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Impact of a game-based tool on student engagement in a foreign language course: a three-term analysis

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In recent years, the use of game-based learning platforms has gained significant attention in educational settings for their potential to enhance student engagement and learning outcomes. This paper examines the effectiveness of Kahoot!, a game-based student response system, in an online French as a foreign language course. The study aims to assess how students perceive Kahoot! across three academic terms. A mixed-methods approach was used, combining quantitative data from structured questionnaires with qualitative insights from open-ended questions. This provided a comprehensive view of student perceptions and experiences with Kahoot!. The findings show consistently high student enthusiasm and engagement with Kahoot! across the three terms. Most students strongly agreed that Kahoot! positively impacted their learning, with high mean scores and low standard deviations reflecting widespread consensus. However, some students showed variations in competitive motivation, and minor technical challenges were noted. Overall, the study underscores Kahoot!'s sustained effectiveness in improving student engagement and learning in online French courses. Despite variations in motivation and some technical issues, the tool was largely seen as beneficial. This research adds to the growing evidence of the value of game-based learning tools in online education, particularly for foreign language instruction.

KEYWORDS

online education, game-based learning, student engagement, educational technology, foreign language instruction, Kahoot!

1 Introduction

Educators are increasingly aware of the challenges in sustaining students' motivation, engagement, and focus during extended lectures (Balakrishnan Nair, 2022). Insufficient motivation can lead to reduced learning outcomes and an unfavorable classroom environment. Research has shown consistently that active student engagement during lectures positively impacts comprehension and academic performance (Prince, 2004). Rooted in constructivist and sociocultural learning theories, the theory of active learning underscores the idea that learners construct their knowledge and understanding through active engagement and involvement in the learning process (Arthurs and Kreager, 2017).

When teaching a foreign language (FL), it is imperative to prioritize full engagement of students in the learning process in order to facilitate effective assimilation of the target language (Kotob and Ibrahim, 2019; Turan and Akdag-Cimen, 2020; Dewaele and Li, 2020). These studies have shown that engaged students tend to be more motivated, devote additional time to language study outside the classroom, and generally achieve higher levels of language proficiency. In online education, this principle is especially pertinent because student

motivation, engagement, and participation often decrease (Martín-Sómer et al., 2021; Kohnke and Moorhouse, 2022a, 2022b; Hollister et al., 2022; Derakhshan et al., 2022) and instructors encounter challenges in maintaining learners' focus and interest (Khaldi et al., 2023).

Attention should be paid to the fact that the current generation of university students—often referred to as Generation Z—encompasses individuals who were born between the mid-1990s and the mid-2000s. Unlike previous generations, Generation Z has been exposed to the internet from an early age, leading to a strong affinity for and a growing reliance on technology (Wijayaratna et al., 2023). For this reason, they might respond more positively to technology-based learning.

Numerous innovative teaching methodologies have been integrated into modern classrooms to enhance interaction and engagement (Deng, 2023). Examples include (i) peer instruction, which involves students learning from each other's perspectives, (ii) blended learning, which combines online and in-person educational experiences, and (iii) flipped learning, in which traditional lecture and homework elements are reversed.

Technological advancements have revolutionized not just our daily communication and interactions but also the educational landscape, altering how knowledge is delivered and assimilated (Fuchs, 2022; Thanyawatpokin and Vollmer, 2022). Technological tools have been integrated into classrooms to stimulate students' critical thinking, collaborative discussion, inquisitive investigation, and creative innovation. This approach transforms students from passive recipients of information into active participants in the learning process (Nganji, 2018; Attard and Holmes, 2020; Zou et al., 2021; Bratel et al., 2021; López-Martínez et al., 2022; Chan and Lo, 2022; Utami and Nurhalizz, 2023).

The efficacy of technology in education is well established: learners experience enhanced outcomes and improved performance (Pratiwi et al., 2021; Núñez-Pacheco et al., 2023). Also, it fosters increased motivation and engagement among students (Baah et al., 2023). In language learning, technology has been used effectively to focus on various facets such as enhancing vocabulary skills (Ahmed et al., 2022; Rojabi et al., 2022), grammar (Azman and Yunus, 2019), reading (Chiang, 2020), and reading comprehension (Korkmaz and Öz, 2021).

Numerous game-based student response systems (GSRSs) are available for free, such as Socrative, Quizlet, PollEveryWhere, Mentimeter, Kahoot!, and Quizizz. These tools enable instructors to design diverse activities such as quizzes and interactive clouds. Using these technologies and games, digital classes have demonstrated enhanced effectiveness compared to traditional classroom settings in various aspects including learning outcomes (Parra-González et al., 2020; Dehghanzadeh et al., 2021; Foroutan Far and Taghizadeh, 2022; Candan and Başaran, 2023; Pratiwi and Waluyo, 2023).

Among the various available options, Kahoot! stands out as the pioneering GSRS. Introduced in 2013, it has been designed uniquely to offer a game-like experience, utilizing game design principles that are rooted in the concept of intrinsic motivation (Wang, 2015; Wang and Tahir, 2020). According to Wang (2015), Kahoot! uniquely transforms a classroom setting into a dynamic game-show environment. Game elements such as challenges, rules, and objectives are combined with features such as time constraints, leaderboards, points, and levels to enhance student motivation in the learning process (Banfield and Wilkerson, 2014; Zhang and Zou, 2020; Xezonaki, 2022).

In higher education, the elements that are used most frequently for gamifying e-learning systems are PBLs (points, badges, and leaderboards), levels, and feedback (Khaldi et al., 2023). In addition to these gaming elements, Kahoot! offers several other benefits, as noted by (Plump and LaRosa, 2017). It has a version that is available for free, user-friendly for instructors, and provides functionalities for downloading, assessing, and storing student performance data. This feature allows instructors to identify and address specific areas of weakness for each section or individual student. Similarly, the integration of music and vibrant colors in Kahoot! invigorates the classroom atmosphere, fostering enthusiasm and energy among students (Plump and LaRosa, 2017). Educators have the flexibility to create questions in different formats, such as quizzes, true-or-false statements, puzzles, polls, and word clouds (Zhang and Yu, 2021). They can vary and adapt them to the purpose of the course, adding photos or videos if needed. However, the questions must be short and are limited to a maximum of 120 characters. Moreover, Kahoot! allows immediate feedback, which promotes the learning of students. It is an opportunity for learners to advance by dispelling misunderstandings and adjusting learning paths (Cutri et al., 2016). Kahoot! has been subjected to numerous studies, and the literature indicates that when implemented effectively, Kahoot! can improve learning outcomes significantly (Orhan Göksün and Gürsoy, 2019; Zhang and Yu, 2021; Cadet, 2023; Pratiwi and Waluyo, 2023), influence students' learning progress positively (Yürük, 2019; Fuchs, 2022; Aidoune et al., 2022; Candan and Başaran, 2023), and reduce distractions (Licorish et al., 2018).

Likewise, Kahoot! can play a role in enhancing students' motivation and engagement (Bicen and Kocakoyun, 2018; Campillo-Ferrer et al., 2020; Kaur and Nadarajan, 2020; Cárdenas-Moncada et al., 2020; Chen, 2022; Tao and Zou, 2023). It creates a fun and enjoyable learning environment (Chiang, 2020).

This paper extends the discussion initiated by (Anane, 2022), making a significant contribution by expanding substantially on the work presented previously. It is an integral component of a larger research project centered on the approach of gamified flipped online learning.

The primary objective of this paper is to report an in-depth study of Kahoot!, a crucial component of our teaching methodology in a French Foreign language course delivered online at the university of Sharjah, UAE. Kahoot! was fully integrated into this course, being utilized in each session and often twice per session. This study examined students' perceptions of Kahoot! by comparing the views of three distinct cohorts of students who were enrolled on the same course but during different terms, each experiencing the same teaching methodology. By analyzing these groups' perceptions, we seek valuable insights into potential variations or similarities in their experiences, and we seek any trends in their overall perceptions. Our goal is to determine whether the extensive use of Kahoot! influences students' attitudes and perceptions of this tool. It is crucial for course instructors to understand whether frequent use of this tool will sustain student motivation or conversely lead to disengagement.

2 Literature review

In this section, we report a literature review on the use of Kahoot! in educational settings, synthesizing existing research to highlight current knowledge, trends, and gaps in the field.

To evaluate the effect of Kahoot! on student achievement, Ortiz-Martínez et al. (2023) developed a correlation matrix and compared the average scores obtained by students in Kahoot! games. Their analysis led to the conclusion that game-based learning positively influences students' official grades, demonstrating that Kahoot! is an efficacious educational instrument for boosting learning outcomes. The study involved 98 students, thereby offering a solid foundation for initial observations, but this sample size may be too small to generalize the findings broadly. Also, the Kahoot! quizzes were administered unannounced during lessons to review the topics covered; while that approach effectively simulated spontaneous recall, it might also have induced anxiety in some students, potentially affecting their performance and skewing the results.

To explore the students' experience of using Kahoot! in an Information Systems Strategy and Governance course at a research-intensive teaching university in New Zealand, Licorish et al. (2018) carried out semi-structured interviews with a group of students in order to understand the impact of Kahoot! on classroom dynamics, motivation, and the learning process. Their study showed that Kahoot! had a positive effect on the quality of student learning in the classroom, with the greatest influence observed on classroom dynamics, engagement, motivation, and overall learning experience. However, that study was conducted over just one semester, thereby restricting the ability to evaluate the long-term effects of using Kahoot! on student learning and engagement.

Consistent with the above findings, Lin et al. (2018) also reported that the students who they observed perceived Kahoot! to be helpful in terms of increasing motivation and engagement, as well as promoting and strengthening learning in both theoretical and practical aspects. The scholars conducted a study involving undergraduate students of English for the Media at a public university in Malaysia. Over the course of a semester (14 weeks), the students were introduced to Kahoot! as a learning tool during their weekly lectures. The Kahoot! sessions were conducted after the lecture, featuring a single interactive multiple-choice quiz with 10 to 14 questions based on the day's lecture. The sessions were brief, lasting no more than 15 min to avoid any potential wear-out effect. However, only 51 students took part to this study that was conducted at only one university in Malaysia.

In another survey conducted with 112 students in a different context, Alawadhi and Abu-Ayyash (2021) investigated undergraduate student perception of Kahoot! in an English language course at a federal university in the United Arab Emirates. The results showed again that Kahoot! raised motivation, enhanced engagement in the classroom, and improved the learning experience, but the students did not perceive a significant impact of Kahoot! on their academic performance. However, a significant gender imbalance (91.1% female and 8.9% male) is noted in that research, and this skewed sample may be unrepresentative of the broader student population, particularly the male perspective. Furthermore, the qualitative component was even smaller, involving only 10 female students.

Likewise, to assess students' opinions on Kahoot!, Licorish and Lötter (2022) analyzed 38 interview transcripts collected from three information-science courses in which Kahoot! was used. Sentiment analysis and inductive content analysis were used to determine under which circumstances Kahoot! demonstrated value, and it did so in all instances of its use. The study also showed a connection between the amount of time the students invested in their studies and their positive attitude toward the use of Kahoot!. However, the study involved only 38 students across three courses, which is a relatively small sample and may be insufficient for drawing broad conclusions. Such a small sample size can limit the statistical power of the findings and the ability to detect significant differences or relationships.

According to Almusharraf et al. (2023), the positive impact of Kahoot! on students' motivation does not seem to be linked to gender. The scholars explored how gender differences affected student engagement and motivation in EFL (English as a foreign language) English literature courses when using Kahoot! as a teaching tool. The research team surveyed 276 undergraduate students (both male and female) from two English language classes. The findings showed that gender did not have a significant effect on the students' level of motivation and engagement in game-based classrooms. However, the study was focused on EFL students at one public university in Saudi Arabia, and this narrow focus limits the generalizability of the findings to other cultural, linguistic, and educational contexts; the results may be inapplicable to EFL learners in other regions or to students in different types of educational institutions. Also, the study had a substantial gender imbalance: 154 female students and 79 male students. Moreover, the study used a quantitative methodology involving surveys but did not include qualitative data that could provide deeper insights into the students' experiences and perceptions.

In another study to assess how female students perceived Kahoot! as a formative assessment tool compared to traditional paper-based assessments, Minton and Bligh (2021) found that although Kahoot! created an enjoyable and collaborative learning environment, it did not have a significant impact on the students' motivation to study for formative exams outside of the classroom. However, the study involved only 14 female students from a paramedic program, with 10 agreeing to participate in the interviews. This small sample size restricts the ability to draw broad conclusions or to represent the diversity of student experiences and perceptions accurately.

Meanwhile, Almusharraf (2023) surveyed 233 undergraduate learners from two English language classrooms and noted that incorporating educational competitions in the classroom reduces distractions and enhances the effectiveness of teaching and learning beyond the scope of traditional classroom approaches. However, the study was conducted over a short period (6 weeks), and the small number of participants in the qualitative component (classroom observations) further restricts the representativeness and richness of the insights gained.

In another study conducted with 80 EFL students, Tao and Zou (2023) explored Chinese undergraduates' perceptions of using Kahoot! in EFL classrooms. Their study was conducted to determine whether Kahoot! effectively enhances classroom learning and how students view its impact. The results showed that most students found Kahoot! beneficial for motivation and learning, but unstable internet connectivity might diminish students' motivation during class. However, Kahoot! was used only twice during a six-week course (in weeks 3 and 5), and this limited exposure makes it difficult to draw robust conclusions about its long-term impact on learning and engagement.

Studies conducted on integrating GSRSs in flipped learning classes have reported the same positive effects. For example, Liu et al. (2019) used a GSRS with an experimental group to do in-class activities in an EFL classroom in an engineering school. The findings indicated that implementing the GSRS had a positive impact on the

students' learning motivation and self-efficacy in English grammar, and it led to increased participation and engagement during in-class activities in the flipped learning process. Also, the questionnaire responses showed that the students embraced the GSRS as an effective instructional method in an EFL flipped classroom. Nevertheless, using the GSRS did not result in significant improvements in the students' grammar learning achievement. However, the sample comprised only 50 students who were divided into an experimental group (26 students) and a control group (24 students), and the study was conducted over a short period, focused on the duration of a single course.

In another context, Ruiz (2021) conducted a study in Singapore to investigate how 32 students in two Spanish flipped classrooms perceived the integration of Kahoot! alongside peer instruction. The results of the study indicated that the students recognized several advantages of incorporating Kahoot!, including heightened engagement and motivation to learn, enhanced comprehension of concepts, and the fostering of a positive learning atmosphere. However, the small and gender-imbalanced sample size restricts the ability to generalize the findings, and the study was conducted over a 13-week semester with only seven Kahoot! sessions integrated into the flipped classroom.

In online education, Kahoot! is gaining attention for its positive impact. Martín-Sómer et al. (2021) conducted a study involving 39 chemical-engineering students in an online course. The students perceived regular quizzes via Kahoot! as being instrumental in keeping them engaged and improving learning outcomes. The study found that a significant number of students appreciated the benefits of Kahoot!, advocating for its use in various academic fields. However, it is important to note the limited scope of the study, given its small sample size of just 39 students. Moreover, the surveys were conducted using the Kahoot! platform itself, which might have biased the responses toward positive perception because of familiarity and preference for the tool.

Regarding gamification elements in marketing education, (Jaskari and Syrjälä, 2023) studied various game-playing motivations across a wide spectrum of gamification elements in higher education and explored how such students perceived various such elements. The scholars indicated that competition can be a significant motivator for some students, particularly those classified as "highly motivated completionists." This cluster of students scored highest on competitiveness and found it motivating when integrated with social aspects such as team competitions. They also responded positively to competitive elements such as tracking grade development, collecting points, and earning rewards. For these students, competitiveness can enhance learning motivation, especially in a group setting where they strive not to be inferior to others. However, the research also highlighted that not all student clusters are motivated by competition. For instance, "social completionists" and "independent completionists" are less motivated by competitive elements and prefer a more relaxed, supportive, or individually controlled learning environment.

While Kahoot! demonstrates positive outcomes in several educational settings, challenges persist, particularly concerning internet connectivity. Studies have highlighted that when using Kahoot!, learners frequently encounter issues with internet connectivity (Wang and Tahir, 2020). This problem can obstruct the smooth operation and effectiveness of Kahoot!, impacting students' learning experiences and participation in activities. In another study, Orhan Göksün and Gürsoy (2019) highlighted certain drawbacks of using Kahoot!, including prolonged loading times and unreliable internet connectivity. They also pointed out the inconvenience caused by the separation of questions and choices on different screens, which can negatively affect students' satisfaction and overall experience with Kahoot!. These technical issues can disrupt the flow of the learning process and may impact the effectiveness of Kahoot!. However, the recent update to Kahoot! has improved its functionality by allowing instructors to display questions and answers on the same screen, thus enhancing the user experience and reforming the flow of sessions. Nevertheless, concerns remain regarding the potential misuse of names on the game board, which could lead to distractions. Likewise, the use of quiz activities in Kahoot! could involuntarily affect student motivation. As noted by Licorish et al. (2018), students might perceive these activities as purely recreational rather than educational, impacting their engagement and learning outcomes. Besides, Zhang and Yu (2021) raised concerns about the competitive elements in Kahoot!, suggesting that excessive competition could have negative effects. They noted that when instructors set very short response times, it may prompt students to guess answers hastily in order to score higher, rather than engaging thoughtfully with the content. This approach could undermine the educational value of the tool, emphasizing speed over understanding. In a study by Ebadi et al. (2021), most of the 80 English language learners at an Iranian state university did not favor using the application in class. Their reluctance was influenced by factors such as internet issues, the game's rapid pace, its competitive aspect (which was seen as a source of stress and heightened anxiety among students), and a lack of in-depth explanations following the game. According to the scholars, these elements led to diminished motivation and increased distraction among most of the students.

Some studies have investigated the long-term effects of Kahoot! in educational settings. Sanchez et al. (2020) explored the effectiveness of gamification on learning in a two-semester introductory psychology course with 473 students. They found that while gamification initially engaged the students because of its novelty, this effect diminished over time. Consequently, they advised educators against relying solely on a single gamification method for extended periods. Instead, they recommended varying gamification strategies to maintain student interest and maximize the long-term benefits of these educational techniques. However, the researchers used an archival dataset from the psychology department at a Western university. This dataset included information from students enrolled in an introductory psychology course over two consecutive semesters, so they were naturally grouped into traditional and gamified quiz formats based on the semester in which they took the course.

Additionally, Wang (2015) investigated the impact of Kahoot! in a software architecture course at the Norwegian University of Science and Technology. The study compared two groups: one experienced Kahoot! for the first time in a motivational lecture, while the other used it consistently over 5 months. This examination of student perspectives on ease of use, engagement, motivation, classroom environment, focus, and perceived learning revealed that continuous use of the same gamification tool could lead to decreased interest. Wang suggested diversifying game-based learning tools to keep the educational experience engaging and fresh.

In a study involving 113 undergraduate students from an international business program at the Prince of Songkla University in Thailand, Fuchs (2022) found that while Kahoot! enhanced learning

progress, it was less effective in maintaining student motivation throughout the course. According to the scholar, this highlights the need for diverse teaching strategies in order to sustain engagement over extended periods.

3 Gaps and research questions

While there is considerable interest in Kahoot!, the existing literature lacks comprehensive comparative studies evaluating student perceptions over extended periods. Also, there is a notable gap in research exploring the consistent long-term use of Kahoot! in the specific context of online French foreign language (FFL) classes.

To explore these research gaps, this study engaged three large student groups on an online FFL course in three different terms. The primary goal was to analyze the learners' attitudes and perceptions toward using Kahoot! on a very regular basis over three separate semesters. While unable to follow the same group of students over time because of the nature of semester-based courses (which typically last for a maximum of 15 weeks), this study uniquely investigated the evolving perspectives and engagement of different student cohorts across successive academic terms. It did so under consistent conditions, with the same teaching methodology used by the same instructor. This approach was aimed at assessing whether the students' views on Kahoot! remained consistent across different periods and identifying any developing trends in their responses. Understanding students' perceptions of Kahoot allows instructors to maintain sustained engagement and ensure that this tool enhances rather than diminishes the learning experience. If a pattern emerges from this study, then instructors can decide whether to use Kahoot frequently or integrate other tools. Overall, confirming or refuting the wear-out effect of Kahoot is crucial for optimizing its use and ensuring that it remains a beneficial educational tool. This research seeks to answer the following questions:

RQ1: How do students' attitudes toward Kahoot! vary across each semester in an online FFL class?

RQ2: What are the perceptions of students regarding the regular use of Kahoot! in an online FFL class across different semesters?

RQ3: Is there a pattern of consistency or variation in students' attitudes and perceptions toward Kahoot! over consecutive semesters in an online FFL class?

4 Materials and methods

To address the research questions, a mixed-methods approach was used, combining quantitative data from scaled survey questions and qualitative insights from open-ended survey questions. The study was embedded in a beginner's FFL course delivered online at the University of Sharjah (UAE) and using Kahoot! to enhance learning and engagement. Flipped learning was implemented in this course, with students having to engage in preparatory activities (PAs) that allowed them to discover a specific topic.

4.1 Participants and methodology

This study used a blend of quantitative and qualitative data to investigate the research questions across three university academic terms at a university in the UAE, i.e., Fall 2021 (FA21), Spring 2022 (SP22), and Fall 2022 (FA22). Quantitative insights were derived from a structured questionnaire, using closed-ended questions to assess quantitatively the students' perceptions and attitudes. Quantitative data are easily analyzed statistically, allowing for comparisons across participants. This was complemented by qualitative data gathered via open-ended questions (OEQs) to allow for a more nuanced exploration of the students' experiences and thoughts (Rosenthal, 2016). OEQs provide rich detailed responses that offer deeper insights into participants' thoughts, feelings, and experiences. They enable respondents to express their opinions in their own words and can reveal new themes or issues that researchers may not have anticipated, leading to more-comprehensive findings. This dual approach provided a comprehensive understanding of the learners' perspectives of and experiences with Kahoot! in an online FFL class.

By combining these data-collection methods, we aim to thoroughly investigate and understand students' attitudes and perceptions toward Kahoot! in this online FFL class across different semesters. OEQs are effective in capturing emotional and psychological experiences, personal narratives, and subjective perspectives. A thematic analysis helps to identify common themes, reasons for changes in attitudes, and specific factors that influence students' experiences with Kahoot!. While questionnaires with structured questions about specific aspects of Kahoot! usage can provide measurable quantitative data, using both types of data to cross-verify and validate findings allows us to draw richer and more-comprehensive conclusions.

In this study, Kahoot! was integrated systematically into a beginner's (A1.1 level) FFL course delivered over a 15-week semester. This is a university free elective course open to students from different colleges and various years. Table 1 shows the number of students enrolled in each course, along with the number and percentage of students who completed the survey. For each term, five sections were offered, allowing students to enroll in the one that best suited their schedule. The distribution of students by year is presented later. The course —offered through an online Learning Management System (Blackboard)—adopted a flipped learning approach. Students engaged in PAs prior to each session, covering several topics such as vocabulary, grammar, communication, and verb conjugation. To assess understanding, two Kahoot! quizzes were conducted in almost every class. The initial quiz consisted of questions taken directly from the PAs; it served to assess the students' preparation (ensuring that they studied the PAs) and to identify areas where students lacked understanding, thereby highlighting topics that needed reinforcement during the session. The concluding quiz—administered after practice—helped further reinforce learning by focusing on clarifying

TABLE 1 Student participation and response details across three academic terms in the *Kahoot!* study.

Term	Number of students enrolled	Number of students answered to the questionnaire	Percentage of participants to the survey
FA21	158 took the Final exam	94	60
SP22	152	110	72
FA22	87	55	63

answers to each question and explaining why certain errors were incorrect choices. This dual-quizzing approach ensured continual assessment and reinforcement of key language concepts.

Before initiating the first Kahoot! in each term, time was allocated to explain its mechanics and required actions to the students. This was in line with the assertion by Chen (2022) about the necessity of familiarizing students with GSRS tools. To ensure full participation and minimize random guessing, students were asked to register for each Kahoot! session using their first name and university ID, following the recommendation by Nielsen et al. (2013) for effective participant tracking and focused attention.

In each Kahoot! session, a five-question quiz was conducted. Students had 30 s to answer each question, accompanied by upbeat music that could have positively influenced the students' engagement because it helped in creating an immersive learning environment, thereby enhancing the students' overall experience (Imlawi, 2021). This setup provided instant feedback on the correctness of their answers, points earned, and their relative position in the session. Also, detailed response statistics for each question were shared during the quiz sequence, further enhancing the interactive and informative nature of the learning experience. In the second Kahoot! session following the lecture, each quiz question was analyzed and explained thoroughly, thereby enhancing the students' understanding of the content. Based on their accumulated points, the top five performers were recognized on a leaderboard at the game's conclusion. This acknowledgement often led to congratulatory messages from peers in the chat, creating a supportive and engaging learning environment. This approach effectively combined competitive spirit with collaborative learning, reinforcing key concepts while promoting student interaction.

To foster greater class participation and maintain the integrity of the learning experience, Kahoot! games were kept private. Recorded classes allowed students to review game sessions, although active participation in the games was limited to real-time class sessions. Also, revision sessions were scheduled at the end of each term, featuring comprehensive Kahoot! quizzes that encompassed a broad range of topics covered during the term. Students engaged in about 40 Kahoot! quizzes per term.

4.2 Questionnaire

Upon completing each term, all students enrolled in each course received an anonymous questionnaire designed to evaluate their views and reactions toward the instructional approach and the use of Kahoot! in classes. This comprehensive questionnaire included a total of 29 questions covering demographic details, Likert-scale responses (the questions indexed as Q1, Q2, etc.), and OEQs. Of these, 13 questions focused specifically on Kahoot! were integral to this research, offering insights into the students' experiences and perceptions related to the use of this tool in their learning process. To ensure consistency and enable meaningful comparisons, the same set of questions was used throughout the three terms of the study. While initial consideration was given to modifying some questions, this idea was eventually abandoned, except for one question that transitioned from a scaled format to an OEQ. For enhanced reliability and relevance, certain Kahoot!-related questions were adopted from the study by Lin et al. (2018), who had previously validated these questions, thereby eliminating the need for a separate question-testing phase in our research.

Throughout the three terms, students were encouraged but not compelled to participate in the questionnaire. The number of students who decided to complete the survey and participate in the study during each term is listed in Table 1. The study's objectives were clearly communicated to emphasize the importance and purpose of the questionnaire. The questionnaires were distributed via Blackboard for FA21 and Microsoft Forms for FA22 and SP22, remaining accessible for a two-week period. As recommended by the university's Research Ethics Committee, which approved this study, research must uphold ethical standards, respecting participants' rights and welfare. Offering the choice to participate is crucial to ethical research practices. Also, voluntary participation reduces response bias, ensuring that participants' responses reflect their true opinions rather than perceived expectations. The gathered questionnaire data were meticulously organized and analyzed using an Excel file. To ensure objectivity and accuracy and minimize potential biases in the analysis, an assigned individual was responsible for data processing; his tasks included calculating key statistical measures such as standard deviation (SD), mean, and frequency distributions.

5 Data collection and analysis

5.1 Scaled questions

For SP22 and FA22, an additional question was included in the questionnaire to determine the gender of respondents; regrettably, no similar data are available for FA21. Analysis of the gender distribution data from the available terms reveals a significant female majority among the respondents, with over three-quarters being female (Table 2).

The data regarding the academic level of ++participants reveal a varying distribution across the terms: in FA21, seniors were the largest group, Table 3 followed by juniors; in SP22, freshman were the largest group, followed by seniors; in FA22, sophomores were the largest group, followed by juniors and seniors. Overall, these patterns indicate that the majority of participants had previous experience in university courses. This university elective course is open to students from various colleges and academic levels, all of whom are expected to be beginners in French. Students at the University of Sharjah are

TABLE 2 Gender distribution.

You are:	SP 22%	FA 22%
Male	23.57	18.57
Female	76.43	81.43

TABLE 3 Students' academic level (%).

You are:	FA21	SP22	FA22
Freshman (First year)	17.00	47.76	11.71
Sophomore (Second year)	19.40	17.89	33.57
Junior (Third year)	30.80	15.01	27.07
Senior (Fourth year)	32.80	19.31	27.64

Emirati or non-Emirati. The latter students come from several countries all over the world, both Arabic and non-Arabic ones. They all speak English and use this language for communication, and this was the language used to distribute the questionnaire.

A closer examination of Table 4 reveals that the students' responses predominantly indicate agreement with the statements. The data show that the participants generally expressed positive attitudes toward and engagement with Kahoot!, with a significant majority either strongly agreeing or agreeing with the statements. This trend remains consistent across all three terms, i.e., 46–73% in FA21, 34.98, and 45.54–83.6% in FA22. The highest percentages are consistently in the "strongly agree" category. Also, the "agree" category received notable responses in all three terms, i.e., 20.60–35.60% in FA21, 20.88–42.18% in SP22, and 13.01–25.49% in FA22.

For Q3, which asked about preparing for Kahoot! in order to win, there was a notable variation in responses, with a higher SD in each term. Also, it shows the lowest average scores across the terms (4.16 in FA21, 3.64 in SP22, and 4.01 in FA22), suggesting somewhat less enthusiasm or commitment to preparing for Kahoot! games compared to other aspects. However, for all other questions, the mean scores ranged between 4.44 and 4.78, indicating a strong and positive response from students to the use of Kahoot! in their courses. This trend of high mean scores across different semesters highlights a generally favorable opinion of the students toward the statements related to Kahoot!. A refined examination of the SD in Table 4—except for Q3—shows that it is typically less than 1 across all three terms, i.e., 0.53–0.93 in FA21, 0.50–0.80 in SP22, and 0.46–0.65 in FA22. This indicates that the responses to these questions are closely clustered around the mean, suggesting a high level of agreement or consensus among the students. However, for Q3, the SD is noticeably higher across all terms (0.97 in FA21, 1.31 in SP22, and 1.13 in FA22), indicating greater variability in responses to this particular question.

Besides, an enthusiasm for participating in Kahoot! is noted. In FA21, 73% of the respondents strongly agreed with the statement "*I look forward to playing Kahoot!*" (Q1). This sentiment was shared by 69.60% in SP22, increasing to 81.67% in FA22. A small percentage expressed disagreement or strong disagreement, with only 1% dissenting in FA21, 3.89% dissenting in SP22, and 1.18% dissenting in FA22. Q2 asking specifically about eagerness to learn via Kahoot! was unique to FA21. A substantial 86.6% of respondents expressed keenness to learn via Kahoot!, reflected in an SD of 0.93. In analyzing Q3 focused on the students' preparation for Kahoot! with the specific intent of winning, it is evident that the students' opinions on this varied more than they did for the other questions. This is reflected in the lower mean scores (4.16 for FA21, 3.64 for SP22, and 4.01 for FA22) and higher SDs (0.97 for FA21, 1.31 for SP22, and 1.13 for FA22). These figures suggest a greater diversity of opinions among the students regarding this aspect of Kahoot!, indicating less consensus compared to other areas explored in the questionnaire.

Regarding Q4, which asked whether the participants responded to every item in each Kahoot! session, 63.6% of FA21 participants confirmed that they did. This positive response rate increased to 73.87% in SP22 and further to 77.50% in FA22, indicating growing engagement with the tool over time.

Regarding the statement "*I focus on the items or questions in each Kahoot! session*" (Q5), the majority of respondents showed strong agreement. In FA21, 61% strongly agreed and 31.2% agreed. Similarly, in SP22, 52.78% strongly agreed and 42.18% agreed. In FA22, a significant 72.57% strongly agreed and 22.22% agreed. Only a small percentage expressed disagreement, with 3.80% disagreeing in FA21, 3.78% disagreeing or strongly disagreeing in SP22, and 1.18% disagreeing in FA22.

Regarding the statement "*I respond as accurately as possible to each item or question in each Kahoot! session*" (Q6), a significant portion of respondents demonstrated strong agreement. In FA21, 62.80% strongly agreed and 34.80% agreed with the statement. Similarly, in SP22, 64.66% strongly agreed and 28.84% agreed. Furthermore, in FA22, an even larger percentage—76.03%—strongly agreed and 22.79% agreed.

Table 4 shows a consistently positive student response toward Kahoot! across the three semesters. High levels of eagerness and anticipation for playing Kahoot! are evident, with a significant majority of students expressing strong agreement. While there is variability in the responses about preparing PAs in order to win at Kahoot!, indicating diverse levels of competitiveness, overall engagement with Kahoot! remains high. The consistent high mean scores and low SDs for most questions suggest that Kahoot! effectively maintains student engagement and participation, making it a valuable tool in educational settings.

Regarding the students' perceptions about the value of using Kahoot! for teaching and learning purposes (Q7), a significant majority expressed agreement (Table 5). In FA21, 72.6% strongly agreed and 23.8% agreed with the statement. Similarly, in SP22, 73.3% strongly agreed and 24.2% agreed. Furthermore, in FA22, a substantial 83.6% strongly agreed and 13.1% agreed. Note that no students disagreed in FA21 or SP22, and only 1.18% expressed disagreement in FA22. During the last two terms, students provided an explanation for their perceived value of Kahoot!. Indeed, to gain a deeper understanding and to gather insights, an OEQ was added. Students were asked "*If you did not agree with the previous statement, could you please specify why? If you agreed with the previous statement, could you please elaborate on what you believe Kahoot! adds to the sessions*?" Additionally, this question served as a means to ensure that the students' responses were not random or arbitrary for OEQs 2 and 3.

Regarding the statement "*Kahoot! helps me in my learning process*" (Q8), the analysis indicates a positive trend. In FA21, a majority 65.4% of respondents strongly agreed and 28.8% agreed. This positive perception increased in SP22, with 68.34% strongly agreeing and 27.8% agreeing. The trend peaked in FA22, with 79.6% strongly agreeing and 19.91% agreeing. Notably, disagreement was minimal, with only 1.18% strongly disagreeing in FA22 and a combined disagreement rate of 4.4% in FA21. SP22 saw no disagreement, indicating widespread acceptance of Kahoot! as beneficial for learning.

Q9 ("*I am motivated by the prospect of winning in these Kahoot! sessions*") sought to assess the students' motivation toward winning in Kahoot! games. In FA21, a majority of students (64%) strongly agreed, showing a high motivation level. However, in SP22, strong agreement decreased to 47.1%, indicating a slight shift in motivation. By FA22, strong agreement increased significantly to 70.5%, suggesting a resurgence in competitive motivation. Notably, only a small percentage of the students expressed strong disagreement (1.18% in FA22), but the combined percentage of disagreement was higher in SP22 (6.34%) and FA21 (5.20%), revealing some variations in the students' motivation toward winning across different semesters.

In Q10 ("*I feel more motivated when I earn points in Kahoot! sessions*"), the students displayed a strong sense of motivation

TABLE 4 Students' attitudes of *Kahoot!*

	FA 21			SP 22			FA 22		
	%	Score	Frequency	%	Score	Frequency	%	Score	Frequency
Q1: I look forward to playing *Kahoot!*									
Stronglyagree	73.00	5	69	69.60	5	77	81.67	5	45
Agree	20.60	4	19	23.79	4	26	17.15	4	9
Disagree	1.00	2	1	2.02	2	2	0.00	2	0
Stronglydisagree	0.00	1	0	1.87	1	2	1.18	1	1
Neitheragreenordisagree	5.00	3	5	2.71	3	3	0.00	3	0
		SD	Mean		SD	Mean		SD	Mean
		0.62	**4.64**		**0.80**	**4.57**		**0.56**	**4.78**
Q 2: I am eager to learn via *Kahoot!*									
Stronglyagree	58.00	5	55						
Agree	28.60	4	27						
Disagree	9.20	2	9						
Stronglydisagree	0.00	1	0						
Neitheragreenordisagree	4.00	3	4						
		SD	Mean						
		0.93	**4.35**						
Q 3: I prepare the AP in order to win in *Kahoot!*									
Stronglyagree	46.00	5	43	34.98	5	38	45.54	5	25
Agree	35.60	4	33	24.20	4	27	25.49	4	14
Disagree	3.80	2	4	11.46	2	13	7.79	2	4
Stronglydisagree	2.80	1	3	9.10	1	10	3.68	1	2
Neitheragreenordisagree	11.20	3	11	20.24	3	22	17.50	3	10
		SD	Mean		SD	Mean		SD	Mean:
		0.97	**4.16**		**1.31**	**3.64**		**1.13**	**4.01**
Q 4: I respond to each item or question in each *Kahoot!* session.									
Stronglyagree	63.60	5	60	73.87	5	81	77.50	5	43
Agree	33.20	4	31	20.88	4	23	18.46	4	10
Disagree	2.00	2	2	3.91	2	4	0.00	2	0
Stronglydisagree	0.00	1	0	0.67	1	1	0.00	1	0
Neitheragreenordisagree	1.20	3	1	0.67	3	1	4.03	3	2
		SD	Mean		SD	Mean		SD	Mean
		0.62	**4.58**		**0.75**	**4.63**		**0.52**	**4.73**
Q 5: I focus on the items or questions in each *Kahoot!* session.									
Stronglyagree	61.80	5	58	52.78	5	58	72.57	5	40
Agree	31.20	4	29	42.18	4	46	22.22	4	12
Disagree	3.80	2	4	3.09	2	3	1.18	2	1
Stronglydisagree	0.00	1	0	0.69	1	1	0.00	1	0
Neitheragreenordisagree	2.00	3	2	1.25	3	1	4.03	3	2
		SD	Mean		SD	Mean		SD	Mean
		0.72	**4.47**		**0.73**	**4.43**		**0.61**	**4.66**
Q 6:I respond as accurately as possible to each item or question in each *Kahoot!* session.									
Stronglyagree	62.80	5	59	64.66	5	71	76.03	5	42
Agree	34.80	4	33	28.84	4	32	22.79	4	13

(Continued)

TABLE 4 (Continued)

	FA 21			SP 22			FA 22		
	%	Score	Frequency	%	Score	Frequency	%	Score	Frequency
Disagree	0.00	2	0	3.78	2	4	0.00	2	0
Stronglydisagree	0.00	1	0	0.67	1	1	0.00	1	0
Neitheragreenordisagree	2.40	3	2	1.35	3	1	1.18	3	1
		SD	Mean		SD	Mean		SD	Mean
		0.54	**4.60**		**0.76**	**4.51**		**0.46**	**4.75**

associated with earning points. In FA21, a significant majority (66.6%) strongly agreed, highlighting the motivational impact of points. SP22 saw a slight decrease in strong agreement (61.9%) but a higher overall agreement when combining "strongly agree" and "agree" responses. FA22 saw a substantial increase in strong agreement (79.3%), suggesting a growing appreciation for the point system. A minor proportion of the students expressed disagreement, indicating that while points are generally motivational, they may not be universally effective for all students.

Table 5 indicates consistently strong and positive student perception of the value of Kahoot! in teaching and learning. Over the three semesters, there is marked strong agreement about the effectiveness of Kahoot!, with the highest agreement observed in FA22. This trend showcases the acceptance and perceived benefits of Kahoot! among the students.

5.2 Open-ended questions

OEQs were used to gain more-nuanced insights into the students' perspectives on the role of Kahoot! in teaching and learning (Table 6). Focused on the value of Kahoot!, introducing OEQ1 in SP22 and FA22 enabled the students to elaborate on their agreement or disagreement with the tool's utility. This approach helped in gathering detailed feedback on the advantages and disadvantages of Kahoot!, as addressed in OEQ2 and OEQ3. OEQ4 offered an opportunity for the students to share any additional comments on their experience with Kahoot!, further enriching the qualitative data. The OEQs were analyzed in several steps. First, after reading the students' answers several times, significant pieces of information were highlighted and assigned codes that captured their essence, then related codes were combined into broader themes. The consistency of these themes was checked to ensure that they accurately represented the coded extracts and the entire dataset. Finally, each theme was given a descriptive name.

OEQ1 was focused on evaluating the value of using Kahoot! for teaching and learning purposes. Presented to two groups, the responses gathered were diverse and enlightening. These responses were categorized systematically into the following four main themes inspired by Licorish et al. (2018), thereby providing a structured understanding of the students' perceptions regarding the role of Kahoot! in their educational experience.

5.2.1 Fun and pleasure

Many of the participants pointed out that Kahoot! was fun, and the word "fun" was used several times during both terms. In FA22, one student said "*It incorporates fun with learning, and makes the sessions lighthearted and active*." They appreciated the entertainment that Kahoot! brought to the session, and some of them stated "*I always look forward to doing it*." Students also liked the joyful atmosphere that it created. In SP22, one student said "*using different ways of teaching makes the student enjoy the class, and in this move the student will have the energy to explore more about the topic*." Another student linked Kahoot! to the online teaching and said "*Kahoot makes online sessions more interactive and is a fun way of learning*."

5.2.2 Engagement and competition

Students during both terms said that Kahoot! provided them with several opportunities to interact actively, engage, and participate during lectures. In SP22, one participant said "*It encourages me to participate in the session*." Several participants expressed that Kahoot! had a positive impact on their engagement in the class, some noting increased involvement during the lectures: "*we are more engaged and eager to learn*" said one student in SP22, and "*Kahoot! really helps me engage in the lectures more*" said another one in FA22. The students' answers revealed competition as a key element. In SP22, one student said, "*Kahoot adds competition which motivates us (students) to listen and interact during the lecture*." Another one said "*The countdowns and competition wakes the students up and stimulates their brain more*"; "*Kahoot are usually fun to do, competing to be in the podium is fun and helps us concentrate on it and try to get the correct answers*." The challenge spirit that Kahoot! brings was also appreciated. One student said "*Kahoot is very helpful and challenging, which makes the students to be excited!! A fun way to study!*" and it "*makes me want to learn more*" (FA22). As said by one student in FA22, Kahoot! motivated them: "*it adds competitiveness which motivates me to do my best*." Students during both terms highly valued collective work and collaboration. According to some of them, Kahoot! "*improves the team work and add the challenging spirit in the classes*" (SP22) and "*makes the lessons feel more collaborative*" (FA22).

5.2.3 Attention and focus

Numerous students expressed a shared sentiment that incorporating Kahoot! into the classroom environment had a beneficial impact on their focus. In FA22, one student said "*Kahoot! attracts all our focus*." As one student said, they have to think fast: "*It's very engaging and with the time limit, helps students think fast and quick to figure out the answer to each question*" (FA22). Besides, making quick decisions enhances students' self-confidence. According to a student, "*Kahoot! gives confidence in answers because we learn to make the decisions fast*" (FA22), and "*I feel confident when I answer correctly*" (FA22). Respondents also highlighted how interacting with Kahoot! not only captured and maintained their engagement ("*we are more engaged and*

TABLE 5 Students' perception of *Kahoot!*

	FA 21			SP 22			FA 22		
	%	Score	Frequency	%	Score	Frequency	%	Score	Frequency
Q7:There is a value in using *Kahoot!* for teaching and learning purposes.									
Strongly agree	72.60	5	68	73.34	5	81	83.67	5	46
Agree	23.80	4	22	24.23	4	27	13.15	4	7
Disagree	0.00	2	0	0.00	2	0	1.18	2	1
Strongly disagree	0.00	1	0	0.00	1	0	0.00	1	0
Neither agree nor disagree	3.60	3	3	2.43	3	3	0.00	3	0
		SD	Mean:		SD	Mean		SD	Mean
		0.53	**4.69**		**0.50**	**4.71**		**0.47**	**4.73**
Q 8:*Kahoot!* helps me in my learning process.									
Strongly agree	65.40	5	61	68.34	5	75	79.64	5	44
Agree	28.80	4	27	27.87	4	31	19.19	4	11
Disagree	2.60	2	2	0.00	2	0	0.00	2	0
Strongly disagree	1.80	1	2	0.00	1	0	1.18	1	1
Neither agree nor disagree	1.40	3	1	3.78	3	4	0.00	3	0
		SD	Mean		SD	Mean		SD	Mean
		0.81	**4.53**		**0.55**	**4.65**		**0.56**	**4.76**
Q 9: I am motivated by the prospect of winning in these *Kahoot!* sessions									
Strongly agree	64.00	5	60	47.14	5	52	70.53	5	39
Agree	23.00	4	22	39.34	4	43	25.44	4	14
Disagree	4.20	2	4	4.40	2	5	0.00	2	0
Strongly disagree	1.00	1	1	1.94	1	2	1.18	1	1
Neither agree nor disagree	7.60	3	7	7.18	3	8	2.86	3	2
		SD	Mean		SD	Mean		SD	Mean
		0.88	**4.44**		**0.91**	**4.25**		**0.65**	**4.64**
Q 10: I feel more motivated when I earn points in *Kahoot!* session.									
Strongly agree	66.60	5	63	61.99	5	68	79.43	5	44
Agree	25.60	4	24	32.04	4	35	17.85	4	10
Disagree	3.40	2	3	2.02	2	2	0.00	2	0
Strongly disagree	0.00	1	0	0.69	1	1	1.18	1	1
Neither agree nor disagree	4.20	3	4	3.25	3	4	1.54	3	1
		SD	Mean		SD	Mean		SD	Mean
		0.73	**4.55**		**0.72**	**4.53**		**0.60**	**4.74**

eager to learn," said one students in SP22) but also offered a refreshing break from traditional lectures that "*introduces a small change in mood*" (FA22), adding a unique element to their learning experience as it "*makes lessons so much more exciting and much less boring*" (FA22).

5.2.4 Learning and memorization

The respondents unanimously acknowledged that Kahoot! had a positive impact on their learning experience. Kahoot! provides more practice: "*it adds more examples that are easy to solve, to re-assure the students of the general concepts*" (SP22), and "*kahoot! questions gives us more examples we can practice*" (FA22). Many students said that Kahoot! was helping them in the learning process: "*it eases the learning process*" (SP22); "*It helped me learn more easier*" and "*It allows us to learn faster*" (FA22). They emphasized that Kahoot! sessions not only enhanced their ability to recall previously covered material—"*helps memorize information efficiently and in an entertaining manner*" (SP22), and another students stated "*For some topics, I only still remember them because I remember the Kahoot! questions*" (SP22)—but also nurtured a deeper understanding through the valuable process of learning from mistakes made during Kahoot! activities. Some students affirmed that "*It helps me test the knowledge I learned during the session and makes me feel more prepared*" (SP22); "*It's a good way for the professor and for us to find our points of weakness, where we need extra explanation or practice*," and "*I learn from my mistakes*" (FA22). Besides, some students appreciated having two *Kahoot!* sessions for each topic: "*I enjoy that we do them before and at the end*

TABLE 6 Open ended questions.

	FA21	SP22	FA22
OEQ1: *There is a value in using Kahoot! for teaching and learning purposes. If you agreed on the previous statement, could you please specify what do you think Kahoot! adds to the sessions. If you did not agree on the previous statement, could you please specify why*	Not asked	Asked	Asked
OEQ2: *In your opinion, what are the advantages of Kahoot!*	Asked	Asked	Asked
OEQ3: *In your opinion, what are the disadvantages of Kahoot!*	Asked	Asked	Asked
OEQ4: *Please state any comment you wish to make about this experience with Kahoot!*	Asked	Asked	Asked

of each class in order to track progress" (SP22). Another student compared this FFL session with other courses and said that "*Kahoot! really helps me engage in the lectures more. I always look forward to doing it. My lectures in other courses which are purely teaching (no labs, no solving problems like in math courses) can become boring after 30–40 min into the session and I lose focus*" (FA22).

OEQ2 was presented to all three groups (Table 6). Notably, the themes and opinions expressed by students in SP22 and FA22 in OEQ1 were echoed in their responses to OEQ2, demonstrating consistency and reinforcing the reliability of their feedback. Similarly, participants from FA21 also provided comparable responses, further validating the coherence and non-random nature of the students' viewpoints across different terms.

OEQ3 was consistently posed to all participant groups. The responses to this question were categorized in the following four themes for a comprehensive analysis and understanding of the perceived drawbacks associated with the use of Kahoot!.

5.2.5 No disadvantages

Many students during the three terms saw "no disadvantages" in using Kahoot!. One student specified that he/she sees no disadvantages as long as it is not graded: "*No disadvantages if it's not graded. Kahoot! gives points for fast answers and I still find my ranking far even when I do all the questions correct because I'm a little slow*" (SP22).

5.2.6 Technical issues

Some students showed some concerns regarding technical problems that happened, with internet connectivity, bugs, and lagging being the most cited issues.

5.2.7 Settings of Kahoot!

Some students did not like the music, and others saw the time pressure as a disadvantage. According to one student, "*Sometimes they do not actually give the accurate level of a student because the game depends on speed and correct answer so sometimes we rush which leads us to get a wrong answer although we might know the correct answer*" (SP22). Another student said "*it focus on how fast you answer rather than how accurate you are*" (SP22). One participant stated that utilizing Kahoot! was not that effective because it was impossible to ensure universal access: "*Cannot guarantee the participation of all members*" (FA22).

5.2.8 Effects of Kahoot!

Some students found the competitive element of Kahoot! to be stressful, and they do not like that. Another student (SP22) noted that having always the same students in the top five was a disadvantage. One student stated "*sometimes it makes me feel like i did not do good enough because of the big competition between students*" (SP22). Also, there was as issue regarding not being focused: "*Sometimes we are just not very focused and that could appear in the score*."

The final OEQ4 allowed respondents to share their thoughts freely, and the responses can be categorized into the following three main themes.

5.2.9 Kahoot! as a learning tool

During the three terms, students expressed their positive feelings about using Kahoot! as a learning tool. They described it as a "*great experience*," "*fantastic*," "*interesting*," "*amazing and fun*" (FA21), and "*the kahoot games were great*" (SP22), "*very helpful and enjoyable*," and "*Kahoot est incroyable!*" said another one in French (SP21). They specifically noted that Kahoot! games were great and emphasized the benefits of using Kahoot! in comparison to other courses in which it was not used. One student mentioned that "*French is the only course where the Dr use Kahoot! (or any interactive game) and I can really see how I'm benefiting from it compared to the other courses that do not have Kahoot sessions*" (FA21). Another student expressed how Kahoot! had motivated them to pay extra attention during lectures: "*it has encouraged me to pay extra attention to the content taught during the lectures and keep writing notes and actively interact with the doctor when asking questions. It has also made me feel excited in a way to attend the lecture as it has become one of my favorite parts of my day*" (SP22).

5.2.10 Questions in Kahoot!

Some students provided feedback on the questions asked on Kahoot! and expressed that the "*number and types of questions are suitable and effective*" (FA21). Some students suggested adding more questions to enhance the experience (SP21 and FA22). Another student proposed playing Kahoot! as two teams to increase competitiveness (SP21).

5.2.11 Students' wishes

Throughout the three terms, several students expressed their wishes regarding the use of Kahoot!. One student remarked "*Keep using Kahoot; it's very interactive and fun for students, and it was a very nice experience*" (FA21). Another student suggested that "*It would be good if the app does not count how fast you answer, only if all answers are correct or not*" (FA21). One student simply stated "*More Kahoots!*" (FA21), and another one stated "*More questions if possible*" (SP21). Another one expressed his/her desire to see more instructors using Kahoot!, considering it an excellent interactive teaching and learning method (FA21). One added "*I love it. I look forward to Kahoot! sessions. I think more professors should include Kahoot! in their lessons! It makes classes less boring*" (FA21). A student expressed his/her wish for Kahoot! to be used in other courses as well (SP22).

The OEQs provided valuable insights into the students' perceptions of Kahoot!. During the three terms, responses highlighted the role of Kahoot! in making learning fun and engaging, enhancing student participation, and fostering competition. Students appreciated the ability of Kahoot! to focus their attention and support learning through practice and memorization. While some technical and setting-related challenges were noted, overall Kahoot! was positively received for its interactive and enjoyable nature. This qualitative feedback complements the quantitative data, presenting a comprehensive understanding of the impact of Kahoot! on learning experiences.

6 Discussion

In online classes, a pressing issue is maintaining student motivation and engagement. This study has assessed students' perceptions of Kahoot! as used very frequently in an online FFL course across three academic terms, aiming to discern any trends in their experiences. While not tracking the same cohort of students longitudinally, this study was focused uniquely on the attitudes and engagement of different student groups across successive semesters.

In response to RQ1, analyzing the students' attitudes to Kahoot! showed high levels of eagerness and anticipation for playing, with consistent and homogenous responses across all three terms. The students generally responded positively to Kahoot! sessions, focusing on and accurately responding to items.

The positive trend in student engagement with Kahoot! underscores the platform's potential as an effective educational tool. This aligns with the findings of Cárdenas-Moncada et al. (2020), who reported increased motivation among students using gamified learning tools. The consistency of our findings with those of Tao and Zou (2023) and Chen (2022) suggests a broader applicability of Kahoot! across diverse educational contexts. The positive attitudes observed are also in agreement with Lin et al. (2018) and Almusharraf (2023), indicating that the engaging and interactive nature of Kahoot! is universally appreciated by students.

The competitive aspect of Kahoot! may play a crucial role in its effectiveness. Because competition can drive engagement and motivation, Kahoot's ability to incorporate this element might explain the increased participation observed. This competitive yet collaborative environment allows students to learn from one another, fostering a community of learners who are motivated to succeed collectively. Also, the immediate feedback provided by Kahoot! could help to reinforce learning because students can quickly identify and correct misunderstandings.

However, while the competitive nature of Kahoot! can be beneficial, it could also lead to increased anxiety for some students, potentially hindering their learning experience. As mentioned by Jaskari and Syrjälä (2023) it is important to pay attention to the profiles of the learners regarding whether or not they are motivated by competition. Therefore, balancing competition and collaboration is essential for maximizing the benefits of this tool.

Likewise, the students perceived Kahoot! positively (RQ2). They found it enjoyable, citing that it added a fun element to the learning process and created a more-active light-hearted classroom atmosphere, in line with Chiang (2020). In terms of attention and focus, including Kahoot! in classroom activities was credited with positively influencing the students' concentration levels. It encouraged quick thinking and decision-making, thereby boosting engagement and building confidence in their learning abilities, in line with Licorish et al. (2018). Also, Kahoot! was unanimously recognized for its positive impact on learning and memorization. It offered valuable practice opportunities, facilitated efficient memorization of information, and provided a platform for students to learn from their mistakes, thereby enriching their overall educational experience, in line with Lin et al. (2018). Lastly, additional comments from the students reinforced the positive view of Kahoot! as an effective learning tool. They appreciated its interactive nature and suggested that it could be improved by increasing the number of questions. Some noted that more instructors should incorporate Kahoot! into their lessons in order to enhance learning experiences.

Despite the overwhelmingly positive feedback, the study also identified some disadvantages associated with the use of Kahoot! in all three semesters. Some students raised concerns related to ranking based on speed, which was unfair for them; this pressure pushed some to answer quickly rather than accurately. This is in line with the warning from Zhang and Yu (2021), who noticed that some students may rush to provide quick answers for higher scores, instead of engaging deeply with the material. There was also a sense of inadequacy among those who did not consistently rank at the top, indicating that the competitive element of Kahoot! could have negative effects on the learning experiences of certain students; however, very few students during the three terms highlighted that. These findings can be linked to the research of Jaskari and Syrjälä's (2023), who mentioned that "social completionist" students enjoy cooperative tasks and peer support but are not motivated by individual competition. Similarly, "independent completionist" students prefer elements that support individual progress—such as progress bars and personalized feedback—and are less motivated by competitive elements. Both student types favor a more relaxed, supportive, or individually controlled learning environment. To address these concerns related to unfair ranking based on speed in Kahoot!, it is essential to design the games in a way that emphasizes accuracy and comprehension over speed. For instance, Kahoot! creators can implement separate leaderboards for speed and accuracy to ensure that students who prioritize accuracy are also recognized.

Furthermore and in line with Orhan Göksün and Gürsoy (2019) and Ebadi et al. (2021), technical issues were another area of concern, with students highlighting problems such as internet connectivity. Another concern raised was related to focus and attention. In line with Licorish et al. (2018), some students admitted that their lack of focus occasionally impacted their scores, which could diminish the educational value of the activity. This indicates that while Kahoot! can be engaging, it also requires students to maintain a certain level of concentration, which may not always be achievable in every session. Besides, in line with Zhang and Yu (2021), the settings of Kahoot! itself were a matter of contention for very few students, particularly the accompanying music, which some found distracting. Moreover, while engaging for many, the competitive nature of Kahoot! sessions was a source of stress for a few students. In line with the findings of Zhang and Yu (2021), a few students found the competitive aspect of Kahoot! to be stressful, detracting from their learning experience. This sentiment highlights the potential downside of gamified learning environments, where the emphasis on competition may not be conducive to all students' learning styles or emotional well-being. Additionally, the repetitive nature of having the same students consistently top the leaderboard was seen as a disadvantage by some

participants. One student (SP22) remarked that this pattern could be demotivating for others because it might create a sense of inequity and reduce the perceived fairness of the competition. This issue underscores the need for strategies to ensure a more inclusive and balanced competitive environment in gamified learning platforms.

These negative aspects of Kahoot! provide valuable insights into the diverse range of student experiences and perceptions. They suggest that while Kahoot! can be an effective tool for enhancing engagement and participation, it must be implemented thoughtfully to mitigate potential stress and ensure a fair and supportive learning environment. Educators might consider incorporating alternative modes of recognition and feedback to address these concerns, such as emphasizing personal progress over competition or providing varied forms of encouragement.

In response to RQ3, the positive effect of Kahoot! was recorded throughout the three terms; this trend is clear. Likewise, none of the students mentioned having too many Kahoot! sessions or getting bored of them. On the contrary, several students suggested adding more questions. Others requested additional Kahoot! sessions, while some proposed that more instructors integrate Kahoot! into their lessons in order to enhance the learning experience. Contrary to Sanchez et al. (2020), who noted that "*it seems not to be effective to use the same game elements to enhance learning permanently or for long-term assignments*" (p. 13), students who participated in approximately 40 Kahoot! quizzes during each of the three terms and responded to the survey requested additional questions and longer Kahoot! sessions. Likewise, none of the students asked to diversify the learning tools as recommended by Wang (2015). In this learning context, an online FFL course for beginners, Kahoot appears to be an effective digital teaching tool. Students appreciated using it frequently, and no signs of wear-out were noted, not even a little.

7 Conclusion

This study has provided valuable insights into the use of Kahoot! in online FFL classes. However, some limitations are evident. First, the study's focus on one specific tool (Kahoot!) and one type of course (online FFL class) limits the generalizability of the findings to other educational tools, subjects, and settings. Indeed, the results may vary depending on the educational context and the specific subject matter being taught. Rooted in a specific educational context, the study's findings may not be fully transferable to other contexts with different educational philosophies, practices, and student expectations. Another limitation is the lack of a control group or comparative analysis with classes not using Kahoot!, which would provide a clearer understanding of the tool's effectiveness relative to traditional teaching methods. Likewise, this study was conducted with a specific population of learners (students at a university in the UAE). To generalize the findings, similar studies using the same protocol should be conducted in other countries. Also, not all students enrolled in the course responded to the survey because participation was voluntary; this may have affected the results and should be considered in future research. Also, the study's design did not allow for the examination of long-term retention of knowledge or the impact of Kahoot! on actual language proficiency and academic performance. Additionally, the study did not explore the instructor's perspective or the potential challenges and time investment required for effectively integrating Kahoot! into the curriculum. The study would have benefited from incorporating objective metrics such as grades or test scores in order to validate the impact of Kahoot! on learning outcomes. Likewise, the focus on a specific course and program limits the applicability of findings to other academic settings.

Based on the consistent effectiveness of Kahoot! in online FFL classes across three terms, our study has revealed valuable insights. These findings present numerous research opportunities to further enhance and expand our understanding. Potential future research directions include the following.

- Investigating the impact of various GSRSs other than Kahoot!, such as Quizizz or Socrative, and comparing their effectiveness in engaging students and improving learning outcomes in FFL classes.
- Investigating the adaptation and effectiveness of Kahoot! for advanced language learners, focusing on more-complex aspects of language learning such as advanced grammar, idiomatic expressions, and cultural nuances.

These research topics will further expand the understanding of the role of interactive learning tools in language education, providing valuable insights for educators and educational technology developers.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

This study involving humans was approved by the Ethical committee at the University of Sharjah. The study was conducted in accordance with the local legislation. Written informed consent from the participants was not required to participate in this study in accordance with the national legislation and the institutional requirements.

Author contributions

CA: Writing – original draft, Writing – review & editing.

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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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