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IMPROVING MARITIME STUDENTS' ENGLISH GRAMMAR THROUGH QUIZIZZ GAMIFICATION APP: A BLOOM'S TAXONOMY-BASED APPROACH AT AMI AIPI MAKASSAR

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Abstract. This study explores the impact of integrating the Quizizz gamification platform with Bloom's Taxonomy to improve the English grammar of third-semester maritime cadets at AMI AIPI Makassar. Employing a quasi-experimental mixed-method design, the research involved 43 students, divided into an experimental group (Nautika, n = 22) and a control group (Teknika, n = 21). Over six instructional sessions, the experimental group engaged with grammar activities designed according to Bloom's cognitive levels using the Quizizz application, while the control group received conventional instruction. The results demonstrated a statistically significant enhancement in the grammar proficiency of the experimental group, which achieved a mean post-test score of 82.5 (SD = 5.8), notably higher than the control group's 70.2 (SD = 5.5). Statistical analyses using paired and independent t-tests confirmed this difference as highly significant ($p < 0.001$). Furthermore, student feedback collected through perception questionnaires indicated strong engagement and positive attitudes toward the gamified approach, especially appreciating features such as leaderboards and real-time feedback. These findings highlight the pedagogical potential of integrating gamification with a structured cognitive framework such as Bloom's Taxonomy to enhance linguistic competence and student motivation in the context of English.

Keywords: English Grammar, Quizizz, Bloom's Taxonomy, Maritime Cadets, Gamification, English for Specific Purposes (ESP)

Abstrak. Penelitian ini mengeksplorasi dampak integrasi *platform* gamifikasi Quizizz dengan Taksonomi Bloom untuk meningkatkan tata bahasa Inggris taruna maritim semester ketiga di AMI AIPI Makassar. Dengan menggunakan desain metode campuran kuasi-eksperimental, penelitian ini melibatkan 43 mahasiswa, dibagi menjadi kelompok eksperimen (Nautika, n = 22) dan kelompok kontrol (Teknika, n = 21). Selama enam sesi pembelajaran, kelompok eksperimen terlibat dengan aktivitas tata bahasa yang dirancang sesuai dengan tingkat kognitif Bloom menggunakan aplikasi Quizizz, sementara kelompok kontrol menerima instruksi konvensional. Hasilnya menunjukkan peningkatan yang signifikan secara statistik dalam kemahiran tata bahasa kelompok eksperimen, yang mencapai skor pasca-tes rata-rata 82,5 (SD = 5,8), jauh lebih tinggi daripada kelompok kontrol 70,2 (SD = 5,5). Analisis statistik menggunakan uji-t berpasangan dan independen mengonfirmasi perbedaan ini sebagai sangat signifikan ($p < 0,001$). Lebih jauh lagi, umpan balik siswa yang dikumpulkan melalui kuesioner persepsi menunjukkan keterlibatan yang kuat dan sikap positif terhadap pendekatan gamifikasi, terutama menghargai fitur-fitur seperti papan peringkat dan umpan balik waktu nyata. Temuan-temuan ini menyoroti potensi pedagogis dari pengintegrasian gamifikasi dengan kerangka kognitif terstruktur seperti Taksonomi Bloom untuk meningkatkan kompetensi linguistik dan motivasi pelajar dalam konteks Bahasa Inggris.

Kata Kunci: Tata Bahasa Inggris, Quizizz, Taksonomi Bloom, Kadet Maritim, Gamifikasi, English for Specific Purposes (ESP)

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INTRODUCTION

Proficiency in English plays a vital role in maritime education, as failures in communication can result in significant operational disruptions and safety hazards. According to the International Maritime Organization (IMO), Maritime English encompasses various communicative skills including grammar that are crucial for effective ship to ship and ship to shore exchanges. Despite this, grammar instruction is frequently underemphasized in favour of maritime vocabulary and technical terms, even though it serves as the backbone of clear and precise communication (Chen, 2016). This imbalance makes it difficult for students to develop the ability to form sentences that are both grammatically correct and appropriate to the context, which may negatively affect their success in academic work and their effectiveness in real world maritime communication.

One ongoing challenge in teaching grammar to maritime students is their generally low motivation and limited engagement, especially when traditional teaching methods are used. Grammar instruction often relies on deductive techniques that focus heavily on rules and repetitive exercises an approach many students find monotonous and irrelevant to real world maritime communication (Smagorinsky, 2007). This lack of engagement is especially evident in vocational settings, where students typically expect learning to be practical and directly applicable to their future careers. As a result, educators need to adopt diverse and contextually appropriate teaching strategies, as the use of effective methods can significantly enhance student learning outcomes particularly for maritime students who often face challenges in mastering grammar and sentence structure. (Rafiq & Sukmawaty, 2018).

To overcome these challenges, educators have begun to explore technology enhanced learning approaches. One such approach is gamification the use of game-based elements in educational settings which has demonstrated potential in boosting students' motivation, engagement, and ability to retain information (Celasun, 2025). Digital platforms such as the Quizizz app provide interactive features, immediate feedback, and a game like environment that can make grammar learning more engaging and enjoyable. These tools cater to the learning preferences of today's digital-native students and support differentiated instruction by enabling learners to advance at a pace that suits their individual needs.

Furthermore, when gamification is thoughtfully designed using Bloom's Taxonomy, it can guide learners through a structured progression from basic understanding to more complex cognitive skills. This approach helps ensure that students move beyond simply recalling grammatical rules to being able to apply, analyse, and critically evaluate them across different contexts. (Wilson, 2016). This kind of framework is especially valuable in maritime education,

where students are required to use language effectively in a variety of complex and high-stakes communication situations. By integrating Quizizz with Bloom's Taxonomy, educators can offer a pedagogically robust and engaging approach to addressing the persistent challenges of teaching grammar in this context.

Although interest in gamification has grown in recent years, there remains a significant gap in empirical research examining its use for grammar instruction within English for Specific Purposes (ESP), especially in the context of maritime education. Much of the existing literature tends to focus on general English or vocabulary development, while grammar a fundamental component of language proficiency has received comparatively little attention (Rahman, 2015). This gap is particularly important to address, as grammatical competence underpins the syntactic accuracy and clear communication that are crucial in maritime settings. In addition, Quizizz presents innovative potential for supporting instructional goals, particularly in grammar teaching. While it has been widely used in classrooms for formative assessment and increasing student engagement, its integration with Bloom's Taxonomy to facilitate structured grammar learning remains underexplored. Most existing studies tend to highlight its motivational benefits, with limited attention given to how it aligns cognitively with specific learning objectives (Sundari, 2024). This highlights a gap in our understanding of how gamified platforms can be purposefully designed to foster deeper learning, especially in vocational education contexts where the emphasis lies on practical, real-world application.

Additionally, the ESP approach in maritime education has traditionally emphasized vocabulary and reading comprehension, often neglecting grammar as a distinct area of focus (Chen, 2016). This limited focus constrains the development of well-rounded language proficiency among maritime students. There is a clear need for research that emphasizes the role of grammar within ESP and examines innovative teaching approaches tailored to learners' specific needs. By exploring the use of Quizizz through the lens of Bloom's Taxonomy, this study seeks to address these gaps and contribute meaningfully to the enhancement of ESP pedagogy in maritime education.

While gamification has become increasingly popular in general education, its use within English for Specific Purposes (ESP), especially in maritime contexts, has not been widely studied. Existing research in ESP tends to concentrate on areas such as vocabulary development or reading comprehension, leaving other critical skills like grammar relatively overlooked. (Rahman, 2015), As a result, there is a noticeable gap in research concerning grammar instruction within this context. Although Quizizz has gained widespread use in classrooms, few empirical studies have explored its integration with Bloom's Taxonomy to support grammar

learning in vocational maritime education. This study aims to bridge that gap by examining the pedagogical potential of Quizizz in strengthening maritime students' grammar proficiency. This study aims to evaluate the effectiveness of using Quizizz Gamification App, structured around Bloom's Taxonomy, in improving the English grammar of maritime students at AMI AIPI Makassar. It also seeks to explore students' perceptions of gamified grammar instruction and its impact on their engagement and learning outcomes

METHOD

Research Design

This study used *quasi-experimental design* with model *pre-test and post-test with control group* to evaluate the effectiveness of using Bloom's Taxonomy-based Quizizz in improving the grammarof maritime students (Jack R. Fraenkel, Norman E. Wallen, 2011). This design is considered suitable because it allows comparison between groups with controlled learning conditions. In addition, this study adopts an approach *mixed methods* which combines quantitative and qualitative methods simultaneously. This approach provides a comprehensive understanding of learning outcomes as well as student perceptions (Creswell & Creswell, 2018). Quantitative data helps to objectively measure the results of grammar improvement, while qualitative data provides insight into students' motivation and experiences with gamification.

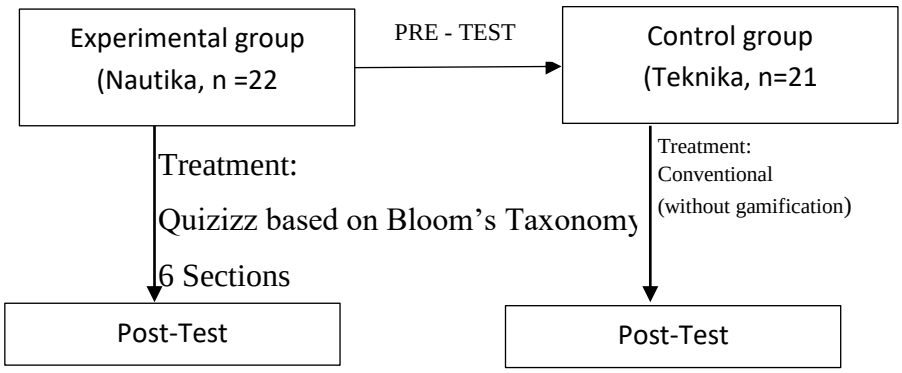

Figure 1. Quasi-experimental design

Population and Sample

The population in this study was all cadets in the 3rd semester of the Nautika and Teknika study program at AMI AIPI Makassar with 43 students. This population is homogeneous in terms of English curriculum and initial proficiency level. Sampling was carried out using the *purposive sampling*. the selection of subjects based on the suitability of certain characteristics

with the purpose of the research (Eric, 2016). In this case, two classes were chosen because they had similar curricula and learning profiles, so that the results could validly reflect differences in treatment (Scott, 2021).

Instruments

The primary instruments used in this study included a Grammar Test based on Bloom's Taxonomy, covering a range of cognitive levels from *Remembering* to *Creating*. This structure enabled a comprehensive assessment of students' grammar competencies (Anderson & Krathwohl, 2001). A Perception Questionnaire employing a 5-point Likert scale was also administered to measure students' perceptions regarding comfort, perceived effectiveness, and motivation in using Quizizz for grammar learning (Boone & Boone, 2012). Additionally, limited semi-structured interviews were conducted to gain deeper insights into students' experiences and perceptions of gamified grammar instruction (Creswell & Poth, 2018).

Treatment Procedures

The experimental group participated in six instructional sessions utilizing Quizizz, with each session specifically designed to target one cognitive level of Bloom's Taxonomy. This approach aimed to move grammar instruction beyond mere memorization, fostering higher-order thinking skills such as application, analysis, and evaluation of grammatical structures. In contrast, the control group received conventional grammar instruction without the use of digital tools or gamified elements. This experimental design was intended to isolate the effect of the Quizizz-Bloom integration, ensuring that any differences in learning outcomes could be reliably attributed to the intervention.

Data Collection Techniques

Data collection was conducted using multiple instruments to ensure both quantitative and qualitative insights. *First*, pre- and post-treatment grammar tests were administered to objectively measure changes in students' grammatical competence. *Second*, a Likert-scale questionnaire was used to evaluate students' perceptions of Quizizz as a tool for grammar learning. *Third*, participatory observation was carried out by the researcher to document student engagement and interaction during the learning sessions. *Finally*, open-ended interviews were conducted to enrich the perceptual data, particularly in response to notable patterns identified through observations or questionnaire results.

Data Analysis

Data analysis was conducted using both quantitative and qualitative approaches. For the quantitative analysis, a paired-sample t-test was employed to compare pre-test and post-test scores within each group, while an independent-sample t-test was used to examine differences between the experimental and control groups (Field, 2020). Meanwhile, a thematic qualitative analysis was applied to observation notes and interview transcripts. This process involved identifying recurring themes that emerged inductively from student responses, following the framework proposed by Braun and Clarke (2019)

RESULT

Quantitative Results

This study compared the increase in grammar scores between two groups: the experimental class (Nautika) that used Bloom's Taxonomy-based Quizizz, and the control class (Teknika) that followed conventional teaching methods.

Pre-test results showed that both groups had relatively equal initial ability levels. However, after six treatment sessions, there was a significant increase in scores in the experimental group.

Table 1. Pre-test and post-test results of experimental and control groups

Group	N	Pre-test (Mean ± SD)	Post-test (Mean ± SD)	Difference
Experimental (Nautika)	22	64.3 ± 6.7	82.5 ± 5.8	18.2
Control (Teknika)	21	63.9 ± 6.9	70.2 ± 5.5	6.3

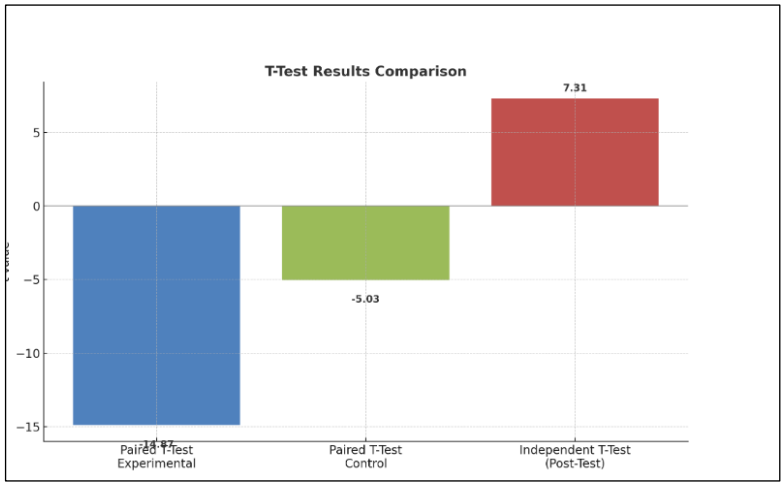

Figure 2. Pre and post test score comparison chart

The blue bar illustrates the substantial impact of the intervention on the experimental group, reflecting a marked improvement in grammar scores. The green bar indicates a moderate yet statistically significant gain in the control group, despite the absence of gamified

instruction. The red bar highlights the significant post-test difference between the two groups, emphasizing the effectiveness of the Quizizz based on Bloom's Taxonomy aligned approach.

Tabel 2. Results of paired t-test & independent t-test

Test Type	t-value	df	Sig. (2-tailed)
Paired T-Test Experimental (Pre-test vs Post-test)	-14.87	21	0.000
Paired T-Test Control (Pre-test vs Post-test)	-5.03	20	0.000
Independent T-Test Post-test Experimental vs Control	7.31	41	0.000

The results of the paired-sample t-test revealed a significant improvement in grammar scores within both the experimental and control groups. However, the independent-sample t-test indicated that the post-test scores of the experimental group were significantly higher than those of the control group ($p < 0.05$). These findings suggest that the integration of Quizizz, structured according to Bloom's Taxonomy, is an effective approach for enhancing the grammar proficiency of maritime students.

Students' Preceptions

To examine students' perceptions of using Quizizz for grammar instruction, a questionnaire was administered following the completion of the treatment sessions. The results indicated that the majority of students responded positively to the use of Quizizz, particularly appreciating its interactive and engaging features. In terms of learning outcomes, the paired-sample t-test showed significant improvements in grammar scores within both the experimental and control groups. However, the independent-sample t-test revealed that the experimental group outperformed the control group in the post-test ($p < 0.05$). These findings support the effectiveness of integrating Quizizz with Bloom's Taxonomy as a pedagogical strategy for enhancing grammar proficiency among maritime students.

Tabel 3. Students' perceptions of using quizizz for grammar learning

Statement	Mean Score (Likert 1-5)
Quizizz makes grammar learning more enjoyable	4.7
The leaderboard feature increases my motivation to learn	4.5
Instant feedback helps me understand my grammar mistakes	4.6
The variation of questions based on Bloom's taxonomy helps me understand sentence structure.	4.4
I feel more motivated to learn grammar with Quizizz compared to traditional methods	4.8

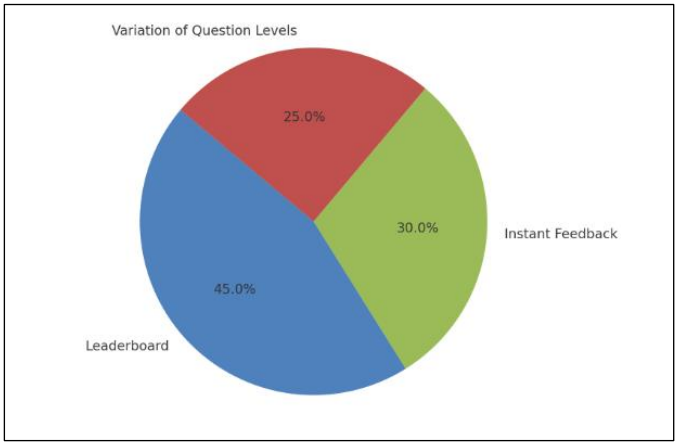

Figure 3. Most engaging features according to students

The chart presents the most engaging features of the Quizizz platform, as perceived by maritime cadets following grammar instruction aligned with Bloom's Taxonomy. The leaderboard emerged as the most engaging aspect (45%), with students noting that it fostered a sense of healthy competition, encouraged active participation, and motivated them to improve their performance throughout the activities. The instant feedback feature (30%) was also highly appreciated, as it enabled learners to immediately recognize and correct their errors, supporting a more responsive and reflective learning process. Additionally, the variation in question levels (25%), structured according to Bloom's cognitive hierarchy, was seen as a valuable component. Students reported feeling both challenged and supported as they progressed through tasks ranging from lower-order skills (e.g., remembering and understanding) to higher-order thinking (e.g., applying and analysing). This scaffolded approach was perceived to enhance engagement while promoting deeper and more meaningful learning

DISCUSSION

The findings of this study reinforce prior research suggesting that cognition-based gamification can enhance English language learning outcomes, particularly in the area of grammar. The significant improvement observed in the experimental group aligns with the principles of Bloom's Taxonomy, which promotes a progressive development of thinking skills from remembering and understanding to applying, analysing, and creating (Anderson & Krathwohl, 2001). Quizizz with its capacity to align questions to specific cognitive levels, enables a multidimensional approach to grammar instruction that moves beyond rote memorization. These results also in line with Self-Determination Theory, as features such as leaderboards and instant feedback address students' psychological needs for autonomy and competence. From a constructivist perspective, using digital platforms like Quizizz provides

scaffolding through interactive feedback and adaptive learning pathways, supporting more independent and learner-cantered grammar instruction.

In sum, this study not only confirms the effectiveness of integrating Quizizz and Bloom's Taxonomy in the context of Maritime English for Specific Purposes (ESP), but also contributes to a broader understanding of how interactive, technology-enhanced strategies can revitalize grammar teaching—an area often viewed as dry or disengaging.

Why Did This Approach Prove Effective?

- Enhanced Learning Motivation (Self-Determination Theory). The effectiveness of the approach can be partly explained through the lens of Self-Determination Theory, which emphasizes the importance of fulfilling learners' psychological needs for autonomy, competence, and relatedness. Gamified features in Quizizz such as leaderboards, live scoring, and personalized avatars—created a sense of achievement and ownership in the learning process. Supporting this, questionnaire results revealed that students rated their motivation to learn grammar using Quizizz at 4.8 out of 5, significantly higher than with traditional methods.
- Interactivity that Encourages Engagement Quizizz's interactive design played a critical role in sustaining student engagement. Real-time quizzes, automated feedback, and competitive elements fostered active participation, even among previously passive learners. Notably, 45% of students identified the leaderboard as the most enjoyable feature, citing it as a motivating factor that enhanced their willingness to participate.
- Layered Learning through Bloom's Taxonomy By aligning instructional activities with Bloom's Taxonomy, grammar instruction followed a cognitively progressive path from basic recall of sentence structures to the creation of complex maritime messages. This layered learning approach deepened students' grammatical understanding and application. Post-test results showed the most significant gains occurred during the "Evaluating" and "Creating" stages, suggesting that students were not only able to recall rules but also apply them in real-world maritime communication scenarios.
- Digital Scaffolding in Action. Quizizz also provided digital scaffolding through features such as review options, immediate feedback, and explanations for incorrect answers. This supports Vygotsky's constructivist theory, which emphasizes that learning is most effective when students receive appropriate guidance within their Zone of Proximal Development (ZPD). Quizizz allowed learners to receive timely support that matched their level of understanding, promoting more independent and confident learning.

Contextual Relevance in Maritime ESP. Grammar instruction was further strengthened by embedding it within authentic maritime English for Specific Purposes (ESP) contexts. Quizizz activities featured realistic scenarios—such as logbook entries and radio communications that mirrored students' future professional tasks. As a result, grammar was no longer perceived as an abstract set of rules, but as a functional tool essential to effective and safe maritime operations.

CONCLUSION

This study concludes that the integration of Quizizz designed within the framework of Bloom's Taxonomy, significantly enhanced the grammar proficiency of students in the Nautical study program at AMI AIPI Makassar. Results from both the paired-sample t-test and the independent-sample t-test indicated a notably higher increase in post-test scores among students in the experimental group compared to those in the control group. These findings demonstrate that this instructional approach is not only statistically effective but also promotes a more structured, engaging, and learner-cantered grammar learning experience.

In response to the first research question *"Can the use of Quizizz based on Bloom's Taxonomy improve the grammar of maritime students?"* the quantitative data provide compelling evidence of a significant positive impact. The second research question, which explored student perceptions, was addressed through questionnaire results and classroom observations. These revealed that students felt more motivated, challenged, and engaged when learning grammar through the gamified and cognitively structured platform. By combining gamification with cognitive scaffolding, this approach enabled students to progress gradually through increasingly complex levels of grammar mastery, from remembering to creating, while benefiting from immediate and personalized feedback. As a result, grammar instruction became not only easier to comprehend but also more enjoyable effectively increasing the learning motivation of maritime students who had previously found conventional grammar lessons unengaging

Pedagogical Implications

Based on the findings of this study, the integration of Quizizz and Bloom's Taxonomy is strongly recommended for implementation in maritime vocational education, particularly in the teaching of grammar. The incorporation of gamification elements—such as leaderboards, real-time feedback, and flexible question design—has been shown to foster a learning environment that is not only interactive and engaging, but also responsive to the unique needs

of vocational learners. Moreover, it is essential for educators to embed cognitive taxonomy into the design of grammar tasks. Moving beyond the simple recall of language rules, tiered questioning strategies encourage students to engage in deeper cognitive processes, including understanding, applying, analysing, evaluating, and creating sentence structures within meaningful maritime contexts. This approach helps learners build more robust and transferable communicative competencies, which are essential in professional maritime communication.

Additionally, this gamified learning model aligns well with the learning preferences of digital-native students, who are typically more responsive to visual, interactive, and technology-enhanced instruction. As such, the adoption of this method holds considerable potential to enrich and modernize grammar instruction, offering an effective alternative to traditional methods that are often perceived as monotonous or less impactful.

Limitations

While the findings of this study demonstrate the effectiveness of using Quizizz integrated with Bloom's Taxonomy in grammar instruction, several limitations should be acknowledged. First, the sample size was relatively small (n = 43) and limited to students from only two study programs. As a result, the generalizability of the findings to broader maritime or vocational education contexts may be constrained. Additionally, the intervention was conducted over a short duration, which limits the ability to assess the long-term sustainability of the observed learning outcomes.

Second, the scope of this research focused exclusively on grammar instruction within Maritime English. Other key components of English for Specific Purposes (ESP) such as writing technical reports, engaging in radio communication, or interpreting logistical texts were not addressed in this study. These areas represent valuable directions for future research, particularly in exploring how gamification and cognitive scaffolding can be applied to support a more holistic development of language competencies relevant to the maritime profession.

RECOMMENDATIONS

To build upon the findings of this study, future research is encouraged to adopt a longitudinal design in order to examine the consistency of grammar improvement over time and to assess the sustained impact of gamified instruction on both academic performance and workplace readiness. Long-term investigations would also offer valuable insights into the durability of student motivation, particularly beyond the initial novelty phase often associated with gamification.

Additionally, there is significant potential to extend this approach to encompass other language skills within ESP, such as technical report writing, oral communication in professional contexts, and the interpretation of industry-specific texts. Expanding gamification strategies across multiple skills would contribute to a more holistic and contextually relevant language learning experience for maritime students. Finally, comparative studies involving alternative gamification platforms—such as Kahoot, Word wall, or Quizlet—are highly recommended. Evaluating the effectiveness, feature sets, and pedagogical flexibility of these tools in relation to learning outcomes will help educators and institutions make informed decisions about selecting digital resources that align with student characteristics, curriculum goals, and institutional contexts

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