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Gamified flipped learning in a French foreign language class: Efficiency and student perception

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To enhance student engagement in a French foreign language course, two active learning methods were combined: Flipped learning and gamification. This study aimed to explore the efficiency of these teaching methods in a foreign language course with beginner learners and to assess student's perception of the experience. A total of 215 students were enrolled in this university elective course. All sections were taught by the same instructor during one semester. All students experienced both the flipped learning methodology and a traditional teaching approach. The results indicate that students' scores in the gamified quizzes were better when they prepared in advance for the sessions and had a flipped learning session. Moreover, in a questionnaire that was completed at the end of the term, students reported that they preferred the flipped learning sessions because such sessions helped them to better understand and memorize the textual material. Students also appreciated the use of gamification tools to help them learn with interest.

KEYWORDS

flipped learning, gamification, foreign language, student's feedback, online education

Introduction

Researchers use innovative approaches to engage students in the learning process because studies have shown that traditional teaching methods, with their heavy reliance on textbooks, are not very efficient (Safapour et al., 2019). Active learning was proposed as an alternative solution and has been widely developed in the last decade. Its core elements are "*student activity and engagement in the learning process*" (Prince, 2004, p. 223). Students no longer passively receive instructions, but are fully engaged in their learning process. Self-learning, social media, case studies, gamification, and flipped learning are some examples of these engaging learning methods (Muir et al., 2022). Flipped learning (FL) methodology has gradually developed from the peer class of Mazur (1997), who had asked students to learn outside of the class and then solve problems during class time. However, a major turning point happened in 2004 with Sams and Bergmann (2013), who started recording their courses for absent students (Allard and Petitfour, 2017). These video recordings were a success and they continued recording such videos to share with their students. Thus, the FL methodology was born. The Flipped learning approach switches the traditional learning process, making students

themselves responsible for their learning. They learn the material at home, while the in-classroom time is fully focused on deepening the understanding pertaining to solving problems and applied activities (Network, 2014). Class time centers entirely on learners, while the teachers help them practice by delivering targeted instructions for activities and problem-solving (Sams and Bergmann, 2013). Essentially, FL involves a change in the use of class and out-of-class time; the "homework" is done in class itself, while the activities traditionally taking place in class are done at home (Abeysekera and Dawson, 2015).

Gamification—defined as "*the use of game design and game elements in other contexts*" (Deterding et al., 2011)—also aims to engage students in their learning activity. The gaming activity pushes the learner/player to follow rules to achieve new learning roles. Foreign language classes must fully engage students in the learning process to assimilate the targeted language (Turan and Akdag-Cimen, 2020). Accordingly, both FL and gamification methodologies presented were introduced in an online French foreign language (FFL) class with beginner students. The objective of introducing these methodologies was to engage learners and involve them fully in the learning process. This study analyzed the application of these combined teaching methods in this specific learning context. Although some studies have been conducted on the use of gamification and FL in language classes, few researchers have explored the impact of gamified FL in an FFL class with beginner students. Furthermore, few studies have used the same group of students, considering both their performance and feedback, and allowing them to experience and compare the same course of FL and non-FL (NFL) sessions. The present study aimed to address these gaps.

The next section reviews relevant literature, followed by the research questions. The second section describes the methodology followed in the course and in this study. The results are presented in section three and discussed in section four. Future research directions are presented in the conclusion.

Literature review

In this section, literature related to the FL methodology and gamified FL is presented. Research conducted with FL classes in general, and in FL language classes in particular, is reviewed. Findings related to gamification and gamified FL classes are also presented.

Flipped learning methodology

Advantages of flipped learning methodology

Flipped learning (FL) has become widely embedded in many disciplines, such as engineering (Karabulut-Ilgu et al., 2018), health sciences (Hew and Lo, 2018), mathematics (Lo and Hew, 2020), economics (Roach, 2014), and languages (Wang et al., 2018; Chang and Lin, 2019; Sauvage, 2019; Aghaei et al., 2020; Li and Li, 2022). It has been implemented in secondary schools (Wagner et al., 2021) and at the university level (Akçayir and Akçayir, 2018; Han and Røkenes, 2020) where the positive impact of FL on learners has been described (Awidi and Paynter, 2019; Martínez-Jiménez and Ruiz-Jiménez, 2020; Tang et al., 2020).

O'Flaherty and Phillips (2015) reviewed the content of higher education flipped classroom research in 28 peer-reviewed English papers published from 1994 to 2014. Several articles acknowledged that students are more interactive during class time. The review showed that engaging independently with learning material made students more responsible for their learning and that technology use in the class offers dynamic and innovative opportunities for learners (O'Flaherty and Phillips, 2015). Akçayir and Akçayir (2018) reviewed 71 papers that focused on the advantages and disadvantages of FL. Fifty-two percent of the reviewed papers concluded that FL improves learners' performance, and 18% mentioned that FL enhances student satisfaction. Furthermore, 14% of the papers revealed that FL increases students' level of engagement and 7% noted that FL enhances students' confidence. In another literature review (Bond, 2020) of 107 papers describing an FL approach in Grades K-12, 81% of studies provided evidence of students' behavioral engagement (interaction with peers and teacher, participation/involvement, and increased confidence). Because students can work at their own speed, they can spend as much time as they need on the activities—doing them several times or undertaking additional research (Basal, 2015; Nouri, 2016; Goedhart et al., 2019). During the class sessions, students can talk about their difficulties, ask questions, and request for clarification, if needed (Hao, 2016).

Students engaged in FL courses tend to do more research on the Internet (Francl, 2014), which contributes to developing their Information and Communications Technology (ICT) skills. In a study comparing three teaching formats in a mathematics class (traditional class, flipped class, and online independent study class), Lo and Hew (2020) noted that the gamified FL format promoted students' cognitive engagement. Learners in the FL class showed a better submission rate, and greater quantity and quality of optional assignments. However, the study had a small sample size (between 21 and 28 students in each group). Further empirical research with larger samples is, thus, needed. In another study conducted in a university information class, Sablan and Hidayanto (2022) offered the same course to two groups of 60 students—one using a traditional methodology and another that applied FL methodology. At the end of the course, 95% of the students in the FL group indicated a preference for this methodology over the traditional one. However, the students stated their preferences without the experience of taking the same course with both methodologies.

In language classes, FL methods have been used to support skills such as listening and speaking (Amiryousefi, 2019) and grammar (Darmawangsa and Racmadhany, 2018). Hung (2015) noted that the students in an English FL class put more effort into their learning process than students in traditional classes. Turan and Akdag-Cimen (2020) reviewed flipped classroom trends in English language teaching described in 43 articles. They reported that this student-centered method promotes the autonomy of learners. Students spend minimal time in class listening to lectures; they have more time to solve problems individually and learn collaboratively with their classmates. A review of 34 flipped language learning articles published from 2015 to 2019 brought to light that most papers mentioned increased motivation associated with FL (Zou et al., 2020). Academic performance also increased and learning autonomy developed. In another study with 386 high school students, Chou et al. (2021) concluded that learning effectiveness is enhanced by using FL in language classes. Many students in that study also considered that the teaching content was easier to assimilate.

Few studies have been conducted on FL in FFL classes with beginner learners (Zou et al., 2020). Darmawangsa and Racmadhany (2018) studied 34 learners from A1/A2 levels learning grammar at university level. They found that student performances improved through the FL methodology. Sauvage (2019) implemented FL at B1/B2 levels and specified that the FL gave better results with the B1 group. The use of a playful frame in an FFL secondary school class increased student autonomy and engagement (Cruaud, 2018) and students voluntarily worked on additional activities. In another study, Amer-Medjani and Maarfia (2021) compared two groups of students enrolled in a BA French program at university. Students who used FL in the oral production class were more active, productive, and motivated than those who did not.

Challenges of flipped learning methodology

Flipped learning (FL) has many advantages, but it also presents some limitations. Ekici (2021) mentions the stress and confusion that an insufficient preparation can cause to both teachers and students alike when using this method. Students are often resistant to take up the extra work required for FL (Stone, 2012) and many studies have revealed "*limited student preparation before the class*" (Akçayir and Akçayir, 2018, p. 341). Students also need clear guidelines for their work at home. Fautch (2015) reported that instructors may not know whether students have undertaken out-of-class activities. The amount of time needed to prepare the flipped content is often presented as a further challenge, including the time and effort needed to create videos of the appropriate length and quality (Akçayir and Akçayir, 2018). Students may face difficulties when instructors assign externally created videos that do not align well with the course content (Akçayir and Akçayir, 2018). Preparing appropriate out-of-class activities takes time and requires intense effort (O'Flaherty and Phillips, 2015).

Gamification and gamified flipped learning

Ekici (2021) noted that "*flipped learning has many educational advantages but at the same time has some certain drawbacks and gamification seems to be a candidate to overcome these drawbacks*" (p. 3331). Mixing gamification with FL is, thus, using "*the best of both worlds to promote learning.*" This mix activates knowledge and "*puts the learner into the flow*" (Ekici, 2021).

"Serious games" are not primarily designed for entertainment but are intended for educational purposes (Barianos et al., 2022; Lazarinis et al., 2022). Game elements can be introduced in learning activities to enhance competition (Zhang and Zou, 2020) and may include challenges, rules, goals, and objects, e.g., points, time pressure, and leaderboards. Games typically rely on mechanisms or rules to manage the objects (Xezonaki, 2022). Points and leaderboards are two of the most common game reward elements. Points are used to reward users when a correct answer is given, and leaderboards share users' scores from timed activities (Xezonaki, 2022). Game elements motivate the students in their learning process (Banfield and Wilkerson, 2014). Zhang and Zou (2020) reviewed articles about using digital technology in language classes to enhance and promote effective learning. They revealed a variety of technologies (e.g., technologies for mobile learning and digital game-based learning) and described an overall positive impact. Campillo-Ferrer et al. (2020) integrated a game-based student response system (*Kahoot*) into the teaching process with 101 students. They noticed that students participated more actively; they were motivated to a large extent to learn in a more interactive and stimulating environment. Likewise, Martínez-Jiménez et al. (2021) introduced *Kahoo*t in eight subjects related to business and found that student results had improved. Another platform, Classcraft, was used to gamify an introductory programming course with 30 high school students (Papadakis and Kalogiannakis, 2019). The platform motivated male and female students who became more active in the learning process.

Aguilos and Fuchs (2022) explored the perceived usefulness and challenges of gamified approaches in online learning. The results showed that students' competitive behavior has a significant impact on their grades. In addition, instant gratification was perceived as highly motivating. However, it was a pilot study that involved only 19 student volunteers. Huang et al. (2019) compared two groups of Information Management students—a gamified-enhanced FL group and a non-gamified FL group. Gamification enhanced the FL student group, with students in that group more likely to complete the

pre- and post-class activities on time than those in the non-gamified FL group. Students in the gamified-enhanced FL group scored significantly higher in the post-course test than their non-gamified counterparts. In a study of the gamified flipped e-learning environment involving 74 students, participation increased with gamification activities (Gündüz and Akkoyunlu, 2020). The students found the course more motivating and interesting than non-gamified courses. This study, however, took place over a relatively short (9-week) period. Pozo Sánchez et al. (2020) combined FL and gamification in a Spanish language and literature course. The mix of these two methodologies improved several academic indicators, although this language was not a foreign language for the participants. In an English foreign language class where gamification was introduced to the FL class, Hung (2018) reported that learners were less anxious when using English in class and more motivated to participate in classroom activities. Participants in this study were intermediate-level learners exposed only to a 3-week gamified flipped classroom.

Despite showing considerable interest in FL and gamified FL, the current literature has included few studies using FL in FFL courses with beginners. Furthermore, to the best of our knowledge, no study has focused on gamified FL in an FFL class. We also lack studies voicing students' perceptions of different methodologies applied in the same course. By structuring sessions with and without FL, students can experience both methodologies and state their preference for the foreign language course. To date, only one study has reported students' experiences of both FL and NFL classes. Goedhart et al. (2019) conducted an 8-week experimental study in a Strategic Organization master's course. Half the course was taught in a traditional way, while the other half used the FL methodology. The study was a pilot with only 43 students, and none of the sessions were presented to separate groups using the FL and NFL methodologies. To date, no studies have allowed students to experience FL and NFL methodologies for each topic as part of the same course.

To fill the research gaps outlined, this study was conducted with a large group (215) of beginner students taking an FFL course (A1 level). The purpose of the study was to investigate whether the gamified FL methodology can efficiently engage beginner students in a foreign language class. This study allowed students to experience two teaching methodologies during the term: sessions with FL and some sessions without FL. Students could then decide on which methodology they would prefer for their foreign language learning pursuit.

The present study aimed to answer two research questions (RQs):

RQ 1: Is gamified FL efficient in a beginner's foreign language class?

RQ 2: What are learners' perceptions and attitudes about using FL methodology?

Materials and methods

Participants

The data were collected during one semester (15 weeks) in Spring of 2021. Students had online classes because of the coronavirus disease (COVID-19) pandemic and meetings took place twice a week for 90 min through a learning management system (LMS): Blackboard (BB). A total of 230 students were enrolled in this French foreign language university elective course (15 students dropped the course during the semester). The same FFL course was offered in five different sections on different days and times. Students were free to register for any section based on their availability. The students came from different colleges and were at different levels of study (freshman, sophomore, junior, and senior). All the students spoke English and the same instructor taught all the groups.

FL implementation in the course

In this course, students were required to learn French in outside-the-class sessions. Activities were so designed as to allow all the students to learn the material equally. Learners could complete activities at their own pace as frequently as they wanted and take as long time as they needed. Students were expected to be prepared to practice during the class. The online classes could then focus on application and discuss what they had discovered. The students were given preparatory activities (PAs) to discover vocabulary (seven PAs) and grammar rules (eight PAs). Some PAs were a mix of both (grammar + vocabulary), described here as communication (six PAs). Preparatory activity 1 (PA1) was not included in the present study because it was used to ensure the students understood both FL and the PA process.

Akçayir and Akçayir (2018) noted several commonly used out-of-class activities in the studies they had reviewed. Tasks undertaken outside the class included watching videos, reading, taking quizzes, and participating in discussions. Automated tutoring systems and study guides were also presented to the students (O'Flaherty and Phillips, 2015; Campillo-Ferrer et al., 2020). Technology, especially video, is often regarded as the easiest way for teachers to share learning content with students (Hwang et al., 2015). However, assigning only videos to watch—as Hung (2018) did—is not recommended for A1-level students. Students would not have been able to understand them fully, because French is completely new to them. Lengthy reading assignments are also not recommended, as students are unlikely to complete all the material on time (O'Flaherty and Phillips, 2015; Akçayir and Akçayir, 2018). Out-of-class activities are very important in FL and preparation of appropriate learning-oriented gaming activity by teachers is critical. Thus, appropriate activities require a careful selection.

Activities were chosen that would not take more than 15 min. The PAs (matching, observing, completing, listening, and watching some very short YouTube videos) and the oral and written input given were varied, so that students remained engaged. Tasks were written in French and sometimes translated or supported by icons (especially during the 1st weeks of the semester). Fautch (2015) noted that students may need help with out-of-class material, as they discover the topics for the first time. Therefore, students were given links to a free monolingual and bilingual online dictionary. Students could also use the "Discussion" section of BB to ask questions and request help. They were free to choose whether to complete the activities alone or in groups.

Group distribution

To ensure that all students experienced FL and NFL sessions, the control group (CG) did not remain constant throughout the course. The optimal time (year of study) to introduce FL remains unclear, together with whether it is better to flip classes for a single course or throughout a complete program. O'Flaherty and Phillips (2015) mentioned that "*there was no evidence presented to suggest whether flipping the entire course [. . .]is more beneficial than flipping only a few selected class sessions/modules per course*" (p. 89). Therefore, for each of the topics taught, it was decided that a CG would be maintained that would not experience the FL for comparative purposes. For each activity, a different CG was selected that would not experience the FL for that topic. During the term, four main topics in each section were taught using a traditional methodology (lecture during the session then activities) and 17 topics with FL methodology, as shown in Table 1.

Data collection

Quantitative and qualitative data were collected to answer the research questions. Quantitative data were used to measure students' performance (scores on *Kahoot* quizzes) and their perception of the FL methodology (percentages with close-ended questions in a questionnaire). Qualitative data (open-ended questions where students could choose their own words and talk in depth) were used to understand how learners perceived this learning experience.

Quizzes on Kahoot

Student response systems that allow the assemblage of data about learners' understanding of the content have become more numerous in recent years (Campillo-Ferrer et al., 2020). Many online educational platforms—PollEverywhere, Socrative, Quizlet, and *Kahoot*—mixing fun and content knowledge are available on the Internet. *Kahoot* has an attractive interface that contains actions, including surveys, quizzes, and discussions. It is described as a student response platform and an online gaming tool with several benefits listed out by Campillo-Ferrer et al. (2020). For example, it requires a low level of technical expertise, is easily accessible from any device, increases student motivation and engagement, reduces distraction, and helps students review the learning content. Students earn points by answering questions within a limited time and a ranking is given to each student. Two game mechanisms (Xezonaki, 2022) are used here: challenges—learners use their knowledge to complete a challenge—and competition—learners compete against each other.

Kahoot was introduced in the course to accomplish two objectives. First, it allows the measurement and tracking of a student's performance. Second, it infuses a challenging spirit to the class; students are ranked and the names of the top five contenders appear on the screen for being viewed by all the students. All the attendees were encouraged to participate and the winners were always announced loudly and congratulated by the instructor. In each FL session, two quizzes comprising five questions each were presented to students using *Kahoot*. The first—QUIZ 1 (QZ1)—was given at the beginning of the session to ensure the students had undertaken the PA and to track what they did not understand. The five questions mainly comprised sentences from the PA. The second Quiz—QUIZ 2 (QZ2)—was more detailed and administered on completion of the session after practice in the class. Students who did not have to prepare any PAs (CG) took only one quiz (QZ2) at the end of the session.

The first part of this research was conducted during the first 9 weeks of the spring semester in 2021. Not all students took the quizzes: 68% took QZ1; 66% took QZ2, and 69% of the CG took QZ2. Additionally, the grade averages were low, with means of 57% for QZ1 and 63% for QZ2. It was reasoned that the students had insufficient time to respond—they were given 20 s per question. Hence, the time to answer was increased from 20 to 30 s per question. The pre-Midterm (first 9 weeks of the term before the Midterm exam) and post-Midterm (classes after the Midterm exam) data were compared. Students' scores were entered into an Excel sheet, and mean and SD were calculated.

Questionnaire

To track the students' perceptions and attitudes of the experience, a Learning Experience Questionnaire (LEQ) comprising 15 questions was presented at the end of the semester. Two questions linked to digital activities shared in the Forum were not considered further. The questionnaire was presented *via* BB and was intentionally kept short so as to encourage the students to complete it.

The students were invited to voluntarily answer the anonymous questionnaire that included eight scaled questions (Table 2). Additionally, three open-ended questions allowed

TABLE 1 Control group distribution during the term.

	PA																			
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Section 1	CG						CG					CG					CG			
Section 2		CG						CG					CG					CG		
Section 3			CG						CG					CG					CG	
Section 4				CG	CG					CG					CG					CG
Section 5						CG					CG					CG				

PA, Preparatory activities; CG, Control group.

TABLE 2 Overview of the questionnaire.

Objective of the question	Question number
Make sure students prepared the PA	Q1
The time it took to prepare the PA	Q2
Students' feelings after preparing the PA and before practicing during the session	Q3
Students' feelings after preparing the PA and after practicing during the session	Q4
The students evaluate the experience on a numerical scale	Q5
Would students like to use the same methodology in other courses? (That would mean that they really enjoyed it. It is a way to control students' answers in Q5)	Q6
Students state their preferred methodology: FL or NFL	Q7
The role of gamification (*Kahoot*)	Q8

PA, Preparatory activities; FL, Flipped learning; NFL, Non-flipped learning.

the respondents to freely express their thoughts regarding this learning experience:

1. What are the advantages of flipped learning (having AP to prepare)?
2. What are the disadvantages of flipped learning (having AP to prepare)?
3. Please share any comments you have about this experience with flipped learning.

Results

Scores in *Kahoot* quizzes

Table 3 summarizes students' scores on the *Kahoot* quizzes. The groups that prepared the activities before attending the sessions had higher scores than the CG students. The mean for QZ1 was 62.5%, increasing to 69.5% in QZ2. The mean for QZ1 was higher than the CG results in QZ2 (60%). Solving PAs before the sessions seems to be beneficial to the students. Focusing on the performance by section for each PA in QZ1 (Figure 1) and in QZ2 (Figure 2) shows a trend toward higher scores in QZ2. Giving students more time to answer the *Kahoot* questions improved their performance, as shown in Table 3. The average for QZ1 increased from 57% in the pre-Midterm data to 68% for the post-Midterm data. The same progression was noted for QZ2, as the average moved from 65 to 74%. The greatest standard deviation (SD) was registered in QZ2 with the CG, indicating a greater disparity in the results of those students.

Analyzing the scores by subject—grammar, vocabulary, and communication (Figure 3)—it is evident that vocabulary quiz performance (72%−76%−72%) was far better than grammar (56%−66%−54%) or communication (63%−65%−54%). Students find it easier to remember the vocabulary and identify objects than to master grammar rules or verb conjugations. Here again, the highest SD was recorded for the CG. In addition, the mean student participation was 70% for QZ1 and QZ2 (CG), and slightly lower for QZ2 (FL) (Figure 4). When the time for answering questions was increased, the participation rate increased primarily for the FL groups. However, the participation rate did not exceed 72%. The non-participation of around 30% of the students raises important questions.

Questionnaire

Responses to the scaled questions are presented in Table 4. A number score was assigned for each answer to the scaled questions, each with four or five answers, and the mean and SD were calculated. The questionnaire was completed by 118 students. Most of the questions had a mean score ranging from 3.5 to 4.85. The results indicate the overall positive feedback about the FL experience. All SDs were also relatively low (between 0.83 and 1.18) indicating consistency and low variation around the mean in the student ratings.

An initial statement, "*You always solve the AP before the sessions*," was presented to determine whether the learners had undertaken the PA. Approximately half (52%) of the students who completed the survey indicated that they agreed and 30% strongly agreed. Only 7% disagreed and 1% strongly disagreed.

TABLE 3 Score distribution for each quiz in flipped learning and control groups.

	Groups that had flipped learning				Control groups	
	QZ1		QZ2		QZ2	
	Mean %	SD	Mean %	SD	Mean %	SD
Pre-midterm data	57	7.31	65	6.99	55	12.31
Post-midterm data	68	10.96	74	10.45	65	14.00
All data	62.5	11.07	69.5	10.13	60	14.05

QZ1, Quiz 1; QZ2, Quiz 2.

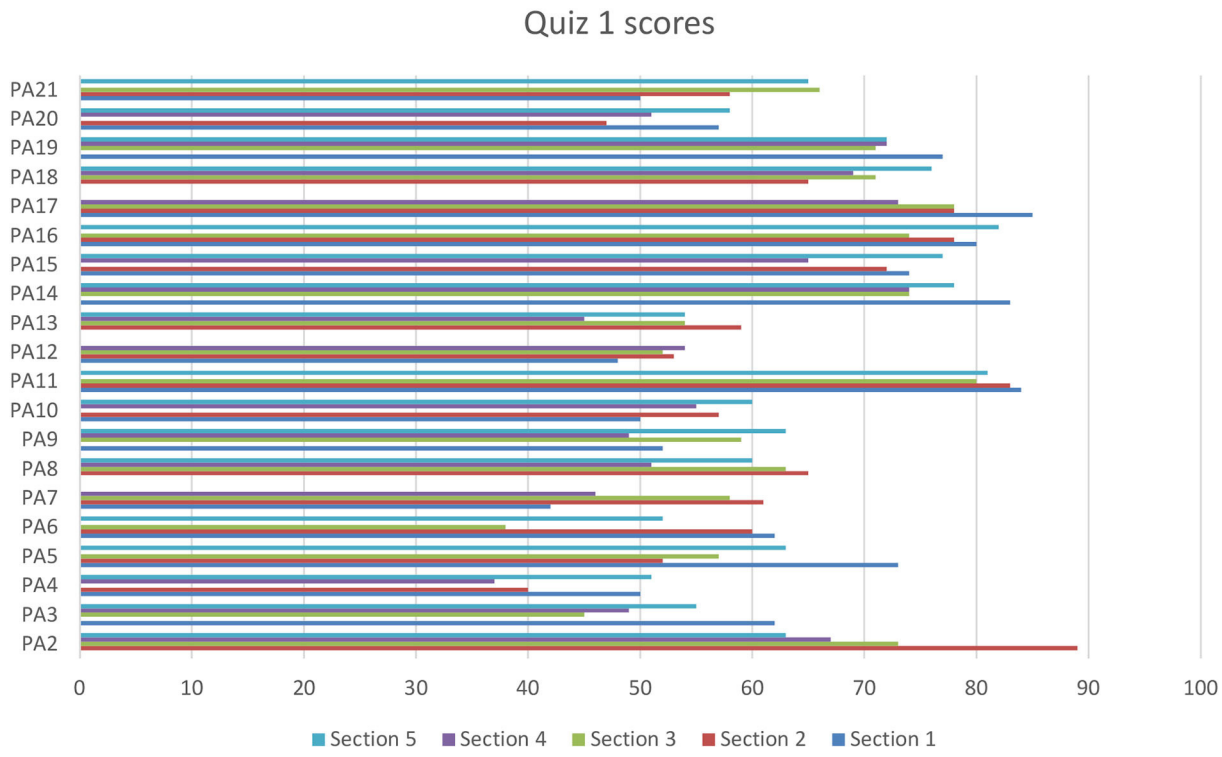

FIGURE 1
Sections' scores in QZ1 for each PA (QZ1, Quiz 1; PA, Preparatory activities).

A significant proportion of respondents (71%) replied that they spend "*not that much time*" preparing the PA. Ten percent indicated spending "*too much time*" and only 2% said, "*too much time that they could not finish preparing the PA*." After preparing the PA and before practicing during the session, 30% of the students reported feeling "*extremely confident*," 56% "*confident*," and 13% "*not very confident*" about the material. Once they had practiced in class, the percentages increased to 57% who felt "*extremely confident*," 36% who were "*confident*," and only 7% who did not feel very confident.

Thirty-one percent of the respondents graded the FL experience as 5 (the highest grade) and 40% gave a rating of 4. Only 3% graded it 1 and another 3% graded it 2. Twenty-three percent of the respondents were neutral and graded it 3. Moreover, 42% of the respondents agreed and 22% strongly agreed with the statement: "*You would like having PAs (and flipped learning) in other courses*." An interesting trend was that 65% of the respondents answered "*I prefer the sessions with PA to prepare (flipped learning)*;" 10% preferred the sessions without PA (NFL) and 25% had no preference. Moreover, 72% of the respondents strongly agreed and 25% agreed that using *Kahoot* during the sessions helped them learn. A non-significant proportion (1%) disagreed and another 1% strongly disagreed with the statement.

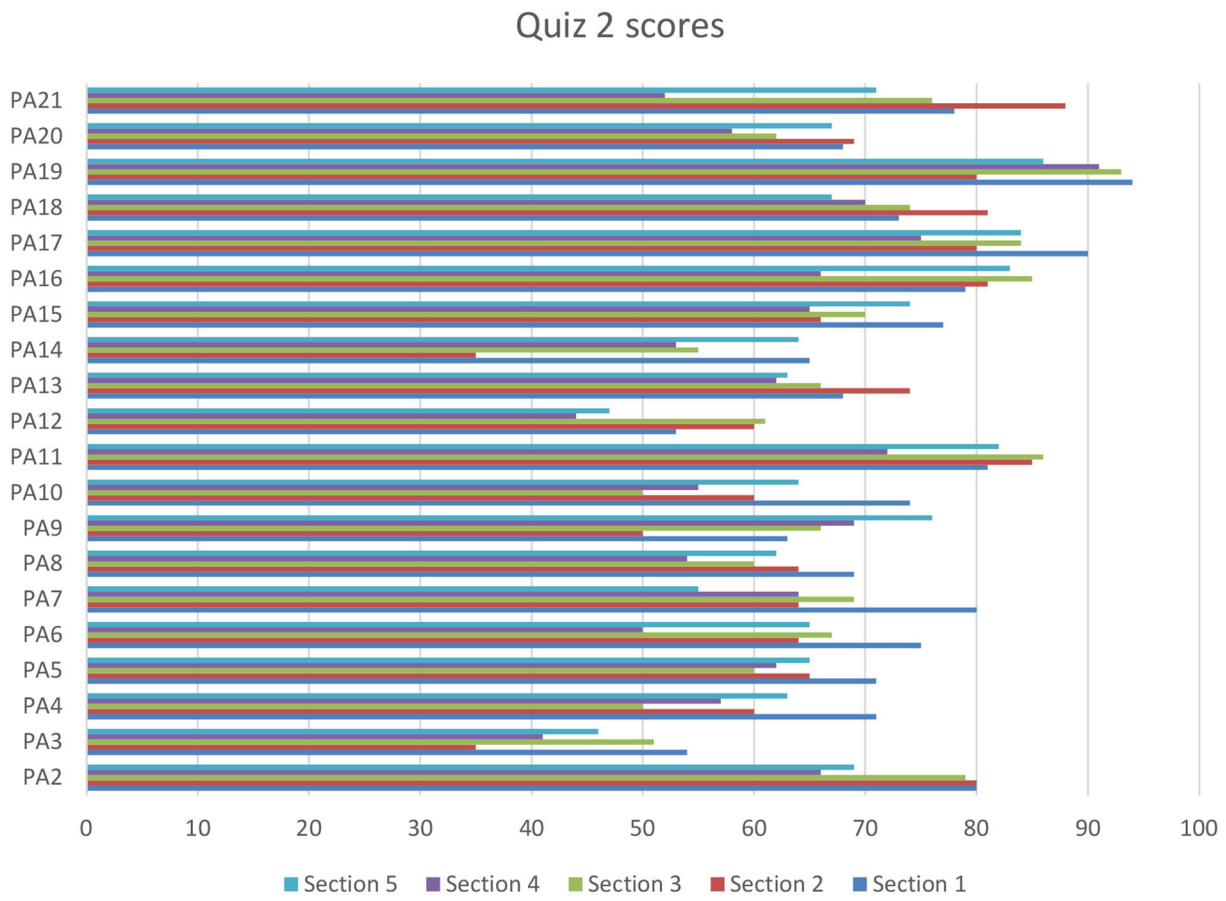

FIGURE 2
Sections' scores in QZ2 for each PA (QZ2, Quiz 2; PA, Preparatory activities).

The open questions revealed the benefits of FL according to the students. Their statements were grouped by topic and some quotations are presented as examples in Table 5. The most frequently mentioned benefits of FL in this foreign language course were understanding and memorizing. Students reported that FL helped them to have "*a clearer understanding*" of the topic, and "*memorize better*." Many students also said that they appreciated having room for questions and asking for clarification during the session. Self-learning was also appreciated by some students who enjoyed discovering the language by themselves. Some respondents described feeling less stressed and more confident. This methodology gives more time for participation and encourages the students to be more active. They valued how PAs helped with exam preparation and some respondents mentioned that they appreciate the opportunity to "*take the time*" needed to understand the topic. Having an "*advantage in Kahoot sessions*" was also appreciated by some respondents.

Many respondents felt there were no disadvantages of employing the FL methodology (Table 6). Some respondents also highlighted that the time needed is the biggest disadvantage of the approach. They mentioned having too much work with their major courses. One student reported feeling lost during the session if they had not prepared the PA, which was seen as a disadvantage of the approach. Preparing the PA to be able to follow in class did not motivate all the students. Some students regretted that the PA activities were completely in French.

A final open question allowed the students to comment freely on their experience (Table 7). A very small number reported a negative experience, but did not explain why. The majority of them considered it a positive experience: "*great*," "*best experience*," "*effective methods*," and "*very beneficial for students*" were some ways used to describe the gamified FL methodology. One respondent said: "*I loved participating and sharing my answers even if I'm wrong.*" This shows that the student felt sufficiently comfortable with this method to not feel afraid of making mistakes. Another student stated, "*I am very happy and thankful*," indicating enjoyment of this learning approach. Respondents considered the FL helped them learn the

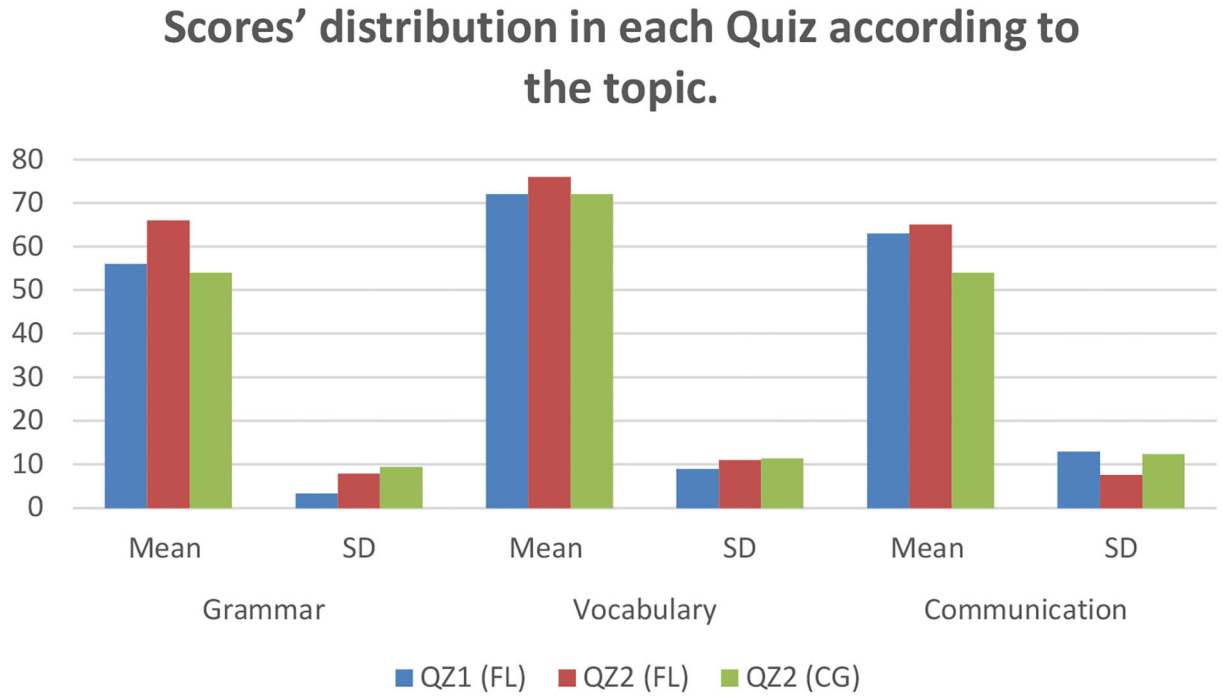

FIGURE 3
Score distribution in each quiz according to the topic (QZ1, Quiz 1; QZ2, Quiz 2; FL, Flipped learning; CG, Control group).

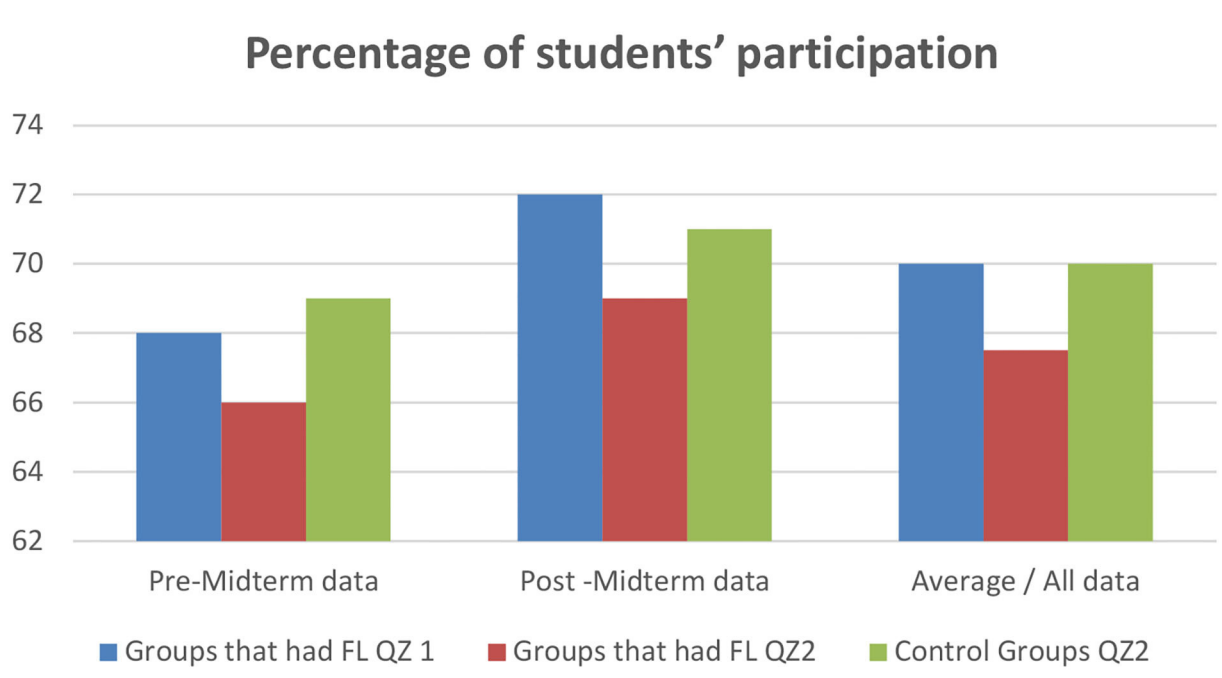

FIGURE 4
Percentage of students' participation (QZ1, Quiz 1; QZ2, Quiz 2).

TABLE 4 Student responses to the scaled questions.

Question	Possible responses	Percentage	Score	Mean	SD
You always solve the PA before the sessions.	Strongly agree	30	5	3.98	0.93
	Agree	52	4		
	Disagree	7	3		
	Strongly disagree	1	1		
	Neither agree nor disagree	11	2		
Please describe the time that preparing the PA takes.	Too much time	10			
	Not that much time	71			
	So much time that you can never finish preparing the PA	2			
	Very few minutes	17			
How confident you feel about the material after preparing the PA and BEFORE coming to class for practice.	Extremely confident	30	5	3.98	0.97
	Confident	56	4		
	Not very confident	13	2		
	Not confident at all	1	1		
How confident you feel about the material after preparing the PA and AFTER coming to class for practice.	Extremely confident	57	5	4.39	0.83
	Confident	36	4		
	Not very confident	7	2		
	Not confident at all	0	1		
On a scale of 1 to 5 (where 5 is the highest), you would rate the flipped learning experience as:	1	3	1	3.87	1
	2	3	2		
	3	23	3		
	4	40	4		
	5	31	5		
You would like having PA (and flipped learning) in other courses.	Strongly agree	22	5	3.50	1.18
	Agree	42	4		
	Disagree	15	3		
	Strongly disagree.	4	1		
	Neither agree nor disagree	17	2		
During the semester, you experienced both: sessions with PA to prepare (flipped learning), and sessions without (the material was discovered in class). Which ones did you prefer?	The sessions with PA to prepare (with flipped learning).	65			
	The sessions without PA to prepare (without flipped learning).	10			
	No preference	25			
The use of gamification during the sessions (*Kahoot*) helps you to learn.	Strongly agree	72	5	4.85	0.83
	Agree	25	4		
	Disagree	1	3		
	Strongly disagree	1	1		
	Neither agree nor disagree	2	2		

PA, Preparatory activities.

TABLE 5 Student answers to the question: What are the advantages of flipped learning (having PA to prepare)?

Topic	Example quotes from students
Understanding	*"Helps understand the topic more."*
	"It prepares us for the next class and it gives us a clearer understanding."
Memorizing	*"It's also an effective way of memorizing the material as you have a chance to go through it before class, during class, and practice it after class."*
	"It makes learning the new material easier."
	"You remember better."
	"Helps keeping the information in my brain."
	"It becomes easier to remember the stuff you learned when studying for an exam."
Room for questions + Asking for clarification	*"To ask questions when needed."*
	"Leaves room for questions to be asked during the lecture."
	"If I didn't know how to solve something I have the chance to ask the doctor to explain and repeat it for me."
	"Flipped learning helps the students prepare the material beforehand which often benefits the student in knowing their weaknesses and what to focus on, and encourages them to ask questions for clarification."
Working at own pace	*"Taking the time to understand the topic."*
Self-learning	*"PA is a good idea for learning before the class. It makes me want to explore the language by myself which encourages me to continue learning. Generally, it is a great way to learn."*
	"It helps me depend more on myself while learning."
	"It teaches self-learning and confidence and prepares for the lecture."
No background in French	*"Having some idea of what we are covering in class especially for students who have zero background in French."*
Confident + less stress	*"It will help you participate more and will let you be confident in your answer."*
	"Ability to solve any question in class with confidence."
	"It makes us less stressed while learning."
	"It makes me excited for the class and more confident to attend and even share my answers."
	"Makes me feel confident with my work and I find it engaging with the students."
Being active and participating	*"Helps in being active during the lecture."*
	"We can participate in the class."
	"More time to practice and clear doubts."
	"It helps me search and learn more about the language aside from the exercises."
	"More participation for students."
Preparation for exams	*"PA's saves the information in my mind and makes it much easier to study for quizzes and exams."*
	"It helps you to prepare for quizzes."
Kahoot	*"It makes me have an advantage in Kahoot sessions."*
	"Advantage in Kahoot sessions."

PA, Preparatory activities.

TABLE 6 Student answers to the question: What are the disadvantages of flipped learning (having PA to prepare)?

Topic	Example quotes from students
None	*"None."*
	"Can't think of any."
	"No disadvantages."
Time	*"Sometimes I don't find much time to solve it due to the pressure of my other courses."*
	"I would say the only disadvantage would be the time it takes to prepare."
	"Sometimes I don't have time to solve them 100%. I make sure to at least take a look at them but unless I solve them at least 80% I sometimes get lost during the class and especially during Kahoot."
	"Takes time to solve."
	"Taking time and researching to understand."
Feeling lost if not prepared	*"Feeling lost in the lecture if you didn't prepare."*
Foreign language	*"All in French."*
	"Having to translate new or unfamiliar terms."
	"Sometimes hard to understand."
	"English explanation should be added."
	"Other than having to translate new or unfamiliar terms there aren't disadvantages with having an PA."

PA, Preparatory activities.

new language—being prepared for the sessions and solving the PAs helped students acquire French.

Discussion

In line with the results obtained by Hung (2015), this study showed that students enjoyed the FL methodology implemented in this FFL course. Being prepared helped them to understand the material and memorize it, confirming Chou et al.'s (2021) findings. Students also valued the self-learning at their own pace in line with Nouri's (2016) findings regarding students' general perceptions of flipped classrooms. One student stated: "*PA is a good idea for learning before the class. It makes me want to explore the language by myself which encourages me to continue learning. Generally, it is a great way to learn.*" Inspired, students engaged more in the sessions and participated more actively.

Students appreciated the dedicated time for questions and explanations. Preparing the PA "*benefits the student in knowing their weaknesses and what to focus on, and encourages them to ask questions for clarification.*" Moreover, it seems that learners appreciated taking more ownership for their learning: "*It teaches self-learning and confidence and prepares [one] for the lecture.*" Another student observed, "*French is a new language for me*

TABLE 7 Student responses to the statement: Please share any comments you have about this experience with "flipped learning."

Topic	Example quotes from students
Positive experience	*"It is a good experience."*
	"It is a great strategy."
	"It's one of the best experiences since none of the other courses use this very effective method."
	"It is helpful."
Participation	*"Practice more in session, like Kahoot."*
	"Very beneficial for students to encourage participation and discussion."
	"It helps to participate more, and I love participating and sharing my answers even if I'm wrong."
Grade the PA	*"The PA would have partial credits."*
Bad experience	*"For me, it was not a good experience"*
	"It's not my favorite experience. I'd rather have worksheets to solve AFTER the class."
Helped in learning a foreign language	*"The PA consists of many learning tools to help students learn a new language, such as pictures and color coordinated texts."*
	"French is a new language for me and so being exposed to the new material beforehand in the PA helps me stay focused and not get lost in class with all the new vocabulary."
Importance of being prepared	*"Flipped learning helped me realize how much preparing before a lesson helps in better understanding during the lecture."*
	"I am very happy and thankful that we do flipped learning in this course. I find that it really helps me understand."

PA, Preparatory activities.

and so being exposed to the new material beforehand in the PA helps me stay focused and not get lost in class with all the new vocabulary." The PA permitted them to self-regulate their learning process to meet their personal needs, helping to optimize their focus and improve the quality of study—confirming findings from previous studies (Goedhart et al., 2019). Solving the PA "*makes me excited for the class and more confident to attend and even share my answers*," said one student. "*It helps to participate more, and I love participating and sharing my answers even if I'm wrong*," said another one. Students who were well-prepared looked forward to attending the sessions and expressed more motivation. Once they had solved the PA and practiced in class, 57% of the students felt extremely confident in this FFL class and 36% felt confident. Only 7% did not feel confident (13% did not feel confident before the practice). Confidence seemed to increase after the practice, which cleared all the doubts and questions they had while preparing. Confident, students took an active role in the foreign language learning processes before and during the sessions.

Throughout the term, students experienced both FL and "traditional" NFL sessions. More (65%) students preferred the FL sessions and, consequently, 64% of them said they would like to use this methodology in other courses (15% disagreed and 4% strongly disagreed). In line with responses to the open questions, these percentages show that most students appreciated being engaged in their learning process. These beginner learners appreciated being prepared for the foreign language class and benefitted from the class time to practice, participate, and ask questions. One student noted: "*Flipped learning helped me realize how much preparing before a lesson helps in better understanding during the lecture*." The FL groups obtained higher scores for both QZ1 and QZ2 than the CG. FL helped students perform better in the quizzes because they could prepare the PAs at their own pace and then practice and resolve any doubts during the sessions. Similar findings were reported by Wang et al. (2018) where Chinese foreign language learners exposed to FL sessions outperformed the NFL group. This finding also aligns with the research by Pozo Sánchez et al. (2020) who concluded that gamified FL caused their learners' academic indicators to improve. The CG's SD was the highest, suggesting greater range and spread of student scores. Students who prepared for the classes had scores that were more consistent and closer to the mean.

Extending the time given to answer the questions allowed the learners to obtain better results. Clearly, 20 s was insufficient for students learning a foreign language, and the 10 additional seconds enabled a better performance. Would further extension of the time allow for more improvement in the mean scores? Unfortunately, *Kahoot's* next option for more time is 1 min, which may be too long for the types of questions asked and reduce the challenge. *Kahoot* created spirited competition in class and motivated the students. An overwhelming majority (97%) of the respondents concurred that the "*use of gamification during the sessions helps them learn*" (72% strongly agreed and 25% agreed). This was, by far, the statement with the highest percentage of agreement. Gamification that involves sessions with points —rewarding learners when a correct answer is given—and leaderboards—giving the learners scores under time pressure—(Xezonaki, 2022) has a positive impact on students and supports them in their learning process. This finding aligns with other reports (Hung, 2018; Huang et al., 2019; Gündüz and Akkoyunlu, 2020) that describe the benefits of gamification for students in FL classes. Introducing this game-based student response system seemed to "*put the learners into the flow*," as urged by Ekici (2021). It pushed them to prepare prior to the sessions to be ready for QZ1 and to focus during the sessions to improve their QZ2 scores. One student said preparing PA led to an "*advantage in Kahoot games*." Students did their best to be on the leaderboard and have their names announced. Consequently, the quizzes challenged the students and encouraged them to focus before and during the sessions. Furthermore, by testing their knowledge, learners

could identify their weaknesses and work on addressing any areas of uncertainty during the session.

It was noted, however, that ∼30% of the enrolled students did not take part in the quizzes on *Kahoot*. In some instances, the students were connected to BB but not to *Kahoot*. It is possible that some of them had technical issues, but that seems unlikely for 30% of the students. The FL and gamification did not engage these students in this course. How can this be explained? Several factors may have driven students not to complete quizzes on *Kahoot*. These active learning methodologies may not engage the "*isolated learner*" (Gillett-Swan, 2017). Some students prefer not to engage in the learning process, and others may find it difficult to switch from traditional teaching methods to a more engaging approach, as Gündüz and Akkoyunlu (2020) note. In a comparative review of research, Lo and Hew (2021) stated that the behavioral engagement (e.g., participation, effort, and conduct) of students may be affected in FL courses. They cited Heuett (2017), who noticed that the number of absent days increased significantly after introducing FL in his mathematics class. Heuett (2017) linked these absences to the introduction of video lectures—students felt that they knew the material and did not need to attend the classes anymore. In our case, the FFL course was offered online and the sessions were recorded. With this delivery mode, students can prepare the course material by themselves and watch the recording. These factors may have discouraged learners from attending the synchronous sessions, even if they were compulsory. Tang et al. (2020), working with university students taking online classes, noted that 60.2% of students are attentive for ∼15 min, and their attention decreases noticeably after 25 min. In the same research, the authors found that students who prepared material before the session maintained their attention for more than 50% of the course. Thus, the online delivery mode may explain the inactive students. Moreover, this FFL course is a university elective course and students may have preferred to focus on their major courses. One student reflected: "*I don't find much time to solve [PAs] due to the pressure of my other courses*." Students could be connected to the course on BB but not actually following it, that is, not actually in the course. In future research, a comparison with major courses using this method would be interesting and help clarify the findings.

Some changes in the implementation of FL and PAs are needed in the future. Students need clear guidelines to complete the PAs (Akçayir and Akçayir, 2018). Our PA types varied, and instructions were presented mainly in French. All the tasks should have been translated into students' shared language (English), and a glossary of the new words presented to the students for each PA. They would then have spent less time searching for the meanings and be more encouraged to prepare the activities. Ultimately, we want students to feel encouraged to complete the PA and come to class prepared. Some students suggested grading the PAs: "*The PA should have partial credits*," stated one student. This may be a good idea as grades are always motivating for students. The short *Kahoot* quizzes could be graded "*as completion with no make-ups*" (Fautch, 2015). When the students know that their final grade may be affected, more students may participate.

The current study has some limitations that should be addressed in future research. First, the questionnaire was too focused on FL. Other questions linked to *Kahoot* and the online delivery mode should have been added. In future research, the questionnaire will focus more on gamification. Second, the questions could have corresponded more closely to those used in other studies to enable comparison. Further studies are recommended, with more detailed questionnaires inspired by other research. Third, other data analysis tools could be used to ensure that the students did not answer randomly. Even if the data were carefully double-checked to avoid bias, the lack of investigator triangulation is a limitation in this study. In future research, the Cronbach's alpha test, for example, could be employed to test for internal consistency.

Conclusion

This study has evaluated the efficiency of a gamified FL methodology in an FFL class for beginners. The purpose of this study was to determine whether this methodology was efficient in a foreign language class with novice students, and quantitative and qualitative data were collected. Students' scores for gamified quizzes and feedback through a questionnaire were analyzed. It was clear that students who had FL sessions obtained higher scores on the quizzes. Feedback also showed that they appreciated the FL method because it helped them in the learning process, and *Kahoot* was regarded as very valuable. In response to RQ1, it can be affirmed that gamified FL methodology is applicable in an FFL class with beginner students and appears to be efficient. Furthermore, learners appreciate this combined teaching method (RQ2) and seem to prefer it to traditional teaching approaches. Results showed that learners embrace FL and appreciate taking responsibility for their learning.

This study has several strengths. First, to the best of our knowledge, it is the first study that allowed students in the same course to undertake topics with FL and others without enabling them to compare the methodologies and decide which is more suitable for their learning. Second, it is the first study conducted on gamified FL with FFL beginners. This study contributes to the literature by expanding the application of gamified FL to FFL, and to foreign languages in general.

Foreign language instructors may benefit from this study because it adds evidence to the case for FL, a finding that FL helps students learn by making them more motivated and engaged. This study shows that students feel more comfortable with this method and prefer it to traditional approaches. Prepared beginner learners are more confident in their first

steps in learning a foreign language. Motivated and engaged in their learning process, students will acquire the targeted foreign language more readily and deeply. The study may help foreign language instructors working with beginner students develop ideas regarding gamified FL methodology. Varying the gamification tools could also be considered in future research.

It is hoped that some instructors will introduce this combined methodology to their novice students. However, some adjustments are needed to implement this methodology in class. The PA tasks must be presented in the students' vehicular language—not in the targeted language—to reduce the time spent undertaking the activities. The time given to answer the quizzes should be increased to determine if the scores will improve further. Any online game-based learning platform could be used if it fulfills the timing requirements.

Finally, these courses were delivered online, which may have discouraged some students' participation. In future, a comparison with face-to-face education using the same methodology should be done to identify the impact of online learning.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

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Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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