

## **Gamification in the English Language Class: Analysis of Pre-service Teachers' Perceptions**

Ignacio Fernández-Portero (ignaciofp@unex.es)  
Universidad de Extremadura, Cáceres, Spain

Cristina Castillo-Rodríguez (cristina.castillo@uma.es)  
Universidad de Málaga, Málaga, Spain

### **Abstract**

An educative breakout is a modified version of the popular immersive entertainment experience of escape rooms, in which game elements and game design techniques are used in non-game contexts. In educational settings, it is usually used to teach content while developing cognitive skills to improve learners' performance. This study used a mixed-methods research design to examine the effectiveness of a digital breakout to learn English as a Foreign Language (EFL) in higher education. Quantitative and qualitative data were collected through several forms and surveys so that the participants could express their perceptions about this learning experience. Results showed that pre-service English teachers (N = 95) had a positive attitude towards learning grammar-related content through complex games, riddles, and puzzles. Moreover, 95.8% of them would use this teaching method in the future and 90% completed all the challenges. Therefore, it can be concluded that a gamification-based approach can be an effective and motivating way to learn EFL in higher education.

*Keywords:* Pre-service teachers, breakout, gamification, EFL, motivation.

### **Introduction**

Games play a significant role to change the traditional teacher-centred classroom into a learner-centred one (Wichadee & Pattanapichet, 2018). The current trends in education demand “a shift from lecture-based, content-focused instruction to hands-on, student-centred techniques that foster lifelong learning competencies” (O'Brien & Pitera, 2019, p. 192). This change can be possible due to the recent technological advances and the wide variety of digital teaching tools and resources, which make game-based learning (GBL) and gamification popular assets in the educational system (Vidergor, 2021). While the former refers to real games used in the classroom to enhance learning and teaching, the latter relates to game-design elements used in non-game contexts (Wiggins, 2016).

GBL and gamification are pedagogical processes that can help learners to achieve educational goals and develop their skills through active participation, problem-

solving and instant feedback (Connolly et al., 2012). Their adaptability differentiates them from one-size-fits-all lectures to the extent that they can suit the learners' skill-level to reach a state of optimal experience for learning, feeling more capable and skilled (Csikszentmihalyi, 1990). Research shows that these student-centred teaching models have been well accepted by learners (Lathwesen & Belova, 2021; O'Brien & Pitera, 2019), as well as the transformation of contents into games (Hunt-Gómez et al., 2020), which is an indicator of positive attitudes towards these teaching methods.

Positive learning outcomes are connected to these teaching techniques because of what they entail in both the pedagogical and cognitive spheres. The two most relevant pedagogical actions might be instant feedback and collaborative learning. On the one hand, there is evidence that instant feedback has a direct effect on learning outcomes and motivation because learners are constantly guided while learning from mistakes, and it benefits the classroom flow to increase their engagement (Wichadee & Pattanapichet, 2018). On the other hand, collaborative learning is another effective approach (Manzano-León et al., 2021) and, when linked to the use of mobile applications, it produces higher levels of students' perceived competence, perceived autonomy, intrinsic motivation, and achievement through competence (Fithriani, 2021; Jenó et al., 2019). Regarding cognitive learning outcomes, the achievement of knowledge transfer through skill-based learning leads to affective learning outcomes, which are essential to complete a successful learning process (Connolly et al., 2012; Vidergor, 2021).

Integrating technology into teaching and learning is not a new challenge for universities (Schindler et al., 2017), which need to turn their focus to more digitally enhanced lectures—such as gaming—to meet the needs of the students in the 21<sup>st</sup> century (Högberg et al., 2019; Johnson, 2020). This type of teaching can be used in higher-education courses to engage students in learning and model a resource that pre-service teachers can use in their future teaching (Hunt-Gómez et al., 2020; Parker & Hessling, 2019). In the field of foreign language teaching, many studies have demonstrated the positive effects of the inclusion of gamified experiences in the English as a foreign language (EFL) class (Figueroa, 2015; Moreno, 2019) and, when carried out digitally, participants show higher levels of satisfaction, commitment, and engagement than when executed in-person (Johnson, 2020; Wichadee & Pattanapichet, 2018).

Research conducted in this area has shown not only grammar learning effectiveness through the use of online games combined with riddles and puzzles designed with a high level of difficulty to teach curricular content (Wichadee & Pattanapichet, 2018) but also better results in terms of skill-based learning (Bartlett & Anderson, 2019; Hunt-Gómez et al., 2020; Jiménez et al., 2020; Pham et al., 2021), long-term memory (Connolly et al., 2012; O'Brien & Pitera, 2019), problem-solving skills (Manzano-León et al., 2021; Wichadee & Pattanapichet, 2018; Wiemker et al., 2015), critical thinking (Manzano-León et al., 2021) and creativity (Fotaris & Mastoras, 2019; Grande-de-Prado et al., 2021; Jiménez et al., 2020). Therefore, these benefits stated above—i.e., the grammar gains, the motivation, and the development of these cognitive skills—have led us to explore the impact of the implementation of a digital breakout, as a form of gamification-based approach, on pre-service English teachers of primary education. To achieve this, the following research questions were posed:

- RQ1. How effective can a digital breakout be to learn EFL in higher education?  
 RQ2. What attitude will pre-service English teachers have towards learning a foreign language through complex games, riddles, and puzzles?  
 RQ3. To what extent and under what conditions would pre-service English teachers be willing to implement this teaching method in the future?

## **Literature Review**

### **Educative breakout**

An educative breakout is a modified version of the popular immersive entertainment experience of escape rooms, aimed to be used in educational settings to teach content and other skills such as creative thinking, problem-solving, and collaboration (Parker & Hessling, 2019). Escape rooms are a type of “escape games” designed playfully through narrative-based challenges that offer an immersive experience to be usually carried out in groups in a cooperative manner (Grande-de-Prado et al., 2021). Their design includes a game played by teams where they have to “escape” from a room by solving challenges —such as solving riddles and puzzles, finding hidden objects, finding out codes or passwords— within a time limit (Bartlett & Anderson, 2019; Wiemker et al., 2015). When escape rooms have a pedagogical purpose, they are related to gamification and GBL (Grande-de-Prado et al., 2021) because of the cognitive development entailed by skill-based learning while providing suspense and rewards (Healy, 2019).

The main objective of this challenge-based approach is to create a creative and playful learning environment to help learners learn new subject matter and skills, as well as to reinforce and transfer the existing knowledge (Lathwesen & Belova, 2021; Manzano-León et al., 2021). The game concept should be adopted, adapted to the needs of the target group, and linked to the required content-related and process-related skills (Lathwesen & Belova, 2021).

A breakout must meet a series of characteristics in terms of game type (physical, digital or mixed), location (classroom or lab), time limit (average of 30-60 min), and team size (5-10 members) to be considered as such (Fotaris & Mastoras, 2019). However, this can change when offered to students in an online or digital format, asking them to collaborate from home to solve a case related to a topic studied in class while relying on the internet connection to prevent face-to-face communication (Vidergor, 2021).

Research into utilizing these academic activities is still in its nascent stages (Bartlett & Anderson, 2019), reflecting the need for more easily adaptable escape rooms and more empirical evidence on their actual effects (Lathwesen & Belova, 2021). However, some studies have provided evidence that they are useful in enhancing student collaboration and communication skills, and in building specific content knowledge (Bartlett & Anderson, 2019).

### **Characteristics of a breakout**

A series of characteristics or elements must be used for gamification in learning and education. Even though using these elements does not ensure more effective activities or better results (Mora et al., 2017), they are advised for a coherent design. Manzano-León et al. (2021) recommend to take into account some essential elements such as the pattern, the challenges, the physical or online elements used to solve tasks, for the clues, and the narrative. These authors describe the pattern as linear (an orderly sequence of challenges), open (the final task is solved with the combination of the solutions of challenges of all teams), or multilinear (those in which you can simultaneously develop two or more lines of clues/puzzles throughout the game). They refer to the challenges as the diverse tasks whose resolution leads to the exit or other challenges through the use of elements like padlocks, puzzles, hidden codes, encrypted messages, riddles, or hidden objects. According to them, clues are also an essential part that must be provided by the Game Master (GM), who must ensure the group does not become frustrated or stuck in a challenge. Finally, they define the narrative as a guiding thread by which all of the challenges are related. Educational escape rooms are not always designed with a narrative. However, this can contribute to making the game more immersive and, therefore, more motivating for the players.

Despite the variety of possible challenges, Wiemker et al. (2015) identified three core components: a challenge, a solution, and a reward. Durin et al. (2019) listed 33 game elements and concluded that the most popular ones used from 2008 to 2018 were rewards, feedback, challenge, quest/mission/goal, level/stage, point/score, avatars/players, task, character, time limit, narrative/dialogue, leaderboards/dashboards, progress bars, and badges/achievements.

The instructor usually plays the role of Game Designer (GD) and GM, structuring the learning environment and providing instructional scaffolding and instant feedback to the learners to facilitate their interaction not only with the challenges but also with each other (Giang et al., 2018). This follow-up is essential so that participants do not lose the flow in the activity and, therefore, they keep an intense concentration for achievement or winning (Vidergor, 2021). GD and GM must take this work into account as part of the challenges or constraints they might face when designing this type of activity. The lack of resources, the investment of time, the planning stage, the testing of the challenges, and the debriefing stage after the game need to be considered before starting the process (Botturi & Babazadeh, 2020; O'Brien & Pitera, 2019).

### **Benefits of game-based approaches**

Even though a few disadvantages have been conferred upon these game-based approaches (like the breakout): excessive competitiveness, inadequate time management, unfocussed games —i.e., they are created because they are fun or trendy—, stress, frustration, and too high expectations on the instructor's behalf —leading to disappointment when learning outcomes fall short— (Kapp et al., 2012; O'Brien & Pitera, 2019, Padilla et al., 2011; Pisabarro & Vivaracho, 2018), the benefits of these teaching methods surpass their drawbacks (Bartlett & Anderson, 2019; Connolly et al., 2012; Hunt-Gómez et al., 2020; Padilla et al., 2011), and that is why this study is based on this approach as the learning theory to be followed.

Gamification, in general, in education has outstandingly increased in the last decade and, in an online setting, it has the potential to provide greater support for

learning outside formal contexts, and for distance, lifelong, and distributed learning groups (De Freitas, 2006). Digital breakouts are characterized for being innovative, active, collaborative, and constructivist instructional approaches that can shape learning more powerfully than conventional teaching because they help learners understand the value of seeing problems from different perspectives (Fotaris & Mastoras, 2019).

Motivation is one of the main reasons why this trend has been implemented in the classrooms (Pham et al., 2021) and, in the best-case scenario, motivation is intended to lead to engagement. At the university level, it has also been confirmed as a practical and motivating teaching-learning strategy to reinforce and evaluate the curricular contents (Manzano-León et al., 2021). While games may initially motivate students with extrinsic motivation, they can also promote intrinsic or self-generated rewards (O'Brien & Pitera, 2019), leading to an improvement in students' engagement (Connolly et al., 2012; Manzano-León et al., 2021). Some consequences of these actions are noticed through more efficient knowledge transfer and their resulting generalisation (O'Brien & Pitera, 2019), more persistence on task (Fotaris & Mastoras, 2019), and an increase in attendance rates (Barata et al., 2013; Wichadee & Pattanapichet, 2018), students' satisfaction (Friedrich et al., 2018), and self-confidence (Lathwesen & Belova, 2021).

Other benefits are more related to the actions involved in the own games, like cooperation, teamwork, communication, social skills, creativity, critical thinking, meaningful learning, and learning outcomes. On the one hand, the first four have a direct and inherent connection to the breakout itself if it has been designed to be executed in groups. Games can often be a facilitator to social, communication, and peer activities (Kirriemuir & McFarlane, 2004), and collaboration allows small groups of students "opportunities to share perspectives, debate points of disagreement, question and understand each other's points of view, problem-solve complex dilemmas, and reach agreements" (Mahoney & Harris-Reeves, 2019, p. 26). On the other hand, the remaining four benefits are more related to intellectual, cognitive, and psychological benefits since they promote logic, memory, concentration, attention, deductive and lateral thinking, metacognition, imagination, mental agility, conflict resolution, time control, and management of available resources (Jiménez et al., 2020; Nicholson, 2015; O'Brien & Pitera, 2019).

Regarding the EFL class, the implementation of digital games has been positively accepted by students due to the benefits that they bring about (Waluyo & Bucol, 2021; Wichadee & Pattanapichet, 2018). The use of mobile computing devices in foreign language courses at the university level has shown positive results. Pham et al. (2021) designed a platform to study English where learners could play games, interact with their classmates, track their progress, and practice their skills and self-study at the same time. Results showed that using this type of learning through gamified activities improved both the students' academic performance and their autonomy, besides their content-based knowledge and listening skills. Wichadee and Pattanapichet (2018) also reported positive results from a gamified experience in an EFL course in higher education. Participants who were exposed to this type of learning obtained higher scores in performance and motivation and showed more positive attitudes towards the application of digital games in English language classes. Also, Bradford et al. (2021) highlighted that the implementation of a breakout in the EFL classroom provided opportunities for cooperation and collaboration; however, how to balance its difficulty

and how to encourage the use of the target language are some of the challenges underlying this implementation.

## Method

### Aim of the study

This study aimed to determine the impact of a digital breakout on students' academic performance and motivation to learn EFL. To do so, a series of activities were designed following a gamification-based approach to try to answer the research questions stated above.

### Sample

A total of 113 undergraduate students from the 2020-2021 and the 2021-2022 academic year, enrolled in the English Grammar course from the Degree of Primary Education in a Spanish public university, were invited to participate in the breakout activity. The breakout was designed as a voluntary activity rewarded with 0.3 extra points added to their final mark, and participants had one day to complete it (from 8.00 am to 12.00 pm on the day chosen by every team). The main goal was to reinforce the contents studied from units 8-13, which were related to morphology and syntax. The valid sample consisted of 95 students out of 113. Therefore, the response rate was 85.84%, which meant to be representative since 88 participants were enough considering (a)  $\pm 5$  margin of error, (b) 50% heterogeneity, and (c) 95% confidence level. In terms of age and gender, 59 women and 36 men took part in the study (62.1% and 37.9%, respectively), and the mean age was 21.62 years old ( $SD = 2.36$ ). Regarding the participants' L2 level, B1 and B2 were the most common ones among them (see Table 1).

Table 1

*Participants' L2 level according to the Common European Framework of Reference for Languages (CEFRL)*

		Frequency	Percent	Cumulative Percent
Valid	I do not have official certification	27	28.4	28.4
	A2	2	2.1	30.5
	B1	25	26.3	56.8
	B2	39	41.1	97.9
	C1	2	2.1	100.0
	Total	95	100.0	

### Design and procedure

The voluntary breakout consisted of five challenges carried out in four game-based learning platforms and three Google Forms quizzes (GFQ) whose function was to connect the games and help maintain the flow. The platforms and forms were in English and linked to each other through links (URL) or QR codes (see Figures 1 and 2). The breakout started and ended with two surveys to collect data from the participants. The initial survey was aimed to gather sociodemographic data from the participants, while the final one was designed to collect data about their attitudes and perceptions towards the breakout in terms of satisfaction, motivation, collaboration, communication skills, knowledge about the contents learned and/or reviewed, willingness to use this approach in the future, etc. The resources used were TED-Ed, Genially (two challenges), Deck.Toys, and Jigsaw Planet. The sequence followed is displayed in Figure 3.

Figure 1  
*Sample of link (URL) to access a new challenge.*

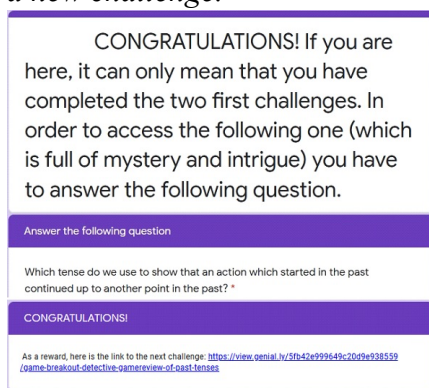


Figure 2  
*Sample of link (QR code) to access a new challenge.*

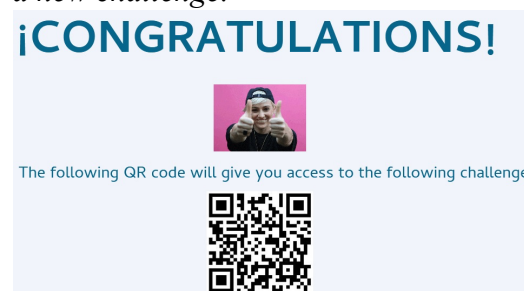
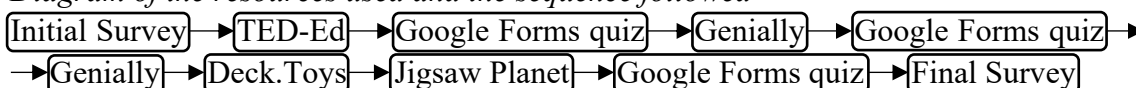


Figure 3  
*Diagram of the resources used and the sequence followed*



Regarding the design, it was carried out following a sequential structure —i.e., solving one puzzle unlocks the next, until the final puzzle can be solved— (Nicholson, 2015), and the model chosen involved two elements focused on achieving the learning goals first and their evaluation after the experience, as proposed by Clarke et al. (2017). Besides, when designing the breakout, a special emphasis was placed on the “flow” so that the tasks were both challenging and enjoyable (Csikszentmihalyi, 1990) while the study was devised using a sequential, explanatory, mixed-methods design since both quantitative and qualitative data were collected (Creswell & Plano Clark, 2010) not only through the tasks but also through the surveys. Finally, in terms of groupings, teams were randomly formed and they consisted of 3-5 members each. Links, codes, and activities were slightly changed for each team to make sure they did not have any type

of advantage over the rest. While every team was carrying out the game, the instructor was available by e-mail to provide support and extra clues in case they could not go on.

As far as the content is concerned, the topics covered were the six following ones under a B2 level according to the CEFRL: tense and aspect, adjectives and pronouns, prepositions and particles, modals, subordinate clauses, and infinitive and gerunds. In the TED-Ed task (see Figure 4) and first GFQ (see Figure 5), participants had to answer questions about English verb tenses. The first Genially challenge was a Use of English exercise they had to complete choosing the right linking word(s) (prepositions, particles, adjectives, and pronouns) to unlock the padlock (see Figure 6). The second GFQ (see Figure 1) was aimed to be a warm-up for the second Genially task, which was a Cluedo (see Figure 7) where the right use of infinitive, gerunds, present, past, and future tenses, besides the resolution of riddles would take participants to find the murderer. The Deck.Toys challenge was based on infographics and audio-visual material about subordinate clauses (dependent and independent) and modal verbs (see Figure 8). The Jigsaw Planet task was a puzzle about future tenses (see Figure 9) that they had to complete to find the link to the last GFQ (see Figure 10), which would take them to the final survey through open-ended questions about pedagogical principles of the teaching of English grammar in primary education.

Figure 4

Sample of the TED-Ed challenge.

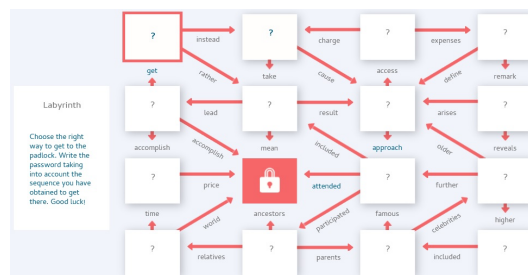


Figure 7

Sample of the second Genially challenge (cluedo).

Figure 5

Sample of the first GFQ.

Figure 6

Sample of the first Genially challenge (labyrinth).

Figure 8

Sample of the Deck.Toys challenge.



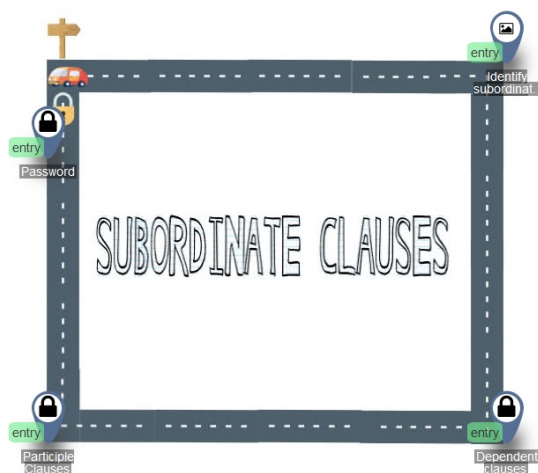


Figure 9  
*Sample of the Jigsaw Planet challenge.*



Figure 10  
*Sample of the third GFQ.*

To what extent the group dynamics implied in a breakout can benefit or impede the learning of English grammar in primary education? \*

Do you think that the complexity of the challenges and time restrictions (so typical in this type of games) can make the learning of English grammar easier or more difficult for 6-12 years-old students? Justify your answer. \*

### Data collection tools and analysis

The main source for data collection was an initial and a final survey elaborated in Google Forms because it has been highly recommended in the literature (Jiménez et al., 2020; Neumann et al., 2020; Vidergor, 2021). These surveys were designed by the 14 members of the project and validated by 4 experts belonging to 4 different Spanish Universities. The forms of the breakout, also designed in Google Forms, enabled the students to submit their solutions and unlock each lock through response validation to prevent them from moving to the next one before they have submitted the correct answer (Neumann et al., 2020). In the final survey, participants were asked to fill in 3 types of questionnaires: ten close-ended questions (weighted with a value of 1 for “Yes” and 2 for “No”), nine open-ended questions, and a 4-point Likert scale consisting of 24 items distributed in eight dimensions: (1) level of difficulty; (2) perceived own learning; (3) working environment; (4) motivation; (5) collaboration; (6) self-regulation, autonomy, and capacity for monitoring progress; (7) promotion of relevance and authenticity; and (8) skill practice and development. This scale had the following range: totally disagree (1), disagree (2), agree (3), and totally agree (4), which was chosen because 4-point scales are easy to understand by participants, require less effort to answer (Nemoto & Beglar, 2014), and maximise reliability (Bendig, 1954; Chang, 1994). Cronbach’s alpha was used to measure the overall internal consistency in this last scale and it was considered optimal (Nunnally and Bernstein, 1994) since the overall reliability was 0.91. With reference to the subscales, Cronbach’s alpha ranged between 0.72 and 0.85 (see Table 3). For the close-ended questions (first and third questionnaires), data were analysed using SPSS (version 22) and, for the open-ended questions (second questionnaire), the text analysis tool Online-Utility.org was used to find insights and trends by creating tags and using them to categorise text responses.

## Results

The breakout activity was primarily designed to check how effective a digital breakout can be to learn EFL in higher education (RQ1). Twenty out of the 22 groups enrolled completed all the challenges within the time limit they had and only 4 groups needed assistance beyond the clues included in every exercise. Therefore, we can conclude that the game was effective to learn and reinforce grammar-related content.

In the second place, this study was aimed to measure pre-service English teachers' attitudes towards learning a foreign language through games, riddles, and puzzles (RQ2). Therefore, when evaluating their perception about the tasks performed through the close-ended questions, in items 1, 4, and 5, most participants answered "Yes" when asked (1) if they enjoyed the experience ( $M = 1.08$ ;  $SD = .279$ ), (4) if they would have assigned a different reward ( $M = 1.21$ ;  $SD = .410$ ), and (5) if they think that the participation in the breakout is a reward in itself as it promotes intrinsic motivation ( $M = 1.08$ ;  $SD = .279$ ), as shown in Table 2.

Table 2  
*Results from the close-ended questions*

	<b>N</b>	<b>M</b>	<b>Standard Error</b>	<b>SD</b>
1. Have you enjoyed the experience with the educative breakout?	95	1.08	.029	.279
2. Would you use this method as a teacher in the future?	95	1.04	.021	.202
3. Do you think the reward assigned to this task was fair enough?	95	1.75	.045	.437
4. Would you have assigned a different reward?	95	1.21	.042	.410
5. Do you think that the participation in the breakout is a reward in itself as it promotes intrinsic motivation?	95	1.08	.029	.279
6. Would you include a reward in Preschool or Early Years?	95	1.41	.051	.495
7. Would you include a reward in Primary education?	95	1.08	.029	.279
8. Would you include a reward in Secondary education?	95	1.04	.021	.202
9. Would you include a reward in Non-compulsory secondary education?	95	1.05	.023	.224
10. Would you include a reward in Higher education?	95	1.03	.018	.176

To evaluate their attitudes towards this innovative experience, the lowest score in the 4-point Likert scale can be found in item 11 (see Table 3), since  $M = 2.86$  ( $SD = .724$ ) and more than half of the participants selected the option "agree" when they were asked if they considered the game as very difficult to follow.

Table 3  
*Results from the 4-point Likert scale*

	<b>N</b>	<b>M</b>	<b>Standard Error</b>	<b>SD</b>
<i>Difficulty</i>				
11. The game was very difficult to follow	95	2.86	.074	.724
<i>Learning</i>				
12. I think the game helps in the review of concepts learnt in class	95	3.35	.071	.696
13. With this method I think I learn more and better than with traditional individual tests	95	3.34	.084	.820
14. It contributes to a significant learning	95	3.57	.061	.595
<i>Working environment</i>				
15. I feel more relaxed with the members of my team during the game rather than with another type of methods	95	3.00	.098	.957
16. All the members of my team have worked equally and collaboratively	95	3.68	.058	.570
17. I have been highly involved during the game	95	3.63	.060	.584
18. My team has listened all my ideas	95	3.77	.051	.494
19. I have listened the ideas of my team	95	3.81	.048	.468
20. It improves the classroom environment	95	3.49	.065	.634
<i>Motivation</i>				
21. It motivates the students and makes them more interested in the subject	95	3.49	.061	.599
22. It fosters curiosity and the willingness to learn	95	3.49	.063	.617
23. It fosters creativity	95	3.48	.070	.682
<i>Collaboration</i>				
24. It promotes participation	95	3.63	.052	.506
25. It improves teamwork	95	3.74	.048	.466
26. It benefits communication	95	3.63	.054	.527
<i>Self-regulation, autonomy, and capacity for monitoring progress</i>				
27. It allows self-evaluation	95	3.42	.068	.662
28. It allows reaching the objectives of the subject	95	3.35	.067	.649
29. It fosters reflection and analysis	95	3.49	.056	.543
30. It allows autonomous learning	95	3.36	.072	.698
<i>Relevance and authenticity</i>				
31. It promotes activities connected to real life	95	3.11	.080	.778
<i>Skill practice and development</i>				
32. It allows varied activities (oral and written)	95	3.46	.068	.665
33. It fosters activities allowing different learning styles	95	3.54	.060	.580
34. It develops all multiple intelligences	95	3.46	.068	.665

*Note.* Cronbach's  $\alpha$  for the subscales: Learning = 0.72; Working environment = 0.78; Motivation = 0.85; Collaboration = 0.80; Self-regulation, autonomy, and capacity for monitoring progress = 0.73; Skill practice and development = 0.78. The dimensions *Difficulty* and *Relevance and authenticity* do not have a measure because this coefficient cannot be estimated with just one item.

Regarding learning, scores on items 12 and 13 were quite similar ( $M = 3.35$  and  $3.34$ , respectively), while in item 14 the score was higher ( $M = 3.57$ ).

When evaluating the working environment as a result of collaboration, item 15 had the second-lowest score in this 4-point Likert scale ( $M = 3.00$ ;  $SD = .957$ ), while the mean in the other five (items 16-20) ranged between 3.49 and 3.81, which means that in these last five items the most selected response was "totally agree".

Motivation was another aspect to be assessed and, in this case, the three items devoted to it had almost the same scores. Items 21, 22, and 23 scored  $M = 3.49$  ( $SD = .599$ ),  $3.49$  ( $SD = .617$ ), and  $3.48$  ( $SD = .682$ ), respectively. Item 19 was about intrinsic motivation, item 20 referred to motivation in terms of engagement by fostering participants' curiosity and interest, and item 23 concerning motivation in connection with creativity. Again, the most selected response was "totally agree" in these three items.

Items 24, 25, and 26 were related to collaboration. Items 24 and 26 were focused on participation and collaboration from the perspective of communication and had the same scores ( $M = 3.63$ ). Item 25 dealt with teamwork and scored higher than the other two ( $M = 3.63$ ;  $SD = .466$ ). Option four, "totally agree", was the most selected one and nobody chose option one, "totally disagree".

Aspects such as self-regulation, autonomy, and capacity for monitoring progress were addressed to determine to what extent participants felt as goal-directed learners along with the game. Items 27, 28, 29, and 30 were focused on this matter, and means were relatively close, ranging from 3.35 to 3.49. Means for items 27 and 29 show that the most selected response was "totally agree", while for items 28 and 30, the most selected response was "agree".

To measure to what extent participants considered the proposed activities as relevant and authentic —i.e., close to real-life experiences—, item 31 was included, obtaining the third-lowest score in this 4-point Likert scale ( $M = 3.11$ ;  $SD = .778$ ), which means that the most selected response was "agree".

Finally, items 32-34 referred to skill practice and development. Items 32 and 34 had the same score ( $M = 3.46$ ), and item 33 scored higher. These means indicate that the most selected response for these three items was "totally agree".

Regarding the nine open-ended questions, four of them were related to the close-ended questions so that the participants could have the opportunity to better explain themselves or justify some of their choices, and the other five were independent —i.e., not related to any question or item—.

In the first independent question, participants were asked for the tools they used to communicate with the members of their teams to solve the challenges. The answers included the following options (participants could choose as many options as they wished): WhatsApp (text messaging and voice messaging), Zoom, Skype, Discord, and

Google Docs. The most selected tool was WhatsApp with an occurrence of 147: 82 participants chose text messaging and 65 voice messaging, as shown in Table 4.

Table 4

*Tools used by participants to communicate with the members of their teams to solve the challenges*

	<b>Text messaging (WhatsApp)</b>	<b>Voice messaging (WhatsApp)</b>	<b>Zoom</b>	<b>Skype</b>	<b>Discord</b>	<b>Google Doc</b>
Occurrences	82	65	26	36	33	21
Percentage	86.32%	68.42%	27.37%	37.89%	34.74%	22.11%

Questions 2, 3, and 4 were related to the quality of the experience from the participants' perspective. In response to item 2 (What has been the best aspect of the experience for you?), it is worth noticing that words such as "working", "work", "team", "review", and "teamwork" were the most recurrent ones in the top-20 of most frequently used words with 15, 14, 11, 10, and 9 occurrences and 1.90%, 1.78%, 1.39%, 1.27%, and 1.14%, respectively. For item 3 (What has been the worst aspect of the experience for you?), it can be highlighted that the clusters "the cluedo", "the time", and "the frustration" were the most recurrent ones in the top-15 (with 12, 9, and 5 occurrences, respectively). These terms were also present in the top-20 of most repeated single words ("time", "cluedo", and "stuck" had 24, 13, and 8 occurrences and 2.66%, 1.44%, and 0.88% respectively). For item 4, (Is there anything you would do differently in your next educative breakout?), the clusters "more time", and "more clues" were the second and third most repeated ones with 14 and 11 occurrences. These words were also present in the top-12 of most repeated terms with 24 occurrences and 3.15% for "time", 15 occurrences, and 1.97% for "clues".

Questions 5, 6, 7, and 8 were aimed at justifying their corresponding closed-ended questions. In question 5 (Please, justify your previous answer, i.e., item 2: Would you use this method as a teacher in the future?), the most repeated responses were "to learn", "a very", "a good", and "good way" with 14, 12, 10, and 9 occurrences, respectively. For item 6 (If your previous answer was "yes", please explain which one, connected to 4: Would you have assigned a different reward?), the most repeated response was "0,5 points" with 17 occurrences. For question 7 (If your previous answer was "no", please explain why, directly related to item 5: Do you think that the participation in the breakout is a reward in itself as it promotes intrinsic motivation?), just two responses were found despite eight participants answered "No" to the previous question. Those two answers were: "I do not consider it a reward in itself since it is part of the syllabus" (student 30) and "This was too hard to make for nothing. Without the reward, I would have quit in the detective game" (student 44). Question 8 (Justify your previous answer by proposing the prize you consider as necessary) was referred to questions 6-10 (see Table 1). The most repeated response was "motivation" (11 occurrences and 1.06%). To reinforce this idea, in the "top phrases containing 4 words"

section of the text analysis tool the word “motivation” had 6 occurrences in 21 samples, which was the highest.

For the last question, number 9 (Would you like to add some other comments?), there were just eight responses, which were the following: “It has been a very good experience” (student 12), “It was an enjoyable and intense activity” (student 21), “I think it could be useful if this activity is included more often in higher education” (student 23), “I enjoyed the breakout, but I didn't find it relaxing” (student 26), “I think you gave us great resources and ideas for the future” (student 29), “I liked the activity but honestly, I didn't enjoyed it due to the stress we have in this period of time” (student 31), “I loved the game, and I hope that many other teachers can use this technique one day” (student 42), and “Thanks for breaking from traditional classes and doing yours different!” (student 67).

Finally, data reveal positive results for the last research question to be answered (RQ3) since Table 1 shows that most of participants would use this method in the future (item 2;  $M = 1.04$ ;  $SD = .202$ ) and would include a reward for every educational stage (items 6-10): preschool, primary, secondary, non-compulsory, and higher education.

## Discussion

The present study was conducted to quantitatively and qualitatively determine the effectiveness of a digital breakout to learn EFL in higher education and findings revealed positive results on the RQs stated. Regarding RQ1 (*How effective can a digital breakout be to learn EFL in higher education?*), the results were positive since 20 out of the 22 groups that took part in the activity completed all the challenges. As far as RQ2 is concerned (*What attitude will pre-service English teachers have towards learning a foreign language through complex games, riddles, and puzzles?*), most of the participants showed a positive attitude towards learning English through complex games, riddles, and puzzles since means ranged between 3.00 and 3.81 from questions 12-34 in the 4-point Likert scale. Finally, to respond to RQ3 (*To what extent and under what conditions would pre-service English teachers be willing to implement this teaching method in the future?*), most of the participants coincided that they would use this teaching method in their future practice (in the line of what other authors indicated. See Hunt-Gómez et al., 2020; Parker & Hessling, 2019), because it is an ideal approach “to learn”. In addition, they would include a reward in every educational stage as an essential feature for this type of teaching.

According to the results, the vast majority of the participants in this study enjoyed the experience, would use this method in the future, think that the participation in the breakout is a reward in itself, and they think a reward would be necessary for primary, secondary, non-compulsory secondary, and higher education. These findings support those of Hunt-Gómez et al. (2020), Lathwesen and Belova (2021), and O'Brien and Pitera (2019), who believed that these types of teaching models are usually well accepted by students and are related to success because of the way they spark intrinsic motivation. Concerning this matter, Hunt-Gómez et al. (2020) reported the potential of

showing pedagogical innovations to future teachers and how they will consider replicating a model if they had a positive experience.

To a lesser degree, participants think that a reward would be necessary for preschool education, the reward assigned to this activity was not fair, and they would have assigned a different one. Findings reveal that 0.5 extra points were the most repeated proposal, whose difference with the reward established for this voluntary activity (0.3 extra points) is minimal. However, this perception makes sense since almost 3/4 of the participants considered the games as difficult to follow.

The remaining items were positively assessed by the participants, showing means ranging from 3.00 to 3.81 on a 4-point Likert scale. Results reinforce those of Vidergor (2021), Jiménez et al. (2020), and O'Brien and Pitera (2019), who concluded that gamification is an efficient way to learn and review content while developing the students' cognitive skills. Items referred to collaboration scored the highest and this seems to be one of the aspects that participants valued the most, as Bartlett and Anderson (2019), Mahoney and Harris-Reeves (2019), and Manzano-León et al. (2021) supported. The way the game was designed and, especially, time restrictions seemed to have stressed and frustrated them because they did not seem as relaxed as they were expected. However, the working environment was positively assessed (means ranged from 3.63 to 3.81) in terms of sharing the workload, engagement, and sharing thoughts, as Fotaris and Mastoras (2019), Hunt-Gómez et al. (2020), and O'Brien and Pitera (2019) suggested about this type of activities. As Manzano-León et al. (2021) and Pham et al. (2021) predicted, participants also felt motivated and expressed their agreement when assessing aspects such as creativity and curiosity when linked to the benefits they thought the undertaken experience had. Relevance and authenticity were positively assessed, although not as high as most of the items in this scale (it obtained the third-lowest score,  $M = 3.11$ ), which might be due to the type of activities through which they had to put into practice their knowledge. Finally, the overall game was positively assessed as a good approach to practice and develop the participants' skills, learning styles, multiple intelligences, and autonomous learning in a meaningful way.

Despite its positive results, this study has some limitations. Findings should be interpreted in the applied research design, although it should be taken into account that the conditions in which it was carried out (with participants from the same region and with similar educational backgrounds) and the sample size (relatively small) restrict its generalizability. However, it provides the potential for future research, which are advised to combine quantitative and qualitative data when possible to provide a depth of understanding about the questions and hypothesis to be answered.

## **Conclusion**

This study utilized a gamification-based approach and GBL to implement a breakout through game-based learning platforms and GFQ. The main goals were to determine the effectiveness of a digital breakout to learn EFL in higher education, to

measure pre-service English teachers' attitudes towards learning a foreign language through complex games, riddles, and puzzles, and if they would be willing to use this teaching method in the future. Results from quantitative and qualitative analysis offer some pedagogical implications suggesting the use of games to enhance students' motivation and learning skills, as well as to increase their willingness to use what they learn during their training in their future teaching.

The extant literature on gamification and GBL shows that the effectiveness and benefits of these learning methods are out of question at all educational levels. This paper suggests an approach to the implementation of digital breakouts for the teaching of English in higher education to improve the students' performance and motivation. The model proposed offers an opportunity not only to modernise the teaching methodologies that pre-service teachers can use in the future, but also to develop their autonomy, teamwork and problem-solving skills, so needed to train our future generations.

### Funding

The work was supported by the University of Málaga (Spain) under the framework of the innovative project GAME-EDU (PIE19-186) and research project CLIL-TECH (Ref. No. B1-2020\_26).

### References

- Barata, G., Gama, S., Jorge, J., & Goncalves, D. (2013). Engaging Engineering Students with Gamification. In C. Gatzidis, & E. F. Anderson (Eds.), *Proceedings of the 5th International Conference on Games and Virtual Worlds for Serious Applications (VS-GAMES)* (pp. 1-8). IEEE. <https://doi.org/10.1109/VS-GAMES.2013.6624211>.
- Bartlett, K. A., & Anderson, J. L. (2019). Gaming to Learn: Bringing Escape Rooms to the Classroom. In P. Bull, & J. Keengwe (Eds.), *Handbook of Research on Innovative Digital Practices to Engage Learners* (pp. 1-27). IGI Global. <https://doi.org/10.4018/978-1-5225-9438-3.ch001>.
- Bendig, A. W. (1954). Reliability of short rating scales and the heterogeneity of the rated stimuli. *Journal of Applied Psychology*, 38, 167-170. <https://doi.org/10.1037/h0059072>.
- Botturi, L., & Babazadeh, M. (2020). Designing educational escape rooms: Validating the star model. *International Journal of Serious Games*, 7(3), 41-57. <https://doi.org/10.17083/ijsg.v7i3.367>.
- Bradford, C.C., Brown, V., El Houari, M., Trakis, J.M., Weber, J.A., & Buendgens-Kosten, J. (2021). English Escape! Using breakout games in the intermediate to advanced EFL classroom. *Ludic Language Pedagogy*, 3, 1-20.



- Chang L. (1994). A Psychometric Evaluation of 4-Point and 6-Point Likert-Type Scales in Relation to Reliability and Validity. *Applied Psychological Measurement*, 18(3), 205-215. <https://doi.org/10.1177/014662169401800302>.
- Clarke, S., Peel, D. J., Arnab, S., Morini, L., Keegan, H., & Wood, O. (2017). EscapED: a framework for creating educational escape rooms and Interactive Games For Higher/Further Education. *International Journal of Serious Games*, 4(3), 73-86. <https://doi.org/10.17083/ijsg.v4i3.180>.
- Connolly, T. M., Boyle, E. A., MacArthur, E., Hainey, T., & Boyle, J. M. (2012). A systematic literature review of empirical evidence on computer games and serious games. *Computers & Education*, 59(2), 661-686. <https://doi.org/10.1016/j.compedu.2012.03.004>.
- Creswell, J. W., & Plano Clark, V. L. (2010). *Designing and conducting mixed methods research*. Sage.
- Csikszentmihalyi, M. (1990). *Flow: The Psychology of Optimal Experience*. Harper & Row.
- De Freitas, S. (2006). Learning in Immersive worlds A review of game-based learning. Prepared for the JISC e-Learning Programme. *JISC ELearning Innov*, 3. [http://www.jisc.ac.uk/media/documents/programmes/elearninginnovation/gaminreport\\_v3.pdf](http://www.jisc.ac.uk/media/documents/programmes/elearninginnovation/gaminreport_v3.pdf).
- Durin, F., Lee, R., Bade, A., On, C. K., & Hamzah, N. (2019). Impact of implementing game elements in gamifying educational environment: A study. *Journal of Physics: Conference Series*, 1358(1). <https://doi.org/10.1088/1742-6596/1358/1/012064>.
- Figueroa, J. F. (2015). Using Gamification to Enhance Second Language Learning. *Digital Education Review*, (27), 32-54. <https://doi.org/10.1344/der.2015.27.32-54>.
- Fithriani, R. (2021). The Utilization of mobile-assisted gamification for vocabulary learning: Its efficacy and perceived benefits. *Computer Assisted Language Learning Electronic Journal*, 22(3), 146-163. <http://callej.org/journal/22-3/Fithriani2021.pdf>.
- Fotaris, P., & Mastoras, T. (2019). Escape rooms for learning: A systematic review. In L. Eleaek et al. (Eds.), *Proceedings of the 13<sup>th</sup> European Conference on Games Based Learning* (pp. 235-243). University of Southern Denmark.
- Friedrich, C., Teaford, H., Taubenheim, A., Boland, P., & Sick, B. (2018). Escaping the professional silo: an escape room implemented in an interprofessional education curriculum. *Journal of Interprofessional Care*, 33(5), 1-3. [10.1080/13561820.2018.1538941](https://doi.org/10.1080/13561820.2018.1538941).
- Giang, C., Chevalier, M., Negrini, L., Peleg, R., Bonnet, E., Piatti, A., & Mondada, F. (2018). Exploring Escape Games as a Teaching Tool in Educational Robotics. In M. Moro, D. Alimisis, and L. Iocchi (Eds.), *Proceedings of the International Conference Educational Robotics 2018 (EDUROBOTICS)* (pp. 95-106). Sapienza University of Rome.
- Grande-de-Prado, M., García-Martín, S., Baelo, R., & Abella-García, V. (2021). Edu-Escape Rooms. *Encyclopedia*, 1(1), 12-19. <https://doi.org/10.3390/encyclopedia1010004>.

- Healy, K. (2019). Using an escape-room-themed curriculum to engage and educate generation Z students about entomology. *American Entomologist*, 65(1), 24-28. <https://doi.org/10.1093/ae/tmz009>.
- Högberg, J., Hamari, J., & Wästlund, E. (2019). Gameful Experience Questionnaire (GAMEFULQUEST): An instrument for measuring the perceived gamefulness of system use. *User Modeling and User-Adapted Interaction*, 29(3), 619-660. <https://doi.org/10.1007/s11257-019-09223-w>.
- Hunt-Gómez, C. I., Moreno-Fernández, O., Moreno-Crespo, P., & Ferreras-Listán, M. (2020). Escape rooms' pedagogical potential from female future teachers' perspectives. *Journal of University Teaching & Learning Practice*, 17(5). <https://doi.org/10.14453/jutlp.v17i5.7>.
- Jeno, L. M., Adachi, P. J., Grytnes, J. A., Vandvik, V., & Deci, E. L. (2019). The effects of m-learning on motivation, achievement and well-being: A self-determination theory approach. *British Journal of Educational Technology*, 50(2), 669-683. <https://doi.org/10.1111/bjet.12657>
- Jiménez, C., Arís, N., Magreñán Ruiz, Á. A., & Orcos, L. (2020). Digital Escape Room, Using Genial.ly and A Breakout to Learn Algebra at Secondary Education Level in Spain. *Education Sciences*, 10(10), 271. <https://doi.org/10.3390/educsci10100271>.
- Johnson, M. (2020). Gaming Education. In D. W. Staat (Ed.), *Student-focused Learning: Higher Education in an Exponential Digital Era* (pp. 67-82). Rowman & Littlefield.
- Kapp, K. M. (2012). *The gamification of learning and instruction: Game-based methods and strategies for training and education*. Pfeiffer.
- Kirriemuir, J., & McFarlane, A. (2004). Literature review in games and learning. <https://telearn.archives-ouvertes.fr/hal-00190453/document>.
- Lathwesen, C., & Belova, N. (2021). Escape Rooms in STEM Teaching and Learning—Prospective Field or Declining Trend? A Literature Review. *Education Sciences*, 11(6), 308. <https://doi.org/10.3390/educsci11060308>.
- Mahoney, J.W., & Harris-Reeves, B. (2019). The effects of collaborative testing on higher order thinking: Do the bright get brighter? *Active Learning in Higher Education*, 20, 25-37. <https://doi.org/10.1177/1469787417723243>.
- Manzano-León, A., Rodríguez-Ferrer, J. M., Aguilar-Parra, J. M., Martínez Martínez, A. M., Luque de la Rosa, A., Salguero García, D., & Fernández Campoy, J. M. (2021). Escape Rooms as a Learning Strategy for Special Education Master's Degree Students. *International Journal of Environmental Research and Public Health*, 18, 7304. <https://doi.org/10.3390/ijerph18147304>
- Mora, A., Riera, D., González-González, C. S., & Arnedo-Moreno, J. (2017). Gamification: A systematic review of design frameworks. *Journal of Computing in Higher Education*, 29, 516-548. <https://doi.org/10.1007/s12528-017-9150-4>.
- Moreno, E. (2019). El “Breakout EDU” como herramienta clave para la gamificación en la formación inicial de maestros/as. *EDUTEC. Revista electrónica de tecnología educativa*, (67), 66-79. <https://doi.org/10.21556/edutec.2019.67.1247>.
- Nemoto, T., & Beglar, D. (2014). Developing Likert-scale questionnaires. In N. Sonda & A. Krause (Eds.), *JALT2013 Conference Proceedings*. JALT.

- Neumann, K. L., Alvarado-Albertorio, F., & Ramírez-Salgado, A. (2020). Online approaches for implementing a digital escape room with preservice teachers. *Journal of Technology and Teacher Education*, 28(2), 415-424. <https://www.learntechlib.org/primary/p/216209/>.
- Nicholson, S. (2015). Peeking behind the locked door: A survey of escape room facilities. White Paper. <http://scottnicholson.com/pubs/erfacwhite.pdf>.
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory*. McGraw- Hill.
- O'Brien, K., & Pitera, J. (2019). Gamifying instruction and engaging students with Breakout EDU. *Journal of Educational Technology Systems*, 48(2), 192-212. <https://doi.org/10.1177/0047239519877165>.
- Padilla, S., Halley, F., & Chantler, J. C. (2011). Improving product browsing whilst engaging users. *Digital Engagement*, 11, 15-17. <http://de2011.computing.dundee.ac.uk/wp-content/uploads/2011/10/Improving-Product-Browsing-whilst-Engaging-Users.pdf>.
- Parker, K. B., & Hessling, P. A. (2019). Breakout of a Traditional Classroom Reality with Game-Based Learning Pedagogy. In P. Bull, & J. Keengwe (Eds.), *Handbook of Research on Innovative Digital Practices to Engage Learners* (pp. 52-67). IGI Global. <http://doi.org/10.4018/978-1-5225-9438-3.ch003>.
- Pham, L. L. N., Nguyen, H. T., & Le, V. T. K. (2021). Triggering Students' Learning Autonomy Using the Combination of M-Learning and Gamification: A Case Study at Nguyen Tat Thanh University. *Teaching English with Technology*, 21(2), 66-91. <https://tewtjournal.org/volume-2021/volume-2021-issue-2/>.
- Pisabarro, A. M., & Vivaracho, C. E. (2018). Gamificación en el aula: gincana de programación. *ReVisión*, 11, 85-93.
- Schindler, L. A., Burkholder, G. J., Morad, O. A., & Marsh, C. (2017). Computer-based technology and student engagement: a critical review of the literature. *International Journal of Educational Technology in Higher Education*, 14(1), 1-28. <https://doi.org/10.1186/s41239-017-0063-0>.
- Vidergor, H. E. (2021). Effects of digital escape room on gameful experience, collaboration, and motivation of elementary school students. *Computers & Education*, 166, 104156. <https://doi.org/10.1016/j.compedu.2021.104156>.
- Villagrasa, S., & Duran, J. (2013). Gamification for learning 3D computer graphics arts. In F. J. García-Peñalvo (Ed.), *Proceedings of the First International Conference on technological ecosystem for enhancing multiculturalism* (pp. 429-433), University of Salamanca.
- 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(1), 164-185. <http://callej.org/journal/22-1/Waluyo-Bucol2021.pdf>.
- Wichadee, S., & Pattanapichet, F. (2018). Enhancement of performance and motivation through application of digital games in an English language class. *Teaching English with Technology*, 18(1), 77-92. <https://tewtjournal.org/issues/volume-18/issue-1/>.
- Wiemker, M., Elumir, E., & Clare, A. (2015). Escape Room Games: Can you transform an unpleasant situation into a pleasant one? In J. Haag, J. Wießenböck, W. Gruber, C. F. Freisleben-Teutscher (Eds.), *Game Based Learning-*

*Dialogorientierung und Spielerisches Lernen Digital und Analog* (pp. 55-68). St. Pölten University of Applied Sciences.

Wiggins, B. E. (2016). An overview and study on the use of games, simulations, and gamification in higher education. *International Journal of Game-Based Learning*, 6(1), 18-29. <https://doi.org/10.4018/IJGBL.2016010102>.