INTERACTIVE INSIGHTS: HOW KAHOOT! TRANSFORMS FORMATIVE ASSESSMENT AND ELEVATES PROSPECTIVE TEACHERS' SUCCESS

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ABSTRACT

This study explores the transformative effect of Kahoot!, a game-based learning platform, on formative assessment practices and academic achievement among prospective teachers. Formative assessment, an essential process in education, fosters continuous learning by providing timely feedback to students and guiding instructional adjustments. Traditional formative assessments often rely on paper-pencil methods, but technological advancements like Kahoot! offer innovative, interactive alternatives that engage students and enhance learning outcomes. This quasi-experimental study was conducted with 60 prospective teachers from a women's university, divided into experimental and control groups. Students in the experimental group participated in Kahoot! games during class, which served as a formative assessment tool, while the control group followed conventional assessment methods. The study employed a posttest-only control design to compare academic achievement between the two groups. To analyze the data, independent sample t-test was used. The results showed that there was a significant improvement in the academic performance of the experimental group. It also identified the effectiveness of Kahoot! in better student engagement and learning outcomes. The results emphasize Kahoot!'s potential as a dynamic tool for formative assessment, providing real-time feedback, promoting competition, and improving academic success among prospective teachers. The study found that Using Kahoot! resulted in a significant difference in academic achievement between the experimental and control groups.

INTRODUCTION

Assessment is a powerful learning tool to identify the strategies essential to judge the students' progress in a particular program. Essentials of assessment design include purpose of assessment, domains to be tested, and characteristics of the assessment tools to be employed (Dann, 2014; Tian & Sun, 2018). Purpose of assessment determine the strategies used to collect data. Contemporary trends showed that assessment is more confined to paper pencil test. Previously mostly assessment was conducted at the end of the program to assign grades and elevate students to next level. There is a paradigm shift because recent assessment trend focused on student progress with regard to classroom content, processes, and products. This information helps teachers make wise, informed decisions about the needs of their students and the direction their instruction should take. This is commonly referred as formative assessment that plays a pivotal role in this process by offering detailed feedback that enhances learning outcomes and supports the development of students, especially in teacher education contexts (Mdlalose et al., 2021). As per Popham (2011), developmental evaluation is a cycle that includes the social occasion and examination of appraisal evoked proof to decide when and how to change educational exercises or learning strategies to accomplish learning objectives (p. 14).

The two major objectives of formative assessment are to guide teachers' instruction and students' learning. Among formative assessment objectives for assisting students' learning include keeping track of their progress and learning as well as

understanding them during instruction. Teaching purposes include planning for decision-making about education, identifying when to learn new ideas and when to move on to the next subject, evaluating formative assessment procedures and instructional strategies, assessing whether or not students have understood the material, and providing information to students, stakeholders, the institution for reporting and providing assessment data regarding numerical marks on success (Asamoah, Shahrill, & Latif, 2022).
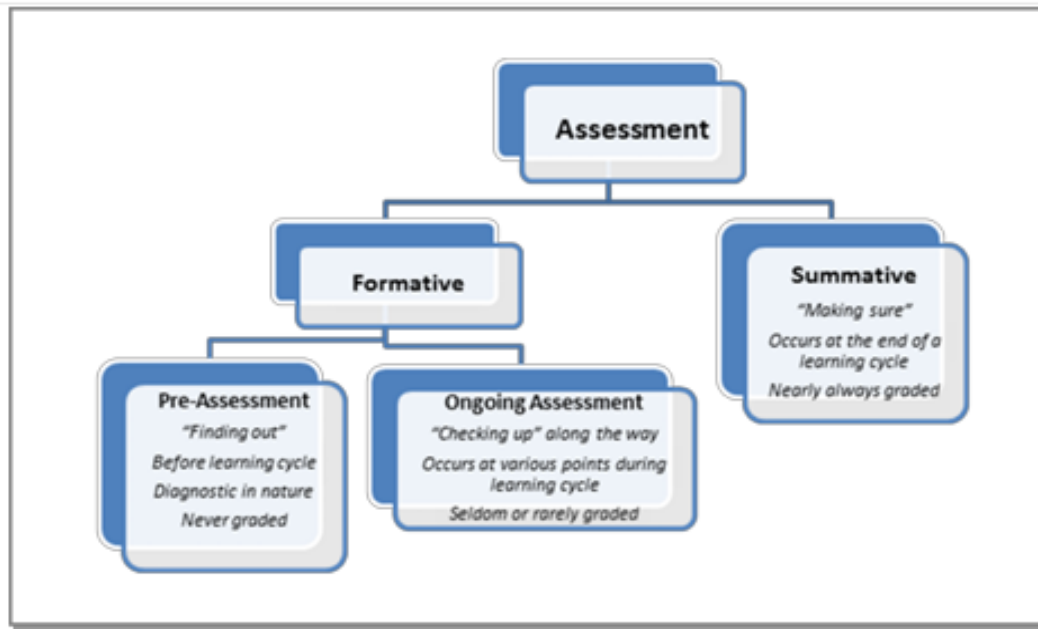
Formative assessment processes are most effective when they include clear learning goals that students understand, high-quality tasks aligned with those goals and appropriately challenging, timely and substantive feedback that helps students evaluate their progress, and responsive adjustments in instruction and practice based on assessment evidence (Hattie & Timperley, 2007; Wiliam, 2018). These elements together help students comprehend their objectives, engage in meaningful learning activities, receive constructive feedback, and make necessary adjustments to enhance their learning outcomes.

This era is of technological and creative resources that are increasingly complete, attractive, easy to use and highly useful for almost everyone and in all aspects of life, including education. Technology plays a crucial role in enhancing these characteristics by providing digital tools and platforms that facilitate these essential components. For instance, technology enables the clear communication of learning objectives through online platforms, ensuring students understand what they are working towards (Spector, 2020). It also supports the creation of engaging, goal-aligned tasks with varying levels of challenge through adaptive learning systems that respond to student needs (Pane, Steiner, Baird, & Hamilton, 2017). Furthermore, technological tools can offer instant, meaningful feedback through automated systems and interactive interfaces, allowing students to assess their progress in real-time (Shute, 2008). Finally, technology-driven data analytics helps educators make responsive adjustments to instruction by analyzing student performance data, thereby personalizing learning experiences and improving outcomes (Siemens & Long, 2011). Thus, integrating technology into formative assessment processes not only streamlines but also enhances the effectiveness of these assessment practices.

In recent years, the integration of interactive gaming platforms, such as Kahoot!, has emerged as an innovative approach to facilitate formative assessment within the classroom. (Douligeris et al., 2018). Kahoot! is a game-based learning platform

that allows teachers to create interactive quizzes, surveys, and discussions, enabling students to engage actively with the learning material. (Hadijah et al., 2020). It allows teachers to create quizzes with multiple-choice questions, fostering active learning and student engagement while providing immediate feedback to assess comprehension (Muna et al., 2023). The platform's usability, effectiveness, and product quality have been rated highly, making it a valuable tool for assessing student learning progress(Cahyani, 2024) . Kahoot! is considered a collaborative tool that enhances dynamic assessment activities, promotes interaction between teachers and students, and contributes to the construction of solid knowledge foundations in educational settings (Da Silva Barros et al., 2023). Kahoot's gamification-based approach stimulates and engages students in the teaching-learning process, making it a beneficial tool for formative assessment in various academic contexts (Faria et al., 2023).

Area of focus	Current findings	Research gap
Impact on Prospective Teachers	Kahoot! enhances classroom dynamics, improves student motivation, and fosters engagement through interactive learning experiences (Licorish et al., 2018).	Limited research on how Kahoot! specifically impacts the development of formative assessment skills in teachers.
Comparative Effectiveness	Kahoot! significantly boosts motivation and engagement compared to other educational games, but learning outcomes were similar across platforms (Wang et al., 2020).	Lack of comparative studies evaluating Kahoot! against other formative assessment tools in teacher education.
Long-Term Impact	Continuous use of Kahoot! over five months maintained high levels of student engagement and motivation, indicating potential for sustained positive effects (Wang, 2020).	Insufficient research on the long-term impact of Kahoot! on formative assessment strategies among prospective teachers.
Pedagogical Integration	Kahoot! can be effectively integrated into various teaching methods, enhancing student performance and engagement in the learning process (Sinnivasagam et al., 2022).	Need for research on how Kahoot! can be effectively integrated into pedagogical frameworks for teacher training.
Student Engagement and Outcomes	Kahoot! increases student motivation, engagement, and enjoyment in learning environments, leading to better academic performance in assessments (Martínez-Jiménez et al., 2021).	More investigation needed into how Kahoot! engagement translates into improvements in formative assessment practices and learning outcomes for prospective teachers.

Literature review

In the educational process, assessment is crucial. In general, the distinction between formative and summative evaluation goals has made. Summative assessment places the primary emphasis on learning outcomes, whereas formative assessment seeks to create a method of learning that supports learning through feedback (Dixson & Worrell, 2016; Stobart, 2008). Summative evaluation is the sort of assessment that is utilised most frequently

in educational institutions. Additionally, evaluation serves as a formative skill. Formative assessment has been used frequently in the classroom to identify students' learning requirements and to evaluate their interactive learning and growth for arranging according to those needs (Centre for Educational Research and Innovation [CERI], 2008). Formative assessment is a method that provides feedback to teachers and students so they can close the gap between their actual learning environment and their desired learning goals. It is a part of both the teaching and learning processes (Heritage, 2007).

The significance of developmental evaluation has been noted in government-funded schooling with the turn of events, execution, and suggestions of states to make changes to further develop responsibility, understudy accomplishment, and plan for twenty-first century abilities (Cotton, 2017).

Developmental evaluation instruments ought to be imaginative and current and are generally ungraded appraisals that give important and urgent data about what understudies know and comprehend and what they don't yet have any idea. The developmental evaluations are an aide for educators with respect to what data should be explained or what further guidance might be fundamental. Developmental appraisal apparatuses are guides for understudies to upgrade their exhibition, increment learning, and further develop grades and outcomes in the present and future.

In a review directed at utilizing versatile learning conditions, the discoveries showed that the students didn't accomplish as much as those in the conventional gathering. For this situation, developmental appraisal didn't increment understudy learning, and the specialists felt it depended on the high mental burden experienced with the versatile picking up overburdening the functioning memory (Chu, 2014). This data showed that different elements really do assume a part in understudy learning and execution of developmental evaluation procedures. It is essential to do more research on the utilization of cell phones since this is the latest thing in schooling.

Compelling educators are the absolute most significant figure understudy accomplishment as indicated by a subjective contextual investigation by Curry et al. (2016). The focal point of the review

was to audit information utilized by educators to illuminate (developmental) instead of assess (summative). The investigation discovered that enlightening information assists educators with being more intelligent in their showing practices and developmental appraisal information further develops educator inspiration. Guidelines for responsibility that emphasis just on summative high-stakes test scores have been found to demotivate instructors and understudies the same. A survey by Hattie and Temperley (2007) found quantitative proof that understudies who get criticism perform more really on an undertaking than the individuals who get recognition, prizes, or discipline. As indicated by Clark (2012) developmental evaluation prompts inspiration for self-managed learning and meta-discernment where students gain attention to control their reasoning which prompts long lasting learning. There is a test to the association among social and social forerunners and low financial status when educators enable and draw in understudies in the instructing and educational experience utilizing developmental evaluation found to have expected in inspiration and accomplishment (Clark, 2012).

Formative assessment with technology support has seen a surge in popularity, yet there remains limited insight into how teachers perceive and effectively utilize it in the classroom. Zhan and So's (2017) study on the formative assessment multimedia learning environment (FAMLE) revealed a noteworthy transformation in teachers' pedagogical approaches toward formative assessment. FAMLE, a comprehensive learning environment, incorporates multimedia assessment tasks to evaluate performance, learning, and knowledge, enabling immediate enhancement through feedback. Additionally, these tasks yield detailed data records that can be analyzed and displayed computationally. Regrettably, formative assessment is either underutilized in classrooms or implemented incorrectly, as highlighted by Black and William (1998, 2018). Nevertheless, there exists a wide array of research-supported tools and new technologies for successful formative assessment implementation.

Alf Inge Wang, a professor of computer science and game technology at the University of Oslo, is the inventor of Kahoot!, and Morten Versvik, a co-founder of the company and Wang's student developed the technology for his master's thesis

(Kahoot, 2018). Educators may create and share interactive quizzes, surveys, discussion topics, and jumble games in the classroom using the online gamification tool and learning platform Kahoot! (Atilano, 2017).It is a dynamic platform that keeps getting better. On the website https://create.kahoot.it, one can open a Kahoot! account for nothing. Teachers can now create four other types of Kahoot games using the "create" option: quiz, discussion, jumble, and survey. Users can upload images or YouTube videos to their Kahoot! projects. Additionally, you have the option of making the project public or keeping it private. Using the discover option, teachers can copy and change hundreds of pre-made Kahoot projects. To make the game more competitive, you can choose to establish time limitations for students to respond to questions (5, 10, 20, 30, 60, 90, or 120 seconds) or give them additional points if they respond correctly more quickly than other students. Before beginning a quiz in class, the instructor logs into her free Kahoot! account and chooses the "play" option to launch the game in either classic (player vs. player) or team (team vs. team) mode. A big screen must be displayed with the image. The pupils must next use their mobile devices to connect to Kahoot! it and enter the special pin code displayed on the screen. A triangle, a diamond, a circle, and a square are the only four possible choices that can be provided to students. Before the allotted time limit expires, all pupils must click on the pertinent symbol. The distribution of replies is depicted on the next screen with a checkmark or checkmarks next to the appropriate response (s).

Research Methodology

The main purpose of this experimental study was to investigate the effect of formative assessment using Kahoot! on the academic achievement of prospective teachers. Experimental research is a scientific approach to research, where one or more independent variables are manipulated and applied to one or more dependent variables to measure their effect on the latter. The methodology of exploring how Kahoot! Changes formative assessment and enhances prospective teachers' success is logical due to its structured and evidence-based approach. By employing quasi-experimental designs, (posttest only control design) researchers systematically tried to assess the effect of formative assessment practices on prospective teachers' achievement. Control group is added to ensure that observed changes are directly attributable to Kahoot! rather than external variables. Focusing specifically on formative assessment the research addressed critical components of effective education. This data-driven approach not only yields reliable and actionable insights but also supports informed decisions about integrating interactive tools into educational practices. Overall, this methodology is well-suited to uncovering how Kahoot! can enhance both student learning and teacher development, providing valuable evidence for improving educational outcomes. All the prospective teachers of semester VI were the population of the study in a local women university. There were 175 prospective teachers who enrolled in semester VI. Sixty (60) prospective teachers were selected randomly and divided into two (2) groups (30 in each group). Groups were equated on the basis of previous GPA. The total duration of the study was four months (16 weeks). Two sections, each consisting of 30 students, were engaged in studying the subject of Research Methods in Education. Treatment was assigned randomly. In the study, the control group continued with the traditional teaching activities and assessment methods they had previously used. Meanwhile, the experimental group experienced a different approach: the teacher created assessments using Kahoot!, a platform for interactive quizzes primarily featuring multiple-choice questions. Students in the experimental group participated in Kahoot! games during class, which served as a formative assessment tool to gauge their understanding and engagement.

The teacher initiated the Kahoot! game and shared the game pin with the students, who then joined the game using their real names. Questions appeared on the screen with multiple-choice options, and students had 30 seconds, or in some cases one minute, to select the correct answer. The display of scores alongside students' names increased their interest, motivated them, and fostered a sense of competition. The teacher (researcher) provided helpful guidance to address any difficulties that arose during the game. After each assessment, detailed feedback was given to the students. Following the intervention, both groups took a post-test, which included both objective and subjective questions to measure achievement.

Posttest was constructed by researcher and validated through experts. For reliability split half method was used (r= 0.85) The data collected from both groups were subsequently analyzed using statistical techniques.

Table 1

Reliability analysis

Cronbach Alpha	Part 1	Value	0.855
		N of items	
			12
	Part 2	Value	0.84
		N of items	13
	Total number of items		25
Correlation between forms			0.706
Spearman-Brown Coefficient		Equal length	0.855
		Unequal length	0.844
Guttman Split-Half Coefficient			0.85

Above Table shows that part 1 of the test, which contains 12 items, shows a Cronbach's Alpha of 0.855, while part 2, with 13 items, has a Cronbach's Alpha of 0.845. These high values indicate that each half of the test reliably measures the same achievement construct. The correlation between the two forms of the test is 0.706, suggesting a strong relationship between the halves, and confirming that both are effective in assessing the same construct.

The Spearman-Brown Coefficient values for equal-length (0.855) and unequal-length (0.844) forms further support the test's reliability, showing consistent performance even when accounting for different numbers of items in each half. The Guttman Split-Half Coefficient of 0.85 reinforces these findings, indicating that the two halves of the test are highly consistent with one another.

Data Analysis
Table 4.2

Comparison of Academic Achievement of Control and Experimental Group

Variable	Groups	N	M	S.D	T	df	Sig.
Achievement test	Control	30	62.03	9.050	-6.385	58	.000
	Experimental	30	75.03	6.515			

The independent sample t-test results presented in table 4.1 showed a significant difference between academic achievement of control and experimental group (t (58) =-6.385, p <0.05). Using Kahoot! Significantly improves the academic achievement of prospective teachers. The experimental group, which engaged with Kahoot! Scored significantly higher on the achievement test compared to control group, indicating that the interactive and engaging nature of Kahoot! can enhance learning outcomes.

Discussion
The current research proposed that Kahoot! can enhance learning of prospective teachers. The present research study also suggested that using Kahoot! significantly improves the academic achievement of prospective teachers. The data was collected from 60 prospective teachers who enrolled in semester VI in University of Punjab, and analyzed data using SPSS, the study found that Using Kahoot! resulted in a significant difference in academic achievement between the experimental and control groups. The findings of this study align with several recent research efforts

that have explored the impact of Kahoot! on student learning and engagement, particularly in teacher education programs. A study by Wang and Tahir (2020) corroborates these results, demonstrating that Kahoot! can significantly enhance student motivation and learning outcomes across various educational contexts. Their meta-analysis of 93 studies revealed that Kahoot! positively affects learning performance, classroom dynamics, and student attitudes. Similarly, Zainuddin et al. (2020) found that integrating Kahoot! into pre-service teacher education courses led to improved content retention and increased participation. Their research highlighted the tool's ability to create an interactive and competitive learning environment, which particularly resonated with prospective teachers. Focusing specifically on teacher preparation programs, Licorish et al. (2018) reported that Kahoot! not only enhanced academic performance but also improved classroom engagement and fostered a more positive attitude towards learning among pre-service teachers. Yilmaz and Kadioglu (2019) also supported the finding of this study that learners are more motivated when using Kahoot! because it makes classroom learning interactive, enjoyable, and rewarding. Their results also demonstrated a positive effect of Kahoot! on students' academic achievement. Additionally, they noted that integrating technology into the classroom increased motivation, and game-like activities encouraged active participation and enhanced learning. Ozan, (2018) conducted research to examine the effect of formative assessment practices on students' academic achievement. Mixed method research was used to conduct the study. Results of the research showed that the experimental group in which the formative assessment practices were performed had a significantly higher academic achievement levels and better attitudes toward the class than the students did in the control group. However, it is important to note that while these studies generally support the positive impact of Kahoot!, some researchers have cautioned against over-reliance on gamification tools. For instance, Plump and LaRosa (2017) suggest that while Kahoot! can be an effective supplement to traditional teaching methods, it should not replace more comprehensive instructional strategies.

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