Utilizing Kahoot! in Business Communication: Journey to Improve Formative Assessment, Enhance Student Engagement, and Increase Student Learning Outcomes

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Abstract

This study's primary purpose was to explore the use of Kahoot!, a digital formative assessment application (APP), to integrate technology into an undergraduate Business Communication course. The goal was to enhance student motivation, engagement, collaboration, and critical thinking. Grounded in Holmberg's Theory of Interaction, this quantitative case study involved 701 students across four course sections. After six weeks of using Kahoot!, pre- and post-survey results indicated increased student motivation to read ahead, active participation in discussions, collaboration, and competition. Students also demonstrated improved performance on summative assessments and showed growth in critical thinking, problem-solving, and divergent thinking skills. The study concludes with implications for teaching, emphasizing the benefits of using gamification tools to foster an interactive and engaging learning environment.

Keywords: Formative Assessment, Gamification, Theory of Interaction, Kahoot!

Formative assessment is an important aspect of everyday teaching. Teachers need feedback to gauge students' learning (Black & William, 2009; Golubeva, 2021; Maliket et al., 2024). Students need feedback to get encouragement regarding their performance in a non-threatening manner (Mao & Lee, 2023). "Formative assessment and formative feedback strategies are very powerful factors for promoting effective learning and instruction in all educational contexts" (Narciss & Zumbach, 2023, pg. 1). Kahoot! is a digital formative assessment tool that can be used to enhance a lesson, by bringing excitement to a lesson, through increased student participation and engagement (Groccia, 2018), as well as provide instant feedback on student performance. Kahoot! "… is a free game-based learning platform that makes it easy to create, share, and play learning games or trivia quizzes in minutes. Unleash the fun in classrooms, offices, and living rooms" (Kahoot!.com, 2022, pg. 1). Kahoot! is versatile and can be used in various aspects of life. Kahoot! utilizes Holmberg's (1983) theoretical concepts of interaction to create a synergistic and collaborative learning environment to integrate technology into a college course, the game-based Kahoot! application (APP) was selected as an accessible, engaging, and fun formative assessment tool (Hattie, 2016; Higgin, 2016; Ismail & Mohammad, 2017; Mao & Lee, 2023).

Historically, formative assessment helps teachers determine how students are progressing toward accomplishing the learning goals during class. The teacher adjusts the teaching-learning process and tracks the learning progress of students, using various strategies such as quick check-ins, questioning, or traditional formative assessments (Golubeva, 2021). In this digital age, having an engaging formative assessment tool is needed to motivate students to learn and be actively involved in the lesson.

According to (Lipp, 2015), in today's undergraduate classroom, Kahoot! can be used successfully as a formative assessment tool. Since 2012, when Kahoot! became available, some teachers and college instructors have researched and utilized this game-based APP in their classes. According to Wang (2015), "When Kahoot! was launched, it distinguished itself from the rest of Software Required Specification (SRS), as it had a strong focus on being a game-based platform, and thus can be classified as a Game-based Student Response System (GSRS)" (pg. 2). Kahoot! was selected for this Business Communication course to improve formative assessments, enhance student engagement, and increase student learning outcomes.

For Kahoot! to be effective as a true gamification APP, time has to be allotted for its use as an effective formative assessment tool (Dicheva et al., 2015; Kim et al., 2018). Using Kahoot! can be time-intensive, and many students like using this gamification tool in their courses because it can be so much fun (Lipp, 2015). Kahoot! bills itself as a "game-based digital learning platform," but all students see is a game (pg. 2). The Kahoot! APP is user-friendly requiring minimal instructor investment (Arherton, 2020). Instructors set up the Kahoot! assessment, and students enter a game PIN displayed on a common screen using their mobile devices (Lipp, 2015), as a group or individually. The class 'plays the game' learning the class content, in an engaging, fun, and competitive environment (Kahoot!.com, 2022).

Literature Review

Teaching Engagement

Getting and keeping the attention of Generation Zs and Millennials continue to present a level of concern for faculty in higher education (Chicioreanu et al., 2018; Goldman & Martin, 2016; Harlick et al., 2015; Maloni et al., 2019; Schwieger et al., 2018). Finding innovative and engaging methods driven by best practices continues to be a viable option, as today's college students are immersed in technology-driven environments, from social media, and mobile applications to interactive games that pique and maintain their attention. Gamification can be a bridge to translate gaming into the education landscape and continues to be a viable option for engaging 21st-Century college students (Alsawaier, 2018, Dicheva et al., 2015). But what is gamification, and why does it present as a viable option to get Gen Zs and Millennials to become more participative in their college classroom?

According to Aparicio et al., (2012), and supported by the research of Kim et al., (2018), gamification is defined as "the use of game design elements in non-gaming contexts [and] can be used as a tool to improve the participation and motivation of people in carrying out diverse tasks and activities that generally could not be too attractive. Its application is not restricted to any specific area and can be used in contexts as diverse as education" (pg. 1). Constructing a classroom environment where students are active participants is critical to learning that is transformative, engaging, and relevant to their prior knowledge and experience. Gamification presents a viable option for Business Communication faculty to construct a classroom environment utilizing gaming principles that have been proven to lead students to increased ". . . satisfaction, motivation, and greater engagement . . ." (Urh et al., 2018, pg. 388). Hence, formative assessments must be designed to elicit student engagement at the highest level.

Formative Assessments

There are multiple formative assessment tools online that are available for use in the classroom. The purpose of formative assessment is to foster students' learning and engagement within the classroom (Black & Wiliam, 2004). The tasks involved in formative assessments give both the teachers and students effective feedback. The purpose of the feedback is to allow the teacher to make decisions regarding student learning outcomes. The literature reviewed elucidates the need for formative assessments to be a primary component of the teacher's assessment toolkit (Black & Wiliam, 2004; Ismail& Mohammad, 2017; Heritage, 2007). Multiple conclusions drawn from formative assessment research are indicated in Table 1.

Table 1: Conclusions obtained from seminal formative assessment (FA) research

Conclusions	Researchers
FA leads to engagement in the lesson	Mao, Z., & Lee, I. (2023) Black, P., & Wiliam, D. (2009) Hattie, J., & Timperley, H. (2007) Tharp, R. G., & Gallimore, R. (1988)
FA produces greater increases in student achievement	Alzina, A. (2016) Yin, Y., Shavelson, R. J., Ayala, C. C., Ruiz-Primo, M. A., Brandon, P. R., Furtak, E. M.,Tomita, M. K., & Young, D. B. (2008) Zahersharifian, Z. (2021)
FA is less expensive than other efforts to boost achievement including reducing class sizes and increasing teachers' content knowledge.	Jepsen, C., & Rivkin, S. (2009) Graue, E., Rauscher, E., & Sherfinski, M. (2009) Harfitt, G. J. (2012) Yeh, S. S. (2009); Yeh, S. S. (2010a) Yeh, S. S. (2010b); Hattie, J. (2009)
FA has a high degree of flexibility because it can occur anytime within and between instructional units as well as within and between lessons	Malik, A., Woodrow, J., & Piech, C. (2024) Ismail**, S. M., Rahul, D. R., & Patra, I. (2022)** Kuo, E., Hull, M. M., Elby, A., & Gupta, A. (2019) Kowalski, F. V., Kowalski, S. E., Colling, T. J., Cuba, J. G., Gardner, T. Q., Greivel, G., ... & Ruskell, T. (2015).
FA has been shown to improve students' achievement over time	Akkaraju, S., Atamturktur, S., Broughton, L., & Frazer, T. (2019) McMillan, J. H., & Hearn, J. (2008) Shute, V. J. (2008)
The use of FA can lead to feelings of greater personal and professional satisfaction	Nicole Panorkou, & Jennifer L. Kobrin. (2017) Park, S., & Lee, H. (2024) Nicol, D. J., & Macfarlane-Dick, D. (2006)

As seen in Table 1, multiple conclusions have been drawn by various researchers in the field. Effective formative assessments generally have key features, including (1) clarifying understanding of what students are expected to know (2) sparking effective classroom discussions, questions, and tasks leading to evidence-based learning, (3) encouraging ownership of learning (4) providing opportunities for students to be a learning resource for each other (Kowalski et al., 2015; Mao & Lee, 2023), and (5) feelings of greater satisfaction.

According to Hattie (2016), formative assessment should not ". . . occur in a vacuum. It needs to follow instructions. Teachers need to listen to the 'hum' of student learning, welcoming quality student talk, structuring classroom discussions, inviting student questions, and openly discussing errors. . ." (pg. 43). Hence, teachers must create a classroom environment that promotes openness, trust, and authentic learning, as well as acceptance of negative feedback regarding expected learning. Hattie (2016) postulates that many times a reteaching of concepts may be the best option if students' feedback reflects a misunderstanding of critical concepts.

Oftentimes, because of tight teaching schedules, concepts may not be retaught, which may lead to students not viewing the formative feedback as valued or important. issues.

The increased prevalence of Kahoot! in college classrooms is predicated on using tools that Gen Z students are familiar with and transferring that comfort and familiarity to college-level content and student-to-student and teacher interaction (Fuchs, 2022; Schultz et al., 2022; Wirani & Nabarian, 2022). Student engagement is the mainstay in higher education, and is often used as a measurement of effective teaching. Engagement is a critical component of the classroom environment because it sets the stage for teacher-to-teacher, teacher-to-student, and student-to-content interaction (Axelson & Flick, 2011). In the quantitative study of Li and Wang (2024), they determined how the students (N = 2874) used new textbook to illustrate student to content interaction. The results of their correlation and regression analyses showed that there was a significant correlation between students' use of textbooks and their interest and attitudes in the content. Thus, promoting when students use or interact with their textbooks, there is increased content interaction.

Conceptual Framework: Theory of Interaction

Kahoot!, the game-based formative assessment tool, lends itself to the constructivist approach to learning, the foundation of interaction. Holmberg's (1983) Theory of Interaction and Communication (TIC) grounds this case study. The primary goal of TIC is to provide a framework that can capture social interactions related to game-based assessments (Fu, 2016). Social interaction requires reciprocation in the social environment. Interaction is a dynamic and pervasive aspect of people's actions, and such interactions are developed and shaped by competition, influences, social roles, status, and environmental, cultural, and global influences (Sam, 2023). The collaboration, communication, and interactivity purported by TIC were important because Kahoot! facilitates a web of interaction as seen in Figure 1.

Figure 1: Web of Kahoot! activities, embedded in the theory of interactions
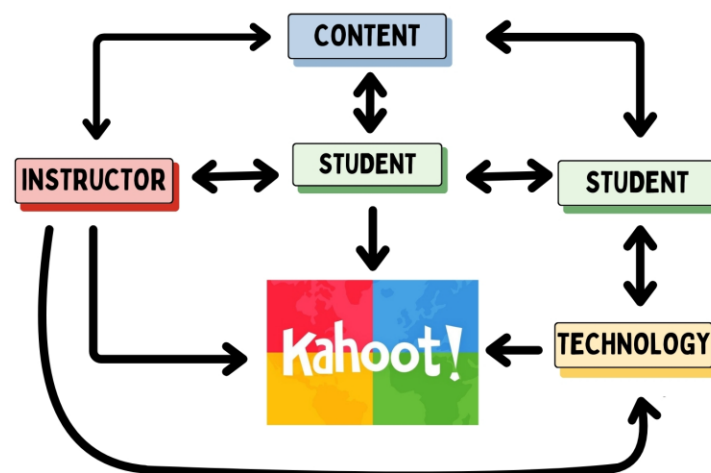
As seen in Figure 1, interactions include student-to-student, student-to-instructor, student-to-content, instructor-to-content, student-to-technology, and instructor-to-technology. These multi-dimensional interactions form a web of constant activities that enhance the teaching and learning environment. Creating a learning environment that is engaging is essential since the majority of undergraduates in higher education are millennials who expect and "demand" an interactive and technology-infused learning environment (Vaughan, 2014). Hence, students are expected to interact with the instructor, each other, and with the content they have been exposed to. Another bedrock of TIC is providing students with interactions that are relevant, multimodal, creative, captivating to their interests, and rewarding to their knowledge in real-time, thus leading to greater learning outcomes.

Holmberg's (1983) theory recommends that when technology is integrated into the classroom, there are important learning milestones to be observed include flexibility of participants, promotion of creativity, sparking of intellectual curiosity and honesty, reduction of time needed for digesting new information, increases in a friendly and personal tone of the participants, constant collaborative opportunities to work with others, bolstering of critical and divergent thinking that facilitates problem-solving, and facilitating passionate engagement with the content by appealing to all of the students' learning modalities (Holmberg Theory Dialogue by 'Holmbergers' 2013). Across the four sections of his course, TIC was applicable because an increase in students' interaction and engagement was noticed.

Increased interaction and engagement were evidenced in four ways (1) students actively participated in class discussions by asking questions, responding to peers, and contributing ideas during class conversations. In fact, this engagement was noticeable because students showed critical and divergent thinking by or making connections to prior learning. (2) Collaborative and competitive Involvement when placed in small groups to problem solve. Students worked productively, sharing tasks, listening to multiple perspectives, and focusing on the goal to get the highest points on the Kahoot. In fact, students' body language and tone in class discussions indicated enthusiasm and cooperation. (3) Students stayed attentive during instruction and activities. They follow directions promptly, and also transitioned smoothly between tasks. Hence, there was less redirection from the instructor. (4) Student engagement showed higher order thinking based on Bloom's Taxonomy (Anderson, & Krathwohl, 2001). Students showed engagement as they took ownership of their learning in the following ways; completing tasks fully, being more involded in the learning process, scaffolding on previous class concepts in new contexts, applying real world situations, and critically evaluating various scenarios related to the lesson.

Purpose of the Study and Research Questions

The purpose of this study was to explore the use of Kahoot!, a digital formative assessment APP, to improve formative assessments, enhance engagement, and increase student learning outcomes in an undergraduate Business Communication course. Specifically, this study addressed the following research questions.

1. Does gamification have a positive impact on student engagement?
2. To what extent are students' performance (letter grade earned) improved in a Business Communication course when gamification is introduced into the curriculum?
3. What are the factors that predict student engagement in the classroom?
4. Does the use of interactive game-based software play a role in students' perception of a "fun" classroom environment?

Participants, answered the research questions and provided insights into future research and practice.

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Research Design and Methodology

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This research was exploratory, utilizing a case study design (Yin, 1994). The unit of analysis was undergraduate students enrolled in a Business Communication course at a mid-south public university for four semesters. The same instructor taught all four section of the business communication course referenced in this study. The anonymous pre-post survey was created and distributed using Survey Monkey to Business Communication students enrolled in an Association to Advance Collegiate Schools of Business (AACSB) accredited business school. SPSS was used to analyze the data. Before completing this research, IRB approval was achieved. Research in educational psychology has consistently demonstrated that gamification strategies are positively associated with higher levels of student engagement and interaction (Buckley & Doyle, 2014; Subhash & Cudney, 2018). Based on this evidence, the researchers anticipated that students exposed to game-based learning elements in the Business Communication course would report increased interaction and improved performance. Accordingly, a one-tailed t-test was conducted to test the directional hypothesis that gamification would lead to higher levels of student engagement and expected achievement compared to traditional instructional methods.

Research Instrument

Students completed a 12-question pre-survey in week three of the semester. The same 12-question survey was administered during week fourteen as the post-survey. The pre-post survey comprised seven Likert-style questions, scaled from strongly agree to disagree strongly. The first seven items were adapted from validated instruments, the Intrinsic Motivation Inventory (Deci & Ryan, 1985; Ryan, 1982); Technology Acceptance Model (Davis, 1989); Johnson & Johnson (2009); Vygotsky, L. S. (1978); and Venkatesh et al. (2003) Unified Theory of Acceptance and use of Technology (UTUAT Model). The remaining five questions were demographic and sought information related to (a) expected letter grade, (b) major, (c) inclusion of technology, and (d) ranking of pre-exam preparation methods.

Data Collection and Analysis

The data was collected over four semesters. Students completed the pre-survey before being introduced to Kahoot! during the 3rd week of the semester. During week 16, students completed a post-survey. The post-survey mirrored the pre-survey. The data was analyzed using SPSS software after exporting it from Survey Monkey to the IBM SPSS 28 software. Multiple regression, Pearson correlation, t-tests, and descriptive statistics were used to analyze and present the data results.

Results/Findings

A total of 701 independent samples of students completed the pre and post-surveys, having 61.1% (429) males and 38.7% (271) females, seen in Table 2.

Table 2: Demographic information

		Frequency	Percent	Valid Percent	Cumulative Percent
			How do you identify?		
Valid	Male	428	61.10%	61.20%	61.20%
	Female	271	38.70%	38.80%	100.00%
	Total	699	99.90%	100.00%	
Missing	System	1	0.10%		
Total		701	100.00%		

The percentage breakout of males to females seen in Table 2, does not reflect the typical percentage breakout of the undergraduate population of students that attend the institution sampled in this research. The typical gender breakout at the sample institution was approximately 65% females and 35% males. The gender breakout at a national level was approximately 58% to 42%, females to males, respectively (National Center for Education Statistics, 2021).

The pre-post survey had three sections. Section one, seven Likert-style questions on a five-point scale equated to; strongly agree (5), agree (4), neutral (3), disagree (2), and strongly disagree (1) at the end of the scale. The internal consistency for the seven questions is acceptable at a Cronbach Alpha of 0.731. Section two had one question measured on the Likert scale with a maximum value of 5 and denoted as very satisfied (5), satisfied (4), neutral (3), dissatisfied (2), and very dissatisfied (1). This question had four parts, addressing Ted Talks, YouTube, Kahoot!, and PowerPoint to engage students in the classroom. The internal consistency for this item is lower than an acceptable 0.7 at 0.588. On examination of the correlation statistics, it was found that the sub-part of this survey question related to PowerPoint, if removed, would increase the internal consistency of the question to an acceptable Cronbach Alpha of 0.725.

Section three focused on students' satisfaction and preference for using open-ended question-and-answer sessions, summary lectures of exam content, electronic study guides, or interactive game-based quizzes as review options before taking exams. Students were asked to rate each of the four options using a scale of one through four (1-4), with one being the most preferred and four the least preferred. The final section contained three open-ended questions: addressing gender identity, expected overall grade, and major classification. Next, the findings related to Research Question One (RQ 1) will be addressed.

RQ1: Does the use of gamification interactive software have a positive impact on student engagement and performance? (Fuchs, 2022; Schultz et al., 2022; Wirani & Nabarian, 2022). Students were asked in a pre-survey to provide feedback on the impact of interactive game-based technology such as Kahoot!, along with other educational technology such as Ted Talks, YouTube videos, and PowerPoint presentations, on their learning outcomes and exam preparation. The results of participants' satisfaction with Kahoot! and other interactive applications are collated in Table 3.

Table 3: Interactive software used for student engagement

	Group Statistics				
	PrePostCombined	N	Mean	Std. Deviation	Std. Error Mean
Ted Talks	PreSurvey	351	3.547	1.07301	0.05727
	PostSurvey	339	3.791	1.0577	0.05745
YouTube	PreSurvey	352	3.702	1.05905	0.05645
	PostSurvey	338	3.968	0.94137	0.0512
Kahoot!	PreSurvey	351	3.593	1.19372	0.06372
	PostSurvey	339	4.738	0.55904	0.03036
PowerPoint	PreSurvey	360	4.289	0.83442	0.04398
	PostSurvey	337	4.454	0.76286	0.04156

Table 3 shows the means, standard deviation, and error for all participants who responded to survey item eight, where participants were asked to indicate their level of satisfaction with the use of Ted Talks, YouTube, Kahoot!, and interactive PowerPoint in course delivery. The data show that the mean satisfaction levels of students were increased when all four elements were introduced in the curriculum, comparing the pre and post-survey results. The 339 participants who completed the post-survey after being exposed to Kahoot! gamification software (M = 4.73754, SD = 0.55904) compared to the 351 students in the pre-survey group (M = 3.5926, SD = 1.19372) demonstrated that students had a significantly higher level of satisfaction with the use of the Kahoot! gamification software as a method of classroom interaction and exam preparation, t(688) = -16.041, p <.001 (See Table 4). Comparatively, even though students indicated a high level of satisfaction with the use of Kahoot!, they also derived satisfaction and increased engagement from the integration of Ted Talks, YouTube videos, and interactive PowerPoints as an essential factor in their level of course satisfaction, as outlined in Table 4.

In Table 4, to answer RQ1, the analysis from an Independent Samples t-test showed 339 participants completed the post-survey (M = 4.738, SD = 0.55904) compared to 351 students in the pre-survey group (M = 3.593, SD = 1.19372). The results show students had a significantly higher level of satisfaction with the use of Kahoot! as a method of exam preparation, $t(688) = -16.041$, $p < .001$ (see Table 4). From the analysis, students also had a significantly higher level of satisfaction with the use of summary lectures of exam content and electronic study guides as methods of exam preparation and classroom interaction (Table 5). Also evident from the results is that the mean satisfaction level increased for students' affinity for open question-and-answer sessions to prepare them for exams. The data further indicate a significant reduction in student satisfaction when comparing the pre and post-survey means related to using summary lectures over exam content and electronic study guides to prepare for exams, displayed in Table 5.

The results in Table 5, relating to RQ 1, indicate that at the 95% confidence level, a significant relationship exists between the use of interactive game-based technology, Kahoot!, and overall student satisfaction with their exam preparation. Hence, we conclude that gamification and other integrative technologies such as YouTube videos, TED Talks, and interactive PowerPoints have a positive impact on student engagement and learning outcomes performance in their Business Communication course and exam preparation.

RQ2: To what extent are students' performance (letter grade earned) improved in a Business Communication course when interactive game-based technology is introduced into the curriculum? An independent samples t-test was run to determine if the mean level of students' perceived letter grades earned for the Business Communication course was influenced by using Kahoot! as shown in Table 6.

From an Independent Samples t-test, shown in Table 6, there were 339 participants who completed the post-survey after being exposed to Kahoot!, the interactive game-based quiz software (M = 4.74, SD = 0.559) compared to the 351 students in the pre-survey group (M = 3.59, SD = 1.194) which indicated that students perceived a significantly higher course grade with the use of the Kahoot! as a method of exam preparation, $t(688) = -16.041$, $p < .001$ (Table 4). Students selected their letter grades based on their perception of their performance in the course. The letter grades were based on a five-point scale A, B, C, D, or F. For this research, students actual grade was not used because it was not part of the IRB request. Hence, the researchers did not corroborate students perceived with their actual grades in this research. To further show how the data spreads, the group statistics of participants related to their predicted grades for the course are represented in Table 7.

As shown in Table 7 and reflected in the independent samples t-test in Table 5, students reported an expected increase in their overall grade for the Business Communication course after introducing interactive game-based software. Kahoot! was the only game-based software introduced to participants after completing the pre-survey. Additionally, a Pearson r was calculated to determine the strength of the relationship between Kahoot! (Interactive game-based software) and perceived academic performance in the Business Communication course displayed in Table 8.

As shown in Table 8, from the calculation of the Pearson r correlation coefficient for the relationship between Kahoot! (game-based integrative software) and the perceived grade in the Business Communication course, a weak but positive correlation was found (r (686) = .10, p =.009. The data also show that a moderate and significant relationship (r(659) = .287, p <.001exists between Kahoot! and the use of interactive game-based quizzes to prepare students for exams. Conversely, there was no significant relationship between the use of interactive game-based quizzes to prepare for exams, in general, and the overall grade earned for the Business Communication course, even though the mean satisfaction score of participants increased from 2.85 to 3.37.

Furthermore, Table 8 shows a significant relationship between Kahoot! and the expected grade in the Business Communication course. Based on the results, it is evident that participants perceived they would do better academically after they were exposed to Kahoot! Game-based software. Working collaboratively is essential to building a community of learners that has a unified goal of achievement. The results from this study clearly suggests that higher levels of interactions in a learning community has a positive correlation with students perceived performance in a business communication course (Marco-Fondevila et al., 2022).

The data in the next section relates to ***RQ 3: What are the factors that predict student engagement in the classroom?*** To answer RQ3, a multiple linear regression was calculated to predict student engagement (dependent variable) in a Business Communication course based on the influence of independent variables, such as excitement about coming to class, the use of mobile educational technology, and collaborative learning when using the interactive game-based technology, Kahoot!. A multiple linear regression was calculated to predict student engagement based using game-based Kahoot! and other educational technology, shown in Table 9.

From the regression analysis shown in Table 10, all of the independent variables have significant interaction with the dependent variable, except for gender, grade expectation, interactive game-based quiz over the exam, use of electronic study guides, summary lecture of exam content, YouTube, Ted Talks, the need for more technology use in class to enhance learning, and whether the learning environment is fun. Conversely, Kahoot! interactive game-based software and the use of mobile technology in class, working collaboratively, and the use of PowerPoints were significant predictors of student engagement/excitement in the Business Communication course. Overall, in answer to RQ3, Kahoot! interactive game-based software, PowerPoint, mobile technology, and collaborative work were significant predictors of student engagement in the Business Communication classroom. Next, we will provide the findings in repones to RQ 4.

RQ4: Does the use of interactive game-based software/educational technology play a role in students' perception of a "fun" classroom environment? To answer RQ4, an Independent Samples t-test and Pearson Correlation were calculated to assess the relationship between the integration of interactive game-based software/ educational technology and the perception of a Business Communication course being a "fun" learning environment for students. Pearson

Correlation Coefficient was used to calculate the relationship between students' perceptions of a "fun" classroom environment to their overall satisfaction with the use of Kahoot! game-based interactive software and other educational technology (Table 10). A weak positive correlation was found between Kahoot! game-based interactive software and students' perception of a "fun" classroom environment (r(337) = .156, p = .004), indicating a significant linear relationship between the two variables. Students perceive the use of Kahoot! game-based interactive software creates a "fun" environment for learning, shown in Table 11.

From the Pearson Correlation conducted in Table 11, a moderate and positive correlation between the use of relevant educational technology in the classroom and students' perception of improved exam performance (r (337) = .316, p <.001, was found. Students perceived the use of more educational technology in the classroom as a significant factor in enhancing their performance in the Business Communication course. From the analysis, 69.7% of students in the post-survey compared to 58.7% in the pre-survey group, strongly agreed that their overall performance in the Business Communication course improved when the learning environment was fun. The next section of the paper will focus on a discussion of the results, implications for practice, conclusions, limitations, and areas for further study.

Table 4: Level of course satisfaction with interactive tools

		Levene's Test for Equality of Variances		t-Test for Equality of Means							95% Confidence Interval of the Difference	
							Significance					
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Ted Talks	= variances assumed	0.351	0.554	-3.002	688	0.001	0.003	-0.24355	0.08114	-0.403	-0.08424
	= variances not assumed			-3.002	687.712	0.001	0.003	-0.24355	0.08112	-0.403	-0.08428
YouTube	= variances assumed	13	<0.001	-3.479	688	<0.001	<0.001	-0.26575	0.07639	-0.416	-0.11576
	= variances not assumed			-3.487	683.96	<0.001	<0.001	-0.26575	0.07621	-0.415	-0.11611
Kahoot!	= variances assumed	249.734	<0.001	-16.041	688	<0.001	<0.001	-1.14487	0.07137	-1.285	-1.00474
	= variances not assumed			-16.221	500.293	<0.001	<0.001	-1.14487	0.07058	-1.284	-1.0062
PowerPoint	=variances assumed	3.944	0.047	-2.721	695	0.003	0.007	-0.16512	0.06068	-0.284	-0.04597
	= variances not assumed			-2.729	694.616	0.003	0.007	-0.16512	0.06051	-0.284	-0.04632

Table 5: Tools used to prepare students for exams

		Levene's Test for Equality of Variances				t-test for equality of Means				95% Confidence Interval of the difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Open question and answer session	= variances assumed	0.683	0.409	0.529	650	0.299	0.597	0.04794	0.09067	-0.1301	0.22598
	= variances not assumed			0.529	649.113	0.298	0.597	0.04794	0.09062	-0.13001	0.22589
Summary lecture of exam content	= variances assumed	0.334	0.563	2.095	663	0.018	0.037	,17939	0.08562	0.01127	0.34752
	= variances not assumed			2.094	657.741	0.018	0.037	17939	0.08567	0.01118	0.34761
Electronic study guides available to us	= variances assumed	0.196	0.658	2.409	658	0.008	0.016	19233	0.07985	0.03555	0.34912
	= variances not assumed			2.406	650.839	0.008	0.016	19233	0.07995	0.03535	0.34932
Interactive game-based quiz over exam	= variances assumed	16.1	<.001	-6.177	666	<.001	<.001	-0.52265	0.08461	-0.68878	-0.35652
	= variances not assumed			-6.194	660.985	<.001	<.001	-0.52265	0.08438	-0.68834	-0.35696

Independent Samples Test

$n = 701$. *Note.* Although SPSS reports both one- and two-tailed p-values, only the one-tailed values were interpreted because the hypotheses predicted specific directional effects.

Table 6: Prediction of course grades based on game-based technology

		Levene's Test for Equality of Variances		t-test for Equality of Means						95% Confidence Interval of the Difference	
Independent Samples Test											
		F	Sig.	t	df	Significance 1-Sided p	2-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
My overall exam performance improves when relevant educational technology Is integrated into the learning environment. Please rate Kahoot!	= variances assumed	0.625	0.43	4.891	697	<.001	<.001	,28122	0.0575	0.16832	0.39412
	= variances not assumed			4.911	692.37	<.001	<.001	0.28122	0.05726	0.1688	0.39364
	= variances assumed	249.73	<.001	-16.04	688	<.001	<.001	-1.14487	0.07137	-1.285	-1.0047
	= variances not assumed			-16.22	500.29	<.001	<.001	-1.14487	0.07058	-1.28354	-1.0062
Interactive game-based quiz over exam	= variances assumed	16.098	<.001	-6.177	666	<.001	<.001	-0.52265	0.08461	-0.68878	-35652
	= variances not assumed			-6194	660.99	<.001	<.001	-52265	0.08438	-0.68834	-0.357
What is your expected grade for this course?	= variances assumed	247.23	<.001	-6.754	697	<.001	<.001	-0.513	0.076	-0.662	-0.364
	= variances not assumed			-6.643	490.08	<.001	<.001	-0.513	0.077	-0.665	-0.361

Note. Although SPSS reports both one- and two-tailed p-values, only the one-tailed values were interpreted because the hypotheses predicted specific directional effects.

Table 7: Spread of students' perceived final course grade

	PrePostCombined	N	Mean	Std. Deviation	Std. Error Mean
	Group Statistics				
My overall exam performance improves when relevant educational technology Is integrated into the learning environment. Please rate	PreSurvey	360	1.89	0.81003	0.04269
	PostSurvey	339	1.61	0.70253	0.03816
Kahoot!	PreSurvey	351	3.59	1.19372	0.06372
	PostSurvey	339	4.74	0.55904	0.03036
Interactive game-based quiz over exam	PreSurvey	341	2.85	1.15983	0.06281
	PostSurvey	327	3.37	1.01897	0.05635
What is your expected grade for this course?	PreSurvey	359	3.76	0.636	0.034
	PostSurvey	340	4.28	1.283	0.07

Table 8: Relationships between Kahoot! and perceived academic performance

		What is your expected grade for this course?	Kahoot!	Interactive game-based quiz over exam
		Correlations		
What is your expected grade for this course?	Pearson Correlation	1	0.100	0.05
	Sig.(2-tailed)		0.009	0.23
	N	699	688	666
Kahoot!	Pearson Correlation	0.100	1	0.29
	Sig.(2-tailed)	0.009		<.001
	N	688	690	661
Interactive game-based quiz over exam	Pearson Correlation	0.047	0.287	1
	Sig.(2-tailed)	0.227	<.001	
	N	666	661	668

Table 9: Multiple linear regression predicting student engagement

Model	R	Square R	Adjusted R Square	Std. Error of the Estimate
		Model Summary(b)		
1	0.529(a)	0.280	0.261	0.56717

(A) Predictors:(Constant) Q2, Q3, Q4, Q5, Q6, Q7, Q8 , Q9, Q10, Q11
(B) Dependent Variable: Q1

Table 10: The significance level of independent variables regarding student performance

Model	Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B	
	B	Std. Error	Beta	t	Sig	Lower Bound	Upper Bound
(Constant)	2.119	0.253		8.375	<.001	1.622	2.616
Q2 Excited about mobile technology as part of my learning	0.212	0.034	0.258	6.152	<.001	0.144	0.28
Q3 Working in groups positively impacts my learning	0.126	0.029	0.183	4.313	<.001	0.069	0.183
Q4 Overall exam performance improves when learning is fun	0.017	0.041	0.016	0.414	0.679	-0.063	0.097
Q5 Overall exam performance improves when collaborating with classmates	0.096	0.034	0.124	2.781	0.006	0.028	0.164
Q6 Overall exam performance improves when relevant ed tech is integrated	-0.004	0.039	-0.004	-0.091	0.928	-0.08	0.073
Q7 Wish we used more tech in this class to enhance my learning	-0.05	0.028	-0.07	-1.815	0.07	-0.104	0.004
Q8 Ted Talks	-0.053	0.029	-0.085	-1.822	0.069	-0.109	0.004
Q8 YouTube	0.015	0.031	0.024	0.492	0.623	-0.046	0.077
Q8 Kahoot!	-0.051	0.025	-0.085	-2.051	0.041	-0.1	-0.002
Q8 PowerPoint	-0.163	0.03	-199	-5.487	<.001	-0.222	-0.105
Q9 Open question and answer session	-0.056	0.02	-0.096	-2.71	0.007	-0.096	-0.015
Q9 Summary lecture of exam content	0	0.022	-0.001	-0.015	0.988	-0.043	0.042
Q9 Electronic study guides available to us	-0.005	0.023	-0.008	-0.211	0.833	-0.05	0.041
Q9 Interactive game-based quiz over exam	0.016	0.022	0.028	0.751	0.453	-0.027	0.059
Q10 What is your expected grade for this course?	-0.005	0.023	-0.008	-0.226	0.821	-0.05	0.04
Q11 How do you identify?	0.019	0.049	0.014	0.39	0.697	-0.077	0.115

a. Dependent Variable: Q1 I come to this class excited about learning.

*See Appendix for complete questions (Q1 to Q12)

Table 11: Post-survey of students' perceptions about using Kahoot! as a "fun" environment for learning

Variables	Excited to use mobile tech	Exam performance improves with fun environment	Exam performance improves with tech integration	Wish for more tech use	Ted Talks	You Tube	Kahoot!	Power Point	Interactive quiz over exam
Excited to use mobile tech	1	0.368**	0.184**	0.281**	0.202**	0.135*	0.151**	0.263**	0.003
Exam performance improves with fun environment	0.368**	1	0.171**	0.470**	0.231**	0.267**	0.169**	0.112*	0.033
Exam performance improves with tech integration	0.184**	0.171**	1	0.266**	0.149**	0.186**	0.156**	0.079	0.077
Wish for more tech use	0.281**	0.470**	0.266**	1	0.141**	0.178**	0.073	0.170**	0.015
Ted Talks	0.202**	0.231**	0.149**	0.141**	1	0.612**	0.132*	0.265**	0.077
YouTube	0.135*	0.267**	0.186**	0.178**	0.612**	1	0.248**	0.033	0.029
Kahoot!	0.151**	0.169**	0.156**	0.209**	0.132*	0.248**	1	0.265**	0.200**
PowerPoint	0.263**	0.112*	0.170**	0.073	0.265**	0.265**	0.265**	1	-0.070
Interactive quiz over exam	0.003	0.033	0.077	0.015	0.077	0.029	0.200**	-0.070	1

Significant Correlations:
-0.01 level (2-tailed) indicated by*
-0.05 level (2-tailed) indicated by **
Values are Pearson correlation coefficients

Discussion and Conclusions

The findings from this study will be discussed based on the four research questions that guided the research. From the results presented, students perceived the use of Kahoot! game-based software and other educational technology enhanced their learning experience. However, the data also show that while students perceived that their overall performance in the Business Communication course improved with the use of Kahoot! game-based interactive software and other educational technology such as Ted Talks, and PowerPoints, they did not believe that the class was more fun to attend (Table 2) because of the integration of these technologies into the delivery of the curriculum. These findings were interesting because they run counter to established research (Costley, 2014; Fang, 2019; Fuchs, 2022; Sun et al., 2018) that the integration of educational technology and interactive software creates a "fun" classroom environment for students to learn.

Research Question 1 (Does gamification have a positive impact on student engagement?) For this question, an answer was sought regarding the use of Kahoot! as an interactive game-based software and its impact on the levels of student engagement (Axelson & Flick, 2010; Groccia, 2018; Macfarlane & Tomlinson, 2017) in a Business Communication course. From the research findings, it is evident that students perceived the use of gamification software Kahoot! and the integration of other technologies such as Ted Talks, YouTube, and PowerPoints as having a positive impact on their engagement and overall performance in the Business Communication course. Additionally, students indicated in their instructor and course evaluation feedback that the use of gamification, Kahoot! and other technologies integrated into the Business Communication course were key components of their motivation to attend class and for them to be active participants.

Analysis of the data revealed that 92.4% compared to 90.2% of students who were not exposed to gamification and other technologies in the delivery of the curriculum were more excited about coming to class. While students were generally excited about coming to class because of the integration of technology into the curriculum, their level of excitement was most noteworthy when it came to the use of Kahoot! as an exam content review software. Compared to the other technologies integrated into the teaching of the Business Communication course, Kahoot! had the highest levels of perceived student satisfaction, with 95.6% of the 340 students completing the post-survey indicating that they were satisfied or very satisfied with the use of Kahoot! in the Business Communication course, as documented in Figure 2.

Figure 2: Student satisfaction with Kahoot! in the Business Communication class
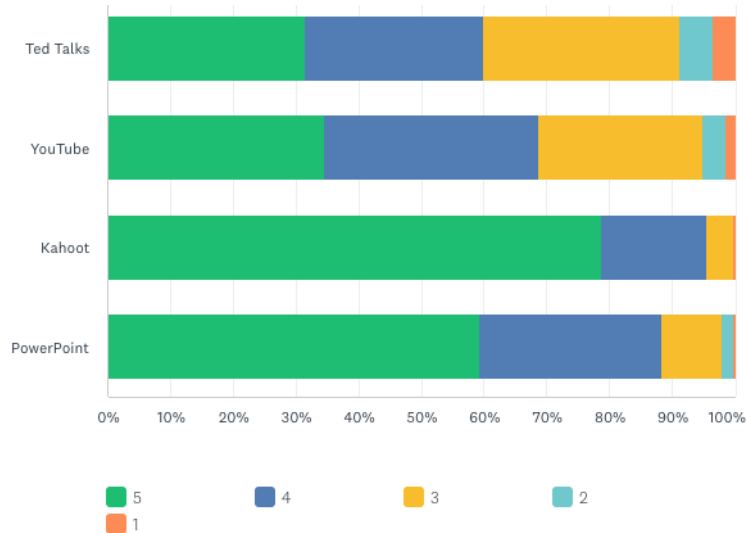
As shown in Figure 2, students developed an expectation to be engaged in Kahoot! assessment for each class session, which led to increased attendance and greater engagement and excitement for learning and exam preparation. Students ranked their preference for exam preparation methods among four options: open question and answer sessions, the summary lecture over exam content, available electronic study guides, and interactive game-based quizzes on Kahoot! addressing exam content. Except for open question and answer sessions, all other methods presented a significant interaction at the 95% confidence level (Table 4). What was interesting about these results is that most students preferred the use of interactive game-based quizzes (Kahoot!) to prepare for exams, shown in Figure 3.

Figure 3: Students preferred way of preparing for exams
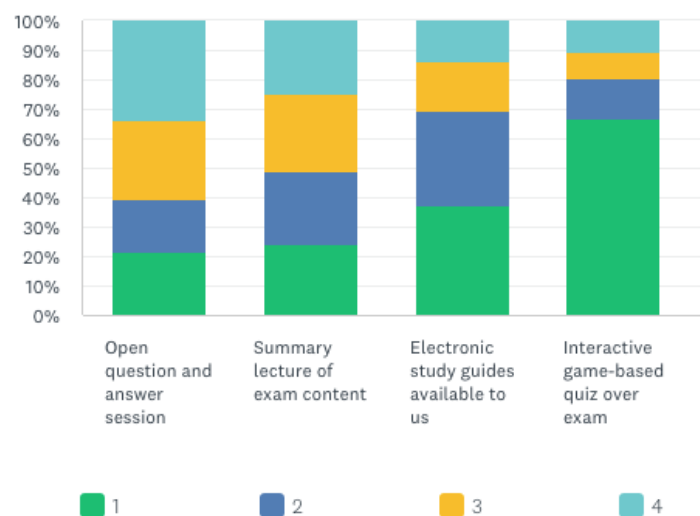
Figure 3 shows an interesting result whereby interactive game-based quizzes (Kahoot!) were selected as the most preferred option to prepare for exams because, based on the literature reviewed, exam preparation tools that elicit fun and excitement are more likely to lead to higher student engagement and improved exam performance (Brady & Andersen, 2021; Lukosch & Licorish, et al., 2017; Sankoff, 2013). Based on the findings, it can be confirmed that students in the Business Communication course came to class more excited to learn and were more inclined to prepare for exams if the exam preparation method utilized integrative game-based software such as Kahoot! Student engagement and student learning outcomes also increased in the Business Communication course because students utilized Kahoot! individually or as part of a team. Students' responses to each question often led to broader and more in-depth discussions that went beyond the typical knowledge/recall nature of the typical Kahoot! quiz questions. In the next section, **RQ2** will be the basis for discussion.

Research Question 2 (To what extent are students' performance (letter grade earned) improved in a Business Communication course when interactive game-based technology is introduced into the curriculum?) **RQ2** assessed the impact of interactive game-based software such as Kahoot! on the overall performance (letter grade earned) of students in a Business Communication course. Even though the mean response of students indicated that students were highly satisfied with the use of Kahoot interactive game-based software to prepare for exams and increase classroom engagement, there was no perceived statistically significant relationship between improved grade performance and integrative game-based software in general. The data revealed that students found the use of Kahoot! to be engaging, and it positively impacted their exam performance. However, students did not translate that positive performance on exams to only using Kahoot!. For example, 70.2% of students who completed the pre-survey (before the use of gamification software such as Kahoot!) believed that they would earn an A for the Business Communication course, compared to only 33.8% of students in the post-survey group at the end of the semester.

From the data, it can be extrapolated that even though Kahoot! game-based software and other technologies are important for classroom engagement and valued by students as an exam preparation method; it is not a strong predictor of overall student performance, evident in the very weak relationship evidenced in the Pearson r of .10 (Table 7). Based on the analysis of the data and in answer to RQ2, Kahoot! interactive game-based software is not a strong predictor of overall grade performance but more of student engagement and motivation to attend class and build a community with classmates (Licorish et al., 2017). The next section of this research relates to **RQ3**.

Research Question 3: (What are the factors that predict student engagement in the classroom?) RQ3 focused on testing whether the factors outlined in Figure 3 are predictive of student engagement as espoused in the literature reviewed (see Axelson & Flick, 2010; Bond et al., 2020; Finn & Zimmer, 2012; Fuchs, 2022; Groccia, 2018; Schultz et al., 2022; Trowler, 2010; Wirani & Nabarian, 2022; Zepke & Leach, 2010). The factors outlined in Figure 4 all have some impact on student engagement, but only a few are statistically significant predictors of student engagement or excitement for learning in the Business Communication classroom.

Figure 4: Factors predicting student engagement in the Business Communication class
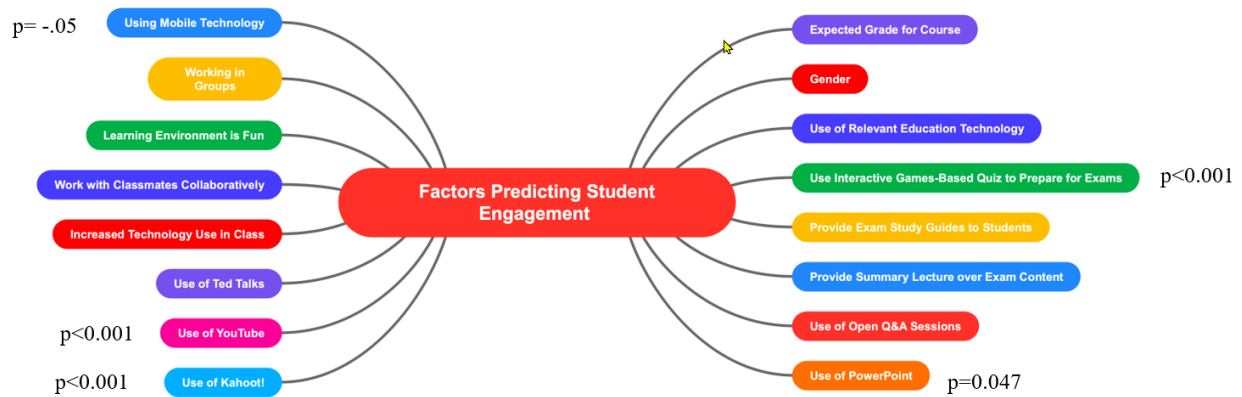
Note. The use of YouTube, Kahoot, and interactive game-based quizzes were statistically significant predictors of student engagement ($p < .001$), while the use of PowerPoint was significant at $p = .047$.

As a predictor for student excitement and engagement, the findings in Figure 4 indicate that the use of mobile technology as part of the learning process is a predictor of student engagement and excitement in the classroom. This is in keeping with the earlier results in Table 9. Also, these findings support the established literature on student engagement, that an environment where students work collaboratively (Mao & Lee, 2023; Park & Lee,2024), as they did with Kahoot! exam practice quizzes are significant predictors of student engagement and excitement for learning (Table 9). Even though YouTube and Ted Talks were viewed by students in their survey responses as technologies that increased their level of course satisfaction, they were not found to be statistical predictors of student engagement or excitement. Interestingly, students' responses indicated a divergent view regarding mobile and general technology. Even though mobile technology was a significant predictor of student engagement at $p < .001$, students' response to the question "I wished we use more technology in this course", was not significant, where $p = .70$ at the 95% confidence level. Even though question and answer sessions do not use any mobile technology or interactive game-based software such as Kahoot!, but is a traditional form of student engagement, it was found to be a significant predictor of student engagement in this research. Neither expected overall grade nor gender was found to be a predictor of student engagement. The next section of the paper focuses on *RQ4.*

Research Question 4 (*Does the use of interactive game-based software/educational technology play a role in students' perception of a "fun" classroom environment?*) **RQ4** tested if any relationship exists between students' perception of a "fun" classroom environment and the use of interactive game-based software Kahoot! and other educational technologies. The research findings indicated that the use of interactive game-based software Kahoot! do play a vital role in students' perception of having fun in the class while learning the Business

Communication content. In keeping with the TIC that grounded this research, students' perception of having fun while interacting with each other, interacting with the technology, content, and the instructor.

All four research questions were answered based on the research data. These results help fill the gap in the literature, specifically, the direct use of Kahoot! in the college classroom. Things have changed due to the plethora of technology in the field of education. As a result, formative assessments are delivered differently and are impacted by artificial intelligence (AI), specifically generative AI (Wright & Sapkpta, 2024). This research data will serve to fill this gap in the literature regarding the use of Kahoot! and similar technology-driven applications in the Business Communication classroom. However, there are limitations to the research and the need for further research on the topic.

Limitations and Future Research

Although this study provides valuable insights, four primary limitations should be addressed in future research. (1) Student demographics and major analysis: Future research should expand on the initial findings by exploring how different student demographics, including their majors, may influence their performance on Kahoot! Understanding which groups of students are benefiting most from this tool can help tailor its use for specific academic majors. (2) Detailed analysis of students' performance: A more thorough analysis of student performance on Kahoot! is needed. For example, researchers should investigate whether students who perform well on Kahoot! are the same students who typically demonstrate high levels of engagement and academic achievement in other areas. This will help clarify whether Kahoot! is truly enhancing learning outcomes or if it is mainly reinforcing the success of already high-performing students. (3) Data collection methods: This study relied solely on anonymous surveys for data collection, which may have limited the depth of insights gained. Future research should incorporate additional methods, such as focus groups or interviews, to gather more detailed feedback from students. These qualitative approaches would provide a richer understanding of students' experiences with Kahoot! and its impact on their learning. (4) Longitudinal study and cross-college comparison: A more robust, longitudinal study that spans multiple semesters would offer a deeper understanding of the long-term effects of using Kahoot! in the classroom. Additionally, it would be valuable to conduct research with other colleges to see if student engagement is similar or different based on the college of their choice. Understanding students across multiple disciplines other than business majors can show how student engagement with gamification tools like Kahoot! is impacted by their major, in today's teaching and learning landscape.

Implications for Teaching

The following key implications for teaching were drawn from the results of this study.
1. *Enhance lesson engagement and active participation*
Business Communication educators should consider integrating interactive gamification tools like Kahoot! into their lessons to increase student engagement. The competitive and fun nature of Kahoot! can capture students' attention and actively involve them in the learning process.

2. *Fostering a competitive yet collaborative learning environment*
The increased/heightened competitive spirit among students both increased engagement and helped foster a sense of team spirit. This suggests that students benefit from an environment that allows them to compete in a non-threatening, yet stimulating, manner. The AACSB accreditation encourages business schools to provide students with opportunities for teamwork and team building. Kahoot! can provide teamwork opportunities and reinforce the TIC (Holmberg, 2013).

3. *Promote self-directed learning*
Students in this Business Communication class began reading chapters before class, which reflects an increase in intrinsic motivation and a shift towards more self-directed learning, which can be replicated by other educators. Furthermore, educators can pair Kahoot! with reading assignments to reinforce coming to class prepared.

4. *Leverage incorrect answers as teaching opportunities*
The use of Kahoot! to identify knowledge gaps through incorrect answers, provided valuable formative assessment data. It was found that when students gave incorrect answers, it became an opportunity for the instructor to explain the concept again, benefiting the entire class. Using the formative feedback gathered from students' responses to Kahoot! questions, the researcher was able to scaffold learning by targeting specific areas of the business communication curriculum where students required additional support—areas that sometimes differed from the instructor's initial perceptions of student challenges. During Kahoot! exam review sessions, students' responses guided the instructor to reteach or provide deeper explanations before formal assessments.

5. *Reduce anxiety and build confidence*
Based on this research, the use of Kahoot! as a low-stakes formative assessment tool (Akkaraju et al., 2019; Alzina, 2016) helped alleviate test and social anxiety, fostering an environment where students felt comfortable and confident in their learning. This is beneficial in a classroom where students may struggle with self-esteem or fear of failure. Kahoot! can be used to help students develop a positive relationship with learning.

6. *Increase student-teacher interaction*
   The smooth integration of Kahoot! in the Business Communication class contributed to better attendance, particularly in the latter weeks of the semester. This suggests students were more motivated to attend class because of the enjoyable learning atmosphere. No student was asleep or disinterested when a *Kahoot!* was utilized. Therefore, regularly engaging students in such activities results in sustained interest in the course.

7. *Build a positive socio-emotional classroom environment*
   The utilization of Kahoot! fostered a more relaxed and supportive classroom climate, which helped improve team spirit and the overall socio-emotional environment of the classroom. Educators should prioritize creating an emotionally safe and supportive learning environment, especially with competitive activities, to ensure that all students feel comfortable participating.

This research found that Kahoot! boost the excitement of the students, increase and encourage curiosity, motivate students to be fully involved in a topic, help to successfully identify knowledge gaps as a means of formative assessment, and instructors can successfully use incorrect answers from students as a teaching opportunity for all students to relearn information. This significance is in keeping with the work of Dellos (2015). Furthermore, Kahoot! can help relieve students with test and or social anxiety to build their confidence in a non-threatening manner to improve their self-esteem and self-concept as it relates to learning in the college classroom. This is in keeping with the works of Johns (2015).

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Appendix

<u>Business Communication Survey</u>

In this class, I am excited to provide you with the best learning experience possible, so I welcome your comments. Please fill out this questionnaire anonymously. Thank you.

Key:

      SA   =Strongly Agree

      A   =Agree

      U   =Unsure

      D   =Disagree

      SA   =Strongly Disagree

Section # 1

1. I come to this class excited about learning. Please rate
    - ☐ 5 -- SA
    - ☐ 4 -- A
    - ☐ 3 -- U
    - ☐ 2 -- D
    - ☐ 1 -- SD

2. I am excited to be in a class where I am able to use mobile technology as part of my learning. Please rate
    - ☐ 5 -- SA
    - ☐ 4 -- A
    - ☐ 3 -- U
    - ☐ 2 -- D
    - ☐ 1 -- SD

3. When I work in groups, my learning is impacted positively. Please rate.
    - ☐ 5 -- SA
    - ☐ 4 -- A
    - ☐ 3 -- U
    - ☐ 2 -- D
    - ☐ 1 -- SD

4. My overall exam performance improves when the learning environment is fun. Please rate
   - ☐ 5 -- SA
   - ☐ 4 -- A
   - ☐ 3 -- U
   - ☐ 2 -- D
   - ☐ 1 -- SD

5. My overall exam performance improves when I am able to work with my classmates collaboratively. Please rate
   - ☐ 5 -- SA
   - ☐ 4 -- A
   - ☐ 3 -- U
   - ☐ 2 -- D
   - ☐ 1 – SD

6. My overall exam performance improves when relevant educational technology is integrated into the learning environment. Please rate
   - ☐ 5 -- SA
   - ☐ 4 -- A
   - ☐ 3 -- U
   - ☐ 2 -- D
   - ☐ 1 -- SD

7. I wish we used more technology in this class to enhance my learning. Please rate the
   - ☐ 5 -- SA
   - ☐ 4 -- A
   - ☐ 3 -- U
   - ☐ 2 -- D
   - ☐ 1 – SD

Section # 2

8. Please rate the use of interactive technology in this course.
   | 5 = very satisfied | 4 = somewhat satisfied | 3 = neutral |
   | 2 = somewhat dissatisfied | 1 = very dissatisfied | |

	5	4	3	2	1
Ted Talks	☐5	☐4	☐3	☐2	☐1
YouTube	☐5	☐4	☐3	☐2	☐1
Kahoot	☐5	☐4	☐3	☐2	☐1
PowerPoint	☐5	☐4	☐3	☐2	☐1

Section # 3

9. Please WRITE in your ranking of your preferred method of pre-exam preparation (1-4) is most preferred.

Open question and answer session	☐
Summary lecture of exam content	☐
Electronic study guides available to us	☐
Interactive game-based quiz over exam	☐

Other _____

Section # 4

10. What is your final grade for this course?

☐A ☐B ☐C ☐D

Unsure what grade I will earn ☐

11. How do you identify?

☐Male

☐Female

☐Other _____

12. Please write in your major

_____

Thank You!