

Cross-Disciplinary Usage of Kahoot to Enhance Classroom Teaching

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Abstract

This study investigates using Kahoot, a gamified learning platform, to enhance classroom teaching in both engineering and psychology courses at Oklahoma State University. The research focuses on the impact of Kahoot on students' short-term recall, perceptions of learning, and post-course satisfaction. The researchers surveyed 208 undergraduate students who were taught traditionally and with Kahoot. Analysis of the survey data showed a significant increase in course content quiz scores and student enjoyment when Kahoot was used. This implies that incorporating Kahoot into university classroom settings can create a more engaging and effective learning environment that maximizes student outcomes across different academic disciplines.

Keywords

Gamified Learning, Kahoot, Psychology, Engineering, Teaching Methods

Introduction

The integration of technology in classroom education has become increasingly important, as it can enhance interactive teaching methods, facilitate greater student engagement [1], and improve learning outcomes [2]. Utilizing tools like Kahoot can transform traditional teaching approaches, making learning more dynamic and engaging [3]. This shift towards digital learning platforms supports a range of learning styles and can accommodate individual students' needs more effectively. By making learning interactive and enjoyable, these tools can significantly improve student participation and interest [4].

Technology facilitates active learning by incorporating various strategies that involve critical thinking and problem-solving skills. One of these strategies involves gamification, which is defined as “the use of game design elements in non-game contexts” [5]. Kahoot is a game-based learning platform, which incorporates gamification elements to make learning more engaging and fun and is widely regarded as one of the top gamification tools for education [6]. A few reasons include:

1. It is easy for students to access and can be played on most electronic devices
2. Students can join using a given PIN code, no login required
3. Easy to develop – educators can embed a variety of question types in the Kahoot games
4. Questions can be hosted live during class or assigned to students to complete on their own [7]

Student response systems (systems that allow students to provide feedback to instructors in real time, i.e., systems that allow students to answer quiz questions during class) may help support short-term recall of information during class sessions [8] and facilitate awareness of a student's own understanding of the lesson material [9]. Additionally, facilitating the retrieval and recall of information in an educational setting supports gains in long-term retention of information [10] - [12].

This study focused on understanding if the integration of Kahoot into active learning strategies can enhance student enjoyment and improve learning outcomes in the classroom. Specifically, findings on the impact of Kahoot in the areas of short-term recall, impact on student perceptions of learning and post-course satisfaction were included. One of the unique features of gamified learning is its applicability across disciplines. Whether in engineering, psychology, or any other field, gamified learning can be effectively integrated to enhance the educational experience [8]. Therefore, students from introductory engineering and psychology courses were participants in the study, providing a cross-disciplinary view on the effectiveness of Kahoot.

Methodology

For this study, Kahoot was integrated into the courses using different approaches, depending on the discipline. In the psychology courses, the implementation of Kahoot began with a guiding question introduced at the beginning of the session to frame the learning objectives. Kahoot quizzes were integrated between sections to reinforce these objectives and maintain student engagement. PSYC 2313 (Psychology of Adjustment) covers topics including stress and coping, identity, gender, personal growth, communication, interpersonal relationships, psychological disorders and treatment, and career issues. PSYC 2583 (Developmental Psychology) covers pertinent studies, causes, and theories of human developmental phenomena across the life span. Following the Kahoot quizzes, in-class activities were conducted to deepen understanding through practical application. The specific approach used to integrate Kahoot into the courses are listed below:

1. PSYC 2313 and PSYC 2583 are lecture courses worth three credit hours.
2. Multiple lecture sessions are offered, but the specific sections in this study met on Tuesday/Thursday for 75 minutes per session.
3. Class sizes are limited to 45 students per section.
4. Before lecture, students complete required, open book reading quizzes and have access to optional instructional videos and materials.
5. When students sign in to Kahoot, they enter a nickname but are not required to use their actual name or identifying information. Kahoot is voluntary and not tied to a grade in the course.
6. Each 75-minute class period starts with a guiding question that ties together the topics of the day and applies the topics to students' lives.
7. After approximately 15 minutes of lecture, students take a brief Kahoot quiz over what they learned. After each question, a distribution of responses is shown to the class. Based

on the results, the professor spends time on the topic if some of the student responses are incorrect.

8. After the Kahoot is completed, students participate in a hands-on activity and/or class discussion.
9. This formula of lecture / Kahoot quiz / activity or discussion is repeated throughout the class period, typically three to four times.
10. The Kahoot responses are not graded, but reports are available per question so the professor can go back and look at analytics per student and question.
11. At the end of class, a leaderboard of the top three finishers is shown.

In the engineering course, students completed reading and homework assignments before the lecture. During the lecture, students worked on weekly interactive programming tasks, then Kahoot was used to review key concepts and assess understanding in real time. The course involves three weeks of Excel and 13 weeks of Python. A web-native, interactive textbook called a zyBook is used for the course. Specific steps used to integrate Kahoot into this class are listed below:

1. ENGR 1412 is a two-hour course with a one-hour lecture followed by a 2-hour lab (can be on different days).
2. Multiple lecture sections and labs are offered.
3. Overall class size is 200 – 400 students per semester.
4. Before lecture, students complete Participation Activities (PA) and Challenge Activities (CA) in the zyBook. These include interactive questions, animations, and short homework-type problems.
5. For the first half of lecture, a brief overview of topics covered in the PAs and CAs is presented. Then a specific programming problem is discussed by the professor. For some problems, students also work on the problem individually or in groups.
6. The Kahoot is typically (not always) used in the last half of class. Its purpose is to gauge student understanding of topics learned that week.
7. When students sign in, they enter a nickname and use their Oklahoma State Email account. Their Email is used to track attendance. To receive attendance points, the student must attempt all questions.
8. Several technical questions are asked using a multiple-choice format and are timed.
9. After each question, a distribution of responses is shown to the class. Based on the results, the professor spent time on the topic if some of the student responses are incorrect.
10. The Kahoot responses are not graded, but reports are available per question so the professor can go back and look at analytics per student and question.
11. At the end of class, a leaderboard of the top 3 finishers is shown.

These descriptions highlight the diverse strategies that can be used to integrate Kahoot into a classroom experience. Additionally, they also illustrate the versatility of Kahoot in enhancing educational experiences across disciplines.

The approach for this study involved surveying 208 undergraduate students from Oklahoma State University in the Spring of 2024. The distribution of students is shown in Table 1.

Table 1. Study participant overview

Course	Year in School	Number of Students
ENGR 1412: Introduction to Computer Programming using Python	First- and second-year students from six engineering disciplines	126
PSYC 2313: Psychology of Adjustment PSYC 2583: Developmental Psychology	80% were first- and second-year students majoring in Psychology	82

Each course had half of its sections taught using Kahoot, while the other half were taught without it. At the end of each class, students were directed to an online consent form and voluntary survey via a QR code. The survey included questions to assess short-term recall and preferred learning methods, and the questions had been validated in a previous study [13].

Results

The researchers analyzed the results of the student survey to understand how undergraduate college students' short-term recall of course content differs when Kahoot is utilized during class sessions compared to traditional teaching methods. In both the engineering and psychology courses, one lecture section was taught using traditional teaching methods. In the second section of the same course, the lecture was taught using Kahoot. At the end of both sections, the students were given a quiz over the course content. Each quiz contained five course-content related questions. One point was given for each correct answer. Figure 1 depicts the average quiz scores for both courses.

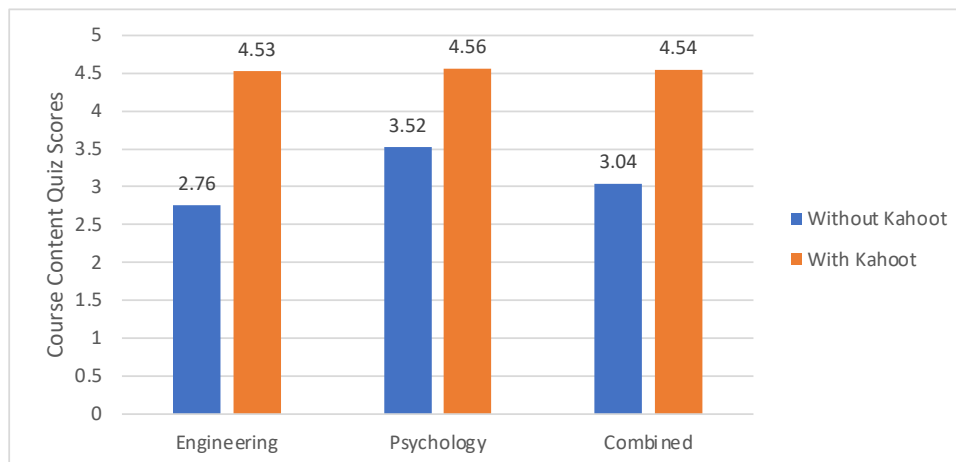


Figure 1. Average scores on course content quizzes for engineering and psychology courses.

For the engineering course there was a 64.1% increase in average quiz score when Kahoot was used. Additionally, a 29.5% increase for the psychology classes resulted from using Kahoot. Tables 2 and 3 show the summary quiz statistics using a traditional teaching method and also with the incorporation of Kahoot into the lecture in the engineering course and psychology courses, respectively.

Table 2. Summary statistics for ENGR 1412 quiz scores (out of 5)

Method	N	Mean	Std Dev
Traditional	72	2.76	1.17
Using Kahoot	53	4.53	0.87

Table 3. Summary statistics for PSYC 2313 and PSYC 2583 (out of 5)

Method	N	Mean	Std Dev
Traditional	42	3.52	1.45
Using Kahoot	36	4.56	0.70

For both engineering and psychology, the average scores increased when the Kahoot platform was integrated into the lecture. Also, the standard deviation for both engineering and psychology tightened considerably when Kahoot was used.

A two-sample t-test was performed to statistically compare quiz scores between sections taught traditionally and those with Kahoot. These results are displayed in Table 4.

Table 4: T-test results for quiz scores using Kahoot vs. not using Kahoot

Discipline	df	t	p
Engineering	123	9.2645	< .0001
Psychology	76	3.7887	0.0003

The results of the t-test show a significant difference in quiz scores between traditional teaching methods and those using Kahoot in both the engineering and psychology classes. These findings suggest that the integration of Kahoot into classroom activities significantly enhances the short-term recall of course content compared to traditional teaching methods. Immediate feedback provided by Kahoot plays an important role in enhancing the learning experience. This type of reinforcement helped solidify students' understanding of the material and improved their short-term learning outcomes.

The survey administered to the students contained course content questions in addition to questions aimed at understanding how students felt about using Kahoot. One of the questions asked was: "When I play Kahoot" for which the response choices were:

- I neither enjoy nor learn

- I enjoy, but I don't learn
- I don't enjoy, but I learn
- I enjoy and learn

Results from both the engineering and psychology courses are depicted in Figure 2. Analysis of the chart shows that many students selected that they “enjoy and learn” when using Kahoot. This provides evidence that students embraced this technology to both learn course content and provide a fun and enjoyable technology to enhance classroom interaction.

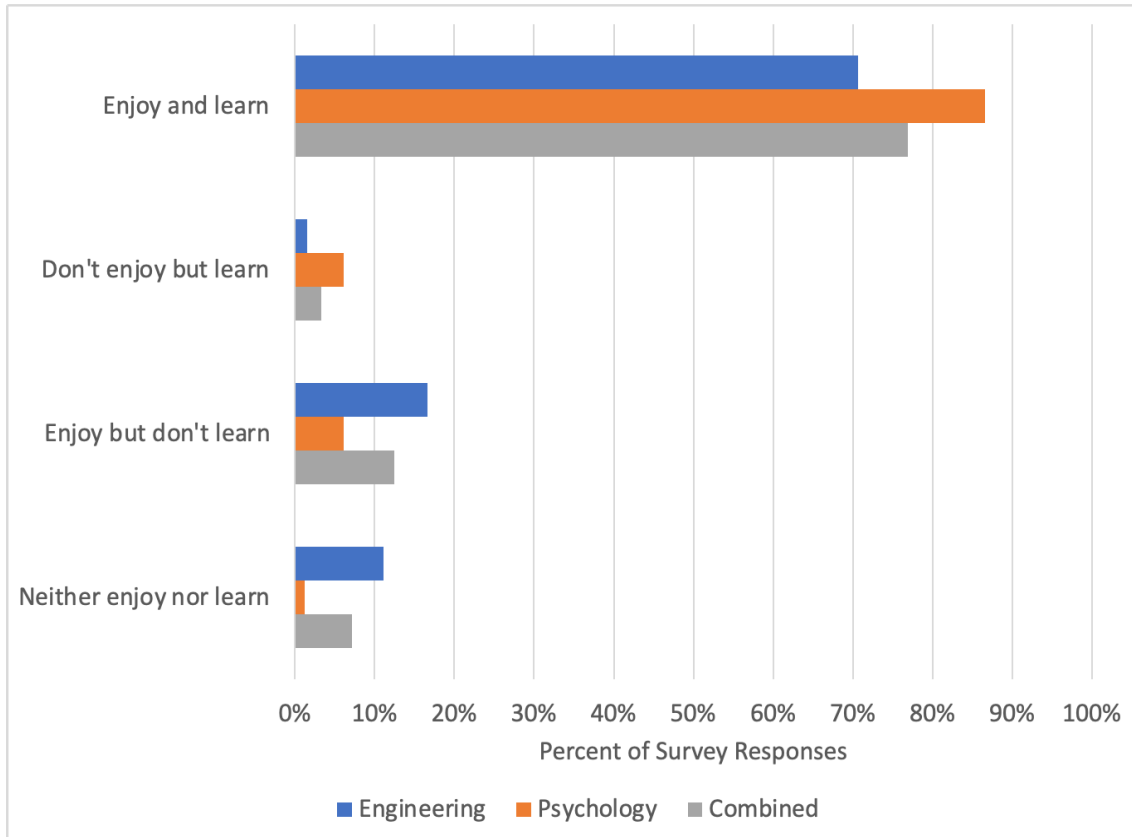


Figure 2. Student responses to survey question: “When I play Kahoot, I ...”

The researchers were also interested in post-course perceptions measured outside of the survey conducted in the classroom during this research study. Course evaluations administered by the university at the end of each semester were an effective way to measure these perceptions. One of the questions contained in this survey was “Presentation of course content enhanced my learning of the subject”. Students responded with one of the following choices: Strongly Disagree = 1, Disagree = 2, Neutral = 3, Agree = 4, Strongly Agree = 5. Tables 5 and 6 show the evaluation results from both disciplines over a 2-year period.

Table 5. Engineering course evaluation results regarding presentation of content

Course	Method	Average Score	# Responding
ENGR 1412	Traditional	4.03	390
ENGR 1412	With Kahoot	4.15	369

Table 6. Psychology course evaluation results regarding presentation of content

Course	Method	Average Score	# Responding
PSYC 2583 and PSYC 2313	Traditional	4.51	129
PSYC 2583 and PSYC 2313	With Kahoot	4.65	292

The average scores across both disciplines increased in the semesters where Kahoot was used in the course presentation. Thus, the results appear to support incorporation of this gamification platform into the teaching pedagogy as measured by post-course perceptions of presentation methods as it related to student learning.

Conclusion

The results of the study show the use of Kahoot improves short-term recall of course content. Students who participated in Kahoot sessions showed better retention of information compared to those taught using traditional methods. This finding highlights the effectiveness of gamified learning tools in reinforcing key concepts which results in increased content retention. In addition to improved recall, students reported high levels of enjoyment and learning when Kahoot was incorporated into their learning process. The interactive nature of Kahoot contributed to a more satisfying and rewarding educational experience in both disciplines.

The benefits of Kahoot were observed across both engineering and psychology courses, highlighting its versatility and effectiveness in different academic courses. By incorporating the features of Kahoot, such as real-time feedback, gamified quizzes, and interactive sessions, educators can create a more engaging and effective learning environment that maximizes student outcomes.

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