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Aspects of gamification in the ESP program for maritime students

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Abstract. This paper explores the possibilities offered by the integration of various gamified learning tasks in the teaching of maritime English at "Mircea cel Bătrân" Naval Academy, with a focus on the enhancement of the acquisition of specialized vocabulary. The study will discuss the impact of online interactive activities in a game-like format on student motivation, as well as on the speed and quality of the subsequent linguistic intake. Classroom observations have shown that gamified learning activities and strategies have enriched the learning process by prompting a higher level of engagement with the learning content, by fostering participation, developing transferable digital skills, encouraging student autonomy and ultimately leading to learner empowerment. The paper will also provide some practical demonstrations of such gamified language learning activities with the aim of sharing best practices and encouraging the use of ICT means in the teaching and learning process.

1. Key concepts. Literature review

Digital gamified learning is a segment of e-learning which has garnered quite a lot of academic attention and recognition in the last fifteen years. The concept of gamification appeared roughly at the beginning of the 2000s, at first in the marketing field. In 2011 Deterding et al. put forth the now widely accepted definition: "the use of game-design elements in non-game contexts." (Deterding et al., 2011, p. 10) Papastergiou, M. (2009) and later De-Marcos et al. (2016) discussed game-based learning (GBL) wherein game features and principles as well as gamified content are incorporated into a learning setting and used as an e-learning technique to enhance the overall academic performance of learners. According to Barata et al. (2017) game elements may include points systems, levels, rewards, leaderboards, quizzes, etc.

Since the 2011 definition, the potential of gamified educational tools to facilitate the creation and delivery of more meaningful, immersive and engaging learning experiences has been investigated and reported on in numerous research articles. Zainuddin et al. (2020) offered a comprehensive literature review of research papers published on the use of gamification in the field of education between 2016 and 2019, evidencing its learning outcomes and impact on student motivation and engagement. The last years of the second decade of the 2000s have seen a surge in academic material on the topic as illustrated by literature reviews by Manzano-León et al. (2021), Vnucko and Klimova (2023) and Zou et al. (2019). The latter reported that "10 types of digital games dominate the field, and these generally demonstrate positive effects in *promoting short-term and long-term vocabulary learning*, facilitating reading and listening comprehension, *increasing motivation and engagement*, *decreasing anxiety* and

fostering interactions among learners. These findings further render implications that are meaningful for vocabulary learning and game design." (Zou et al., 2019, p. 751, emphasis mine)

The profile of today's student population (mostly Generation Z) is one based on digital nativism with all its benefits and pitfalls for learning. Our students have been exposed from an early age to multiple format digital content and an array of various stimuli all delivered at mind boggling speeds, which has significantly affected their attention span and ability to concentrate for longer periods of time. Moreover, digital media with its dazzling and highly impactful features and digital games with their fast-faced, overstimulating settings based on a system of competition and rewards have all shaped the affective reaction of the learning generation to the content they are meant to process.

It seems that for our learners to respond to learning prompts with the necessary interest and engagement to ensure a successful outcome, the learning experience must be "fascinating or at least interesting." (Campos et al., 2015, p. 117) This insight places the role of the teacher into a new light as they become facilitators of the learning process and mediators between the target content and the learners, the latter playing an active and decisive role as the main actors in their own learning journey. Thus, teachers nowadays must strive to create engaging learning contexts in which both the content presentation and the learning procedures cater to the preferences and learning styles of our modern learners who are obviously highly engaged with technology and less open to traditional teaching approaches and strategies. In this context, game features and mechanics such as points, rewards, scores, etc. are important in securing learner engagement, affective response and motivation. (Barata et al., 2017)

Motivation is commonly acknowledged to be one of the key elements to a successful learning enterprise (Gamlo, 2019, Saeed and Zyngier, 2012). Research on the impact of gamified tasks and content on student motivation have shown a noticeable increase in motivation as reported by Jović et al. (2021) who analyzed the effects of the regular use of several gamified apps to teach ESP vocabulary at tertiary level. In this case "92% of the respondents believed that the use of apps *motivated them to actively engage in class activities*." (Jović et al., 2021, p. 13, emphasis mine) Another study carried out by Zarzycka-Piskorz in 2016 on a group of 112 ESP undergraduate students focused on the learning of grammar with the help of a game developed in Kahoot!, a very popular online gamified learning platform. Students expressed their opinions on the interest level of the gamified activities and their motivation to complete them. The findings indicated that a significant percentage of the students (70%) felt motivated to learn grammar by playing Kahoot!, and appreciated that the game offered them the possibility of revisiting the target content. Whether motivation is intrinsic or external, conditioned by rewards, score and points, is still a point of contention among researchers, nevertheless, the consensus is that it does manifest itself more evidently as the driving force behind game-based learning than in the case of the traditional educational setting.

In the context of teaching and learning vocabulary, gamified activities have brought in the necessary elements of excitement and engagement to offset the tediousness of memorization and repetition As pointed out by Waluyo and Bucol, "gamifying vocabulary learning is one solution to get students interested and excited about learning words in a playful context, yet still within comprehensive vocabulary instruction. (Waluyo and Bucol, 2021, p.165)

In addition to being motivating and captivating, gamified activities have been undeniably proven to be instrumental in facilitating a more efficient acquisition and retention of target vocabulary. For instance, Zainuddin et al. (2020) report that the incorporation of gamified elements in the teaching and learning process has positively impacted student academic achievement when compared to the results of conventional, traditional classroom activities and settings. Other studies (Jović et al., 2021) and (Chen et al., 2019) also report higher levels of perceived satisfaction in terms of the efficiency of learning and the level of lexical retention. In one study conducted by Głowacki et al. in 2018 on an ESP course for undergraduate polytechnic students, Kahoot! was used to study engineering terminology and grammatical structures. The research findings indicated that students' lexical and grammar knowledge had increased significantly after practicing with the help of the Kahoot! games. Students expressed their appreciation for the competitiveness aspect of the games and their

entertaining and motivating qualities. Perhaps the most interesting insight provided by this study is the effect of gamified activities on the activation and performance of the lower level students who had previously shown little agency and initiative in their own learning process. It appears as though such students are more willing to get involved and face the challenges of learning vocabulary in a gamified settings rather than a traditional pen and paper one.

One of the biggest contributions of gamified activities in language learning, particularly in the case of vocabulary acquisition as discussed herein, is the possibility of fostering learner autonomy, which as Almusharraf (2020) points out, is in close connection to intrinsic motivation. While playing games to study vocabulary, learners are encouraged to take charge of their own learning process and make decisions as to the time allotted to study, the pace of study, the number of revisions, etc. The flexibility offered by digital gamified content allows learners to develop their own learning strategies to accomplish their objectives, thus taking ownership of their learning experience while becoming autonomous and empowered. What is more, according to Panmei and Waluyo, "gamification apps are one of the technologies that enable teachers to foster learner autonomy outside of class hours" (Panmei and Waluyo, 2023, p. 5) as the learning process can take place either during class hours or outside them, as individual study.

2. Practical demonstration.

This section will offer a practical demonstration of the ways in which several digital gamified tools were employed in the teaching of specialized vocabulary to marine electrical engineering students at "Mircea cel Bătrân" Naval Academy in Constanta.

Student population. Venue. The target student audience is made up of 30 1st year and 25 2nd year marine electrical engineering students. The working level is B1/B1+ according to CEFR. The students have a 100-minute session per week for 14 weeks per semester. Their course objectives focus on the acquisition of general ship terminology during the first year of study, moving on to more specialized marine electrical engineering lexical content in the second year of study. In addition, students are expected to develop both their receptive skills (reading and listening) and their productive skills (being able to communicate orally and in writing in everyday and professional contexts). All the English classes are held in a multimedia laboratory with an integrated smartboard and 21 networked computers connected to the Internet.

Digital gamified tools. During the English classes the following digital gamified tools were used: Quizlet, Learning Apps, Wordwall and Factile (to create Jeopardy games).

Procedures: Quizlet is one of the most commonly used learning apps for vocabulary, based on the concept of using flashcards as learning tools. It also adds extra writing, spelling and matching activities and offers a variety of features for teachers to create, save and organize their content in classes and study sets. You can save other study sets, not just your own creations which decisively broadens your options for a variety of study content. Your students can be invited via invitation link to join your class. In this way it is easier for them to access the required study set. The flashcards will typically show a word/ phrase to be studied with its written and audio definition/ explanation, examples and possibly visual illustration on the flipside. The application allows for two types of practice: live in class with students competing against each other either individually or in groups and the self-study mode (which can still be used in class) with four main options: *flashcards, learn, test, and match.* The application will automatically transform your flashcards into a variety of exercise formats from T/F, multiple choice, matching to written answers etc. Students have the possibility to play as many times as they wish.

In our particular context, Quizlet was employed during the practice phase of the seminar on the topic of "Ship Parts" for the 1st year students, after the vocabulary had been presented in plenary by means of contextualizing videos, texts and audio content. By that time, the students had already practiced their receptive skills on textual and audio input by answering comprehension questions. In order to consolidate their newly received lexical knowledge and enhance the vocabulary retention rate,

students were directed to a pre-selected flashcards set on the session topic: (see flashcard set here: https://quizlet.com/714922180/merchant-navy-study-flash-cards/?funnelUUID=50eca4a6-33a3-42d5-9f37-c523b5f7836c). Students were allowed to select the format they favored and decided on the number of exercises they did and the pace of their study. The efficiency of this vocabulary learning approach was confirmed during the mid-semester and final tests in which a significant percentage of students demonstrated a good knowledge of the targeted vocabulary, scoring, on average, well above 80%.

Another digital authoring platform, namely *LearningApps*, has also been used to expand the exercise format from Quizlet to other interactive gamified activities. On *LeanringApps* teachers can use a large variety of available templates to create exercises which can then be collected in personal folders in the teacher's account. Exercise apps can be made public or private and a link can be sent to users or the app can be embedded or accessed via a QR-Code.

In our case, several learning apps meant to practice with vocabulary related to "Life-Saving Appliances onboard Merchant Ships" have been developed and integrated in the face-to-face seminar for 2nd year marine electrical engineering students. Students were presented with a word document handout which they could access on their computers in the laboratory. The seminar followed the traditional presentation, practice, production sequence and the digital gamified activities were accessed via a web link on their handout. For instance, the multiple-choice activity pictured below was used to practice with the significance of IMO safety pictograms/ signs. It might be of interest to mention the fact that students also had the same activity in word format on their handout but preferred, in a significant percentage, to solve the interactive online variant. Another online interactive sorting activity was used to differentiate between categories of life-saving appliances at sea.
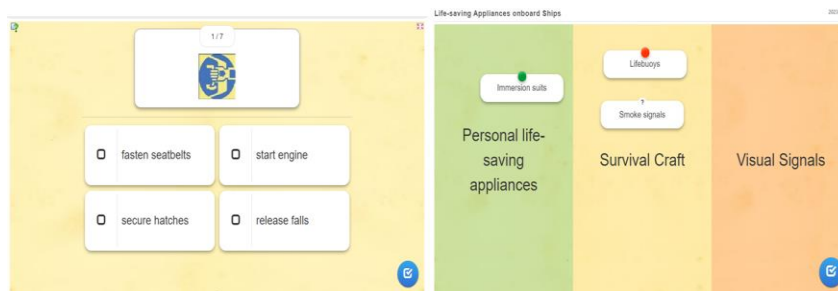

Finally, two more digital gamified application platforms were used, this time to facilitate student interaction and cooperation in solving a collaborative, competition-based gamified task. In addition to the regular gamified features such as scores and a prompt, online feedback, both Wordwall and *Factile* offered a fully immersive, quiz show experience, with all the trimmings and excitement of a fully-fledged entertainment show such as challenges, avatars, chimes, applauses, etc.

Wordwall is an authoring platform which combines the benefits of the variety of exercise formats offered by LearningApps and the repurposing options offered by Quizlet. Thus, once a type of exercise is created, it can be automatically recreated in another available format. See image below.

In our case, the 2nd year students were given the opportunity to consolidate their knowledge on the topic of "Direct Current" by playing a quiz show game. During the game they faced challenges, received surprise bonuses, faced time pressure and contemplated a final leader board position. They could also retake the game in another format such as Spin the Wheel.

Factile allows teachers to create *Jeopardy* style games and was used with 1st year students to practice on the topic of "Ship General Arrangement Plan" in the practice phase. The students had already been introduced to the key concepts via reading texts and videos and used the second part of the seminar to play the game in order to consolidate the newly acquired knowledge.
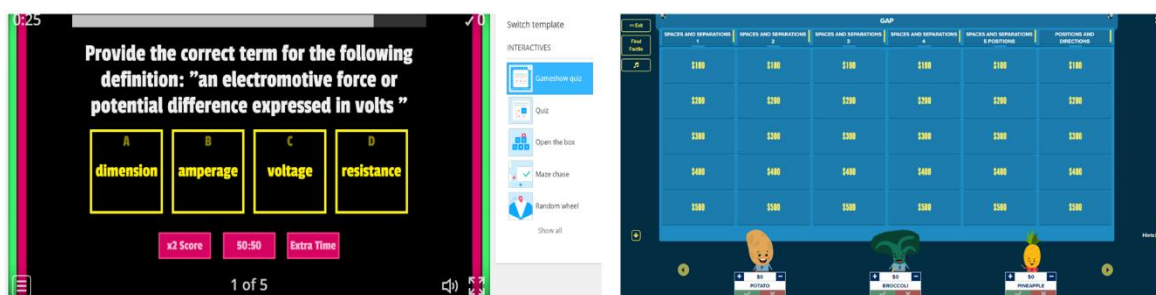
Student feedback. In all instances presented herein classroom observation and informal discussions revealed that the students had an overwhelmingly positive perception of the attractiveness and, most importantly, usefulness of such activities and intimated that they preferred them to more classical pen and paper ones. They felt confident in their vocabulary intake, fact confirmed by their mid-semester and final semester tests.

Conclusions

ESP lexical content is notoriously dry, as there is less opportunity for students to relate to it from an affective standpoint by involving in discussions of the values clarification type or expressing their opinions on the topic, etc. Given such inherent limitations, it is up to the teachers to strive to present the content in a manner which will increase the interest level and thus, the students' motivation and engagement with the target material. Gamified learning activates can constitute one of the solutions to cater to the learning styles of our current target population either by incorporating them in a classical face-to-face setting or as self-study tools. They will not replace other paper-based face-to-face activities but rather complement them, offering a broader spectrum of learning strategies and tools to boost student involvement, affective rapport, efficient lexical acquisition and retention and finally, student autonomy.

References

[1] Almusharraf, N., Agudo, J. (Reviewing editor) (2020) Teachers' perspectives on promoting learner autonomy for vocabulary development: A case study. Cogent Education, 7:1.

[2] Barata, G., Gama, S., Jorge, J., & Gonçalves, D. (2017). Studying student differentiation in gamified education: A long-term study. Computers in Human Behavior, 71, 550–585.

[3] Campos, A., Batista, E., Signoretti, A., Gardiman, R., & Madeira, C. (2015). Gamifying activities in a higher education course. Proceedings of European Conference on Games Based Learning (ECGBL 2015) 117–124.

[4] Chen, C.M., Liu, H., Huang, H.B. (2019) Effects of a mobile game-based English vocabulary learning app on learners' perceptions and learning performance: A case study of Taiwanese EFL learners. ReCALL, 31, 170–188.

[4] De-Marcos, L., Garcia-Lopez, E., & Garcia-Cabot, A. (2016). On the effectiveness of game-like and social approaches in learning: Comparing educational gaming, gamification & social networking. Computers & Education, 95, 99–113.

[5] Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: Defining "gamification". Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments, 9-15.

[6] Gamlo, N. (2019). The impact of mobile game-based language learning apps on EFL learners' motivation. English Language Teaching, 12, 49–56.

[7] Głowacki J., Kriukova Y., Avshenyuk N., (2018) Gamification in Higher Education: Experience of Poland and Ukraine. Advanced Education, 10, 105-110.

[8] Jović, J., Anđelković, J., Meršnik, M. (2021). In-Class Use of Web Applications with ESP Students in Higher Education. Scripta Manent, 17:1, 3–18.

[9] Manzano-León, A., Camacho-Lazarraga, P., Guerrero, M.A., Guerrero-Puerta, L., Aguilar-Parra, J.M., Trigueros, R., Alias, A. (2021) Between level up and game over: A systematic literature review of gamification in education. Sustainability, 13, 2247.

[10] Panmei, B., Waluyo, B. (2023) The Pedagogical Use of Gamification in English Vocabulary Training and Learning in Higher Education. Education Sciences 13:1, 24.

[11] Papastergiou, M. (2009). Digital Game-Based Learning in High School Computer Science Education: Impact on Educational Effectiveness and Student Motivation. Computers & Education, 52, 1-12.

[12] Saeed, S., & Zyngier, D. (2012). How motivation influences student engagement: A qualitative case study. Journal of Education and Learning, 1:2, 252–267.

[13]Vnucko, G., & Klimova, B.F. (2023). Exploring the Potential of Digital Game-Based Vocabulary Learning: A Systematic Review. Systems, 11, 57.

[14]Waluyo, B., Bucol, J.L. (2021) The impact of gamified vocabulary learning using Quizlet on low-proficiency students. Computer Assisted Language Learning. Electronic Journal, 22, 164–185.

[15] Waluyo, B. (2020) Learning outcomes of a general English course implementing multiple e-learning technologies and active learning concepts. J. Asia TEFL, 17, 160–181.

[16] York, J., & deHaan, J. W. (2018). A constructivist approach to game-based language learning: Student perceptions in a beginner-level EFL context. International Journal of Game-Based Learning, 8:1, 19–40.

[17] Zainuddin, Z., Chu, S. K. W., Shujahat, M., & Perera, C. J. (2020). The impact of gamification on learning and instruction: A systematic review of empirical evidence. Educational Research Review, 30, 1 – 23.

[18]Zarzycka-Piskorz E., (2016) Kahoot It or Not? Can Games Be Motivating in Learning Grammar? Teaching English with Technology, 16:3, 17-36.

[19]Zou, D.; Huang, Y.; Xie, H. (2019) Digital game-based vocabulary learning: Where are we and where are we going? Computer Assisted Language Learning, 34:6, 751–777.