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An Investigation on the Application of Wordwall to Promote Learner Autonomy in EFL Classes at a University

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Abstract

The use of game-based learning platforms has significantly contributed to learners' improvements in autonomous learning. This mixed methods research aimed to investigate how Wordwall, one of the game-based learning platforms, promoted learner autonomy in an EFL class. To serve the research purposes, the study conducted a two-month experimental teaching, class observations, a questionnaire and semi-structured interviews. The findings indicated that students showed their dynamic engagement, motivation and responsibility during their learning process. Moreover, students expressed their purposeful selection of learning content and learning templates aligned with their ability and preference, resulting in better learning outcomes. Most of them shared their positive and in-depth perceptions towards the use of Wordwall. However, the students still showed that some limitations of templates in the free learning platform and teachers' immediate feedback cause certain hindrances to interact with this platform. Therefore, some pedagogical implications were highly recommended to help students mitigate some barriers and drawbacks, thereby optimizing the effectiveness of using Wordwall in the EFL class.

Keywords: learner autonomy, perception, Wordwall

Introduction

There is no denying that technology plays an indispensable part in current education, especially in teaching English. According to Avila and Mayorga (2020), technology integration can strongly facilitate and strengthen students' learning processes inside and outside the classroom. Additionally, Katemba (2019) indicated that teachers have been required to apply technology during classroom teaching sessions as much as possible.

In Vietnamese educational settings, MOET (2022) also emphasized a clear mission in the Decision issued by the Prime Minister, namely, "strengthening the application of information technology and digital transformation in education and training period 2022 - 2025, orientation to 2030." In other words, implementing technology-driven learning activities needs to be concerned and exploited effectively with the aim of creating a proactive and dynamic learning environment.

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What is more, Ahmadi (2018) asserted that technology-based learning activities result in students' collaborative interaction, good critical thinking abilities, and learning and teaching reorientation to meet the learning requirements. Besides, learner autonomy, confidence, and motivation are considered important improvements after the implementation of technology-based learning.

The problem of increasing learner autonomy has been much concerned these days because when students know how to learn autonomously, they can improve their performance through activities such as taking charge of their own learning, controlling and evaluating their learning progress (Holec, 1981; Benson, 2011; Dang, 2012b). Hence, it is vital to develop learner autonomy both inside and outside the classroom.

In order to drive autonomy more dynamically and engagingly, Green (2020) believes that games can be useful in the classroom for promoting creativity and problem-solving and motivating them. Moreover, game-based learning has brought many substantial benefits to learners, including the development of engagement and participation, information retention, and the increase of higher-order thinking abilities (Kahu & Nelson, 2018). There is a close relationship between games and learner autonomy, which is a positive trend. Wordwall is one of the game-based learning platforms which can foster students' learning process. Wordwall has been proven to boost students' vocabulary retention (Wandari et al., 2024; Rodríguez-Escobar, 2023), strengthen students' engagement (Mazelin et al., 2022; Le, 2021), improve students' learning outcomes (Susanto & Sari, 2023; Rahmasari & Wijayanti, 2022). There has been a wide range of studies about the benefits of Wordwall in different dimensions. Nevertheless, there is no research focusing on using Wordwall to promote learner autonomy in EFL classes. From these reasons, the author is urged to conduct the current study.

Literature review

Game-based learning platform

In the 2000s, Prensky (2001) gave an introduction of game-based learning as an innovative approach combined with computer games to achieve educational purposes. In addition to this definition, Plass et al. (2015) defined game-based learning as the process of game design to meet educational requirements, assuring that the subject matter develops in harmony with the game use. Several years later, Ge and Ifenthaler (2018) depicted game-based learning as the implementation of video games and components attributed to different aspects of games including game reality, content, subject and images in the teaching and learning process. Li et al. (2021) construed this term as an educational strategy to support learning and engagement. In other words, learners are actively engaged in the learning environment by using games to achieve their knowledge and skill development.

Some other authors affirmed its benefits in promoting learners' involvement and arousing their interests which result in better learning outcomes (Shaffer et al., 2005; Plass et al., 2015). Yu (2019) indicated that interacting with applied games enables learners to rehearse their skills and nurture their knowledge effectively. They are willing to overcome challenging games during their learning process. The mobile and technology-based integration provides learners with

useful opportunities to participate in authentic learning environments and gain advantages beyond conventional educational settings (Huizenga et al., 2009).

Moreover, in a game-based learning environment, students experience exciting learning tasks to increase their imagination and awaken their curiosity. They, therefore, can be involved proactively and strongly in an innovative and meaningful learning environment more efficiently compared with interacting with conventional teaching techniques (Huizenga et al., 2009; Karram, 2021). Game-based learning environment strengthens learners' actively self-regulated learning, increases the interaction of learners with authentically educational settings and provides them prompt feedback (Pellas & Mystakidis, 2020; Zhao et al., 2021).

Learner autonomy

The term "learner autonomy" was first defined by Holec (1981), which was the "ability to take charge of one's own learning" (p. 3). Benson (2011) gave a more comprehensive definition of this term that was referred to as "capability to take control of one's own learning" (p. 59). From the concepts, students know how to choose, determine, and evaluate what they learned (Dang, 2012b). Learner autonomy comprises three perspectives in earlier time (Beson, 1997); namely, technical perspective, psychological perspective, and political perspective. Oxford (2003, 2015) added another one which is the socio-cultural perspective to develop learner autonomy more comprehensively.

In the first perspective, students both make a decision about their learning choices and define what, when, and how they learn to satisfy the learning outcomes. The learning environment influences the way learners behave to some certain extent (Oxford, 2003, 2015). Psychological perspective is indispensable to make the former perspective inert or active (Oxford, 2003, p. 82). While the technical perspective puts an emphasis on physical situations, the psychological one focuses on learners' capacity which is referred to as "a construct of attitudes and abilities which allow learners to take more responsibility for their own learning" (Benson, 2007, p. 19) or "the capacity to take control of one's own learning" (Benson, 2011, p. 58) mentioned earlier. Political perspective, according to Benson (1997), implied the "learner's control over the process and content of learning" (p. 19). Oxford (2003) asserted that this perspective comprises "power, access, and ideology" (p. 88). In order to gain what was mentioned in Oxford's (2003) concept, it is necessary for students to "fight for cultural alternatives" and raise their voices (Dang, 2012, p. 35).

In a sociocultural perspective, learners express the interaction and collaboration with their peers and teachers. Learner autonomy under a sociocultural perspective was defined as the result of interaction between learners and their learning environment (Benson, 2007; Ushioda, 2011). In practice, this perspective was influenced by Vygotsky's (1978) theory of ZPD and Lave and Wenger's (1991) concept. Peers and teachers play vital roles in supporting learners' improvement inside and outside the classroom. According to Palfreyman and Benson (2019), "the role of the teacher is to carefully and responsively scaffold attempts by the learner to take control of [their] learning decisions and performance in the second language" (p. 672). Teachers in this case play roles in guiding students to self-assess, set learning goals and observe other students. With other learners' and teachers' assistance, learners can develop themselves. When

less capable learners receive the support of scaffolding and collaborative learning, learners become active to reach the maximum potential within their ZPD. Moreover, learners are required to create relationships with their fellows and teachers to get involved with the community (Lave & Wenger, 1991). Social interaction, thereby, is strengthened between learners and "situational influences" (Dang, 2010, p. 34).

As pointed out by Benson (2007), learning activities going beyond the class play an important part in the real teaching environment. Reinders (2011) and Benson (2011) also reaffirmed the significance of beyond-the-classroom activities that help improve learners' language proficiency and create a good learning environment for students to practice individually or with their peers (Benson, 2011). Therefore, students need to take advantage of after-school activities on Wordwall to achieve the best learning results. Moreover, Huynh (2024) indicated in her study that thanks to the integration of AI helps students boost their learning self-regulation and autonomy. Duong (2021) also added that the development of learner autonomy has increased both inside and outside the classroom. The students affirmed that they enhanced their autonomous learning, resulting in their higher results.

The previous studies about the integration of Wordwall in EFL classes

Wordwall is a creative learning application in which learners can enjoy an interesting learning atmosphere (Maghfiroh, 2018). Miftah and Lamasitudju (2022) pointed out the same opinion about this learning tool as the previous author. There is a wide variety of game designs on this platform, namely quizzes, matchmaking, anagram, matching pairs, crossword, grouping, random words, unjumble, and grouping (Amany, 2020; Supriadi, 2022; Khoriyah & Muhid, 2022; Saida, 2021). With a fee-paid version, teachers can exploit from 12 to 18 game templates conveniently and effectively. In contrast, with the free version a game compiler can merely choose to design with given templates. Learners, on the other hand, can make use of available input created by many compilers online. They need to type what they want to practice on Google along with the word "Wordwall", everything will be displayed on the screen for them to choose.

This platform is actually interesting and provides learners with an easy way to access vast knowledge with a rich and diverse knowledge base as long as they know how to find and determine which one suits their needs (Sinaga & Soesanto, 2022). Moreover, some content can be downloaded directly from this learning tool (Mujahidin et al., 2021). Besides, students can also receive immediate feedback during learning on this platform (Nadia et al., 2022) to help students comprehend their mistakes (Maghfiroh, 2018), and motivate learning engagement (Arimbawa, 2021).

When using Wordwall, students can collaborate with their peers, which helps them boost their group work and pair work skills. In this case, peers can exchange and provide real-time feedback to each other (Amri & Sukmaningrum, 2023). Hereby, students can recognize their mistakes and contribute to their better future learning by receiving timely corrections and recommendations from their fellows (Ulya et al., 2020).

Wordwall has been researched by several authors over many years. More specifically, Wandari et al. (2024) conducted a study about Wordwall to improve students' vocabulary mastery. Experimental research proved clearly that using Wordwall is an effective way to master

students' vocabulary. Students also expressed their enthusiasm during their learning process. Similarly, Lam (2024) conducted an action research to investigate the effectiveness of using Wordwall to help students better engage in learning vocabulary in terms of emotional, behavioral and cognitive attributes of attitudes. In another aspect, Mazelin et al. (2022) exploited Wordwall in ESL classrooms and achieved certain success in promoting students' active engagement. Susanto and Sari (2023) considered the important role of Wordwall in improving learning outcomes. Based on the posttest results, they concluded that Wordwall had a significant effect on learning outcome enhancement, which is one of the characteristics of learner autonomy.

Research Questions

To achieve the research purposes, the following research questions were formulated as follows:

1. How is Wordwall implemented in an EFL class at People's Security University?
2. What are students' perceptions towards the application of Wordwall to develop learner autonomy in an EFL class?

Methods

Pedagogical Setting & Participants

The study was conducted in one class with 41 homogeneous students of People's Security University. Students have to general English modules in the fourth and fifth semesters and try their best to achieve results in the final exams as required. The depiction of student participants in the research was illustrated in the following figures:

Figure 1.

The gender of participants

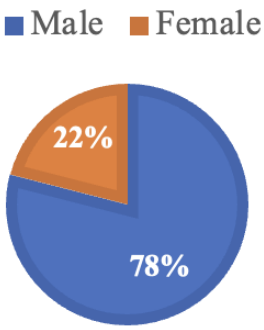
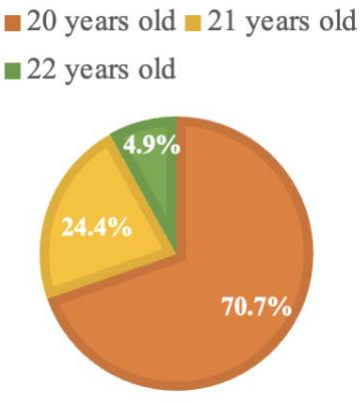


Figure 2.

The age of participants



From the pie chart, it can be easily seen that the number of male students (80%) are much higher than that of female ones (22%). Besides, the majority of age belongs to 20 years old (nearly 71%) whilst the lowest percentage is of 22 years old (4.9%).

The participants showed their frequency of using online game learning platforms inside the

classroom. All of them mentioned the use of Kahoot! and Quizlet in-class activities, but Wordwall.

Design of the Study

The study employed a mixed-methods research design, incorporating both qualitative and quantitative data collection and analysis methods. Flick (2014) argues that utilizing a mixed methods approach enhances the reliability of research findings by leveraging the complementary nature of qualitative and quantitative data. Cresswell and Cresswell (2018) indicated that a mixed-methods research design aims to achieve more insight into the problem from "mixing and the integration of the quantitative and qualitative data (p. 294)". By employing a combination of these methods, the study aimed to provide a comprehensive understanding of the research topic.

Data collection procedure & analysis

During the implementation of Wordwall, in-class activities were observed, and taken notes precisely to consider how Wordwall was applied to real teaching and learning. The observation sheets were taken notes of detailed learning activities happening in each session and given to analyze. After the two-month experimental teaching, all of the student participants received a questionnaire to investigate their perceptions towards using Wordwall to develop their autonomous learning. The questionnaire was delivered directly to the students, and the author was present to answer all of the queries of the participants. Later, the semi-structured interviews were exploited to gain in-depth responses relating to the process of using Wordwall inside and outside the classroom as well as the development of learner autonomy. Two focus group interviews were invited to interview face-to-face within 30 minutes for each group to elicit their opinions after the interactive procedure with Wordwall. The quantitative data were analyzed by using SPSS version 26, while interview responses were grouped to analyze in themes.

Findings and discussion

Findings of the study

The implementation of Wordwall in an EFL class

Wordwall was applied to real teaching in an eight-week period to consolidate and review what the students had learnt.

In the first-class observation, the students were introduced to overall information relating to Wordwall and its eighteen templates. The students felt eager with this learning platform because it was strange to them. Many students expressed their interest with some words like 'Oh' or 'Wow, perfect'. The teacher illustrated the images of each template for the students to recognize. The teacher also took one grammar point and vocabulary of lesson File 7A of using Infinitive as an example. With this point of knowledge, the teacher helped the students review the ways of using Infinitive by using Wordwall. The teacher chose the Quiz template for the students to observe. In this task, the teacher asked her students to interact with the example she showed on the slides. Similarly, the students were instructed to do with three

other templates including Gameshow Quiz, Hangman, and Anagram to practice the same grammar point and vocabulary.

In the two next class observations, the teacher gave a careful instruction for the rest of the other templates. On the second day with the topic of Vocabulary and Grammar relating to "Gerund", the students experienced seven vocabulary and grammar templates and interacted directly with their teacher. Furthermore, the students have interacted with Worwall games to distinguish "To-infinitive" and "Gerund". Whereas, on the next day, they were asked to observe seven templates left about the speaking topic of File 7C relating to languages and tourism using "Adjective + Prepositions". The teacher explained precisely the steps for the students to choose and how to deal with each template.

The templates of the first three sessions are displayed in the following table.

Table 1.

The depiction of using Wordwall templates in class

	Learning contents and mode	**Wordwall templates**
Session 1	- File 7A - Vocabulary and grammar about "To-infinitive" - Work in the whole class	- Quiz - Gameshow Quiz - Hangman - Anagram
Session 2	- File 7B - Vocabulary and grammar about "Gerund" - Distinguish "To-infinitive" and "Gerund" - Work in the whole class	- Complete the sentence - Group sort - Open the box - Win or lose quiz - Flip tiles - Wordsearch - Match up
Session 3	- File 7C - Practice speaking about languages and tourism using "Adjective + Prepositions" - Work in the whole class	- Speaking cards - Flash cards - Spin the wheel - Unjumble - Matching pairs - Find the match - Labeled diagram

In the three next three sessions, the teacher integrated each grammar, vocabulary, reading, pronunciation, listening, and speaking activity into Wordwall games corresponding to the knowledge of File 8A, 8B, and 8C. The students were asked to work individually, in pairs, and in groups in turn for each session. The students were sent the links via Zalo and guided on how to do each game effectively in order to gain the highest score within the shortest time. The teacher encouraged to give a bonus mark to four students who gained the highest scores in each game. In each session, the students expressed their active and dynamic engagement in Wordwall games, especially when they worked in pairs or in groups. They both played the game and competed with each other, which created an interesting learning atmosphere. The teacher played the role of a facilitator, an instructor, and a supporter during the time of game. The students made use of their skills and knowledge to accomplish the tasks as best as they could. At the end

of each session, the teacher informed which students gained the bonus marks and asked them to look at their answers again and check the wrong sentences to find out the reason for each mistake.

After each session, from the first day to the sixth day, the teacher sent the Wordwall game links of knowledge that the students were taught in the coursebook and assigned them to do out of the classroom.

In the seventh session, it was time for the students to share their opinions about all the activities they worked with from the previous sessions. The teacher asked the students to note down some things about Wordwall games and indicate which one they loved best on the piece of paper without writing their names. After 5 minutes of taking notes, the teacher collected and read some notes aloud in front of the class. One student wrote that, "*It's amazing. I like these interesting games because it helps me review the knowledge in a funny way. I love the 'Gameshow quiz'. It is competitive when playing in groups*." Another student shared that, "*I find this new teaching method is engaging. I can experience interesting games on Wordwall. My friends and I tried our best to get the highest scores. Sometimes we are on the top. It's really fun and exciting.*" However, one student noted that, "*Although these games are interesting, I have no time to take notes of the mistakes in class. I often have a wifi disconnection, so I hardly ever get high scores.*" Added to the downside, another student shared that "*I don't like to do Wordwall game individually much because it doesn't create fun. It's more fun to work in pairs or in groups.*" Besides, the students asked the teacher some questions about the times they could interact with each Wordwall game to get the highest score. The teacher concluded that the more the students worked with each game, the better results they could achieve and the longer they could remember the knowledge. After this session, the teacher asked her students to find out more Wordwall games available online relating to the knowledge of each file in the coursebook and rehearse more. They were encouraged to work in the way they were interested in and sent the teacher good results if their names appeared on the leaderboard.

The last session was a day to synthesize all that the students learned with random Wordwall games. The students clicked on the link that their teacher sent via Group Zalo. For the first Wordwall game, Open the box, the students reviewed the usage of 'Infinitive and Gerund' individually. They had to choose to correct answer for each given sentence as fast and correct as they could. At the end of the game, the teacher showed the leaderboard of scores and gave bonus marks to the first five students. The second game, Unjumble, involved the students working in pairs to review their writing skill. The students were asked to put the words in the correct order to make complete sentences. This game was quite challenging for students and required them to take time and make an effort to complete this activity. Similarly, the teacher wrapped up and gave bonus marks to five couples who gained the highest scores. Finally, the students were divided into groups of four to practice the Wordwall speaking game, "Speaking cards". For this activity, the teacher encouraged the students to make longer talks as well as possible. While one student talked, the others took notes of the main ideas and key words from their friends. At the end of this game, the students were asked to report what their friends shared for each question. The teacher consolidated all of what she taught to her students and heartened them in Wordwall games. The teacher also shared a strong desire with her students to use this learning tool to practice outside the classroom.

Students' perceptions towards the application of Wordwall to develop learner autonomy in an EFL class

Students' perceptions of implementing Wordwall to strengthen the students' autonomous learning in the EFL class were analyzed in four main contents in terms of choosing and controlling their learning, evaluating their learning, exploiting out-of-class activities using Wordwall and collaborating with their teachers and peers.

First and foremost, the students expressed their opinions about the choice and control of what they could learn after using Wordwall. The descriptive statistics illustrated in Table 2 showed a positive perception towards what the students could be responsible for their own learning. In detail, most of the items received an agreeable opinion from the students whilst Item 4 showed that the students strongly agreed with the recognition of locating answers, mistakes, and game scores on Wordwall (Mean=4.32). The standard deviations of these items are relatively similar and fluctuate from .506 to .779. The students who defined their learning outcomes better gained the highest standard deviation (S.D=.779), which proved that there was a higher disparity in the students' perceptions compared with the other ones. By contrast, the decision of amount, template, and frequency to interact with Wordwall games and the decision of defining the pace of each Wordwall game had the analogous lowest standard deviation (S.D=.506).

Table 2.

Students' perceptions of choosing and controlling their learning

No.	Items	N	Min	Max	Mean	S.D
1	You can define what you have to learn in one semester.	41	2	5	3.51	.779
2	You can define the main contents of each lesson better.	41	3	5	3.88	.714
3	You can define the favorite type of classroom activities such as individually, pair work or group work.	41	3	5	3.93	.608
4	You can locate the records of your study such as answers, mistakes or game scores on Wordwall.	41	3	5	4.32	.521
5	You can define the amount, template, and frequency of Wordwall templates for each lesson.	41	3	4	3.51	.506
6	You can define the pace of each Wordwall game.	41	3	4	3.49	.506
7	You can define which game type on Wordwall is effective for your learning ability and interest.	41	2	5	3.71	.716
8	You can define the knowledge you can learn from each Wordwall game.	41	2	5	3.56	.743

When being interviewed about the factors that influence the students most in choosing and controlling their learning, many of the students mentioned the learning contents, interactive frequency, and learning mode. Specifically, thanks to Wordwall, the students could review the knowledge they have learned, ranging from language areas to language skills. One student in the first focus group interview shared that,

> *Using Wordwall helps me practice grammar points effectively. I can do many different Wordwall templates for one grammar point, and it helps me remember better*. (FG1-S4)

Some other students from the second group responded that,

> *I can improve my writing skills through the Unjumble game.* (FG2-S2)
>
> *I rarely practice my speaking skills. However, with interesting Wordwall template designs, I find this skill more enjoyable. (FG2-S5)*

In addition, the students pointed out that the more frequently they interacted with Wordwall games, the more knowledge they could gain. They said that they could decide the length to do with Wordwall games to consolidate their in-class knowledge. Most of the students reported that they spent at least 30 minutes per day accessing Wordwall links to self-study. They also knew how to choose the Wordwall template to arouse their interest and meet their needs.

Besides, the learning mode such as working individually, working in pairs or groups affected the student's learning process to some extent. Some students shared that they were not in favor of working personally because this way of learning was quite boring and made them easily uninterested. Pair works and group work received the students' preferences because of their collaborative benefits. Some students said that these learning modes helped them "*proactively engage in the learning environment* (FG1-S1, S3), *motivate their interest* (FG1-S3), *and help them understand the difficult lesson contents thanks to their peers' help* (FG2-S5)". They added that they would continue working with their friends outside the classroom. In general, these above-mentioned factors support the students to achieve the best learning outcomes through using Wordwall as an effective learning tool.

Secondly, the students showed their perceptions of evaluating their learning process after the application of Wordwall in Table 3.

Table 3.

Students' perceptions of evaluating their learning

No.	Items	N	Min	Max	Mean	S.D
9	You can evaluate your progress after interacting with Wordwall games.	41	3	5	3.68	.567
10	You feel more interested in learning with Wordwall.	41	2	5	3.88	.748
11	You study harder when using Wordwall.	41	2	5	3.77	.829
12	You can evaluate which Wordwall game is more effective with your learning pace.	41	3	4	3.66	.480
13	You can identify your weaknesses after learning with Wordwall.	41	2	5	3.34	.728
14	You can identify which game template to use in the future.	41	2	5	3.61	.802
15	You can compare the contents of available Wordwall games with the contents learned in class.	41	3	5	3.88	.678

From data analysis of the questionnaire, the students showed their neutral perceptions on identifying their weaknesses with Wordwall games with a mean of 3.34. The other items gained positive opinions from the students' side with the highest mean (Mean=3.88) for more interest in learning and the comparison of the learning contents. The students could self-evaluate the

Wordwall template which was effective for their learning pace and showed the lowest standard deviation (S.D=.480) while the students expressed the highest disparity in their answers promoting their diligence (S.D=.829).

From the interview, the students were asked about their evaluation of learning progress after using Wordwall. Most of them responded that using Wordwall helped them track their learning path more efficiently. More specifically, the students showed that they could "*remember the knowledge more durably* (FG1-S2), *gain higher scores* (FG1-S3; FG2-S1, S4), *and know how to choose suitable Wordwall games to do* (FG1-S5)". Additionally, the student (FG1-S1) said that he could see his obvious learning improvement after learning with Wordwall game. He was also motivated by colorful and interesting Wordwall games. In order to elicit weaknesses that the students could recognize after learning on Wordwall platform, the students also shared some personal feelings. The students felt embarrassed when they lacked *"vocabulary* (FG1-S2, S3; FG2-S4, S5), *confidence and ideas for speaking games* (FG1-S1) *and skill ability* (FG2-S2)". When facing these problems, the students often gained lower scores for their games compared with other classmates, especially reading skills.

When being interviewed with the questions of three Wordwall templates that interested the students best, half of the students shared similar ideas of Quiz, Gameshow quiz, and Find the match. These games displayed given options for them to choose from. In case of not knowing the meaning of the words, they could pick any option. The student from the second focus group revealed that,

> *I am into the 'Find the match' game because I am good at remembering to match two things with each other.* (FG2-S4)

Another student (FG2-S2) marked his predilection for Crossword or Wordsearch because she could develop her critical thinking when doing these games. One student in the first group (FG1-S1) said that he preferred the Unjumble game to the others since he could rehearse his writing skills with this kind of template. On the whole, each individual has his/her own favorable selection as long as the choice suits their needs.

Thirdly, the students revealed their frequency of participating in Wordwall activities or activities to support their learning on this game-based online platform beyond the classroom. The descriptive data from the questionnaire presented the great regularity of grammar games (Mean=4.51) and vocabulary games (Mean=4.44) in the students' learning process outside the classroom. Additionally, the students actively accessed the Wordwall links that the teacher sent to do the Wordwall games with a mean of 4.32. Conversely, the reading games received the lowest mean (Mean=1.54), which showed that the students hardly ever or seldom do reading games on Wordwall. This item had the lowest standard deviation (S.D=.505), which specified the similarity in the students' responses. Meanwhile, the highest disparity in the participants' opinions belongs to the note-taking of mistakes from Wordwall games (S.D=1.006).

Table 4.

Students' perceptions of out-of-class activities on Wordwall

No.	Items	N	Min	Max	Mean	S.D
16	To interact with grammar games relating to the contents of the module.	41	3	5	4.51	.597
17	To interact with vocabulary games relating to the contents of the module.	41	3	5	4.44	.594
18	To interact with pronunciation games relating to the contents of the module.	41	1	4	2.46	.636
19	To interact with reading games relating to the contents of the module.	41	1	2	1.54	.505
20	To interact with writing games relating to the contents of the module.	41	2	4	2.98	.758
21	To interact with speaking games relating to the contents of the module.	41	1	4	2.59	.999
22	To take notes of your mistakes from Wordwall games.	41	1	5	2.71	1.006
23	To look up the dictionary to find out the meaning of new words.	41	1	4	2.63	.968
24	To access all of the Wordwall links that your teacher sends.	41	1	5	4.32	.789
25	To access available Wordwall links online.	41	2	5	3.34	.938

From the interview, the students shared the Wordwall game that supported their learning process the most effectively. Many of the students affirmed that the grammar and vocabulary Wordwall games helped them the most. The student from the first group said that the vocabulary Wordwall games were "*useful for my revision and relatively similar to the question types of the final exam* (FG1-S4)". Another student added that the grammar and pronunciation Wordwall games "*are very fruitful for my learning outside the classroom* (FG1-S5)". However, the students presented some problems while they interacted with Wordwall games. For instance, they found it difficult to access available reading and listening Wordwall games or diverse reading templates (FG1-S1, S3, S4; FG2-S2, S3, S5). In addition to reading games, the students seldom found listening to Wordwall games online to practice because of their limitations. Furthermore, the students needed a stable and good Internet connection to complete the games with the highest scores. In fact, they often faced the Wifi disconnection and influenced more or less their results. What was more, the students shared that some answers corrected at the end of the game made them confused. They did not "*comprehend the reason why that question was wrong* (FG1-S1, S4, S5; FG2-S2, S3)". This game-based learning platform did not provide a detailed explanation of the wrong answers, which hindered the students' knowledge comprehension. It requires the students to work by themselves or work with their friends more actively outside the classroom.

Finally, the students disclosed the collaboration between the teacher and the students and among the students. The quantitative statistics from the questionnaire in Table 5 depicted that the students seldom suggested their queries to their teacher with a mean of 1.88, but gained the

lowest standard deviation (S.D=.640). Instead, they often chose to ask and exchange with their friends with a higher mean of 3.93. The last item received the highest standard deviation (S.D=.999), which presented the distinction in the respondents' answers.

Table 5.

Students' perceptions of collaborating with their teachers and peers

No.	Items	N	Min	Max	Mean	S.D
26	To ask your teacher questions when you don't understand.	41	1	4	2.24	.767
27	To ask your friends questions when you don't understand.	41	2	5	3.63	.888
28	To make suggestions to your teacher.	41	1	3	1.88	.640
29	To discuss learning problems with your classmates.	41	1	5	3.93	.877
30	To self-study with your classmates outside the classroom.	41	2	5	3.59	.999

From the interview, the students shared the reason why they usually work with their classmates rather than their teacher. The first reason was that they felt shy when making questions directly for the teacher (FG1-S4). Sometimes they did not know how to ask good questions for the teacher (FG2-S1). Many students shared that they "*feel at ease when talking with other peers* (FG1-S2, S3, S5; FG2-S2, S3, S4), *share useful techniques to interact with Wordwall games* (FG1-S1) *and convey meaningful knowledge for friends* (FG2-S5)". The student (FG1-S3) added that he lived with his friends in a dormitory; therefore, he could discuss things easily. When they had learning difficulties, they exchanged with each other immediately to find out the appropriate strategies. Besides, the students responded that they only received immediate and short feedback from Wordwall platform like scores or answer checking outside the classroom. The teacher's feedback or constructive feedback was limited out of the class, so the students sometimes could not recognize their strengths or weaknesses.

In conclusion, after all of the Wordwall games, the students could enhance their autonomous learning in self-planning and controlling what they had to learn, evaluating their learning process and proactively engage in beyond-the-classroom Wordwall games.

Discussion

In respect of the students' responsibility for their learning, the students from the class observations revealed their choice and determination of game activities when interacting with Wordwall. They could define their missions to achieve better learning outcomes. Besides, they could define the learning mode as well as the game templates which suit their needs and learning path. Moreover, they knew how to evaluate their learning improvement and interest after the application of Wordwall. Through the periodic class observations, the students expressed their higher motivation and active engagement in class activities that the teacher instructed and let them practice. Additionally, they accessed Wordwall links that the teacher sent via Zalo and submitted their good results of Wordwall to the teacher. All the students' in-charge-of activities revealed their autonomous learning. These results are consistent with the theory from Holec's (1981) notion and Benson's (2011) concept mentioned in the parts of Introduction and

Literature Review.

Regarding the out-of-classroom activities, the students got proactively involved in Wordwall games relating to vocabulary, grammar, pronunciation, reading, writing, and speaking skills. The games of language areas received a preference from the students because of their various game templates and interesting designs mentioned by several authors of the second section (Amany, 2020; Supriadi, 2022; Khoriyah & Muhid, 2022; Saida, 2021). Thanks to Wordwall games, the students got immersed in an authentic and interesting learning environment and achieved significant benefits compared with traditional educational contexts. This result is in accordance with what Huizenga et al. (2009) and Karram (2021) classify as the importance of technology integration as Avila and Mayorga (2020) presented in the first section. What was more, the students responded that they had more opportunities to practice language skills and language areas outside the classroom, and this resulted in better learning outcomes. This finding supports the results many authors proved in their studies (Wandari et al., 2024; Mazelin et al., 2022; Le, 2021; Susanto & Sari, 2023; Rahmasari & Wijayanti, 2022). It was also worth noting that after-school activities helped the students develop their self-regulated learning and create room for their collaboration with their teacher and classmates. This finding confirmed what Reinders (2011) and Benson (2011) presented in the second section of the study. Generally, the students could gain many benefits after the interaction with Wordwall.

In relation to the collaboration with the teacher and peers, the students shared the frequency in working with their fellow friends. They confidently discussed their problems and asked questions relating to the learning mistakes. In addition, they spent time working with each other or together outside the classroom. This was a good chance for weak students to gain help from their better students with the purpose of assisting both to achieve better learning results. This finding made a strong connection with Vygotsky's (1978) notion of ZPD and Lave and Wenger's (1991) concept displayed in the literature review section. Feedback is a vital factor that contributes to the students' devotion and involvement. The students usually received instant feedback such as scores or corrections from Wordwall games. Sometimes their teacher sent them compliments for their effort as well as their good results. Feedback created a great influence on the students' attempts and encouraged their engagement. This finding is closely linked to some authors' viewpoints (Nadia et al., 2022; Maghfiroh, 2018; Arimbawa, 2021; Amri & Sukmaningrum, 2023; Ulya et al., 2020). Nevertheless, the lack of corrective and detailed feedback exerted a certain effect on the student's learning process. They need constructive feedback like the explanation of correcting wrong answers or some hints for speaking games to help them gain comprehension of knowledge.

Conclusion

From the students' perceptions and responses from the questionnaire and the interviews, the students revealed their responsibility in learning and completing Wordwall games. They knew how to choose, determine the contents to study, and evaluate their learning process. They also expressed their autonomous learning through the participation of out-of-classroom Wordwall games actively. They indicated that the Wordwall game templates appeal to them, capture their

interests, and suit their learning capacity. Thanks to after-class Wordwall games, the students also created better relationships and collaboration with their peers. They both discussed, shared, and supported each other so as to achieve the best learning outcomes. However, there were some obstacles that hindered them, such as the limitation of skill templates on Wordwall, the lack of precise feedback, and the mistakes of technical problems. The students, therefore, need to take advantage of working with their friends and the teacher outside the classroom.

The current study contains some limitations in terms of the research scope and the sampling. Firstly, the study mainly focuses on applying Wordwall to the practical teaching context to investigate the students' development of learner autonomy. In further research, more game-based learning platforms should be included to give a more general evaluation of learner autonomy towards these learning applications. Moreover, the participants invited in this study are limited, so these results are merely for reference and cannot be used to generalize the views of all students. As a result, there should have more participants should be included in further research to make the findings more convincing.

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