They believe some gamification apps are hard and confusing for them to use.	4.03	Very Useful	0.97
They believe my manipulation on computers is not skilled enough to use smoothly in the class.	3.96	Very Useful	0.78
They believe that they may fail to manage time in the class.	3.82	Very Useful	0.72
They believe that they cannot manage the class resulting in student's disinterest and distraction.	3.97	Very Useful	0.73
They believe that they might be nervous and unconfident when using gamification apps in front of the class.	3.97	Very Useful	0.70
Overall	**4.29**	**Extremely Useful**	**0.55**

Note. Scale and Description: 4.20 – 5.00 (Extremely Useful); 3.40 – 4.19 (Very Useful); 2.60 – 3.39 (Moderately Useful); 1.80 – 2.59 (Slightly Useful); 1.00 – 1.79 (Not Useful)

In terms of age, school, program, course, and experience, the faculty's perceived usefulness of gamification was "extremely useful," which means that gamification is utilized all the time. However, the middle adult faculty, employed in school C, teaching in BSMT program, handling allied courses, and with below 10 years of teaching experience, have a more extreme perceived usefulness of gamification towards teaching and learning as compared to their counterparts, with the mean that falls within the 4.20 to 5 range.

Table 3: Faculty's Perceived Usefulness of Gamification when classified as to Personal Factors

Category	n	*M*	Descriptive Rating	*SD*
Age				
Below 40	48	4.22	Extremely Useful	0.54
41 – 50	33	4.32	Extremely Useful	0.62
51 Above	36	4.24	Extremely Useful	0.51
School				
School A	52	4.29	Extremely Useful	0.53
School B	30	3.96	Very Useful	0.55
School C	35	4.44	Extremely Useful	0.48
Program				
BSMT	37	4.41	Extremely Useful	0.37
BSMarE	80	4.18	Very Useful	0.61
Course Area of Specialization				
Professional Course	45	4.27	Extremely Useful	0.62
Allied Course	15	4.42	Extremely Useful	0.41
General Education	57	4.19	Very Useful	0.53
Experience				
Below 10 years	78	4.28	Extremely Useful	0.60
11 – 20 years	25	4.25	Extremely Useful	0.50
21 years and above	14	4.16	Very Useful	0.42

Note. Scale and Description: 4.20 – 5.00 (Extremely Useful); 3.40 – 4.19 (Very Useful); 2.60 – 3.39 (Moderately Useful); 1.80 – 2.59 (Slightly Useful); 1.00 – 1.79 (Not Useful).

Faculty Technology Proficiency for Gamification Use in Terms of Personal Factors

Table 4 presents the faculty's technology proficiency for gamification use when taken as an entire group.

The result revealed that when taken as an entire group, the faculty's technology proficiency for gamification use was "advanced," meaning that individuals at this level possess comprehensive and in-depth knowledge and skills in a particular technology domain (*M*=4.41, *SD*=0.53). A scrutiny of the means in the same table reveals that faculty obtained a five (5) highest mean score in the indicators were: They can transfer photos or other data via a smartphone (*M*=4.60); They can send and receive text messages (*M*=4.55); They can use an Internet search engine (e.g., Google) to find web pages related to my subject matter interests (*M*=4.52); They can use online tools to teach students from a distance (*M*=4.52); and They can search for and find the Institution website, described as "advanced" which means they possess comprehensive and in-depth knowledge and skills in a particular technology domain.

On the other hand, the items of the questionnaire which got five lowest means were create a newsletter with graphics (*M*=4.13); They can create their own web page (*M*=4.13); They can use a spreadsheet to create a bar graph of the proportions of the different colors of M&Ms in a bag (*M*=4.19) described as "expert" means that have a solid understanding and competence in utilizing technology tools and systems. Meanwhile, they can write a plan with a budget to buy technology for the classroom (*M*=4.30), and can describe 5 software programs or apps that could be used in teaching (*M*=4.30), described as "advanced," which means they possess comprehensive and in-depth knowledge and skills in a particular technology domain.

Table 4: Faculty's Technology Proficiency for Gamification Use when taken as an Entire Group

Items	*M*	Descriptive Rating	*SD*
I feel confident that I could…			
… transfer photos or other data via a smartphone.	4.60	Advanced	0.61
… send and receive text messages.	4.55	Advanced	0.68
… use an Internet search engine (e.g., Google) to find web pages related to my subject matter interests.	4.52	Advanced	0.68
… use online tools to teach my students from a distance.	4.52	Advanced	0.68
… search for and find the Institution website.	4.50	Advanced	0.68
… send a document as an attachment to an email message.	4.48	Advanced	0.70
… create a lesson or unit that incorporates subject matter software as an integral part.	4.60	Advanced	0.61
… use technology to collaborate with teachers or students, who are distant from my classroom?	4.47	Advanced	0.67
… use social media tools for instruction in the classroom (ex. Facebook, Twitter, etc.).	4.47	Advanced	0.64
… send email to a friend.	4.46	Advanced	0.70
… write an essay describing how I would use technology in my classroom.	4.46	Advanced	0.70
… use mobile devices to have my students access learning activities.	4.46	Advanced	0.70
… download and view streaming movies/video clips.	4.46	Advanced	0.68
… create a distribution list to send email to several people at once.	4.45	Advanced	0.73

… subscribe to a discussion list.	4.44	Advanced	0.65
… find a way to use a smartphone in my classroom for student responses.	4.44	Advanced	0.68
… use the computer to create a slideshow presentation.	4.43	Advanced	0.74
… use mobile devices to connect to others for my professional development.	4.43	Advanced	0.71
… integrate mobile technologies into my curriculum.	4.42	Advanced	0.76
… save documents in formats so that others can read them if they have different word processing programs (e.g., saving Word, pdf, RTF, or text).	4.41	Advanced	0.71
… create a database of information about important authors in a subject matter fields.	4.41	Advanced	0.81
… download and read e-books.	4.41	Advanced	0.72
… keep copies of outgoing messages that I send to others.	4.40	Advanced	0.74
… teach in a one-to-one environment in which the students have their own device.	4.40	Advanced	0.69
… keep track of websites I have visited so that I can return to them later e.g., bookmarks.	4.38	Advanced	0.72
… find primary sources of information on the Internet that I can use in my teaching.	4.38	Advanced	0.67
… download and listen to podcasts/audio books.	4.38	Advanced	0.75
… save and retrieve files in a cloud-based environment.	4.38	Advanced	0.75
… create a wiki or blog to have my students collaborate.	4.30	Advanced	0.80
… write a plan with a budget to buy technology for my classroom.	4.07	Advanced	0.94
… describe 5 software programs or apps that I would use in my teaching.	4.30	Advanced	0. 97
… use a spreadsheet to create a bar graph of the proportions of the different colors of M&Ms in a bag.	4.19	Expert	0.79
… create my own web page.	4.13	Expert	0.85
… create a newsletter with graphics.	4.13	Expert	0.70
Overall	**4.41**	**Advanced**	**0.53**

Note. Scale and Description: 4.20 – 5.00 (Advanced); 3.40 – 4.19 (Expert); 2.60 – 3.39 (Intermediate); 1.80 – 2.59 (Fundamental); 1.00 – 1.79 (Basic).

In terms of age, school, program, course, and experience, the faculty's technology proficiency for gamification use is "advanced," which means that individuals at this level possess comprehensive and in-depth knowledge and skills in a particular technology domain. However, the middle adult faculty, employed in School C, teaching in BSMT program, handling allied courses, and with 11 to 20 years of teaching experience, are at a more expert level of technology proficiency for gamification use as compared to their counterparts, with the mean falling within the 4.20 to 5 range.

Table 5: Faculty's Technology Proficiency for Gamification Use when classified as to Personal Factors

Category	n	*M*	Descriptive Rating	*SD*
Age				
Below 40	48	4.36	Advanced	0.58
41 – 50	33	4.48	Advanced	0.49
51 Above	36	4.37	Advanced	0.48
School				
School A	52	4.48	Advanced	0.49
School B	30	4.12	Advanced	0.64
School C	35	4.52	Advanced	0.36
Program				
BSMT	37	4.57	Advanced	0.32
BSMarE	80	4.32	Advanced	0.58
Course Area of Specialization				
Professional Course	45	4.34	Advanced	0.54
Allied Course	15	4.56	Advanced	0.32
General Education Course	57	4.40	Advanced	0.55
Experience				
Below 10 years	78	4.40	Advanced	0.54
11 – 20 years	25	4.43	Advanced	0.48
21 years and above	14	4.33	Advanced	0.63

Note. Scale and Description: 4.20 – 5.00 (Advanced); 3.40 – 4.19 (Expert); 2.60 – 3.39 (Intermediate); 1.80 – 2.59 (Fundamental); 1.00 – 1.79 (Basic).

Faculty's Self-Efficacy for Gamification Use in terms of Personal Factors

Table 6 presents the faculty's self-efficacy for gamification use when taken as an entire group.

The result revealed that when taken as an entire group, the faculty's self-efficacy for gamification use was "very high," meaning that extremely confident in their ability to perform tasks and achieve goals, even in difficult situations. (*M*=4.43, *SD*=.47). A scrutiny of the means in the same table reveals that faculty obtained a five highest mean score in the indicators were they convinced that, as time goes by, they continue to become more and more capable of helping to address their students' needs (*M*=4.52), if they try hard enough, they know that they can exert a positive influence on both the personal and academic development of their students (*M*=4.52), even if they get disrupted while teaching, they are confident that they maintain their composure and continue to teach well (*M*=4.50), they know that they can motivate their students to participate in innovative projects (*M*=4.49), and they convinced that they successfully teach all relevant subject content to even the most difficult students (*M*=4.45), described as very high self-efficacy towards gamification use.

On the other hand, the items of the questionnaire which got five lowest means were: They convinced that they can develop creative ways to cope with system constraints (such as budget cuts and other administrative problems) and continue to teach well (*M*=4.34); They know that they can maintain a positive relationship with parents even when tensions arise (*M*=4.39); When they try really hard; They reach even the most difficult students (*M*=4.40); They know that they can carry out innovative projects even when they opposed by skeptical colleagues (*M*=4.43); They are confident in their ability to be responsive to their students' needs even if they are having a bad day (*M*=4.45), described as "very high", means they are extremely confidents in their ability to perform tasks and achieve goals, even in difficult situations.

Table 6: Faculty's Self- Efficacy for Gamification Use when taken as an Entire Group

Items	*M*	Descriptive Rating	*SD*
They convinced that, as time goes by, they continue to become more and more capable of helping to address their students' needs.	4.52	Very High	0.66
If they try hard enough, they know that they can exert a positive influence on both the personal and academic development of their students.	4.52	Advanced	0.59
Even if they get disrupted while teaching, they are confident that they maintain their composure and continue to teach well.	4.50	Very High	0.64
They know that they can motivate their students to participate in innovative projects.	4.49	Very High	0.67
They convinced that they successfully teach all relevant subject content to even the most difficult students.	4.45	Very High	0.63
They are confident in their ability to be responsive to their students' needs even if they having a bad day.	4.45	Very High	0.63
They know that they can carry out innovative projects even when they opposed by skeptical colleagues.	4.43	Very High	0.64
When they try really hard, they reach even the most difficult students.	4.40	Very High	0.68
They know that they can maintain a positive relationship with parents even when tensions arise.	4.39	Very High	0.64
They convinced that they can develop creative ways to cope with system constraints (such as budget cuts and other administrative problems) and continue to teach well.	4.34	Very High	0.68
Overall	**4.43**	**Very High**	**0.47**

Note. Scale and Description: 4.20 – 5.00 (Very High); 3.40 – 4.19 (High); 2.60 – 3.39 (Medium); 1.80 – 2.59 (Low); 1.00 – 1.79 (Very Low).

In terms of age, school, program, course, and experience, the faculty's self-efficacy towards gamification use is "very high," meaning that extremely confident in their ability to perform tasks and achieve goals, even in difficult situations. However, the older adult faculty, employed in school A, teaching in the BSMT program, handling allied courses, and with less than ten years of teaching experience, have a higher level of self-efficacy towards gamification use as compared to their counterparts, with the mean falling within the 4.20 to 5 range.

Table 7: Faculty's Self-Efficacy for Gamification Use when classified as to Personal Factors

Category	n	*M*	Descriptive Rating	*SD*
Age				
Below 40	48	4.44	Advanced	0.51
41 – 50	33	4.39	Advanced	0.49
51 Above	36	4.48	Advanced	0.41
School				
School A	52	4.53	Advanced	0.39
School B	30	4.19	Advanced	0.61
School C	35	4.50	Advanced	0.38
Program				
BSMT	37	4.57	Advanced	0.33
BSMarE	80	4.37	Advanced	0.51
Course Area of Specialization				
Professional Course	45	4.40	Advanced	0.43
Allied Course	15	4.55	Advanced	0.41
General Education Course	57	4.43	Advanced	0.52
Experience				
Below 10 years	78	4.44	Advanced	0.49
11 – 20 years	25	4.43	Advanced	0.44
21 years and above	14	4.31	Advanced	0.44

Note. Scale and Description: 4.20 – 5.00 (Very High); 3.40 – 4.19 (High); 2.60 – 3.39 (Medium); 1.80 – 2.59 (Low); 1.00 – 1.79 (Very Low).

Inferential Data Analysis

Significant Difference in the Faculty's Perceived Usefulness of Gamification When Classified by Program

Table 8 presents the significant difference in the faculty's perceived usefulness of gamification when classified according to program.

The result revealed that a significant difference existed in the faculty's perceived usefulness of gamification when classified according to program, t (107) =2.158, p=.004. This result suggests that the faculty members' assigned programs affect their perception of gamification's usefulness in their teaching.

Table 8: t-test Result for Significant Difference in the Faculty's Perceived Usefulness of Gamification when classified according to Program

Category	n	*M*	*SD*	t- value	df	*p*
Program						
BSMT	37	4.40	.37	2.158*	107	.004
BSMarE	80	4.40	.61			

Note. *p<.05.

Significant Difference in the Faculty's Perceived Usefulness of Gamification when classified according to Personal Factors

Table 9 presents the significant difference in the faculty's perceived usefulness of gamification when classified according to age, course, school, and experience.

The result shows that a significant difference existed in the faculty's usefulness of gamification when classified according to school, F (2,114) = 7.906, p=.001. This result suggests that faculty members from different maritime schools have varying perceptions of the usefulness of gamification in their teaching. However, no significant differences existed in the faculty's perceived usefulness of gamification when classified according to age, F (2,114) =.404, p=.669, course, F (2,114) =1.124, p=.329, and experience, F (2,114) =.253, p=.777). These results indicate that faculty members, irrespective of age, courses taught, and teaching experience, share similar perceptions of the usefulness of gamification in their teaching.

Table 9: One-way Analysis of Variance (ANOVA) Results in the Faculty's Perceived Usefulness of Gamification when classified according to Personal Factors

Sources of Variation	Sum of Square	*df*	Mean of Square	*F*	*p*
Age					
Between groups	.224	2	.112	.404	.669
Within groups	31.618	114	.277		
Total	31.842	116			
Course					
Between groups	.615	2	.307	1.124	.329
Within groups	31.227	114	.274		
Total	31.842	116			

School					
Between groups	3.878	2	1.939	7.906*	.001
Within groups	27.964	114	.245		
Total	31.842	116			
Experience					
Between groups	.141	2	.070	.253	.777
Within groups	31.702	114	.278		
Total	31.842	116			

Note. *p<.05.

Multiple comparisons showed that the faculty at School B has a significantly higher mean perceived usefulness of gamification compared to the faculty at School A and School C. This indicates that gamification is considered highly effective at School B. the mean difference is significant at the .05 level.

Table 10: Comparison of Means Using Scheffe Test

	Mean Diff.	**Std. Error**	***p***
School B School C	-.55092*	.13004	.000
School A	-.32361*	.11902	.028

Note. *p<.05.

Significant Difference in the Faculty's Technology Proficiency for Gamification Use when classified by Program

Table 11 presents the significant difference in the faculty's technology proficiency for gamification use when classified according to program.

The results revealed a significant difference in faculty's technology proficiency for using gamification when classified by program, t (115) =2.418, p=.002. This suggests that the program to which faculty members are assigned impacts their technology proficiency for gamification use.

Table 11: t-test Result for Significant Difference in the Faculty's Technology Proficiency when classified according to Program

Category	**n**	***M***	**SD**	**t- value**	**df**	***p***
Program						
BSMT	37	4.56	.33	2.771*	109	.002
BSMarE	80	4.33	.57			

Note. *p<.05.

Significant Difference in the Faculty's Technology Proficiency for Gamification Use when classified according to Personal Factors

Table 12 presents the difference in the faculty's technology proficiency for gamification use when classified according to age, course, school, and experience.

The result shows that a significant difference existed in the faculty's technology proficiency for gamification use when classified according to school, F (2,114) =6.464, p=.002. This result indicates that faculty members from different maritime schools have varying levels of proficiency in teaching with gamification. However, no significant differences existed in the faculty's technology proficiency for gamification use when classified according to age, F (2,114) =.576, p=.564, course, F (2,114) =1.009, p=.363, and experience, F (2,114) =.157, p=.855. These results simply suggest that the faculty, regardless of age, course handled, and teaching experience, have similar technology proficiency for gamification use.

Table 12: One-way ANOVA Results in the Differences in the Faculty's Technology Proficiency for Gamification Use when classified by Personal Factors

Sources of Variation	**Sum of Square**	***df***	**Mean of Square**	***F***	***p***
Age					
Between groups	.318	2	.159	.576	.564
Within groups	31.458	114	.276		
Total	31.776	116			
Course					
Between groups	.553	2	.276	1.009	.368
Within groups	31.223	114	.274		
Total	31.776	116			
School					
Between groups	3.237	2	1.618	6.464*	.002
Within groups	28.539	114	.250		
Total	31.776	116			
Experience					
Between groups	.087	2	.044	.157	.855
Within groups	31.689	114	.278		
Total	31.776	116			

Note. *p<.05.

Multiple comparisons showed that the faculty at School B has a significantly higher mean technology proficiency for gamification use compared to the faculty at School A and School C. This indicates that faculty at this level at School B have extensive and in-depth knowledge and skills in a specific technology domain.

Table 13: Comparison of Means Using Scheffe Test

	Mean Diff.	**Std. Error**	***p***
School B School C	-.40819*	.11623	.007
School A	-.38077*	.11682	.006

Significant Difference in the Faculty's Self-Efficacy for Gamification Use when classified by Program

Table 14 presents the difference in the faculty's self-efficacy for gamification use when classified according to program.

The result revealed that a significant difference existed in the faculty's self-efficacy for gamification use when classified according to program, t (103) =2.204, p=.006. This result suggests that faculty members' assigned programs affect their self-efficacy in using gamification.

Table 14: t-test Results for Difference in the Faculty's Self-Efficacy for Gamification Use When Classified According to Program

Category	**n**	***M***	**SD**	***t***	**df**	***p***
Program						
BSMT	37	4.57	.32	2.585*	103	.006
BSMarE	80	4.37	.51			

Note. *p<.05.

Difference in the Faculty's Self-Efficacy for Gamification Use when classified by Personal Factors

Table 15 presents the difference in the faculty's self-efficacy for gamification use when classified according to age, course, school, and experience.

The result shows that a significant difference existed in the faculty's self-efficacy for gamification use when classified according to school, F (2,114) =5.752, p=.004. This result

suggests that faculty from different maritime schools have varying levels of self-efficacy in using gamification. However, no significant differences existed in the faculty's self-efficacy for gamification use when classified according to age, F (2,114) =.291, p=.748), course, F (2,114) =.530, p=.590, and experience, F (2,114) =.026, p=.974. These results simply suggest that the faculty, regardless of age, course handled, and teaching experience, have similar self-efficacy for gamification use.

Table 15: One-way ANOVA Results in the Differences in the Faculty's Self-efficacy for Gamification Use when classified by Personal Factors

Sources of Variation	Sum of Square	*df*	Mean of Square	*F*	*p*
Age					
Between groups	.131	2	.065	.291	.748
Within groups	25.592	114	.224		
Total	25.723	116			
Course					
Between groups	.237	2	.118	.530	.590
Within groups	25.486	114	.224		
Total	25.723	116			
School					
Between groups	2.358	2	1.179	5.752*	.004
Within groups	23.365	114	.205		
Total	25.776	116			
Experience					
Between groups	.012	2	.006	.026	.974
Within groups	25.711	114	.226		
Total	25.776	116			

Note. *p<.05.

Multiple comparisons showed that the faculty at School B has a significantly higher mean self-efficacy for gamification use compared to the faculty at School A and School C. This indicates that faculty at School B are extremely confident in their ability to perform tasks and achieve goals, even in challenging situations. The mean difference is significant at the .05 level.

Table 16: Comparison of Means Using Scheffe Test

	Mean Diff.	Std. Error	*p*
School B School C	-.30667*	.11264	.028
School A	-.33551*	.10380	.007

Relationships among Faculty's Perceived Usefulness of Gamification, Technology Proficiency, and Self-efficacy for Gamification Use

The significance of the relationship between faculty's perceived usefulness of gamification, technology proficiency, and self-efficacy for gamification use was ascertained in this investigation.

Pearson's r results in Table 17 show a strong positive and significant relationship between faculty's perceived usefulness of gamification and technology proficiency (r=.697, p=.001), faculty's perceived usefulness of gamification and self-efficacy (r=.680, p=.001), and faculty's technology proficiency and self-efficacy (r=.786, p=.001). All the probability values are less than .05. These results suggest that highly effective gamification is linked to mastery of technology proficiency and a very high level of self-efficacy in using gamification. Therefore, integrating gamification into lessons, which is timely and relevant for 21st-century learning, should be supported by a high degree of technology proficiency and strong self-efficacy in using gamification.

Table 17: Significant Relationships among Faculty's Perceived Usefulness of Gamification, Technology Proficiency, and Self-efficacy for Gamification Use

		Usefulness of Gamification	Teaching Proficiency	Self-efficacy
Usefulness of Gamification	Pearson Correlation	-	.697**	.680**
	Sig.(2-tailed)		.000	.000
Teaching Proficiency	Pearson Correlation			.786**
	Sig.(2-tailed)			.000
Self-Efficacy	Pearson Correlation			
	Sig.(2-tailed)			-

Note. *p<.05, Significant.

Predictors of Faculty's Perceived Usefulness of Gamification, Technology Proficiency, and Self-efficacy

Table 18 presents the predictors of faculty's perceived usefulness of gamification and personal factors.

The results show that among the five (5) personal factors examined, both school and program emerged as significant predictors of the faculty's perceived usefulness of gamification.

As predictive factors, the values obtained for school were (R=.340, R^2=.115, R^2 change=.108, t=3.875, and p=.001), and for program (R=.201, R^2=.041, R^2 change=.032, t=2.206, and p=.029). These findings suggest that personal factors such as school and program impact the perceived usefulness of gamification among faculty members.

Conversely, course, experience, and age did not emerge as significant predictors of the faculty's perceived usefulness of gamification. The values obtained for course (t=3.875, p=.436), for experience (t=.662, p=.509), and for age (t=.238, p=.812). These results indicate that personal factors such as age, course, and experience do not impact the faculty's perceived usefulness of gamification.

Table 18: Predictors of the Faculty's Perceived Usefulness of Gamification and Personal Factors

Category	Multiple R	R^2	R^2 Change	SEB	Beta	*t*	*p*
Age	.022	.000	.008	.014	.022	.238	.812
Program	.201	.041	.032	.226	.102	2.206*	.029
Course	.073	.005	.003	.041	.052	.782	.436
School	.340	.115	.108	.238	.061	3.875*	.000
Experience	.062	.004	.005	.046	.070	.662	.509

Note. *p>.05.

Table 19 presents predictors of faculty's technology proficiency of gamification use and personal factors.

The results show that among the five personal factors examined, school and program emerged as significant predictors of the faculty's technology proficiency for gamification use.

As predictive factors, the values obtained for school were (R=.278, R^2=.077, R^2 change=.069, t=3.103, and p=.002), and for program (R=.220, R^2=.048, R^2 change=.040, t=2.418, and p=.017). These findings suggest that personal factors such as school and program impact the technology proficiency of gamification use among faculty members.

The findings of this study are aligned with the work of Cabaron, R.R. (2023), the influence of self-efficacy on teaching digital technology as perceived by the maritime education faculty in the Philippines that the maritime education faculty's' in teaching digital technology is influenced by personal factors.

Conversely, course, experience, and age did not emerge as significant predictors of the faculty's technology proficiency for gamification use. The values obtained for course were (t=.541, p=.590), for experience (t=.304, p=.762), and for age (t=.161, p=.872). These results indicate that personal factors such as age, course, and experience do not impact the faculty's technology proficiency of gamification use.

Table 19: Predictors of the Faculty's Technology Proficiency for Gamification Use and Personal Factors

Category	Multiple R	R^2	R^2 Change	SEB	Beta	*t*	*p*
Age	.015	.000	.008	.009	.015	.161	.872
Program	.220	.048	.040	.247	.220	2.418*	.017
Course	.050	.003	.006	.028	.050	.541	.590
School	.278	.077	.069	.195	.278	3.103*	.002
Experience	.028	.001	.008	.021	.070	.304	.762

Note. *p>.05.

Table 20 presents the predictors of faculty's self- efficacy of gamification use and personal factors.

The result shows that among the five personal factors examined, both school and program emerged as significant predictors of the faculty's self- efficacy for gamification use. As predictive factors, the values obtained for school were (R=.233, R^2=.054, R^2 change=.046, t=2.574, and p=.011), and for program (R=.201, R^2=.041, R^2 change=.032, t=2.204, and p=.030). These findings suggest that personal factors such as school and program impact the self- efficacy of gamification use among faculty members.

Conversely, course, experience, and age did not emerge as significant predictors of the faculty's technology proficiency for gamification use. The values obtained for course (t=.251, p=.803), for experience (t=.171, p=.864), and for age (t=.328, p=.864). These results indicate that personal factors such as age, course, and experience do not impact the faculty's self- efficacy of gamification use.

Table 20: Predictors of the Faculty's Self-efficacy for Gamification Use and Personal Factors

Category	Multiple R	R^2	R^2 Change	SEB	Beta	*t*	*p*
Age	.031	.001	.008	.017	.031	.328	.744
Program	.201	.041	.032	.203	.092	2.204*	.030
Course	.023	.001	.008	.012	.047	.251	.803
School	.233	.054	.046	.147	.057	2.574*	.011
Experience	.016	.000	.008	.011	.063	.171	.864

Note. *p>.05.

Instructional Enhancement Program

The Instructional Enhancement Program is an initiative focused on elevating teaching quality and effectiveness. It provides educators with the necessary tools, resources, and training to refine their instructional techniques. The program emphasizes advanced teaching strategies, the integration of modern technology in the classroom, and the promotion of collaborative learning environments. By engaging in this program, educators can enhance their professional skills, adapt to changing educational requirements, and improve student learning outcomes.

The Instructional Enhancement Program aims to elevate teaching quality through the integration of advanced techniques, focusing specifically on gamification. This program seeks to improve the perceived usefulness of gamification among faculty, enhance their technology proficiency in using gamification tools, and boost their self-efficacy in applying these techniques. Notable findings indicate that perceptions of gamification's usefulness and technology proficiency vary significantly among faculty members based on their program and school, but not by age, course, or experience. Additionally, there are significant relationships between the perceived usefulness of gamification, technology proficiency, and self-efficacy among faculty in three maritime schools.

The program's objectives are to cultivate a deeper appreciation of gamification, improve technical skills related to its use, and increase faculty confidence in its application. Strategies include conducting workshops and seminars, presenting case studies, organizing feedback sessions, developing comprehensive training programs, providing technical support, creating resource portals, implementing mentorship programs, encouraging peer collaboration, and including confidence-building activities.

The program will roll out in three (3) phases: an initial phase for needs assessment and planning, an implementation phase for conducting training and mentorship, and an evaluation phase for ongoing assessment and refinement. Required resources include educational experts, technology specialists, financial support for training and resources, and technical tools.

Expected outcomes include a better understanding of gamification benefits among faculty, improved technical proficiency, and greater confidence in using gamification techniques. By implementing this program, the three maritime schools expect significant improvements in teaching effectiveness, leading to better educational outcomes and a more engaging learning environment. This Instructional Enhancement Program is designed to be sustainable, ensuring long-term benefits.

Table 21: Instructional Enhancement Program

Category	Objectives	Specific Item	Strategies	Time Frame	Persons Involved	Expected Output
A) Gamification	To improve the perceived usefulness of gamification among faculty members.	1) Manage the class resulting in student's disinterest and distraction 2) Might be nervous and unconfident when using gamification apps in front of the class. 3) They may fail to manage time in the class 4) Manipulation on computer is not skilled enough to use smoothly in the class 5) Some gamification apps are hard and confusing for them to use.	1) Workshops and Seminars: Conduct regular workshops and seminars to demonstrate the benefits and applications of gamification in teaching. 2) Case Studies: Present case studies and success stories from School B to highlight effective gamification practices. 3) Feedback Sessions: Organize feedback sessions where faculty can discuss their experiences and perceptions of gamification.	Initial Phase (Months 1-3): Needs assessment, program design, and resource allocation. Implementation Phase (Months 4-12): Conduct workshops, training sessions, and mentorship programs. Evaluation Phase (Month 13 onwards): Continuous evaluation and refinement of the program based on feedback and effectiveness	Human Resources: Educational experts from MARINA and CHED, technology specialists, faculty representatives, instructional designers, and a dedicated support team. Financial Resources: Budget from institution and other external fund for training programs, workshops, technical support, and resource development. Technical Resources: Gamification software, online portals, training materials, and case study documentation.	Improved Perceived Usefulness: Faculty members will have a better understanding and appreciation of the benefits of gamification in teaching.

5. Summary, Conclusions, Implications and Recommendations

This chapter presents the summary of the findings, the conclusions drawn, Implication, and the recommendations.

Summary of the Findings

This study generated the following findings:

1. The faculty members in three maritime schools were "extremely useful" in their perceived usefulness of gamification when taken as an entire group and when classified as to personal factors.
2. The faculty members in three maritime schools were "advanced" in their technology proficiency towards gamification usage when taken as an entire group and when classified according to personal factors.
3. The faculty members in three maritime schools were "very high" in their self-efficacy towards gamification usage when taken as an entire group and when classified according to personal factors.
4. Significant differences existed in the usefulness of gamification as perceived by faculty members when classified according to program and school. However, no significant difference existed in the usefulness of gamification as perceived by faculty members when classified according to age, course, and experience.
5. Significant differences existed in the technology proficiency towards gamification use among faculty members when classified according to program and school. However, no significant difference existed in the technology proficiency towards gamification use among faculty members when classified according to age, course, and experience.
6. Significant differences existed in the self-efficacy towards gamification usage among faculty members when classified according to program and school. However, no significant difference existed in the self-efficacy towards gamification use among faculty members when classified according to age, course, and experience.
7. Significant relationships existed among the perceived usefulness of gamification, technology proficiency, and self-efficacy for gamification usage among faculty members in three (3) maritime schools.
8. School and program were personal factors that could significantly predict the usefulness of gamification, technology proficiency, and self-efficacy for gamification usage among faculty members in three (3) maritime schools. However, age, course, and experience were the personal factors that could not significantly predict the usefulness of gamification, technology proficiency, and self-efficacy for gamification usage among faculty members in three (3) maritime school.
9. A program was formulated to further improve the level of usefulness of gamification, technology proficiency, and self-efficacy for gamification usage among faculty members in Zamboanga Peninsula.

Conclusions

In view of the foregoing findings, the following conclusions were drawn:

1. The faculty members at the three maritime schools consistently perceive gamification as "extremely useful," both as an entire group and when classified by personal factors. This designation indicates that gamification is regarded as highly effective in enhancing their educational experiences and outcomes.
2. The faculty members at the three maritime schools exhibit "advanced" in their technology proficiency for gamification usage, indicating that they possess comprehensive and in-depth knowledge and skills in the domain of gamification technology.
3. The faculty members at the three maritime schools demonstrate "very high" self-efficacy in their use of gamification, indicating that they are extremely confident in their ability to perform tasks and achieve goals with

gamification, even in challenging situations.
4. A significant difference in the faculty's perceived usefulness of gamification when classified according to program and school. This seems to indicate that faculty members' assigned programs and the maritime schools they belong to affect their perception of gamification's usefulness in teaching.
5. A significant difference in faculty technology proficiency for gamification usage when classified by program and school. This seems to indicate that the assigned programs and the maritime schools to which faculty members belong impact their proficiency in using gamification. When classified by age, course, and experience, indicating that faculty members, regardless of these personal factors, have similar levels of technology proficiency for gamification use.
6. A significant difference in faculty self-efficacy for gamification usage when classified by program and school. Specifically, faculty members' assigned programs and the maritime schools they belong to impact their self-efficacy in using gamification. Faculty at School B show significantly higher self-efficacy for gamification use compared to those at School A and School C, indicating that they are extremely confident in their ability to perform tasks and achieve goals, even in challenging situations. Conversely, no significant differences were found when classified by age, course, and experience, indicating that faculty members, regardless of these personal factors, have similar levels of self-efficacy for gamification use.
7. A significant relationship among faculty's perceived usefulness of gamification, technology proficiency, and self-efficacy for gamification usage. These findings indicate that highly effective gamification is linked to mastery of technology proficiency and a very high level of self-efficacy in using gamification. Therefore, integrating gamification into lessons, which is timely and relevant for 21st-century learning, should be supported by a high degree of technology proficiency and strong self-efficacy in using gamification.
8. The determinants of gamification usage among faculty members in three maritime schools underscore the significance of certain personal factors. The findings suggest that institutional contexts play a crucial role in shaping faculty members' attitudes and readiness towards gamification adoption. Thus, future initiatives aimed at enhancing gamification usage should prioritize understanding and leveraging the influence of school and program affiliations while also considering individual characteristics.
9. The development of an Instructional Enhancement Program aimed at bolstering the perceived usefulness of gamification, enhancing technology proficiency, and fostering self-efficacy for gamification usage among faculty members in the three maritime schools represents a strategic initiative. By tailoring interventions to address specific needs identified in our research, such as providing targeted training sessions, resources, and support, this program has the potential to yield significant benefits for faculty members. Through continuous evaluation and refinement, this program can serve as a valuable tool in promoting the effective integration of gamification into educational practices, ultimately enhancing the learning experiences of students in the maritime school.

Implications

The findings of this study support the notion that gamification can enhance teaching and learning, reinforcing existing research on the effectiveness of gamification in education by Dicheva and Dichev (2017) [16]. This contributes to the growing body of literature on gamification in education by highlighting its potential to increase student engagement and motivation.

Faculty members who demonstrate high efficiency in using gamification suggest that confidence in using technology is a key factor in its successful implementation. This aligns with the concept of self-efficacy proposed by Bandura (1977) [7], which emphasizes that individuals' belief in their capability to perform tasks influences their behavior and performance. This reinforces the importance of self-efficacy in technology adoption and suggests that interventions targeting self-efficacy may be effective in promoting the adoption of gamification. Furthermore, the perceived usefulness and self-efficacy of gamification among faculty members align with the Technology Acceptance Model, which highlights the importance of perceived usefulness and ease of use in technology adoption. This suggests that efforts to promote gamification should focus on demonstrating its value and ease of use.

To support the implementation of gamification, institutions can develop professional development programs focusing on gamification strategies, technological skills, and addressing specific faculty needs. These programs may include workshops, online courses, or peer mentoring initiatives.

Institutions should also ensure that adequate resources are available to support faculty in implementing gamified approaches. This may involve providing dedicated staff, technological tools, or funding for gamification initiatives.

Moreover, institutions should foster a culture where faculty feel comfortable experimenting with gamification with minimal risk of negative consequences. This could include providing incentives for innovation or recognizing faculty members' efforts in implementing gamified teaching strategies.

Finally, institutions should regularly assess gamification initiatives and gather feedback from both faculty and students to guide future improvements. This may involve conducting surveys, organizing focus group discussions, or utilizing analytics to better understand the impact of gamification on teaching and learning.

Recommendations

Based on the findings and conclusions, the following recommendations are presented:

1. MARINA and CHED may develop and implement specialized training programs focused on gamification techniques and tools. These should be tailored to the specific needs of faculty members based on their assigned programs and the schools they belong to, and ensure that these training sessions are ongoing and updated regularly to keep pace with technological advancements and emerging best practices in gamification.
2. Faculty members and curriculum planners may integrate and implement gamification in the curriculum of 21st-century learning. Gamification should interact well with other educational technology that fully supports the social connections between the students while at the same time addressing their individual differences. Further, gamification

should also be directed through various teaching and learning activities that require the students' active participation and provide a more engaging, challenging, and complementary approach to the very purpose of gamification.

3. Maritime institutions may allocate resources to support gamification initiatives, including access to the latest technology, software, and instructional materials.

4. Program Chair may foster a collaborative environment where faculty members can share their experiences, strategies, and successes with gamification. The Program Chair may develop an Instructional Enhancement Program specifically designed to further improve the perceived usefulness of gamification, enhance technology proficiency, and foster self-efficacy among faculty members.

5. Technology proficiency and self-efficacy based on program and school affiliation, curriculum planners may develop strategies that address the unique needs of each program and school.

6. This study may be replicated in other regions of the country where maritime schools are located to find out their level of perceived usefulness of gamification, technology proficiency, and self-efficacy towards gamification use.

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