Students' perceptions of *Kahoot!*: An exploratory mixed-method study in EFL undergraduate classrooms in the UAE

دراسة آراء الطلاب في المرحلة التأسيسية من الدراسة الجامعية حول أثر لعبة كاهوت في إحدى الكليات في دولة الإمارات العربية المتحدة

by

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Abstract

In recent years, game-based student response systems (GSRS) such as *Socrative*, *Quizlet,* and *Kahoot!* has become a popular tool to increase motivation, enhance classroom engagement, and facilitate collaborative learning. Despite the popularity of GSRS, little research has attempted to understand student perceptions and experiences using these platforms for language learning across higher education in the Middle East. The purpose of this exploratory mixed methods research was to examine undergraduate student perceptions of *Kahoot!*, a game-based interactive platform, in an English language course at a federal higher education institution in the UAE. The qualitative phase of data collection involved using semi-structured in-depth interviews (N=10) to understand Emirati students' attitude, experience and general perception of *Kahoot!*. In addition, quantitative evidence was collected through an online survey (N=112) to find out which variables identified in the interviews were experienced by the majority of undergraduate students using *Kahoot!*. This study contributes to the literature by providing an insight into students' perceived value, usefulness, satisfaction and overall experience of GSRS through mixed-methods analysis. Results were found to be consistent with the current literature as there was a positive general response towards *Kahoot!,* with the highest influence reported on increased motivation, improved classroom engagement, and enhanced learning experience. However, the effect on academic performance was not significant as perceived by Emirati students. The outcome of this study suggests that gamified digital platforms could be incorporated as part of the teaching pedagogy to retain students' attention, increase participation, and provide undergraduate students with an enhanced enjoyable learning experience. This research further highlights the need to integrate more game-based learning strategies not only to increase students' motivation but to also support a learner-centered environment.

Keywords: game-based learning, game-based student response system, Kahoot!, motivation, engagement, attention, interaction, learning, enjoyment, mixed methods

خلاصة البحث

إنّ هذا البحث يسلّط الضوء على محور مهمّ من محاور التعليم الجامعيّ بدمج استراتيجية تكنولوجية تسهم في رفع كفاءة التعلّم عبر الألعاب الإلكترونية، التي أصبحت منتشرة في السنوات الأخيرة من مثل: (*Kahoot!, Socrative, Quizlet*) حيث كان لها دور في تحفيز الطلاب وزيادة التفاعل في الفصول الدراسية. وتعد الدراسات التي تناولت آراء الطلاب من ناحية تأثير الألعاب على الجوانب التعليمية في الشرق الأوسط قليلة. يهدف هذا البحث إلى دراسة آراء الطلاب الإماراتيين في المرحلة التأسيسية من الدراسة الجامعية حول أثر لعبة كاهوت (*Kahoot!*) في إحدى الكليات في دولة الإمارات العربية المتحدة، قامت الدراسة بجمع المعلومات عبر المقابلات الشخصية، والاستبانات. يعدّ هذا البحث إضافة جديدة في تقديم نظرة للدراسات التي تتناول أهمية الألعاب الإلكترونية في هذه المنطقة بالتحديد من العالم، ومن أهمّ ما توصّلت إليه هو التطابق في النتائج مع البحوث المنشورة، وقد كانت أعلى نتيجة حققتها الدراسة ارتفاع الحافز لدى الطلاب في استعمال لعبة كاهوت (*Kahoot!*)؛ التي أدت إلى زيادة دافعية التعلم عند الطلاب ، وتحقيق أعلى استجابة تفاعلية مع المواد الدراسية، لكنّ الحقيقة التي تنعكس من هذه النتائج أنّ الأداء الأكاديمي للطلاب لم يفلح في رفع نتائج الطلاب الدراسية – مثلما ذكر الطلاب أنفسهم –، ورغم ذلك فإنّ التوصيات التي تمخّض عنها البحث تكمن في أنّ استخدام هذه الألعاب في استراتيجيات التدريس ترفع من مستوى التركيز والانتباه أثناء اللعب، وتحقق التفاعل بين الطالب والأستاذ، وتضفي المتعة على التجربة التعليمية في الوقت ذاته.

Acknowledgments

I grew up surrounded by educational and digital games since my mother was a teacher. Thinking back, I was around five years old when I had my first gaming experience playing Super Mario using my brother's Nintendo. I remember the feelings of joy and excitement I had while playing that game. The colorful layout, the competitive aspect of collecting golden coins, and the stimulating music made the game fun to play. I had to pay attention and concentrate if I wanted to do well in the game. Now, more than twenty years later, I am writing my dissertation on the use of digital games in education. In presenting this dissertation, I would like to express my sincere gratitude to every participant who has contributed to my research and made this experience a joyful journey for me. First and foremost, I would like to thank my dissertation supervisor, Dr. Emad Abu-Ayyash at the British University in Dubai for being welcoming and showing interest in my research. Dr. Emad, your expertise, wise suggestions, and constructive feedback helped me a lot. Your attention to detail helped me to improve my work, and I am truly fortunate to have had the opportunity to work with you.

I am also very grateful for the advice and moral support provided by my colleague Shelley Lawson. Shelley, thank you for all of the interesting and useful discussions we had about research methods and I wish you the best with your Ph.D. thesis.

Last but not least, I would like to thank the participants for their invaluable contribution and taking the time to share their thoughts and experiences. Special thanks to my parents, who taught me to value learning from an early age and encouraged me to pursue my dreams. Their love and guidance and continuing encouragement have enabled me to achieve my goal and this journey would not have been possible without their support.

To the researchers who will benefit from this study

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1 Chapter One: Introduction

This initial chapter provides an overview of game-based student response systems (GSRS) to contextualize the research questions to the broader field of research on game-based learning (GBL) and the integration of digital games (e.g. *Kahoot!)* in education. This chapter also highlights the research purpose and significance and presents an outline of the research.

1.1 Background of the research

The widespread use of mobile technology in today's classroom has created new opportunities for instructors to adopt digital games for teaching and learning. A decade ago, classroom interaction was offered through traditional student response systems (SRS), commonly called 'clickers' (Caldwell 2007). In recent years, game mechanics are integrated into traditional SRS leading to the development of GSRS. Today, a variety of GSRS, such as *Quizlet*, *Socrative*, and *Kahoot!* is available to support active learning in classrooms. These interactive technologies have evolved to interface with multiple devices, including laptops, smartphones, and tablets. In this study, GSRS was used to refer to these gamified platforms. However, in the literature, these terms are often used interchangeably. Informed by the design and processes of digital games, GSRS fosters a friendly competitive learning experience, which in turn creates a pleasant classroom atmosphere. According to Gee (2005), digital games are learning machines that can add an extra level of motivation, engagement, and incentive to many classrooms. The motivational aspects involved in GSRS include competition, challenge leaderboards, achievement badges, reward points, and instant feedback loops which allow students to engage with educational content in a playful and dynamic way. Several researchers have reported that these game-like elements appear to make learning more fun and engaging for students (Gee 2003; Papastergiou 2009; Squire 2011; Kapp 2012).

This study was conducted in an English language program at a higher education institution in the United Arab Emirates. More than 300 students are enrolled in this program, with a class size of 20-25 students. In this program, students take intensive English classes for 24 hours a week. All of the students have repeated levels up to 5 times throughout the year to achieve the IELTS score necessary to enter a degree program. One of the problems caused by this is they become bored and

engage in off-task behavior. For most of the students, this is their last chance before dismissal. Studies by Gitsaki et al. (2013) and Gunn and Raven (2017) show that teacher-centered instruction is still predominant in many higher education classrooms. In traditional classroom instruction, maintaining students' attention can be difficult and student learning is largely passive. In this college setting, students have low-class participation and experience poor academic engagement and a lack of interest. What is more, it appears that the availability of mobile phones has brought a high-level of distraction into the classroom. Previous research by Bruff (2009) confirmed that college students' attention can easily shift to non-academic activities with the availability of technology (e.g texting friends and using social networks). This could lower their concentration levels (Morrell & Joyce 2015), and have a negative impact on their academic achievement. As instructors struggle to motivate reluctant students, GSRS provides a great opportunity to encourage active participation and engage students in deep learning. In reviewing the literature, GSRS has been associated with positive educational outcomes. In particular, it has been found to elicit positive student motivation for learning (Iaremenko 2017), promote active engagement (Wang & Lieberoth 2016), facilitate classroom discussions (Sprague 2016), improve knowledge acquisition (Plump & LaRosa 2017), enhance classroom dynamics (Licorish et al. 2018), increase instructor-student interaction (Coca & Slisko 2013), and facilitate formative assessment (Mohammed & Ismail 2017).

Kahoot! is one example of a playful, game-based student response system. It is a free online application which has extensively received wide acceptance with 70 million active users across the world (Harrell 2019). Recently, *Kahoot!* has become increasingly popular in colleges and universities as a way to engage students and increase their participation. *Kahoot!* is mainly used in education to construct quizzes, assess students learning and review concepts. This popular game-show platform has features inspired by games and traditional SRS. In *Kahoot!*, quizzes are integrated with game design elements, such as graphics, music, sounds, points and competitive leaderboards with the primary aim of increasing students' motivation to create a playful and competitive atmosphere (Wang 2015). To play the game, students sign-in with a pin number using a nickname that allows them to stay anonymous. Questions are displayed on a large screen with four graphical shapes along with a countdown timer, and students respond by using their internet-enabled digital devices (Figure 1). Students choose the possible answer by selecting the graphical shape which they believe is correct and receive instant feedback accordingly. Following each

question, the game ranks players based on speed and accuracy (Figure 2). At the end of the quiz, the names of the top five players' are displayed on the leaderboard. The results can be downloaded by instructors to highlight problematic questions and identify students who may be struggling. Therefore, there is a need to investigate how students perceive *Kahoot!* for language learning in this context. A large number of existing studies have been written on student perceptions and experiences of GSRS in higher education classrooms across a variety of disciplines (Wang 2015; Plump & LaRosa 2017; Licorish et al. 2018; Nicolaidou 2018). However, there has been little mixed-methods analysis on investigating students' perceptions of GSRS in higher education and particularly in the Middle Eastern context. Given this background, it is worthwhile to examine more in-depth undergraduate students' perceptions of their *Kahoot!* gamified experience to get a better insight into the phenomenon.

Figure 1. Students answer questions displayed on screen and receive instant feedback on their phones.
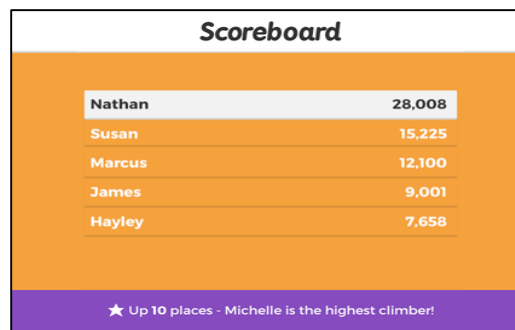
Figure 2. Scoreboard showing students ranks.

1.2 The problem statement

Some of the ongoing challenges facing instructors in college X is students' lack of motivation, lack of attention, and distraction caused by mobile phones. These challenges can be addressed by integrating GSRS as it may achieve more effective teaching and is assumed to be an excellent way to combine meaningful learning with fun. Although many studies have been published on GSRS, only a limited number of studies used reliable data measurement tools to assess student perceptions of classroom response systems (Richardson et al. 2015). It appears that a considerable amount of

previous research that has examined students' feedback of *Kahoot!* has been mainly dominated by quantitative evidence with limited reliability and validity (Richardson et al. 2015), while studies that have attempted to use qualitative methods are notably lacking. For example, Wang (2015) generated qualitative feedback on student opinions of *Kahoot!* through surveys. However, the data were only analysed quantitatively. Interestingly, the data from the surveys were not always consistent with students' open-ended feedback. It seems that the simple Likert-scale surveys that were previously used on their own to assess *Kahoot!* were not necessarily adequate to understand more in-depth student experiences. Recently, Licorish et al. (2018) interviewed students about their perceptions of *Kahoot!* using semi-structured qualitative interviews. However, their study lacked further evidence beyond individual interviews.

Moreover, earlier research within GSRS has primarily focused on the educational benefits of GSRS in K-12 education (Caldwell 2007; Kay & LeSage 2009; Mork 2014), and less effort was directed towards understanding how these platforms are perceived by students in the higher education context. Past studies provide a generally positive picture of GSRS, and the literature indicates that these interactive technologies are effective at keeping students engaged and motivated (Wang 2015; Barrio et al. 2016; Iaremenko 2017). Nevertheless, there is relatively little research that considers students' points of view beyond its relation to motivation and engagement. This study further identifies other variables experienced by undergraduate students including improved attention, increased interaction, competition, knowledge retention, and enjoyment. While a lot has been written on GSRS, the topic remains less explored in large academic settings in the Middle Eastern context. In fact, one study conducted by Awedh et al. (2014) in Saudi Arabia found that GSRS contributes to an enhanced collaborative learning experience. However, other variables experienced by students remains unexplored. Furthermore, apart from Al-Hadithy and Ali (2018) investigation, the potentials of *Kahoot!* have not been extensively researched in the UAE context and the integration of GSRS is still regarded as a relatively new phenomenon. In bridging these research gaps and given the lack of mixed-methods research in this area, the purpose of this study was to seek understanding on how Emirati undergraduate students perceive *Kahoot!* in an English language course at a federal higher education institution in the UAE through qualitative and quantitative data analysis.

1.3   The research purpose and questions

In response to the problem statement, this study aimed to gain better insights into student perceptions of GSRS through qualitative and quantitative data analysis. By reporting on students' feedback, the study hopes to shed light on how digital games can create an enjoyable learning experience, particularly within the higher education context in the Middle East. The present study limits its scope to the context of *Kahoot!* in an English language program at a college in the UAE.

The purpose of this mixed-methods study was to examine undergraduate students' perceptions of *Kahoot!*, a game-based interactive platform in an English language course at a federal higher education institution in the UAE.

In an attempt to address this research purpose, the following research questions guided this study:

- **RQ1:** What are Emirati students' perceptions on the use of *Kahoot!* in English classes?
- **RQ2:** Which variables identified in the interviews (e.g. engagement, motivation, and learning) are experienced by the majority of undergraduate students using Kahoot! in this context?

According to Tashakkori and Creswell (2007), in mixed-methods research, it is important to include qualitative, quantitative and an 'integrated' mixed-method question. They suggest that a mixed-method question can emphasize the importance of integrating qualitative and quantitative data. Therefore, during the analysis stage, the third question was added:

- **RQ3:** Do the quantitative data from the online survey validate the results from the initial qualitative interviews?

1.4   Significance of the research

There are two main contributions from this mixed-methods research on undergraduate student perceptions of *Kahoot!*. First, the results offer insights into how students perceive GSRS, which is of importance considering that technology plays a vital role in today's classroom. While previous research provides evidence that GSRS such as *Kahoot!* increases students' motivation and engagement (Wang 2015; Barrio et al. 2016; Wang & Lieberoth 2016; Iaremenko 2017; Grinias

2017), this study provides a further understanding beyond motivation and engagement by identifying other variables experienced by undergraduate students, such as improved attention, increased interaction and competition, enhanced learning and knowledge retention. Second, the study makes a theoretical contribution to practice and presents practical recommendations based on mixed-methods analysis. Since the perspective of college students in the Middle Eastern context has not been extensively explored in the existing literature, this research will be a valuable contribution to the field of game-based learning in the region. Finally, the data obtained from this study are of relevance to researchers, instructors, and policymakers as it may inform teaching practices in higher education classrooms.

1.5   Definition of terms

The following terms are explained based on the research purpose: engagement, motivation, classroom dynamics, and learning. Engagement is defined by Hu and Kuh (2002) as students' effort to actively participate in academic purposeful activities that contribute to desired learning outcomes. Kuh (2007) builds on this definition and describes engagement as the extent to which students show interest, curiosity, and energy in educationally effective practices inside and outside the classroom that are linked to measurable learning outcomes. Along with these definitions and in line with the aim of this study, 'student engagement' has been conceptualized as the level of meaningful involvement, interest, cognitive effort and energy that students demonstrate during the session. Motivation has been widely researched by a significant number of scholars. Gardner (1985) interprets motivation as a combination of elements including effort, desire and a positive attitude towards a goal. Dörnyei (2001, p.7) describes motivation as "the choice of a particular action and the effort expended on it and the persistence with it". However, this definition is limited as it does not identify other elements that characterize motivation. Consistent with these definitions, 'motivation' is defined as the internal need and desire to participate in classroom activities because it is personally rewarding. Several scholars identified a difference between intrinsic and extrinsic motivation (Deci & Ryan 1985; Malone & Lepper 1987; Dörnyei 1994; Cameron et al. 2005). In technology-supported learning environments, intrinsic motivation arises from personal rewards, such as satisfying one's curiosity and competition, while extrinsic motivation is acquired through achievement scores and badges (Filsecker & Hickey 2014). Since

this study is driven by the work of Malone (1981) on intrinsic motivation, the focus will be on the motivational factors found in digital games which are explained in (Chapter 2). Following Licorish's et al. (2018) definition, 'classroom dynamics' refers to the level of interaction between students and lecturers. There is a lack of consensus about the definition of 'learning' as the concept may vary across disciplines (De Houwer, Barnes-Holmes & Moors 2013). Nevertheless, it essentially entails acquiring new knowledge, information, skills through study, practice and experience (Breedlove & Watson 2013).

1.6   Scope of the research

This study addresses the use of digital games supported by GSRS within a federal higher education institution in the UAE, and aims to provide a better understanding of how Emirati undergraduate students perceive these platforms in the context of *Kahoot!*. This study focuses specifically on the perceptions and experiences of undergraduate students in an introductory English language program. A mixed-methods research design is used which may provide a more detailed and robust picture of many of the factors experienced by students while playing *Kahoot!*.

1.7   The outline of the research

This dissertation is organized into five chapters:

Chapter one provides a background overview of GSRS research that leads to the problem statement, which brings an understanding to the gap in the literature. This chapter also includes the research purpose and questions, and highlights the significance and contributions of the research.

Chapter two contains a comprehensive review of related GSRS literature. Relevant studies on *Kahoot!* are also presented and critically evaluated which leads to the conceptualization of the research framework. This chapter also contains the theoretical underpinnings of this study.

Chapter three describes the research design and explains the methodology of the study. It includes details about the participants and sampling, the context of the research, and data collection

procedures. Data analysis and a description of the qualitative and quantitative data collection instruments are outlined. This chapter also highlights the ethical considerations in relation to the confidentiality and anonymity of the participants.

Chapter four reports the findings from both the qualitative and quantitative data in relation to prior research on GSRS. This chapter also provides an analysis of the results and a discussion of the key findings.

Chapter five summarizes and discusses the study results as well as listing the limitations. This chapter also offers some implications and recommendations for future research.

2 Chapter Two: Literature review

This chapter presents an overview of previous research on the integration of GSRS for teaching and learning in the higher education context. The content of this chapter also acknowledges similar studies to broaden our understanding of the way student perceptions of GSRS has been previously measured in terms of motivation, engagement, and learning. This literature review is structured into three parts. Part one discusses the theoretical framework that informs this research. Part two presents a critical synthesis of previous research based on relevant themes and variables in the literature. Part three highlights similar studies conducted in the Middle Eastern context. While working on this review, it was evident that there is a gap in the literature that calls for further investigation.

2.1 Theoretical perspective

This section outlines the theoretical framework that formed the basis of this research. This study proposes that intrinsic motivation and social interaction theories together form the foundations of GSRS (*Kahoot!*).

2.1.1 Intrinsically Motivating Instructions Theory

Malone's theory of intrinsic motivation has been extensively used and documented in GSRS literature (Wang 2015; Wang & Lieberoth 2016; Licorish, et al. 2018; Sabandar, Supit, & Suryana 2018; Cameron & Bizo 2019). In Malone's view, learning is fun when players are challenged with problem-solving tasks in an audio-visually stimulating environment. He identifies three factors that influence intrinsic motivation: 'Challenge', 'Fantasy' and 'Curiosity'. Challenge is hypothesized to depend on goals with uncertain outcomes, for instance, variable difficulty levels, multiple level goals, randomness and performance feedback. Malone (1981) argues that when players are challenged and succeed through the struggle, their self-esteem increases. Wang and Lieberoth (2016) sustain this view and add that the use of points, scoring and control in GSRS (*Kahoot!*) enhances students' intrinsic motivation by providing them with enjoyable meaningful

challenges. The importance of providing students with a chance to engage in abstract challenges and solve problems has also been pointed by Kapp (2012).

Creating a fantasy environment is another motivator in intrinsic motivation theory. Fantasy refers to the way players imagine themselves in competitive contexts. Malone (1981) assumes that fantasies provide learners with richer learning experiences through narrative structure, while allowing them to experiment in a low-risk environment. Furthermore, in digital games fantasies often address the emotional needs of learners, allowing to connect new learning to prior knowledge. Wang (2015) agrees with Malone (1981) and contends that incorporating fantasies in GSRS could create more user engagement, which in turn increases memory of the material. Wang (2015) further explains that fantasy may help players learn skills within a meaningful context. Curiosity is another fundamental factor of intrinsic motivation, which is according to Ryan and Deci (2000), translates into students' motivation to learn. Malone (1981) distinguished between sensory curiosity and cognitive curiosity. Sensory curiosity is activated by the music, colors, audio effects, instant feedback and interactive abilities afforded by GSRS, while cognitive curiosity is stimulated by making learners believe that their knowledge structures are incomplete and inconsistent. According to Wang (2015), the gamified platform *Kahoot!* has been designed with these motivating factors in mind. The 'challenge' in *Kahoot!* is to answer questions while competing against other students. 'Fantasy' is when the classroom transforms into a game-show, and 'curiosity' is stimulated through music and audio effects which is activated by immediate feedback.

Malone and Lepper (1987) later added the factors of 'Control', 'Competition', 'Cooperation' and 'Recognition'. They propose that learners find digital games exciting because games give them a sense of user control and empowerment. They argue that when players have more control over their learning, they have a higher sense of perceived use and experience intense concentration and excitement. Subsequently, Garris, Ahlers and Driskell (2002) agree with Malone and Lepper's (1987) ideas and suggest that digital games can improve learning outcomes through the use of clear rules, feedback, sensory stimuli and active user control. Likewise, competition and performance feedback motivated by class ranking can have positive effects for certain players because competition poses an exciting challenge (Tauer & Harackiewicz 2004). The role of cooperation in the development of students' social and problem-solving skills is also emphasized

in the motivation theory. Nevertheless, Malone and Lepper (1987) assume that motivating cooperation through a team performance scoring system is considered a weak motivator. In contrast, they consider that learners would be much more highly motivated if success is attributed to the efforts of all group members. Still, Ryan and Deci (2000) confirm that the need for success seems to affect learners' perception of how they are viewed by their peers and also influence their emotional engagement. Moreover, Domínguez et al., (2013) maintain that learners are likely to show more user engagement when their achievements and accomplishments are acknowledged and recognized in the leaderboards through status, ranks and points. Contrary to these findings, research by Mozelius, Fagerstr̈om and S̈oderquist (2017) showed no relationships for Malone and Lepper's intrinsic motivation factors on students' performance; however, some connections were observed for user control, fantasy and competition.

Shroff and Vogel (2009) say that the seven motivating factors proposed by Malone and Lepper (1987) seem to sustain learner's motivation and engagement as they assist in enhancing motivated behavior in technology-supported learning environments. In summarizing their ideas, Malone and Lepper (1987) state that motivating factors may vary from one person to another depending on the environment. While Malone and Lepper's work did not focus on what makes games educational, they made a significant theoretical claim by attributing educational benefits produced by the positive impact of motivators. This study, therefore speculates that Malone's theory of intrinsically motivating instructions plays a key role in students' acceptance of GSRS and particularly *Kahoot!*.

2.1.2   Social Development Theory

It is important to discuss the social context of GSRS (*Kahoot!*) from a constructivist view of learning. The social development theory, which is attributed to Vygotsky (1978), takes the view that learning is mediated by social interaction, and cognitive development happens through collaborative learning. Previous literature has supported the idea that social interaction provides a theoretical framework for digital games (Papastergiou 2009; Verenikina 2010; Kaya 2015; Dreyer 2017; Solmaz & Çetin 2017). Since GSRS promotes greater interactivity, learning may increase beyond what should be expected from traditional methods (Coca & Slisko 2013). In addition, the friendly interactions among peers can provoke a deep sense of engagement creating

more interest in the lesson (Iaremenko 2017), leading to stronger learning motivation (Wang 2015), and improved learning outcomes (Dakka 2015).

According to Vygotsky (1978), higher mental functions, such as focus, attention, memory, and self-regulation occur from a shared task. Research by Caldwell (2007) and Papastergiou (2009) show that interactions with the social environment, including peers and instructors, are necessary to facilitate learner's cognitive growth, enhance understanding and improve higher-order learning. In addition, Squire et al. (2003) say that gamification found in GSRS (e.g: goals, challenge, rules, interaction) may promote effective learning by providing learners with an opportunity to practice and reflect in a problem-based context. Similarly, Gebbles (2018) highlights that gamified platforms, such as *Kahoot!*, have been found to help students to develop cognitive and social skills, such as critical thinking and problem-solving. Research by Biçen and Kocakoyun (2018) shows that 69% of students believed that GSRS (*Kahoot!*) helped them to increase their cooperative and social skills. According to Papastergiou (2009), these interactive platforms increasingly become social environments involving communities of players.

From a Vygotskian perspective, learning occurs when appropriate scaffolding strategies are used. He asserts that students could achieve much greater level of learning through the help of instructors and peers. Vygotsky (1978) speculates that scaffolding simplifies tasks so they are meaningful and motivates students to pursue goals. Gebbels (2018) also reinforces the importance of providing learning guidance and constructive feedback to facilitate learning in digital games.

Another important aspect of the social development theory is the idea that cognitive development depends on the Zone of Proximal Development (ZPD) which refers to problem-solving with the guidance and encouragement of more capable peers. Learners must feel challenged. However, the difficulty level of the challenge must be within learners ZPD to make them feel competent. It is noteworthy to mention that the dynamics of progression found in GSRS encourage students to be in Vygotsky's ZPD (Chaiklin 2003), since progression and rapid feedback are linked to scaffolded instructions in digital games (Stott & Neustaedter 2013).

From the constructivist perspective, self-regulation plays an important role in the learning process. Even though not always explicitly noted, metacognition (students' thinking about their learning) is an important aspect in this theory. Research supports that bringing game technology into the

classroom offers students a quiet place to reflect, construct knowledge and respond at their comfort level (Cicconi 2014). Studies suggest that GSRS promotes learning contexts in which students take an active role in the construction of knowledge and improve meta-cognitive abilities (Coca & Slisko 2013; Plump & LaRosa 2017; Curto Prieto et al. 2019). According to Whitton (2011), students are encouraged to take control of their learning, which may ultimately support learning performance. Digital games supported by GSRS, such as *Kahoot!*, have the capability to add value to Vygotsky's theory. These technologies encompass opportunities for self-assessment through scores and providing immediate feedback. Previous research shows that GSRS platforms have also been found to promote active learning (Dakka 2015), and collaborative learning (Awedh et al. 2014). As *Kahoot!* was designed to be used in the classroom, it was necessary to incorporate social game-play where the classroom turns into a 'game show' and the teacher plays the role of a game host, while students compete against each other (Wang, Zhu & Sætre 2016).

In summary, these findings appear to be consistent with Vygotsky's theory of social learning and support Malone's theory of intrinsic motivation. Further research is needed to provide a closer insight into undergraduate students' perceptions in the Middle Eastern context.

2.2   Previous research findings

What is already known from previous research on Game-based Student Response System (GSRS)?

GSRS platforms, such as *Socrative*, *Quizlet* and *Kahoot!*, have become more common in higher education classrooms. All of these platforms enable instructors to host a live interactive multiple-choice quiz to measure students' performance and to promote student learning. Previous research supported that incorporating GSRS in higher education classrooms can have a positive influence on student engagement (Wash 2014; Wang & Lieberoth 2016; Plump & LaRosa 2017), motivation (Wang 2015; Iaremenko 2017; Medina & Hurtado 2017), and on student learning (Dervan 2014; Dakka 2015, Barrio et al. 2016; Sprague 2016). These interactive platforms have also been found to enhance positive classroom dynamics (Wang & Lieberoth 2016; Hung 2017; Licorish et al. 2017), facilitate instructor-student interaction (Coca & Slisko 2013), and collect formative assessment data (Ismail & Mohammad 2017; McLaughlin & Yan, 2017; Balta et al. 2018).

Nicolaidou (2018) found that students were positive about the introduction of *Kahoot!* as shown in the satisfaction survey and thought that *Kahoot!* helped them to identify their weaknesses in real-time. Findings suggested that students who score high in classroom games also perform better in academic courses. Plump and LaRosa (2017) surveyed Business Law undergraduate and graduate students about their *Kahoot!* gamified experience. Results show students believed that *Kahoot!* helped them to understand law concepts better and provided them with an enjoyable learning experience. In addition, for both instructors and students, *Kahoot!* was easy to use and required no prior training. Students also revealed that the real-time feedback enhanced their knowledge acquisition and gave them a chance to discuss the correct answers with instructors, while allowing anonymous participation. Plump and LaRosa's (2017) study is significant because it offered insights from students' perspective, which has not been fully investigated in university settings. However, their survey was limited to 4 Likert-scale statements and one open-ended question which may have not provided in-depth insights about students' experiences with *Kahoot!*. Another comprehensive view of student perceptions of GSRS can be found in Licorish et al. (2018) qualitative study. They interviewed students about their *Kahoot!* experience and found that learners may retain attention while playing Kahoot! classroom distractions were reduced, therefore the quality of teaching and learning was improved. Additionally, *Kahoot!* was found to enrich the quality of teaching and learning, with the highest impact reported on classroom dynamics, engagement, motivation and perceived learning. Perhaps, a limitation of Licorish et al. (2018) research is the small sample size (N:14), and it was limited to one context. Nonetheless, these views correspond with earlier studies of Mork (2014) and Barrio et al. (2016), which showed that students perceived GSRS as beneficial.

2.2.1 Advantages and disadvantages of GSRS

Several researchers have recognized that GSRS, also known as SRS convey a number of benefits (Kay & LeSage 2009; Blasco-Arcas et al. 2013; Wentao, Jinyu & Zhonggen 2017). Prior research by Caldwell (2007) summarized the common uses of SRS. He mentions that these interactive technologies have been found to increase classroom attendance, improve attention span, and prompt classroom discussion. Likewise, SRS were found to make lectures more fun, guide thinking review, differentiate instruction, and provide students with opportunities for reflection. In

their review, Kay and LeSage (2009) listed the benefits of SRS in the areas of classroom environment, learning, and assessment. They state that these platforms have the potential to provide more focused students, improve classroom interaction, and provide anonymous class participation. These benefits are also echoed by Aljaloud et al. (2015), who reviewed the advantages and disadvantages of contemporary game-based platforms. GSRS benefits can also be understood through Wang and Liberoth's (2016) experiment with *Kahoot!*. Results obtained from their experiment show that the use of points and sound effects was effective at increasing student intrinsic motivation. Furthermore, they noticed important differences in the areas of concentration, engagement, participation in lectures and enjoyment when compared to classes where audio and points were not used. This increase in motivation is may be due to the fact that points provide students with recognition for the completion of the quiz, which is in line with Malone and Lepper's (1987) assumption of the role of recognition in intrinsic motivation. In addition to the motivational aspects of GSRS, classroom dynamics has also been the focus of numerous studies within the literature (Rosas et al. 2003; Wang 2015; Licorish et al. 2017). Wang and Lieberoth (2016) observed that classroom dynamics were positively affected by the use of sound effects when combined with the use of points in *Kahoot!*. Hung (2017) and Licorish et al. (2018) also found similar results and supported that classroom dynamics were enhanced with the integration of *Kahoot!*.

Despite the generally positive perceptions of GSRS, there are also some reported drawbacks including technical challenges and unreliable wireless networks (Caldwell 2007; Kay & LeSage 2009). Students often expressed their frustration when their Wi-Fi connection was down; however, this challenge was associated with internet availability, not the platform. Another critical pedagogical issue is academic inefficacy (Aljaloud et al. 2015). According to Nielsen, Hansen and Stav (2013), anonymous participation is likely to increase blind guessing among students which may not accurately reflect students' level of understanding. Moreover, there is evidence from the literature of a minimal increase in boredom of repeated use of GSRS. Wang's (2015) survey showed that with the repeated use of *Kahoot!*, students' perception slightly changed over time in terms of user-friendliness, engagement, and motivation which resulted in a slight 'wear-out effect' of classroom dynamics. Another factor that appears to negatively influence students' experience of GSRS is the classroom disruption caused by the intense excitement experienced by students while playing *Kahoot!*. Sprague (2019) observed how students reacted to *Kahoot!*'s background

music and explain that although the sound effects encouraged students to engage with the quiz, it also caused students to become loud and disruptive as they were shouting in excitement or agony over gaining and losing scores. Research by Plump and LaRosa (2017) also shows that few students felt it was hard for them to stay motivated once they got a couple of wrong answers, while other students commented that they did not like being ranked. Singer (2016) explains that status and being ranked in the scoreboard does not always appeal to students. Ipeirotis and Gabrilovich (2015) agree with Singer (2016) and acknowledge that the downside of scoreboards is that low-ranked students may be demotivated if they get lower scores than their classmates which may lead to negative effects on students' participation. Considering the amount of research in this area, Sprague (2019) concludes that the advantages of GSRS outweigh the disadvantages.

2.2.2 Motivation and Engagement

Numerous researchers have found a relationship between motivation, engagement and digital games (Malone 1981; Gee 2003; Papastergiou 2009; Squire 2011; Kapp 2012). Wang (2015) investigated the game-based platform *Kahoot!*. According to Wang (2015), *Kahoot!* is distinguished from other SRS's as it was designed as a game, whereas other SRS's provide gamification as part of their platforms. Student perception surveys, such as those conducted by Wang (2015), showed that Software Architecture students reported a high level of satisfaction while using GSRS, declaring that lectures were more fun and interesting while using *Kahoot!*. Students also reported increased classroom engagement during lectures, which has influenced their motivation to attend classes. Mork (2014) noticed similar enthusiasm in her qualitative study with Japanese students. Her Likert-scale survey reports that the use of *Socrative*, a similarly designed GSRS to *Kahoot!* increases students' engagement, motivation, group interaction and enjoyment.

The intrinsic motivation potentials of *Kahoot!* was also investigated by Iaremnko (2017) in an ESL university context. Iaremnko (2017) wanted to find out which aspects motivated Ukrainian students to use *Kahoot!*; therefore, she conducted a questionnaire to measure how students feel about the following aspects: winning *Kahoot!*, mastery of the material and playing as a team. Results demonstrated that 88% of students expressed 'the desire to win' as their highest motivator to play *Kahoot!*. It appears that students showed more interest in learning because they were

competing against each other which satisfies the motivating factor of competition (Malone & Lepper 1987). Iaremenko (2017) results match those observed in earlier studies of Wang (2015) and Grinias (2017), who note that the competitive environment and to be on the top of the leaderboard makes the learning experience exciting for students. Coca and Slisko (2013) also found higher self-reported rates of satisfaction with the use of GSRS. Many studies, especially those of Plump and LaRosa (2017), Hung (2017) and Licorish et al. (2018) have stressed the fun and entertaining aspects of GSRS and particularly *Kahoot!*. Research by Ismail et al. (2019), shows that *Kahoot!* increased learners' desire for competition, goal achievement and reflection. What is more, they state that *Kahoot!* was a great tool to promote interactivity and add positive energy to the classroom. Evidence from Ismail et al. (2019) study show that *Kahoot!* aroused medical students' interest in the lesson and made the lectures more engaging and extremely entertaining. Similarly, research results by Balta et al. (2018) found that university students displayed significantly more interest in Physics when GSRS was used. Based on Wang's (2015) survey, students attributed their high level of engagement to the use of GSRS as it provided them with a break from the long lecture.

2.2.3   Learning performance

Prior research has presented conflicting findings regarding the effects of GSRS on students' learning performance at higher education level. GSRS was reported to have positive learning outcomes, such as higher levels of academic achievement, improved understanding and greater retention of information (Dervan 2014; Nicolaidou 2018; Dickinson 2019). For instance, Dakka (2015) evaluated Engineering students' performance using a combination of questionnaires and exam records. Results revealed that 53% of students improved their performance while there was no difference for the remaining 23%. Similarly, Balta et al. (2018) investigated the use of *Socrative* as an online homework tool with 85 students in Physics class using student midterm grades and attitude surveys. A correlation was found between students' attitudes towards *Socrative* and their final exam scores. More recently, Tóth, Lógó and Lógó (2019) attempted to measure the long-term learning effects of *Kahoot!* on students' exam results using data collected from weekly quizzes and final exams. They found similarly encouraging results. Students who participated in more *Kahoot!*'s received higher exam marks.

On the contrary, experimental research by Barrio et al. (2016) with undergraduate students did not recognize these outcomes. They explored the academic influence of gamified SRS and found that students who attended lectures with a gamified SRS had more positive perceptions in terms of improved attention, interaction with peers, and increased motivation compared to students who attended lectures with a non-gamified SRS. However, no significant improvement in learning performance was identified. Interestingly, a gender difference in Psychology classes was identified as female students preferred to use SRS more than male students to remain anonymous. In contrast to these findings, Cerqueiro and Harrison (2019) show that first-year university students using *Socrative* outperformed students who attended a traditional lecture and experienced positive academic outcomes. Still, their conclusions were based on students' feedback and not supported with empirical findings such as performance records or exam scores. Wang and Lieberoth (2016) studied the use of *Kahoot!* in a university setting with 593 students. Results show that *Kahoot!* was found to be helpful in promoting active student participation in university classes, but no measurable learning effects were found. Likewise, Aktekin, Çelebi and Aktekin (2018) measured the responses of 45 medical school students. The vast majority of students 56% reported that *Kahoot!* helped them to improve their academic performance, while 29% of students were indecisive and the remaining 15% disagreed.

Many earlier studies used data from surveys and questionnaires to assess student perceptions of GSRS, however some recent studies used data from interviews and focus groups (Dervan 2014; Sprague 2019; Licorish et al. 2018). These studies provided a qualitative understanding of how students in universities experience digital games. For example, Sprague (2019) tested how college students respond to the integration of *Kahoot!* to evaluate paragraph organization in a writing course. Results show that students essay grades improved when *Kahoot!* was used. Sprague (2019) reveals that *Kahoot!* allowed students to engage more deeply with content materials and also improved interaction with instructors and peers because of its collaborative nature. He concludes that such classroom engagement and intrinsic motivation are key to encouraging long-term retention. However, the study of Sprague (2019) was limited to a single English course, and the 14 comments which he received cannot be generalized. *Kahoot!* has also been largely explored in ESL context to improve students' vocabulary knowledge (Dizon 2016; Wright 2016; Taylor & Reynolds 2018; Dickinson 2019). For example, Medina and Hurtado (2017) satisfaction survey revealed that students' acquisition of vocabulary improved with the use of *Kahoot!*, and students

were more eager to study before the quiz. Similar results were reported by Wolff (2015), who found that *Quizlet*, a platform that shares many characteristics as *Kahoot!* provided a comprehensive environment to study vocabulary.

Research by Cameron and Bizo (2019) as well as Gebbles (2018) reinforces the idea that beyond fun and extra practice, GSRS can be used as a meaningful educational tool. Specifically, GSRS constitute potentially powerful learning environments for a number of reasons (Wentao, Jinyu & Zhonggen 2017). First of all, these platforms can support students' metacognition and concept exploration. Similar to *Socrative* and *Quizlet*, *Kahoot!* also allows students to facilitate activation of prior knowledge, given that learners must use previously learned information to advance and progress in the game. Although fewer studies have addressed the social development aspect of digital games, some found relationships between GSRS and problem-solving. Gebbels (2018) acknowledged that GSRS can favor the development of various skills such as collaboration, peer-tutoring, problem-solving and critical thinking skills. These findings have also been supported by previous research which confirms that students using digital games were twice as likely to work on a problem presented during class (Gee 2005; Caldwell 2007; Kaya 2015). As identified by Coca and Slisko (2013) and Barrio et al. (2016), GSRS was found to support conceptual understanding, but students' academic performance was not affected. Nevertheless, these perceptions remained unclear as data were mostly collected through simple Likert-scale surveys rather than empirical records.

In terms of concentration and focus, studies conducted by Wang and Liberoth (2016), Plump and LaRosa (2017) and Licorish et al. (2018) indicated that using GSRS resulted in higher recorded levels of focus during lectures. The excitement brought by *Kahoot!* has been found to encourage students to focus more during quizzes, retain their attention and improve content mastery. Research by Cameron and Bizo (2019) correspond with these findings. They revealed that students were more attentive to lectures when GSRS was used. Research by Coca and Slisko (2013) and McLaughlin and Yan (2017) shows that GSRS is also applicable for formative assessment purposes. A quantitative study by Ismail and Mohammad (2017) concluded that medical students highly perceived *Kahoot!* as an appropriate tool for providing feedback and formative assessment. However, based on students' feedback, *Kahoot!* was not the best tool to simplify complex subjects for medical students. There is evidence from the literature to demonstrate that students appreciated

the real-time feedback which helped them to improve their performance and provided information about their success and failure. Students specifically reported that *Socrative* supported by instant feedback helped them to review course content for the final exam (Coca & Slisko 2013). Malone (1981) underlined the importance of feedback in technology-supported learning environment. He concluded that digital games such as *Kahoot!* provide information for instructors about students understanding as errors are identified immediately, and explanations and further follow-ups are provided.

Other studies have considered the relationship between active learning and GSRS (Dakka 2015; Gebbles 2018). The game-based learning theory is grounded in the idea that engagement stimulates the brain for active learning (Plass et al. 2015). Based on Coca and Slisko (2013) survey with 36 Physics students, *Socrative* was reported to increase students' opportunities for active learning. Moreover, students mentioned that they learned to ask for clarification for their answers which enhanced their negotiation skills, whereas a more recent study (Biçen & Kocakoyun 2018) indicated that GSRS was found to promote more interest in curricular contents and create a learner-centered environment which encourages learning through practice. Similarly, research by Dakka (2015) found that GSRS increased students' engagement in active learning in an Engineering university classroom. Given that social interaction is an essential component of effective learning, GSRS (*Kahoot!*) enables active learning environments that encourage students' dialogue.

While Dakka (2015), Balta et al. (2018) and Sprague (2019) findings support that GSRS could lead to improved learning performance, other researchers have found no measurable learning difference in final grades of students who used GSRS (Coca & Slisko 2013; Barrio et al. 2016; Wang & Lieberoth 2016). Recent experimental studies by Wang, Zhu and Sætre (2016) at the Norwegian University of Science and Technology have shown *Kahoot!,* improved memory, motivation, and engagement. However, there was no statistically significant differences in students learning records with the use of *Kahoot!*. Research concludes that the use of GSRS does not necessarily guarantee improvement in student academic performance.

Drawing on evidence from the literature, a large number of studies focused on the benefits of using GSRS in the higher education classroom. GSRS was found to enhance classroom dynamics, create a more positive and active atmosphere, improve concentration and focus. While these studies

proved GSRS may contribute to an increase in students' motivation and engagement, there are some contradictory results related to learning and students' performance.

2.3   Previous research from the Middle East

The literature review demonstrated that there were only a few studies on students' perceived value of GSRS conducted in the Middle Eastern context (Solmaz & Çetin 2017; Al-Hadithy & Ali 2018; Biçen & Kocakoyun 2018; Aktekin, Çelebi & Aktekin 2018; Benhadj et al. 2019; Göksün & Gürsoy 2019; Yürük 2019), and many of these studies used a survey methodology to capture students' perceptions of GSRS. For example, previous research by Awedh et al. (2014) with Saudi undergraduate students revealed that *Socrative* assisted students to be more active in class and encouraged them to share ideas which improved collaborative work. Moreover, their survey shows that students appreciated working with peers and confirmed that *Socrative* helped to facilitate peer learning and allowed them to recognize gaps in their knowledge. However, their data was limited to quantitative analysis with 38 male participants and restricted to a single Architecture Computer course. Likewise, Solmaz and Çetin (2017) compared three different GSRS; *Kahoot!*, *Socrative* and *Plickers* in an ICT course and found these tools to increase motivation among Turkish university students.

More recently, Benhadj et al. (2019) examined students' attitudes towards the impact of *Kahoot!* on engagement, motivation and learning outcomes at a school in Morocco. They found positive feedback and students conveyed that *Kahoot!* helped them increase their engagement with the lesson. It is worth noting that the studies conducted by (Solmaz & Çetin 2017; Benhadj et al. 2019) lead to a significant understanding of the role of GSRS in improving motivation, engagement and enjoyment, but the gain in learning performance remains to be proven. Among the limited studies, Al-Hadithy and Ali (2018) investigated *Kahoot!* with Law university students in the UAE. Results revealed that there was a marked increase in active learning, student's self-directed learning and a general improvement in summative assessment outcomes, nonetheless other variables such as competition, knowledge retention and concentration remain to be addressed. Although Al-Hadithy and Ali's (2018) finding are substantial, the majority of GSRS research remains narrowly focused

on experimental research with data generated from surveys, and no studies have specifically investigated how Emirati undergraduate students perceive *Kahoot!* using mixed-methods analysis.

While these studies have made significant contributions to the GBL literature, they have not looked at graduate students' perceived value of *Kahoot!* as measured by improved learning, enhanced engagement, improved social interaction and increased motivation. Drawing from the findings of the literature review, this mixed-methods research focuses on understanding students' perspectives and perceptions of using *Kahoot!* a game-based interactive platform in an English language program at a college in the UAE. Therefore, the aim of this study was to focus on the insight, views and perceptions of Emirati undergraduate students in the Middle Eastern context, an often less explored topic in GSRS research.

Chapter summary

This chapter critically reviewed previous research on GSRS in the higher education context. The findings from this review revealed a number of research gaps. First of all, previous studies were mainly based on experimental methods dominated by quantitative measures (surveys), while less effort has been made to understand undergraduate student perceptions of *Kahoot!* using mixed-methods analysis. In addition, data from the surveys were not always consistent with students' feedback and results on learning performance were mixed, showing positive or no effects. Second, past studies mainly focused on the benefits and motivational aspects of GSRS, whereas other significant variables remaining unexplored. Also, the perceptions of college students have not been extensively researched in the literature except for few studies that used qualitative interviews. Finally, there is a gap in the literature in reporting student perceptions of GSRS in this region and particularly in the UAE. This study seeks to address this gap and examine how Emirati undergraduate students perceive *Kahoot!* a game-based interactive platform in an English language course at a federal higher education institution in the UAE using a combination of interviews and surveys which of valuable contribution as the results may help to improve pedagogy in higher education. The following chapter discusses the methodological approach and the research design used to answer the research questions.

3 Chapter Three: Methodology

This chapter describes the research design and includes details about the participants, sampling, and data collection procedures. Data analysis are organized under three sections: qualitative data collection and analysis, quantitative data collection and analysis, and mixed-methods analysis. This chapter also mentions the validity and reliability of the data and the ethical considerations that guided this study.

This study adopted a pragmatic worldview (Tashakkori & Teddlie 2003) to approach the purpose of the research. According to pragmatism, a mixture of qualitative and quantitative approaches is needed to provide a comprehensive understanding of the problem and create shared meaning. Qualitative research is used to provide insights into a problem, describe an experience, explain and interpret relationships, while quantitative research is used to generate numerical data about attitudes, opinions and generalize results from a larger sample population. Mixed-methods draw on the strengths of both approaches which are found to be complementary of each other. For the purpose of this study, mixed-methods research is defined as an approach to inquiry that involves collecting, analyzing and integrating both qualitative and quantitative methods within a single study (Dörnyei 2007).

To narrow the scope of the research, the following purpose was defined:

- To examine undergraduate student perceptions of *Kahoot!*, a game-based student response system in an English language course at a federal higher education institution in the UAE.

This research was guided by the following research questions:

- **RQ1:** What are Emirati students' perceptions on the use of *Kahoot!* in English classes?
- **RQ2:** Which variables identified in the interviews (e.g. engagement, motivation, and learning) are experienced by the majority of undergraduate students using Kahoot! in this context?

During the analysis stage, the third question was added:

- **RQ3:** Do the quantitative data from the online survey validate the results from the initial qualitative interviews?

3.1 Research design

This study employed a mixed-methods research design to report on Emirati undergraduate students' perception of *Kahoot!*. Mixed-methods were selected because this approach is found to increase validity in the findings (Johnson & Christensen 2014), reduce bias (Punch 2009), and gain a deeper understanding of the phenomenon (Dörnyei 2007). In addition, Tashakkori and Creswell (2007) and other proponents of mixed-methods seem to agree that combining qualitative and quantitative measures offer multiple perspectives to examine a research problem, expand the understanding of a complex educational issue, and lead to better interpretation of the findings. One of the most valuable characteristics of mixed-methods is the possibility of triangulation, which refers to the use of multiple data sources to examine the problem from different angles (Creswell 2014). Mixed-methods acknowledge that both qualitative and quantitative approaches have their advantages and limitations, and the integration of data maximizes the strengths and minimizes the weaknesses of each approach. An essential requirement of mixed-methods is that different forms of data are integrated, mixed or connected at some stage of the research. In this study, integration occurred at the data instrument development and reporting of the findings.

Since this was a qualitatively driven study, the (QUAL → quan) exploratory design (Schoonenboom & Johnson 2017) appeared to be appropriate to address the research questions. Interviews seemed to be a logical first step to identify the different variables experienced by students, however the researcher also wanted to know if the whole group of undergraduate students feel the same, thus the chosen method was guided by the research questions. This exploratory sequential design is characterized by two phases of data collection (Figure 3). Dörnyei (2007) suggests conducting a small-scale exploratory qualitative one-on-one interview first to provide background information on the context and then identify possible variables for preparing the items for the survey. In the first phase of data collection, qualitative semi-structured interviews were primarily used to answer the first research question and identify key themes to inform the development of the survey. In the second phase, a quantitative measure was utilized to answer the second research question and generalize the findings obtained from the qualitative analysis to the undergraduate population. Then, the two phases were connected in the interpretation stage of the study. The researcher made use of the strengths of qualitative research which takes account for the complexity of the phenomenon to gain deeper insight into student perceptions, views and

experiences of *Kahoot!*. Meanwhile, the researcher made use of the strengths in quantitative research to confirm the findings from the qualitative data based on numerical data collection and maintain the internal validity of the research.
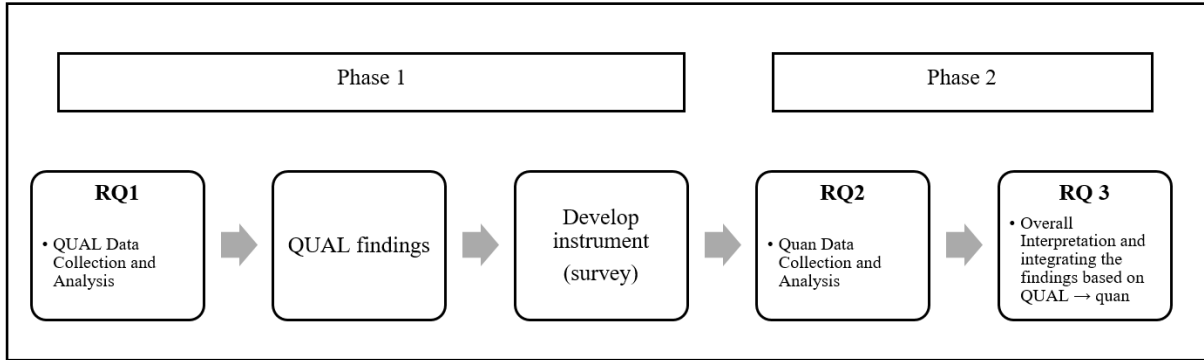
Figure.3 Exploratory sequential design QUAL → quan (adapted from Creswell & Plano Clark, 2011).

3.2 Participants and sampling

The participants in this study included a total of 112 undergraduate students (female N = 102; male N = 10) who are enrolled at a one-year Foundation language program. The gender distribution was 91.1% female students and 8.9% male students. The age of the participants ranged from 17-18 years old. The participant's demographic information are summarized in (Table1).

Table 2 Participant's demographic information

Characteristics	Frequency	Percentage
Age	(n)	(%)
17-18	78	69.6%
19-20	30	26.8%
21-22	5	4.5%
Above 22	1	0.9%
English level		
Level 1	27	24.1%
Level 2	10	8.9%
Level 3	43	38.4%
Level 4	32	28.6%
Gender		
Male	10	8.9%
Female	102	91.1%
Total sample 112		

The study took place at a federal higher education institution in the UAE with a separate male and female campuses during winter 2019. In this college, students are enrolled in an intensive English course where they have to attend classes for 24 hours a week to improve their academic English language skills. Students are placed in four levels based on their English competency. All of the participants were native Arabic speakers within the CEFR levels of A1, A2, B1 and B2 and they are required to pass an exam in order to progress to Bachelors. With regard to participants' past learning experiences, all of them have used a variety of educational games integrated with GSRS including *Kahoot!*. With the availability of mobile phones, students are distracted and show little enthusiasm towards learning. In addition, students tend to be reluctant to participate in class and usually complain about the class being too long and boring. Despite instructor warnings, most students continue to use their mobile phones for social purposes or for self-directed learning. Due to the growing prevalence of mobile technology, GSRS has brought new possibilities to enhance learning in ways that never existed before.

Convenience, non-probability sampling was used to recruit students from Foundations to participate in the individual semi-structured interviews and the survey. This sampling technique seems to be appropriate because the sample of participants were readily available, convenient, represent the population the researcher seeks to study (Cohen, Manion & Morrison 2011), and easy to access since the researcher works in this institution. While the data from the interviews relied on participants' self-report which should be considered in generalizing the findings of the research, the differences between the sample size and general program population did not appear substantial. Generally, it is estimated that the sample in the present research provides a reasonable representation of the total undergraduate population.

3.3 Materials

The *Kahoot!* multiple-choice quizzes were created by different instructors. These quizzes were often used as supplementary teaching materials to review vocabulary and grammar items, check students' understanding of content materials, and as a revision for the weekly exam. Quizzes were given to students approximately once a week and each activity lasted for about 20-25 minutes. Each quiz contained between 10-25 questions covering key vocabulary. Some of the quizzes were

supplemented with short videos and graphics. During the quiz, students had the freedom to use their smartphone or laptop using nicknames or real names based on their preferences.

3.4   Data collection procedures

This section provides details on the data collection procedures, issues of accessibility, feasibility, and transferability. It is important to provide a thick description to make sure if the study is repeated in other contexts, other researchers would arrive at similar findings and conclusions. The research procedure is illustrated in (Figure 4).
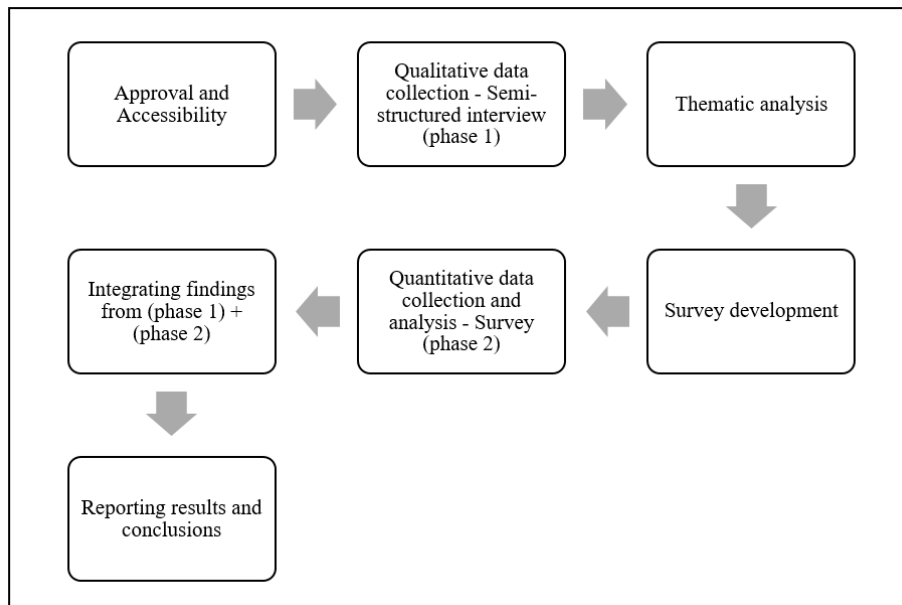
Figure 4: Research procedure

After receiving approval, the study was announced and its objective was explained to participants. The inquiry for this mixed-methods study included two phases. Qualitative exploratory data was first collected and thematic data analysis was performed. Themes and subthemes were identified and used to drive the development of a quantitative instrument (survey) to further explore the research problem (Creswell & Plano Clark 2011; Schoonenboom & Johnson 2017). Analysis of qualitative data led to 10 codes which are organized under five main content areas (attention and focus, interaction and engagement, motivation and competition, learning and knowledge retention,

fun and enjoyment). In the second phase of the study, the survey was administered to a sample of the population. Main outcomes from the quantitative results were used to clarify findings from the qualitative analysis and provide context for the research findings. Based on data interpretation, relationships were identified and all data from both the qualitative and quantitative portions of the study was used to check for reliability. The findings of the two phases were then integrated and results were reported.

3.5   Qualitative data collection (semi-structured interviews)

In the first phase of this exploratory mixed-methods research, primary qualitative data were collected through semi-structured interviews with a convenience sample of students (N=10). The aim of the interview was to offer rich open-ended data and detailed information to explore participants' thoughts, feelings, experiences and perceptions of *Kahoot!*, which was found relevant to addressing the first research question. Dörnyei (2007) explains that the goal of semi-structured interviews is to gain an understanding of a phenomenon by promoting an open conversation with participants. Thus, by creating a relaxed atmosphere, students were more likely to reflect on their experiences on their use of *Kahoot!* for language learning. The interview was guided by a flexible interview protocol (Appendix A), and often supplemented by follow-up questions, prompts and comments. Moreover, semi-structured interviews allowed the interviewer to expand and probe into any emerging issue, while the interview guide helped to maintain a systematic coverage of the topic. As stated by Arthur et al. (2012), a more open format is recommended in semi-structured in-depth interviews, therefore a well-planned interview guide is needed to ensure full coverage of the phenomenon under investigation. The open conversation provided the researcher with a chance to clarify, extend and elaborate on students' responses. Furthermore, the open-ended nature of the interview enabled students to provide details, thereby gaining richness and depth of responses (Cohen, Manion and Morrison 2011). The central question of this study was: What are Emirati student perceptions on the use of *Kahoot!* in English classes? Several follow-up questions were asked, such as: *How do you feel when you play Kahoot? What do you like best about Kahoot for learning? What makes Kahoot fun? What features do you like in Kahoot! (e.g music, points, ranks)?*.

3.5.1 Piloting the semi-structured interviews

In the preliminary stage of preparing for the research, the instruments were tested and piloted to a sample of the population. Piloting interviews are an integral aspect in the process of conducting research as it may highlight potential issues with the study. This process allowed to obtain a valid picture of the participants' responses in order to make changes. Piloting is very important to reduce mistakes and evaluate the feasibility, the validity and comprehensibility of the instrument which are used to assess the trustworthiness and transparency of the qualitative data of this study. According to Johnson and Christensen (2014), trustworthiness corresponds with research validity and reliability commonly used to assess quantitative data.

Interviews are widely acknowledged as an appropriate technique to seek insights of students who are experiencing the phenomenon, therefore piloting interview questions is crucial to test the questions and to practice interviewing skills. When writing the qualitative questions, the researcher also examined other studies which carried out a similar approach (Mork 2014; Dakka 2015; Licorish et al. 2018). First, the researcher wrote 12 open-ended guiding questions. Questions were then piloted with five students. The questions were reviewed and reworded based on students' feedback. The questions were then reviewed by an instructor who is already familiar with *Kahoot!*. Once the study was approved, the purpose of the research was explained to students. Ten students (N=10) volunteered to participate in the interviews. Those students who accepted to participate in the interview had to sign a consent form. The interviews were conducted individually in the participants' native Arabic language and each interview lasted for about 7-10 minutes. Detailed notes were taken during the interviews for later analysis rather than tape-recording. A tape-recording was not used for cultural reasons as all of the participants were Emirati female students and recording the conversation could make them feel uncomfortable. Therefore, no direct quotes were used during the reporting of the findings.

3.5.2 Qualitative Data Analysis

Thematic data analysis was used to analyze data from the qualitative phase of the study. According to Braun and Clarke (2006), thematic analysis is a method used to identify, analyze and report patterns and themes within qualitative data. This process offered deep interpretation to various

aspects of the research topic and provided qualitative description in rich detail. To further analyze the data from the semi-structured interviews, this study draws on the six-phase framework suggested by Braun and Clarke's (2006):

Step 1: Become familiar with the data,

Step 2: Generate initial codes,

Step 3: Search for themes, repeated words and patterns,

Step 4: Review themes,

Step 5: Define and categorize themes,

Step 6: Write-up the final research.

During data analysis, these steps were followed. First, quotes were reviewed, key phrases were highlighted and data were interpreted to generalize codes. These codes were used to label and capture something interesting in the data. Next, this process resulted in 10 codes which were paired and organized to generate potential themes. Then, the main themes were reviewed and organized into 5 categories (Table 2). Finally, items were produced for the survey. Example of items include: *'I feel that Kahoot! make the class more interactive'*, *'It was fun to compete against other students'*, *'It was important for me to do well in the game'*.

Table 2 Themes generated from qualitative interviews

Theme	Content area
1. Attention	Attention and focus
2. Focus	
3. Interaction	Interaction and engagement
4. Engagement	
5. Motivation	Motivation and competition
6. Competition	
7. Learning	Learning and knowledge retention
8. Knowledge retention	
9. Fun	Fun and enjoyment
10. Enjoyment	

3.6   Quantitative data collection (survey)

In contrast to qualitative research methods which seeks to understand (Punch 2009), the data obtained from the quantitative methods seeks to make numerical generalization of a phenomenon (Creswell 2014). Therefore, a self-report measure (survey) was constructed to support qualitative data from the semi-structured interviews. An online survey was used to assess students' attitudes and perceptions of their gamified *Kahoot!* experience and to identify which variables were experienced the most while playing the game. The survey was made with Google Forms, a tool used for creating and analyzing online surveys. The first part of the survey included the purpose of the study and general questions to identify participant's demographic information such as: age, gender and English proficiency level.

The second part of the survey contained 16 items using a 5-point Likert-scale ranging from 1 to 5 representing the following values: (Strongly Agree: 5 points, Agree: 4 points, Not sure: 3 points, Disagree: 2 points, Strongly disagree: 1 point). The items are organized under five categories: attention and focus (3 items), interaction and engagement (3 items), motivation and competition (4 items), learning and knowledge retention (3 items) fun and enjoyment (3 items). This scale comprised of multiple items to measure the participants' attitude towards more than one attribute related to each theme. The attention scale included items focusing on attention, focus and concentration which student show while playing *Kahoot!*. The interaction and engagement scale included items on students' involvement and active participation in class. Motivation scale consisted of items about interest and enthusiasm for *Kahoot!*. Finally, the learning scale captured students' beliefs about whether *Kahoot!* affects their learning performance. Closed-ended statements seemed to be useful in this study because it exposed participants to predetermined response categories and allowed standardized quantitative statistical analysis (Johnson & Christensen 2014). Furthermore, close-ended statements result in statistics that can be viewed graphically which are used to interpret findings easily. Example of close-ended statements includes: *I was excited while playing the game*, *I often spent time explaining the correct answer to my classmate* and *I think Kahoot! leads to a better learning experience*.

3.6.1 Piloting the survey

Before distributing the survey, it was revised and piloted with 12 students. During the piloting phase, spelling errors, and ambiguous statements were detected and reworded. When designing the question items, the Arabic translation was checked to ensure the validity of the survey. While piloting the survey, it appeared that some students showed uncertainty of some survey items. Therefore, some statements were reworded especially items under 'Motivation' and 'Engagement' as these terminologies are very broad when translated into Arabic. After removing the confusing questions, a total of 16 items remained. In addition, initially the survey was constructed in English but later it was decided to translate it into Arabic to avoid any misunderstanding as the majority of the participants are in the introductory level of the English program.

The survey also included both positively and negatively worded items to reduce the effects of response bias (Dörnyei 2007). Thus, before running Cronbach's alpha on scale items, the scoring of code items that are negatively worded were reversed so that the numerical scoring scale ran in the opposite direction. For example, strongly disagree would attract a score of 5. The survey was sent to all students enrolled in Foundations by email, and 112 students responded.

3.6.2 Quantitative data analysis

Statistical data analyses were performed with SPSS version 23. This software was used to analyze the data collected from the survey. In addition, Google Forms provided visual charts, showing both frequencies for each question as well as percentages which helped in analyzing the data and reporting the findings. The survey was analyzed using the coefficient of internal consistency (reliability of scales) of the survey items. The Cronbach's value of the survey was $\alpha = 0.89$, showing good reliability in internal consistency (Table 3).

Table 3 Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.898	.905	16

3.7 Mixed methods data analysis

It is important to integrate and connect qualitative and quantitative methods data to categorize a study as mixed methods. Creswell (2014) defines integration as the combination of qualitative and quantitative data within a given stage of inquiry or within data analysis. In this study, the first linking of data occurred in the data collection phase when the results from the first phase were used to build the second phase by transferring themes to quantitative items and scales. The second phase of integration occurred during the interpretation and reporting of the findings. To ensure internal validity, the triangulation of multiple data sources was used. Semi-structured interviews were conducted to allow students to express their thoughts and experiences in words, whereas the survey was used to confirm the findings and investigate whether results were generalizable to the undergraduate population.

3.8 Ethical considerations

Prior to conducting the research and before data collection, approval was obtained from the Program Dean. Ethical considerations were taken into account in the data collection, analysis and reporting of the results. All of the participants were informed of the aim of the study and potential benefits. Students were ensured confidentiality and were informed that participation was voluntary before the start of the study. During this stage, potential participants had the chance to ask questions about their role in the research and how their data and information would be used. Those students who agreed to take part in the semi-structured interview were provided with an informed consent form (Appendix B).

To account for any ethical issues that may have risen during the process of the research, participants' names remained confidential. Although participants were required to sign the consent form, they were not required to identify themselves or write their names on the survey. For easy referencing, each participant was subsequently assigned a number e.g. (student 1, student 2, student 3……...etc). This number was used to identify each participant's ideas and views in reporting the findings.

Chapter summary

This chapter discussed the methodology and research design used to conduct this study. This research used an exploratory mixed-methods (QUAL → quan) research design to address the research questions. A combination of qualitative and quantitative methods were used to enhance the validity of research. Qualitative data was first collected and analyzed through semi-structured interviews. In these interviews, participants had the chance to express their thoughts and opinions about the perceived value of *Kahoot!*. To assist in explaining and interpreting the findings from the qualitative findings, themes extracted from the interviews were used to drive the development of a quantitative instrument (survey) to generalize the results to a sample of the population. The findings from both the qualitative and quantitative portions of the study are included in the following chapter.

4 Chapter Four: Findings and Discussion

This chapter presents a discussion of the key findings from both the qualitative and quantitative phases with reference to the research purpose. Mixed-methods analysis was used to examine undergraduate student perceptions of *Kahoot!*, a game-based student response system in an English language course at a federal higher education institution in the UAE. This chapter is organized into three parts. Part one presents the main findings and analysis of the semi-structured qualitative interviews with 10 participants. Part two reports the quantitative findings and analysis from the online survey with 112 participants. Part three integrates and discusses the findings from both phases.

4.1 Qualitative phase findings and analysis

RQ1: What are Emirati students' perceptions on the use of *Kahoot!* in English classes?

The semi-structured interviews revealed 5 pairs of themes related to students' perception of *Kahoot!*, which are presented under the following areas: (1) attention and focus, (2) interaction and engagement, (3) motivation and competition, (4) learning and knowledge retention, and finally (5) fun and enjoyment.

4.1.1 Attention and focus

Subthemes: concentration, music, audio effects, break

The analysis of the semi-structured interviews revealed that all of the participants seem to agree that weekly *Kahoot!* sessions maintained their attention. 8 out of 10 students believed that *Kahoot!* helped them to 'recall' and 'memorize information', while 6 others highlighted that participating in *Kahoot!* quizzes, especially before the final exam, have helped them to stay focused and refreshed their memory. These findings confirm how cognitive functions, such as concentration, focus, memorization, and attention are stimulated by social interaction, which is in line with Vygotsky's (1978) beliefs about the role of the zone of proximal development (ZPD) in facilitating learners' cognitive growth and improving higher-order learning. The positive impacts of enhanced

attention found in this study are also similar to those mentioned in previous literature (Caldwell 2007; Wang & Lieberoth 2016; Licorish, et al. 2018).

Kahoot! helped me to memorize words because I remember the pictures. (Student 8)

Another aspect reported by students is how the audio effects and music impacted their concentration. Many students stated that the sound effects found in *Kahoot!* sustained their engagement and focus, which is consistent with Wang and Liberoth (2016) experiments with *Kahoot!*, and is linked to Malone's (1981) ideas of the role of music and sounds in stimulating students sensory curiosity.

When the music gets faster, it creates a feeling of suspense and encourage me to concentrate and work harder. (Student 4)

The music makes me nervous, but at the same time motivates me to keep playing. (Student 3)

Contrary to expectations, one student declared that the audio effects negatively affected her concentration, and she felt distracted by the music and the time-pressure.

There was no time to think of the questions, I was distracted by the music and had to answer quickly before the time runs out. (Student 5)

A major barrier to concentration was the length of the lesson as well as the time of the day in which the English class took place. Students detailed that *Kahoot!* relieved feelings of fatigue, and that it gave them a 'refreshing break' from the 2 hours English class. A student referred to her experience with *Kahoot!* as giving her a chance to 'recharge' and 'refocus' when she felt tired and sleepy in the morning. In general, the majority of undergraduate students agreed that they concentrated more during class when *Kahoot!* was used to do well and progress in the game. Some statements provided by the participants illustrated their positive feelings about using *Kahoot!* in relation to attention and focus:

Playing Kahoot! helped me to pay attention and focus while studying in class. (Student 1)

Kahoot! kept me awake, especially during 8 o'clock classes. (Student 2)

4.1.2 Interaction and engagement

Subthemes: collaboration, discussion, the anonymity of participation, classroom dynamics

Similar to previous studies (Coca & Slisko 2013; Awedh et al. 2014; Wang 2015; Hung 2017; Licorish et al. 2018), qualitative data analysis showed that *Kahoot!* increased students' opportunities for interaction with peers and instructors and facilitated students' deep engagement with content materials. All of the participants (N=10) reported that *Kahoot!* encouraged active class engagement, and 7 students mentioned that *Kahoot!* improved their collaborative skills.

I enjoyed collaborating with my classmates to answer questions. (Student 10)

I was more involved and active in class. (Student 8)

These comments show elements of collaborative and active learning, which ties well with Dakka's (2015) study who found similar conclusions. Moreover, students reported that both class participation and discussion with peers 'kept them on task'. These findings appear to show that students appreciated the peer learning facilitated by *Kahoot!*. In addition, data analysis revealed that the gamification elements embedded in *Kahoot!* have been found to maximize students social, cognitive and collaborative learning experience which is in accordance with Vygotsky's social development theory and was also reported by Gee (2005), Kaya (2015), and Gebbels (2018). Furthermore, a number of students suggested that *Kahoot!* was particularly helpful in changing the dynamic of the lesson, as they seemed to feel that they were part of the discussion rather than passive learners. Consistent with Awedh et al. (2014) study with Saudi undergraduate students, Emirati students also confirmed that *Kahoot!* increased their collaboration and involvement in the lesson, which seems to translate into increased motivation, seamless engagement and enhanced classroom dynamics.

I feel that Kahoot! increased classroom interaction. I am talking to students to ask for clarifications.
(Student 2)

Kahoot! gave me a chance to be active and participate in class. I usually sit at the back and don't share my ideas, but now I discuss the correct answers with my teacher. (Student 3)

When I play Kahoot! I start interacting with more girls. (Student 4)

Another key point that emerged from the data was the role of anonymity in increasing student's participation. While the anonymity of participation is often seen as a negative aspect of GSRS (Nielsen, Hansen & Stav 2013), allowing students to use nicknames seem to encourage wider participation. During the interviews, some students expressed that they feel more comfortable to use nicknames while playing because they were worried about choosing the wrong answers. In addition, at least 6 students preferred to use nicknames because they thought it was 'cool' and 'entertaining', while 2 others confirmed that they use nicknames only if they were not prepared for the quiz. This is probably because anonymity in digital games provides a safe environment where students can participate without the fear of embarrassment if they get wrong answers. These findings are consistent with previous research by Plump and LaRosa (2017) and Licorish et al. (2018), who found that maintaining students' anonymity is critical to facilitate engagement among students.

My nickname is 'Tamy'. Everybody asks who is Tamy if I get a good rank. (Student 3)

Some students like to use funny names which I think is amusing. It help us get to know each other more.
(Student 5)

Notably, 6 students indicated a significant interest to identify themselves if they get high scores on the leaderboard. In fact, it makes them feel proud and gives them an opportunity to show-off their status and celebrate their efforts.

I like to use my name because I want everyone to know I am a good student. (Student 4)

Additionally, students appreciated the competition they experienced while participating in *Kahoot!* including the use of points, leaderboard, time pressure, status, suspense music and ranks, which appears to sustain their engagement.

I like to see my name among the top five players. It makes me feel special. (Student 8)

Also, it seems that *Kahoot!* was perceived as an icebreaker for many students, encouraging them to interact more with classmates. Overall, participants' feedback suggested a general satisfaction of the gamified platform in terms of interactivity, user engagement, improving participation and collaboration with peers.

I think Kahoot! makes us more interested and enthusiastic in class. It give us a chance to discuss the correct and wrong answers as a group. (Student 6)

4.1.3 Motivation and competition

Subthemes: competition, desire to win, enthusiasm

The second identified theme is motivation, which is related to students' attitude, desire, interest, curiosity and the efforts that they show while participating in *Kahoot!*. Research indicates that GSRS, such as *Kahoot!* is an effective way to foster positive attitudes and support student motivation to learn (Papastergiou 2009; Kapp 2012; Wang 2015; Grinias 2017; Nicolaidou 2018). Qualitative data analysis showed that all of the students (N=10) believed that *Kahoot!* brought friendly competition to the classroom which enhanced their motivation. These findings seem to suggest that *Kahoot!* is intrinsically motivating because it satisfies students' desire for challenge, curiosity, and fantasy, which is consistent with Malone's (1981) intrinsic motivation theory who declares that motivating tasks are often associated with fun and enjoyable activities that students would want to perform on their own. In fact, Gee (2005) sustains this view and contends that to a certain degree, temporary experiences of frustration targets students' needs for challenge and may enhance enjoyability. These findings have also been recently confirmed by Cameron and Bizo (2019) found that gamified platforms engage students in their learning. Furthermore, a student remarked that getting a high score and the ranking made the quiz more exciting, while another student emphasized that it was important for her to put more effort and study the vocabulary to win the game. These effects of enhanced motivation and students 'desire to win' are also reflected in Iaremnko (2017) research findings with Ukrainian students who found that undergraduate students' intrinsic motivation was driven by competition.

Playing against other students motivates me to work harder to win. (Student 3)

It is exciting and motivating to see my name suddenly excelling in the leaderboard. (Student 4)

I review vocabulary items in order to do well during the quiz. (Student 6)

In analyzing the interview data, 8 out of 10 students also pointed out that seeing their names on the leaderboard had a positive effect on their self-esteem. A number of students conveyed that they

are likely to attend English classes knowing that *Kahoot!* is used. Perhaps students showed more interest in English class due to the integration of digital games. Over 6 students highlighted that they were more positive about the subject because they enjoyed the variation that *Kahoot!* brought to the lesson.

> *I am more interested in English classes especially when I get high scores in Kahoot!.* (Student 2)

As previously mentioned, students thought that 8 am classes are tiring, and that using *Kahoot!* sustained their attention and kept them awake. Throughout the interview, students made positive remarks about *Kahoot!* and repeatedly mentioned that it boosted enthusiasm. 9 students agreed that they concentrated more when they were competing against other students, while others confirmed that they studied before class with the goal of winning. These findings emphasize the importance of competition and recognition factors in enhancing students' intrinsic motivation in technology-supported learning environments. This result supports previously documented positive effects of GSRS on motivation and engagement (Wang 2015; Barrio et al. 2016; Iaremnko 2017; Grinias 2017; Biçen & Kocakoyun 2018; Göksün & Gürsoy 2019). Malone's (1981) intrinsically motivating instructions theory can also be used to explain this finding. According to Malone (1981), intense excitement motivated by competition and control are key factors in sustaining intrinsic motivation. Perhaps the satisfaction of these needs foster interest in the lesson which leads to higher quality engagement and learning.

4.1.4 Learning and knowledge retention

Subthemes: revision, feedback, understanding of material, peer learning, assessment, vocabulary acquisition

In terms of the learning variable, qualitative analysis showed that students perceived *Kahoot!* to improve their learning performance. 5 out of 10 students thought that this platform had a positive impact on their achievement, and around 7 students said that *Kahoot!* quizzes helped them to review for the final assessment.

> *I think Kahoot! help us to revise for the exam. My grades improved because I remember the correct answers.* (Student 2)

It help me study for the exam. (Student 3)

Students feedback indicated that when they participated in more *Kahoot!*s, there was a noticeable improvement in their vocabulary repertoire. Furthermore, students stated that *Kahoot!* supported learning and helped them to remember previous information and aid comprehension of the subject. These findings are in accordance with findings reported by Wolff (2015), Taylor and Reynolds (2018) and Dickinson (2019), who demonstrated that students' in EFL contexts can benefit from GSRS to enhance their vocabulary development. By using GSRS for revision, it was anticipated that students' learning experience and vocabulary acquisition are improved.

Kahoot! improved my vocabulary knowledge. I was more prepared for taking the weekly quiz after playing Kahoot!. (Student 6)

Students also emphasized two learning outcomes, knowledge retention and identifying learning difficulties. Several students described *Kahoot!* as a useful tool to reinforce their knowledge, and 8 students thought that *Kahoot!* helped them to identify their mistakes and learn the correct answers.

We had the chance to correct our mistakes and learn from each other. (Student 7)

I remember the words which I got wrong. (Student 5)

Kahoot! results helped me see that I am not the only student that doesn't understand. (Student 9)

It appears that *Kahoot!* is likely to enhance students' conceptual understanding due to the use of visuals, graphics, and instant feedback. The findings of this study show that *Kahoot!* is a great tool to revise for the exam and engage students in active learning. Similar results were reported by Al-Hadithy and Ali (2018) who found that there was a significant increase in active learning, student's self-directed learning and a general improvement in summative assessment outcomes with the use of *Kahoot!*. Furthermore, students found the timely feedback very helpful in providing immediate results about their progress. Some students indicated that *Kahoot!* sessions provided learning guidance and opportunities for self-assessment. Similar findings have been widely reported in other studies (Ismail & Mohammad 2017; Merdina & Hurtado 2017; Sprague 2019).

I find it helpful when the teacher discusses the wrong answers to Kahoot! questions. (Student 8)

I think playing Kahoot! has allowed me to reinforce my understanding of new vocabulary. (Student 10)

I find the immediate feedback from my instructor very helpful. It allowed me to discuss my mistakes with my classmates (Student 1)

In particular, the impact on achievement was seen as a distinctive benefit of *Kahoot!* by many students. Several students noted that using *Kahoot!* quizzes helped them prepare for examinations; thus, their studying was more focused. These outcomes are similar to the findings of Nicolaidou (2018), who found a correlation between students' performance in GSRS and their academic performance. This result also confirms earlier findings by Balta et al. (2018), who found that students' exam results in Physics improved while using GSRS. Likewise, Sprague (2019) qualitative analysis of university students' essays revealed similar results.

Interestingly, only 2 students said that they did not think *Kahoot!* helped them to improve their final exam scores, which is consistent with Barrio et al. (2016) findings. Their study showed that no significant improvement in learning performance was noted with the use of a gamified SRS.

I don't think playing games help me pass the final exam. (Student 5)

I use Kahoot! to revise, but it didn't help to pass the exam. (Student 9)

4.1.5   Fun and enjoyment

Subthemes: positive classroom atmosphere

Among the variables, intrinsic motivation of fun and enjoyment prevails as one of the most experienced by Emirati undergraduate students using *Kahoot!*. Qualitative data analysis showed that all of the students agreed that the element of fun that is found in GSRS contribute to a more positive classroom experience. Students also perceived *Kahoot!* quizzes as 'satisfying' and 'rewarding'. Students suggested that *Kahoot!* may 'decrease boredom', make class time 'more fun' and reduce distraction caused by mobile phones.

The class is more fun with Kahoot!. (Student 2)

There is a lot of positive energy in class when we participate in Kahoot!. (Student 7)

The competitive environment was fun. (Student 4)

These comments seem to provide evidence that *Kahoot!* contribute to a more enjoyable learning experience. Students also found *Kahoot!* to be user-friendly as one student commented that it was 'quick' and 'easy to use'. Furthermore, students prominently acknowledged that they preferred instructions with a gamified SRS compared to more traditional academic instruction. Based on students' feedback, leaderboards offered them a chance to be recognized that may have been impossible using traditional classroom settings. Additionally, around 8 students expressed that the ranking obtained while playing *Kahoot!* added an element of joy and gave them an opportunity to 'take pride' in their accomplishments, which boosted their self-esteem. Several students even mentioned that they liked to share their progress on social media to celebrate their success.

I post a picture of my rank on snapchat for my family and friends to see. (Student 8)

A common opinion from students' feedback was that using gamified platforms reduces boredom. During the semi-structured interviews, many students mentioned that the integration of GSRS was found to vary the classroom routine.

Using Kahoot! was nice change, I loved it. (Student 9)

Some students expressed that classes were particularly interesting with the use of GSRS, while a number of students described the English class as 'fun' and 'exciting'. The enjoyment and fun themes found here for Emirati students have also been found by Benhadj et al. (2019) in their study with Moroccan students. These positive perceptions are also in accordance with the results of (Wang & Lieberoth 2016; Plump & LaRosa 2017; Licorish et al. 2018) that showed university students found the implementation of *Kahoot!* to be beneficial and enjoyable.

I think Kahoot! brings positive energy to the classroom. (Student 1)

It was great to participate in Kahoot! because it brought fun and entertainment to the class. (Student 2)

I feel very proud, especially when I am among the top five players. (Student 3)

4.2 Quantitative phase findings and analysis

RQ2: Which variables identified in the interviews are experienced by the majority of undergraduate students using *Kahoot!* in this context?

The goal of RQ2 was to validate the findings obtained from the qualitative component of the study to check if all Emirati undergraduate students in Foundations have the same experience. The results of this survey were gathered using Google Forms. The participants were 112 undergraduate students from the English Foundation program (female N = 102; male N = 10) with a gender distribution of 91.1% female and 8.9% male students. Themes from the qualitative phase were used to develop the survey instrument for the second quantitative phase. 16 items using a 5-point Likert-scale were grouped into five categories and all statements required a response of (strongly agree 5, disagree 4, not sure 3, agree 2 or strongly disagree 1). The descriptive statistics and analysis of the survey are summarized in Table 4.

Table 4. Descriptive statistics of participants responses

			Strongly agree 5	Agree 4	Not sure 3	Disagree 2	Strongly disagree 1
	Interaction and engagement						
1	I don't feel like interacting with the material when I use Kahoot.	لا أشعر بالتفاعل مع المادة عند إستخدام لعبة كاهوت.	45%	5.4%	8%	6.3%	36%
2	I feel that Kahoot makes the class more interactive and lively.	أشعر أن لعبة كاهوت تجعل الصف أكثر تفاعلية و حيوية.	59%	11%	2%	6%	22%
3	I was engaged and enthusiastic while playing Kahoot.	كنت متفاعلة و أجاوب بحماس أثناء اللعبة.	52%	14%	10%	6%	19%
	Attention and focus						
4	I focus more during Kahoot to get a good ranking.	أركز أكثر خلال لعبة كاهوت لأحصل على مرتبة جيدة.	58%	17%	8%	5%	13%
5	Kahoot helps me focus.	لعبة كاهوت تساعدني على التركيز.	55%	15%	11%	6%	13%
6	I feel distracted while playing.	أشعر بالتشتت وعدم الانتباه عند اللعب.	43%	12%	13%	10%	23%
	Motivation and competition						
7	The fact that I can use a nickname makes me willing to participate more in Kahoot.	حقيقة أنة يمكنني المشاركة باسم مستعار ، تجعلني على استعداد للمشاركة في اللعب بشكل أكبر.	30%	12%	24%	11%	23%
8	It was important for me to play well during the game.	كان من المهم بالنسبة لي أن العب بشكل جيد.	52%	16%	17%	5%	11%
9	I don't try to win the game.	لا أحاول الفوز في اللعبة.	49%	11%	12%	11%	18%
10	It was fun to compete against other students.	كان من الممتع التنافس مع الطلاب الاخرين.	62%	8%	13%	4%	13%
	Learning and knowledge retention						
11	Playing in Kahoot helped me learn vocabulary and words.	ساعدني اللعب في كاهوت على تعلم المفردات و الكلمات.	66%	10%	9%	4%	12%
12	I often explain the correct answer to my classmates.	غالبا ما أقوم بشرح الإجابة الصحيحة لزملائي.	30%	16%	29%	13%	13%
13	I think that Kahoot does not lead to a better learning experience.	أعتقد أن كاهوت لايؤدي إلى تجربة تعليمية أفضل.	51%	11%	8%	11%	20%
	Fun and Enjoyment						
14	It is fun to play Kahoot.	أشعر بالمتعة عندما ألعب كاهوت.	63%	11%	10%	5%	12%
15	I think the Kahoot game is boring.	أعتقد أن لعبة كاهوت مملة.	52%	10%	11%	7%	21%
16	I feel proud and happy when I see my name in the advanced rank on the leaderboard.	أشعر بالفخر والسعادة عندما أرى اسمي في المرتبه المتقدمة على الشاشة.	67%	9%	10%	4%	11%

(N=112)

45

4.2.1 Interaction and engagement

Items 1 - 3 are related to the interaction and engagement variables (Table 4). According to students' self-reported data, it appears that many students appreciated the interaction and engagement offered by *Kahoot!*. Over half of those surveyed strongly agreed that '*Kahoot! makes the class more interactive and lively*' (Figure 5). In addition, more than half of the sample (52%) strongly agreed that they were '*engaged and enthusiastic while playing Kahoot!*'. These results indicate that students perceive *Kahoot!* as a useful tool to enhance engagement through stimulating discussions with peers, which has been previously verified by Wang's (2015) quasi-experimental study who found that *Kahoot!* increase students' in-class activity. Plump and LaRosa (2017) surveys with university students also found similar conclusions.
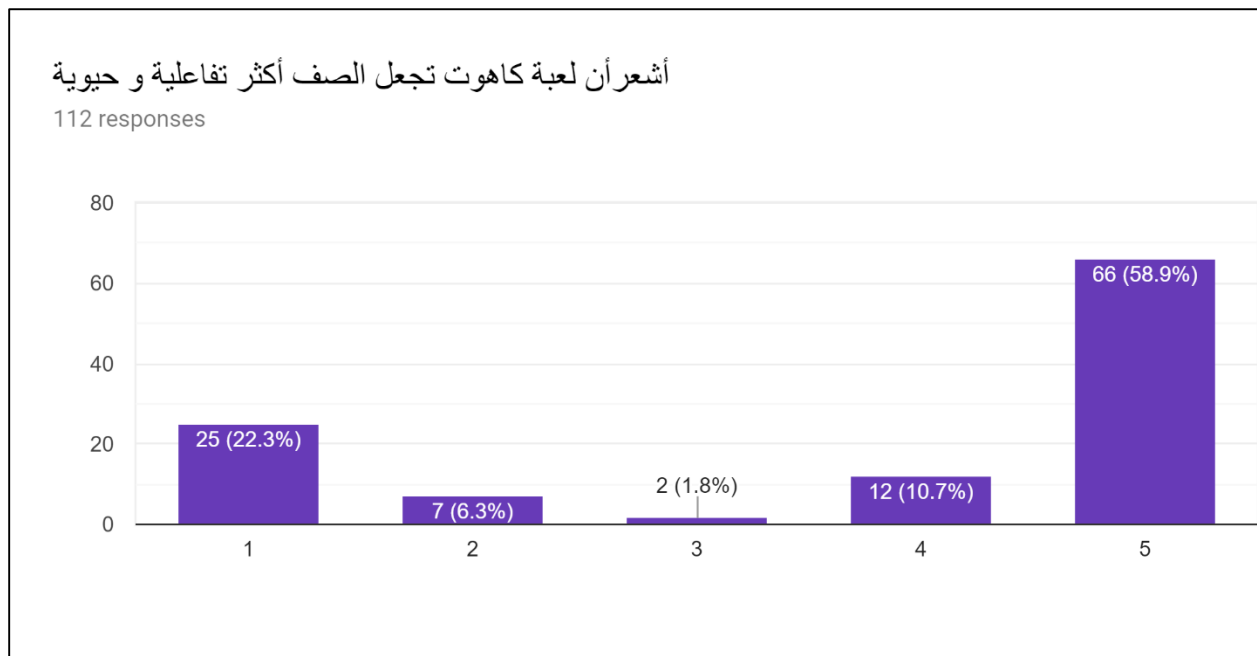

Figure 5 Item number 2 I feel that Kahoot! makes the class more interactive and lively.

4.2.2 Attention and focus

Items 4 – 6 are related to the effectiveness of *Kahoot!* in sustaining students' attention and focus during the session (Table 4). The vast majority of students reported that they '*focus more during*

Kahoot! to get a good ranking'. On the statement directly related to attention and focus (item 5), nearly half of the respondents (55%) strongly agreed that '*Kahoot! helps them focus and concentrate during class*', while a few students were indecisive (Figure 6). These findings suggest that students experience intense concentration when *Kahoot!* is used which are broadly in line with Wang and Liberoth's (2016) experiments who found improved retention period and concentration with the use of points, music and sounds in GSRS.
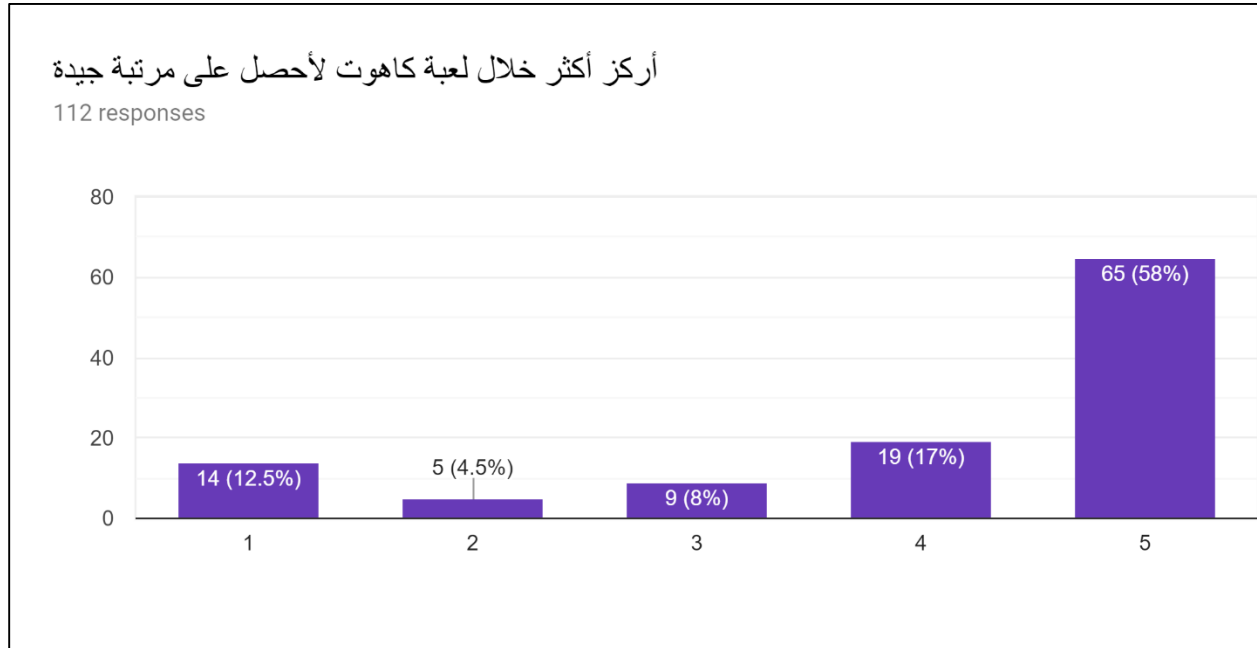
أركز أكثر خلال لعبة كاهوت لأحصل على مرتبة جيدة

112 responses

Figure 6 Item number 5 I focus more during Kahoot! to get a good ranking.

4.2.3   Motivation and competition

Items 7- 10 are related to motivation and competition variables as shown in the descriptive statistics (Table 4). It seems that undergraduate students in the UAE perceive *Kahoot!* as highly beneficial in sustaining their intrinsic motivation. In addition, the competitive element motivated by class ranking found in *Kahoot!* received the highest percentage of satisfaction of all statements in this category as 62% strongly agreed that '*It was fun to compete against other students'*. Remarkably, only 13% disagreed and about the same percent were neutral which shows that the motivating factor of competition is not important for all students as has been previously documented in the literature (Ryan & Deci 2000; Tauer & Harackiewicz 2004). This result means

that the majority of Emirati undergraduate students perceive that *Kahoot!* increases their engagement and involvement when implemented in class due to the competitive factor found in *Kahoot!*. With respect to anonymity found in GSRS, surprisingly students were divided about the role of anonymity in increasing their participation. Only 30% strongly agreed that using nicknames makes them willing to participate more in *Kahoot!*, while about 24% did not really care about the anonymity feature in *Kahoot!* (Figure 7). This can be explained by the fact that being recognized in the leaderboard is very important for students and provides a source of motivation (Domínguez et al., 2013). These results are also in alignment with Malone and Lepper (1987), who argue that students experience extreme intrinsic motivation when their achievements are acknowledged in the leaderboards through status, ranks, and scores. Approximately half of those surveyed felt strongly about the importance to '*play well*' during the game. Interestingly, winning and reaching the top of the scoreboard emerged strongly in the online survey with nearly 49% of students indicating that to a larger degree, students try to work hard to win the game. These results relate to Iaremenko (2017) and Grinias (2017) findings, who state that the 'desire to win' and 'competing against other students' seem to encourage intrinsic motivation.
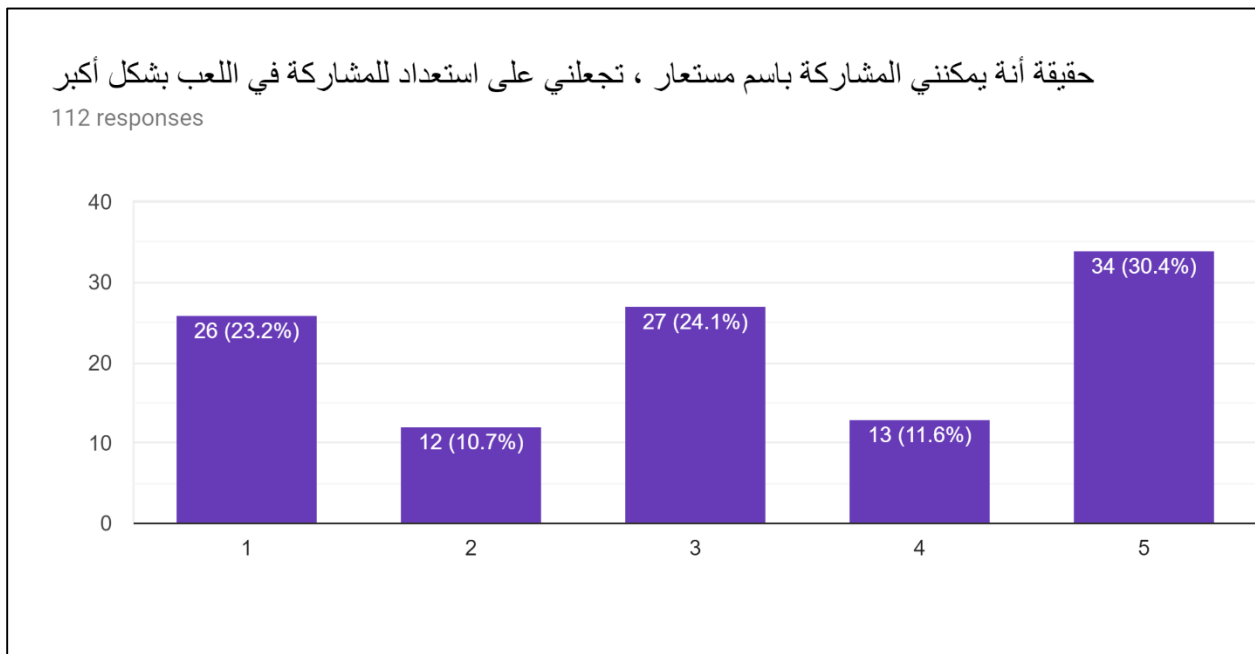

حقيقة أنة يمكنني المشاركة باسم مستعار ، تجعلني على استعداد للمشاركة في اللعب بشكل أكبر

112 responses

Figure 7 Item number 7 The fact that I use a nickname makes me willing to participate more in Kahoot.

4.2.4 Learning and knowledge retention

Items 11- 13 are related to perceived learning and the value of *Kahoot!* in supporting students' understanding of the subject (Table 4). The results show that over 66% of the sample believed that participating in *Kahoot!* sessions '*helped them to learn vocabulary and new words*' (Figure 8). This result is consistent with Mork (2014), Wolff (2016) and Medina and Hurtado (2017) findings, who confirmed that students in EFL context could benefit from GSRS to improve their vocabulary. It was also noticed that students believed that using *Kahoot!* as part of teaching and learning can positively influence their knowledge retention, a finding that was reached by numerous studies (Dervan 2014; Dakka 2015; Balta et al. 2018; Tóth, Lógó & Lógó 2019). Nevertheless, items 12 and 13 received inconsistent results which shows that GSRS such as *Kahoot!* may facilitate conceptual understanding and peer learning for some students, but not for all. Therefore, it could be suggested that *Kahoot!* may mediate learning to some extent, but several students appear to be skeptical of its usefulness to improve their academic achievement. These findings have also been reflected by (Coca & Slisko 2013; Barrio et al. 2016; Wang, Zhu & Sætre 2016) who report that results on the effectiveness of GSRS are mixed, showing no measurable learning differences.
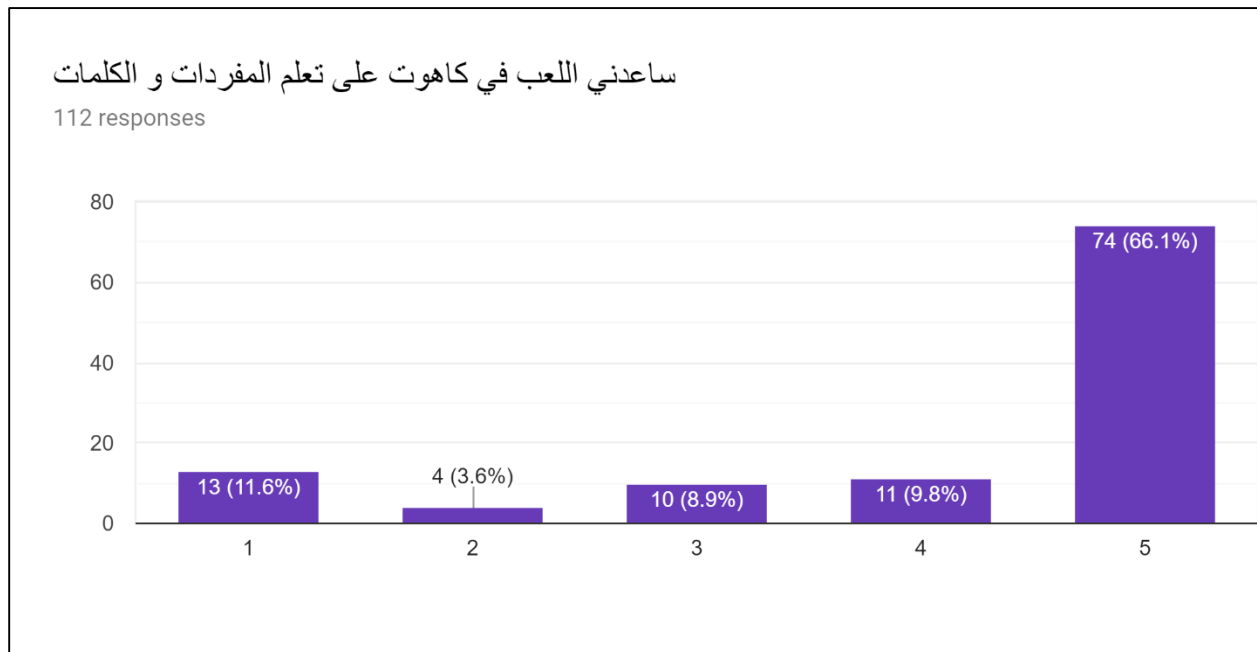

Figure 8 Item number 11 Playing in Kahoot helped me learn vocabulary and words.

4.2.5 Fun and enjoyment

Items 14 - 16 are related to the fun and enjoyment variables experienced by students (Table 4). There was a general consensus that *Kahoot!* created a positive learning experience as reflected by the survey analysis. The majority of students supported that it was fun and entertaining to participate in *Kahoot!* sessions. Significantly, statement number 16 received the highest percentage of all 16 items as more than 67% of students strongly agreed that they '*feel proud and happy*' when their names are recognized in the advanced rank on the leaderboard (Figure 9). It seems that the gamification features in *Kahoot!* promoted fun learning as students enjoyed comparing their progress with that of their peers. This finding also relates back to students need for success (Ryan and Deci 2000), as they like to see their efforts acknowledged and celebrate their achievements. Studies evaluating the use of *Kahoot!* in higher education appeared to support these findings (Wang 2015; Biçen & Kocakoyun 2018; Ismail et al. 2019).
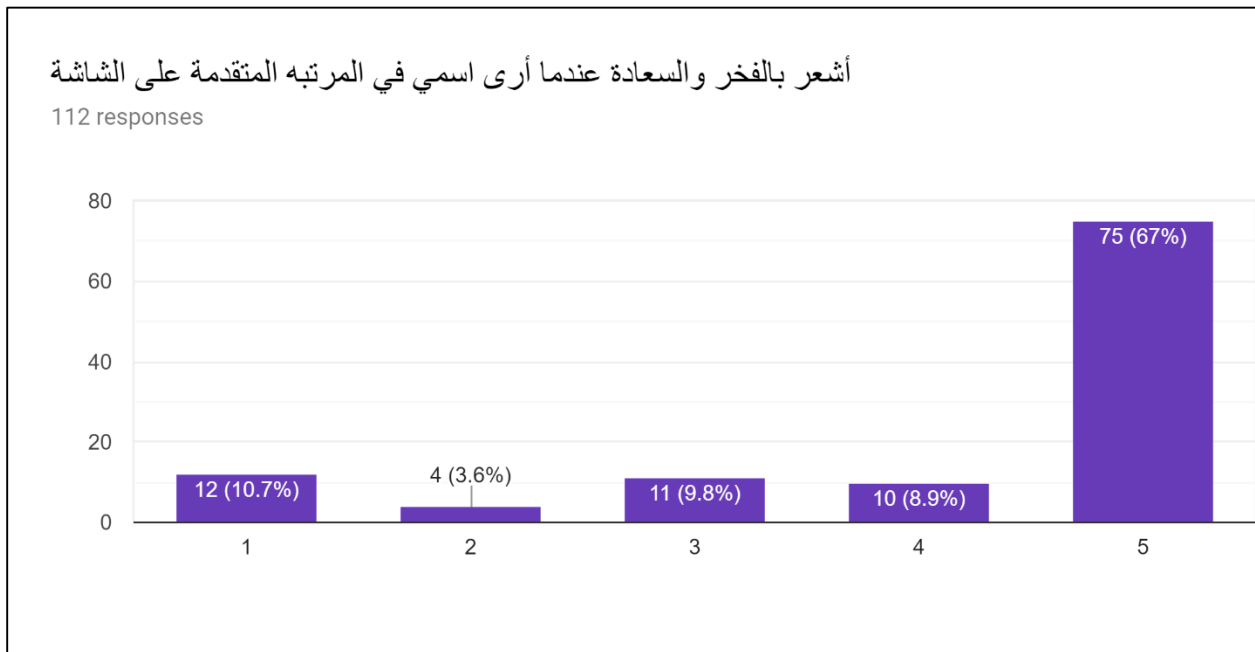

أشعر بالفخر والسعادة عندما أرى اسمي في المرتبه المتقدمة على الشاشة

112 responses

Figure 9 Item number 16 I feel proud to and happy when I see my name in the advanced rank on the screen.

4.3   Mixed methods findings

RQ3: Do the quantitative data from the online survey validate the results from the initial qualitative interviews?

Evidence from both the qualitative and quantitative phases suggest a general acceptance of *Kahoot!* among Emirati undergraduate students, which is very much in line with findings from other published research (Wang 2015; Barrio et al. 2016; Licorish et al. 2018; Cameron & Bizo 2019). An overview of qualitative data analysis revealed that *Kahoot!* seemed to attract students' attention and improve concentration. These results from the interviews have been confirmed by the quantitative survey as more than 58% of students indicated that *Kahoot!* maintained their attention during the lesson. These results accord with the findings of Caldwell (2007) and Gebbels (2018), who report that GSRS improved attention and stimulated students' cognitive skills (Vygotsky 1978), including higher order thinking.

The most common variables from both phases of the study emerged from the impact of *Kahoot!* on motivation, engagement, competition and enjoyment. The findings of the qualitative phase showed that the majority of the participants found *Kahoot!* 'interesting' 'exciting' and 'fun', which makes the lesson 'more enjoyable' and 'bring positive energy' to the classroom. The quantitative results from the online survey confirmed these results with 62% of the sample supporting this finding and around 67% reflecting that using *Kahoot!* was enjoyable. Emirati students experience with *Kahoot!* compares favorably with Benhadj et al. (2019) study who found that Moroccan students had overwhelmingly positive feedback about their gamified *Kahoot!* learning experience in terms of increased motivation, improved classroom engagement, and enhanced classroom dynamics. Another interesting finding refers to students' 'need for success' and 'desire to win', as almost all of the students who participated in the interview declared that they were trying to win. However, the quantitative analysis shows that not every student tried to win.

The findings from the qualitative phase also showed that *Kahoot!* seemed to remove barriers to communication. Students who used *Kahoot!* self-reported an increase in their interaction and discussion with peers and instructors. This aligns with the quantitative findings as 59% of students who were surveyed strongly agreed that *Kahoot!* increases classroom participation and 30% either strongly agreed or disagreed that they often explain the correct answers to their classmates.

Moreover, key benefits that students discussed in the interview were how *Kahoot!* quizzes aided revision and helped them to retain previously learned information. The results from this study expands on Al-Hadithy and Ali (2018) research findings, who report that university students in the UAE perceived *Kahoot!* as a useful tool to facilitate active learning which makes learning more enjoyable as compared to traditional instruction.

Improvement in vocabulary knowledge was first reported in the interviews, and was further verified in the survey, as 66% thought that *Kahoot!* aided vocabulary acquisition. However, based on mixed results in both the qualitative and quantitative data analysis, it seems that not many students agree that GSRS improve their achievement in exams. These results were even lower in the survey with only 8% of students indicating that they are not sure whether *Kahoot!* leads to a better learning experience, while the remaining 11% either agreed or disagreed. However, in line with Coca and Slisko (2013), Dakka (2015), Barrio et al. (2016) and Göksün and Gürsoy (2019) research findings, it can be concluded that results on learning outcomes were mixed, showing either positive or no improvement in students' exam scores.

Chapter summary

This chapter presented a discussion of the main findings from this mixed-methods research. Data analysis suggested that the integration of GSRS (*Kahoot!*) in the higher education classroom have the potential to sustain students' attention, improve classroom engagement, increase motivation, and create a pleasant learning experience. Emirati students highly perceived *Kahoot!* as fun, entertaining and exciting platform. Competition motivated by class ranking and the 'desire to win' emerged as strong variables which contributed to students' intrinsic motivation and acceptance of *Kahoot!*. Nevertheless, in line with previous literature and based on inconsistent results from the data analysis, undergraduate students had mixed views in terms of learning gains showing uncertainty of the benefit of *Kahoot!* to improve their academic achievement. The next chapter presents a summary of the study, the limitations and directions for further research.

5   Chapter Five: Conclusions and Recommendations

This chapter provides a summary of the research and important conclusions drawn from the main findings. This chapter also presents the limitations of the study, a discussion of the theoretical and practical implications for action, and recommendations for further research.

5.1   Summary of the research

This exploratory (QUAL → quan) study aimed to examine undergraduate student perceptions of *Kahoot!*, a game-based student response system in an English language course at a federal higher education institution in the UAE. The following questions guided the study:

- **RQ1:** What are Emirati students' perceptions on the use of *Kahoot!* in English classes?
- **RQ2:** Which variables identified in the interviews (e.g. engagement, motivation, and learning) are experienced by the majority of undergraduate students using Kahoot! in this context?
- **RQ3:** Do the quantitative data from the online survey validate the results from the initial qualitative interviews?

Based on mixed-methods analysis, qualitative semi-structured interviews were conducted with 10 participants to understand their experiences and perceptions of *Kahoot!*. Interview responses were coded descriptively and thematically which were used to inform the development of the survey. The survey was then administrated with 112 participants to identify which variables discussed in the interviews were experienced by the majority of undergraduate students using *Kahoot!* in the English program. To a larger extent, the quantitative results validated the initial qualitative findings by providing a further understanding of all the variables experienced by the majority of undergraduate students using *Kahoot!* within the higher education context in the UAE.

5.2   Key findings

The findings from this study revealed that Emirati undergraduate students reported positive perceptions on the use of *Kahoot!* for teaching and learning, with the highest influence reported

on increased motivation, enhanced engagement, and improved learning experience. In addition, promoting fun learning was shown as noteworthy in facilitating students' positive experiences of *Kahoot!*. Competition motivated by the desire to win was an unexpected theme that describe the feeling of excitement brought by ranking, status, and recognition which contributed to students' intrinsic motivation. Moreover, it appears that *Kahoot!* was not the best tool to improve academic performance as perceived by students. The findings from this study builds on prior research of Wang and Lieberoth (2016) and Barrio et al. (2016), who found *Kahoot!* to be a valuable tool for revision and vocabulary retention, but not necessarily to improve exam scores.

5.3   Implications for action

Based on the key findings, several courses of action for academics and instructors are suggested. The first implication of this study is that interactive platforms supported by GSRS could be integrated as part of the teaching pedagogy to increase students' focus, reduce boredom, and lower distraction caused by mobile phones. Previous research suggest that the amount of time college students spend using their mobile phone is increasing (Bruff 2009), therefore it is important to consider integrating these devices to promote active learning. The evidence from this study suggests that instructors in higher education could benefit from the availability of mobile phones to increase students' participation and engagement using these technologies. Furthermore, this study has provided evidence that *Kahoot!* facilitate interaction among peers and instructors. An implication of this suggests that GSRS platforms have the potential to improve classroom dynamics. It was found that anonymity increased students' willingness to participate, therefore it is recommended to integrate more GSRS platforms to create a comfortable environment for students.

Considering the popularity of game-based learning across higher education, pedagogical consideration should be made to address students learning needs and develop appropriate teaching methods for college students. The findings of this study also have implications for how *Kahoot!,* and other similar GSRS can be successfully integrated into classroom instructions for formative assessment and providing feedback. Also, the present study can inform practices that may help to improve English teaching in higher education classrooms in terms of improving vocabulary

knowledge. Instructors in higher education may find the results of this study helpful as it provides additional evidence that students learn better when there are opportunities for scaffolding and interaction with peers. Instructors are therefore encouraged to adapt *Kahoot!* as a tool to stimulate discussions and facilities understanding.

5.4   Limitations

While this study has significant contributions, the findings are subject to a number of limitations that may potentially affect the validity and generalizability of the study. The first limitation relates to the sample as all of the participants in the semi-structured interviews were females and thus, the results may generalize within a similar gender. Interviewing male students could have provided different ideas and interests which may lead to better understanding of students' experiences of GSRS. Another limitation is that all of the data are based on students' self-reported feedback of their own perceived learning without any measures of assessment records. Therefore, conclusions on the usefulness of *Kahoot!* to improve learning performance needs further investigation as perceptions may vary from the real achievement of actual learning outcomes. Future research could track students' scores, attendance records and how many times students' have repeated the course to correlate these with the findings.

Furthermore, another limitation was the clarity of some items in the survey, which brings the possibility of obtaining different understandings of the statements by different respondents. For example, words like 'motivation' and 'engagement' are very broad when translated into Arabic. Therefore, future research could have two rounds of piloting with a wider sample to ensure the questions are comprehensive. Despite these limitations, the current study has presented an original contribution to existing research on GSRS by presenting a thorough analysis that focus on undergraduate students' insight in a large academic setting in the UAE.

5.5   Recommendations for further research

Although the findings from this study are consistent with previous research findings (Wang 2015; Plump & LaRosa 2017), longer experiments with larger samples need to be conducted to further

investigate the effectiveness of *Kahoot!* for teaching and learning. The current study has examined data collected during the last semester of the course when students were preparing for the final exams, and they were anxious as it was their last chance before dismissal. Therefore, longitudinal studies with data collected at different times during the semester will certainly add further understanding to how students' perceive *Kahoot!,* especially in terms of motivation and academic achievement. Future studies are therefore recommended to examine the efficacy of *Kahoot!* in enhancing student learning outcomes using exam scores that may clarify the extent to which GSRS contributes to improved learning, which will result in more trustworthy findings. Moreover, in this study instructors, perspectives were not considered when assessing *Kahoot!*. A research that considers instructors' opinions may enhance the results of this study.

5.6 Concluding remarks

Despite the large number of research on the integration of GSRS in higher education, a considerable amount of previous research that has examined students' perceptions used experimental methods dominated by simple Likert-scale surveys. In addition, an overview of previous studies revealed that there is a lack of research on students' perceived value of GSRS across universities in the Middle East (Awedh et al. 2014; Solmaz & Çetin 2017; Al-Hadithy & Ali 2018; Benhadj et al. 2019; Göksün & Gürsoy 2019). In an attempt to address this gap, the present study examined how Emirati undergraduate students perceived Kahoot!, a student response system in an English language course at a college in the UAE using mixed-methods analysis. This study contributes to existing knowledge by providing the first empirical analysis that focuses on undergraduate students' perceived value of GSRS in the UAE context. The response to using *Kahoot!* for teaching and learning from both the qualitative and quantitative analysis appears to be largely positive with the majority of students indicating the benefits of *Kahoot!* in several areas related to their learning. In particular, these findings show that there is room for improvement in the area of learning, while the results in the areas of motivation, competition, fun and enjoyment are particularly supportive of the benefits of *Kahoot!*. Meanwhile, the results of this study are preliminary, therefore more in-depth analysis will allow further understanding of these areas. This study concludes that GSRS can indeed support learning and teaching which may change the nature

of university teaching. The present study has shown that digital games to be highly effective and highlighted promising new directions for future research.

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7 Appendices

Appendix A: Interview guide

Date of interview:

Student number:

<u>Opening questions</u>

How was your day?

What class do you have now?

<u>Guiding questions</u>

- Did you use *Kahoot!* to study English?

- How would you describe your experience using *Kahoot!* during English class?

- How do your feel when you play *Kahoot!*? (Excited, engaged, bored, nervous, enthusiastic..etc).

- Is there anything you like or dislike about *Kahoot!*?. Explain.

- Why do you think using *Kahoot!* is useful for vocabulary learning?

- What do you like best about *Kahoot!* for learning? What makes *Kahoot!* fun?

- What features do you like in *Kahoot!*? (Music, graphics, points, competition, leaderboards, anonymity…etc).

- How did playing *Kahoot!* affect your learning and knowledge?

- If you could change one thing about *Kahoot!* what would it be and why?

Appendix B

Consent form for interview: Students' perceptions of *Kahoot!*

Please read the information sheet. If you are happy to participate in the interview then please tick the boxes to confirm that you read and agree to participate and sign the form.

- ☐ I understand that my participation is voluntary and that I am free to withdraw at any time or refuse to answer any question without any negative consequences.
- ☐ I understand that all the information I provide will be treated confidential and my name will remain anonymous in reporting the results of this study.
- ☐ I understand that my data will be kept for future research purposes such as publications.
- ☐ I agree to take part in this interview.

_____ _____ _____

Name of participant   Date   Signature