Perceptions of Students Regarding the Use of Kahoot as an Online Formative Assessment Tool

Tanzeela Alam
PhD Scholar, Fatima Jinnah Women University, Rawalpindi.

Dr. Farhana Khurshid
Associate Professor, Fatima Jinnah Women University, Rawalpindi.

Received on: 05-07-2024 Accepted on: 08-08-2024

Abstract

The current study aims to identify students' views regarding effectiveness of Kahoot as a formative assessment tool in online learning. Classroom action research was conducted and Kurt Lewin Model was followed to plan, implement the intervention, observe and reflect over the activity. After each online session, formative assessment of students was conducted through Kahoot. Five formative assessment quizzes were conducted in total. The nature of the research question demanded a more subjective inquiry. In order to answer this question, focus group discussions were conducted with the students after practically utilizing Kahoot as an online formative assessment tool in online learning. Selected participants were students of B. ED, 3rd semester. Data was analyzed through thematic analysis. Findings of the study highlighted that Kahoot effectively enhanced students' level of understanding and engagement towards their learning and it provided instant feedback opportunity. Students highlighted that competitive and interactive nature of Kahoot created an environment where students enjoy and reinforce the knowledge. The current study contributed in the existing body of knowledge and research on digital assessment tools by highlighting potential benefits of game-based learning through Kahoot.

Keywords: Kahoot, formative assessment, online learning, students' views, Pakistan

1. Introduction

The education sector of the 21st century has undergone significant transformation. The era of confining teaching and learning to the boundaries of a classroom has come to an end. The internet has revolutionized teaching and learning in today's times through a paradigm shift (Syarifudin, 2020). This approach has extended beyond the confines of educational institutions and made it accessible to everyone through handheld devices. Consequently, the educational sector has witnessed a rapid and extensive recognition of online learning worldwide (Hussain et al., 2019). Almost 80% of learners have access to smart devices to engage themselves in healthy learning activities in class and at home. Student learning enhances by adding fun to the learning process (Zhang, 2021).

Game based learning is a pedagogical strategy that employs video games to enhance incidental learning. It differs from gamification, which involves students in deliberate

learning using nongaming systems that contain game aspects. Gamification has been beneficial in terms of student learning performance, motivation, engagement, and feedback. Mobile learning is the fastest growing trend to promote learning everywhere. It personalizes learning experiences and motivates learners to participate more actively in the learning process. Educational technologists have motivated teachers to use digital tools for assessment, like clickers, GBRSs, tablets, and mobile phones. Pre hire tests that are built like games allow employers to quickly and effectively evaluate candidates' talents. Game-Based Student Response Systems (SRSs) are widely used in classrooms. The effectiveness of GSRSs depends on how appealing, realistic, practical, and high quality the games seem to pupils (Shawwa & Kamel, 2023).

The use of GSRS by students throughout a semester long course had a favorable effect on their learning and engagement. Additionally, Kahoot is often utilized as a formative evaluation tool in undergraduate level. More crucially, GSRSs, specifically Kahoot, give teachers meta-conscious support, encourage students to reflect on their interpretation of pre-existing concepts, and speed up their ability to explain their point of view on various themes (Lashari et al., 2023). .

1.1 Online Assessment in Online Learning

Online learning enables learners to engage actively in educational activities around the clock, regardless of their location. It granted the freedom to create a study timetable that suits their convenience (Hussain et al., 2019). Online assessment is a cutting-edge approach used in online learning to evaluate a student's progress in their learning journey, either through online platforms or the internet. It possesses a higher capacity to evaluate intricate cognitive abilities, provide instant or real-time feedback, simplify the process of scoring, and decrease the time and expenses associated with human data entry. The primary objective of online assessment is to gauge and evaluate students' academic advancement during their studies. This seeks to enhance the practices of the assessor and benefit the individual being assessed. There are two primary categories of assessment: Formative assessment is a wide range of techniques used by teachers to measure student learning while it is still in progress. At the conclusion of a unit of instruction, summative assessments are used to measure student learning. Faize and Nawaz (2020) correctly argued that relying solely on summative assessments is insufficient as the use of formative assessments is also necessary. It will enhance the assessment process in its genuine essence.

1.2 Strengths of Online Assessment

Teachers in the current digital age have an increased range of options and prospects for conducting assessments online. Online assessment offers numerous advantages, such as its effectiveness in evaluating crucial life skills, enhancing test quality, improving scoring reliability, and addressing the limitations of traditional paper-based assessments, such as time-consuming grading and potential mismanagement (Urrutia & Araya, 2022). Additionally, it fosters active student participation, aids teachers in delivering prompt feedback to a substantial number of students, reduces the time spent on marking or grading, supplies administrators and teachers with valuable data, lowers printing expenses, enhances objectivity, and mitigates grading bias by having the computer evaluate students' responses

without regard to their race, caste, or culture (Sadi et al., 2021).
The online computer-based tools are specifically developed to provide assessments that evaluate the learners' acquisition of information and necessary abilities in targeted topics. For example, several online assessment platforms offer tests in a game format, incorporating gamification to make them more engaging for learners (Shawwa & Kamel, 2023). Online assessments mitigate the risk of academic dishonesty by presenting a variety of questions in a randomized sequence (Hsiao & Watering, 2020). It enhances the quality of formative feedback provided to students and enables teachers to address students' misunderstandings and uncertainties that may not be clearly apparent to them. This allows for clarification and resolution of ambiguities prior to the final exams (Hilde n & Fro jdendahl, 2018; Kremmel & Harding, 2020). Despite the numerous advantages of online assessment, it also has its drawbacks. Here are several significant constraints of online assessment that can impact the quality of the assessment process in online learning.

1.3 Limitations of Online Assessment

The advantages of online assessment are numerous, yet, it is not without its limitations or shortcomings, as the procedure may not always function optimally. Online assessment, as an example, necessitates a significant amount of time for test preparation and relies on the availability of technology resources and knowledge from both teachers and students in order to be used effectively (Cwil, 2019; Khan & Jawaid, 2020). The efficacy of any online assessment system hinges upon the assessment instrument. Some typical mistakes made by assessors include creating exam forms that are excessively brief, excessively lengthy, or contain ambiguous questions or phrases. Online assessment requires certain skills such as proficient typing, efficient mouse navigation, multitasking with many screens, and using various technical tools (Sa'di et al., 2021).
One of the problems of online assessment is the ineffectiveness of formative assessment. Formative assessment has consistently been the focus in the realm of online learning. While both formative and summative assessment hold significance in the teaching-learning process, summative assessment tends to overshadow formative assessment as the primary instructional method (Bahati, 2019).

1.4 Formative Assessment and Challenges

Formative assessment is subject to varying descriptions depending on different views. According to Simonson (2019), formative assessment is a procedure that specifically targets the achievement of learning objectives. Formative assessment is an ongoing process in which both students and teachers actively participate to emphasize learning outcomes and take steps to approach the established goals. In his work, Nsabayezu (2022) defines formative assessment as an assessment method that is focused on facilitating learning. It is an evaluative process that facilitates additional learning or investigation. Online formative assessment can benefit students by offering constructive feedback and enhancing their dedication to meaningful learning opportunities (Schneider et al., 2021).
Formative assessment, while intended to enhance the quality of students' learning, remains a difficult undertaking that requires practitioners to address several associated challenges. to some teachers' beliefs, formative assessment is not a simple task because it demands

significant resources, time, and perseverance (Hodges et al., 2020). Furthermore, the documented evidence clearly highlights the deficiency in instructors' preparedness and comprehension of formative assessment within that particular setting (Hill et al., 2017). In order to cultivate comprehensive, pertinent, and efficient formative assessment strategies, the teacher must dedicate a significant amount of time and assume the responsibilities of a facilitator, guide, or coach. The true impact of formative assessment procedures remains unknown until individuals actively engage students in their own learning process (Bahati, 2019). To do this, it is necessary to enhance the process of formative assessment. To achieve this goal, several technical tools have been employed, such as Google Classroom, Google Forms, Socrative, Proprofs Quiz, Moodle, Edmodo, and Kahoot. By using these online assessment tools, teachers can avoid the requirement to create a traditional pen-and-paper test or make photocopies of the exam.

An example of such a platform is Kahoot. This application can be seamlessly included into the current online teaching and learning platforms. Kahoot is employed to integrate collaborative learning and increase student involvement in the educational process through the implementation of game-based learning (Abdulla, 2018; Alharbi & Meccawy, 2020; Balta & Tzafilkou, 2019; Munusamy et al., 2019).

1.5 Kahoot- an Online Formative Assessment Tool

In 2013, Kahoot was initially introduced. Since then, over 4.4 billion users from 200 nations have engaged in playing it. The website of Kahoot hosts around 100 million games. The quick growth of users can be attributed to the inclusion of advanced functionality and a user-friendly interface (Abdulla, 2018). Kahoot is an educational technology application that allows teachers to create computer-based quizzes. Kahoot has a colorful interface with interactive features and graphics, building learners' motivation. Indeed, a study conducted by Vick (2019) revealed that students are involved in the process of Learning and Motivation using digital learning applications. Game-based learning has become widespread and a point of interest. Aldana (2020) suggests that this platform has the potential to evaluate the ongoing academic performance of higher education students, making it one of the growing options in this field.

Research on the use of Kahoot as an online assessment tool in Pakistan is gaining popularity with the passage of time. Multiple studies are conducted for such purpose. For instance, Lashari et al. (2023), Qureshi and Khatoon (2023), Batool et al. (2023), Makhdum et al. (2023), Malik et al. (2023), Jalbani et al. (2020), and Jamil et al. (2018) conducted research on practicing Kahoot as an assessment tool in teaching multiple subjects. However, there is lack of research in the area of using Kahoot as an online formative assessment tool in online learning setup. Therefore, current research was planned to overcome the challenges associated with doing formative assessment of students and to improve the quality of existing formative assessment practices. The current action research focused on the use of Kahoot as an online assessment tool for formative assessment purposes in online learning at higher education level. In view of the scope and aim of current research, following research question was formulated;

- What are the views of students regarding the effectiveness of Kahoot as an online formative assessment tool?

2. Theoretical Foundation

There are three main theories that serve as the theoretical foundation for contemporary research: constructivist theory, activity theory, and self-determination learning theory. The constructivist theory emphasizes equipping learners with technological tools to facilitate peer interaction and problem-solving (Ahshan, 2022; Krath et al., 2021). The game-based learning approach incorporated the components of practice, engagement, and experiential learning. Activity theory provides insights into the functioning of the activity system in the context of game-based learning (Narayan et al., 2021). Conversely, the self-determination learning theory posits that learners should be equipped to assume accountability for their own learning. The authors Ryan and Deci (2020) provided the elements of autonomy, competence, and relatedness. A conceptual framework was established for the current research, taking into account these ideas and the intended components. Figure 1.1 shows the conceptual framework of the current research.

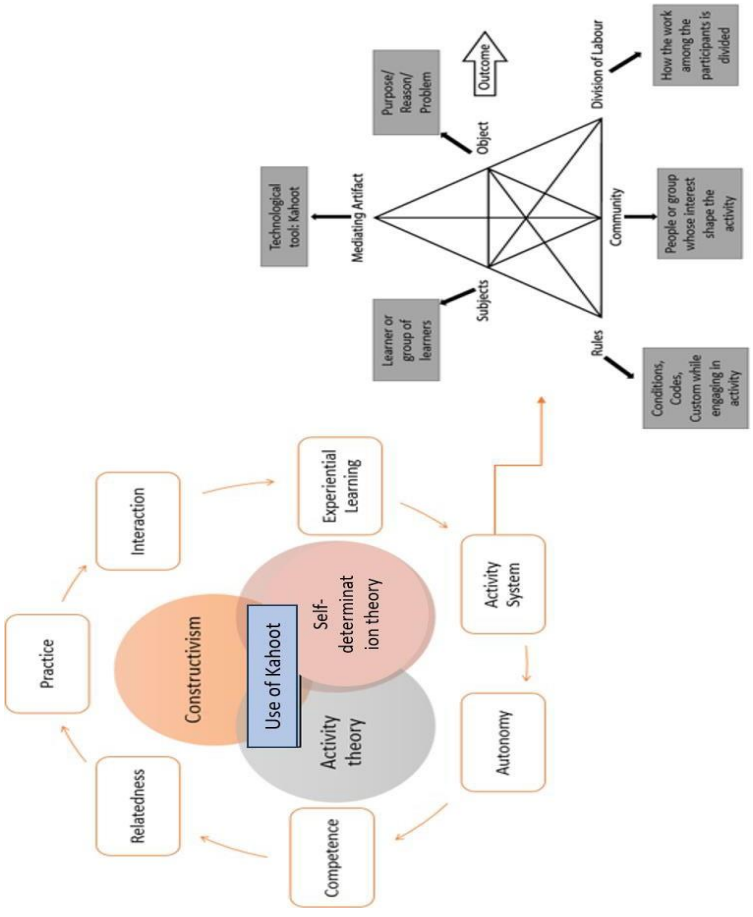

Figure 1.1 Conceptual Framework

3. Methodology

Methodologically, the current study calls for classroom action research. Action research is used to design the studies when focus is to not only inform but to also influence the current practices (Mulvaney et al., 2023). It has been credited with the work of Stephen M.Corey (1953), for bringing educational improvement, who worked on the footsteps of Kurt Lewin in 1940s. Still, Kurt Lewin is considered as the father of action research (Adelman, 1993; Okoko, 2023) where his action research model guided many practitioners for years, up to date. His action-reflection model mainly consisted of four stages; Plan, Act, Observe, and Reflect. In current study, the Kurt Lewin Action Research Model was utilized. In the light of that model, procedure of the study was finalized. Further details of the Kurt Lewin Model and how I utilized it in my research is given below.

The Kurt Lewin's Action Research Model (1948) was used initially to investigate the social problems raised in the post-war time period. Based on which, Kurt Lewin developed an action research and social change theory (Hopkins, 2014). He proposed a four-phased cycle which included; planning, action observation and reflection. Figure 1.2 shows the basic Kurt Lewin's Action Research Model.

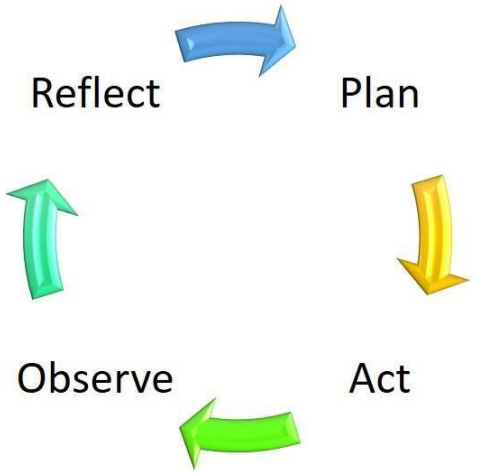

Figure 1.2 Kurt Lewin's Action Research Model

As shown in figure 1.2, the cycle starts with the identification of the problem or idea based on which plan is made for fact-finding. After development of a better plan, action takes place accordingly by implementing the suggested plan. Furthermore, it is followed by in-depth observation of the activities to understand the situation and comes up with some assessment (after continuous reflection) (Andronic, 2010). In this way, the cycle continuous and each reflection gives rise to new identification of problem. Several researchers have used Kurt Lewin's Model in plenty of research conducted in the classroom context (Hunnufus et al., 2023; Aziz et al., 2019; Rahmah, 2019; Nurdiniyah et al., 2021). For this research, the Kurt Lewin's model was used which was adapted from Tivaraju, Yunus and Badusah (2017). Figure 1.3 presented the adapted model for current research.

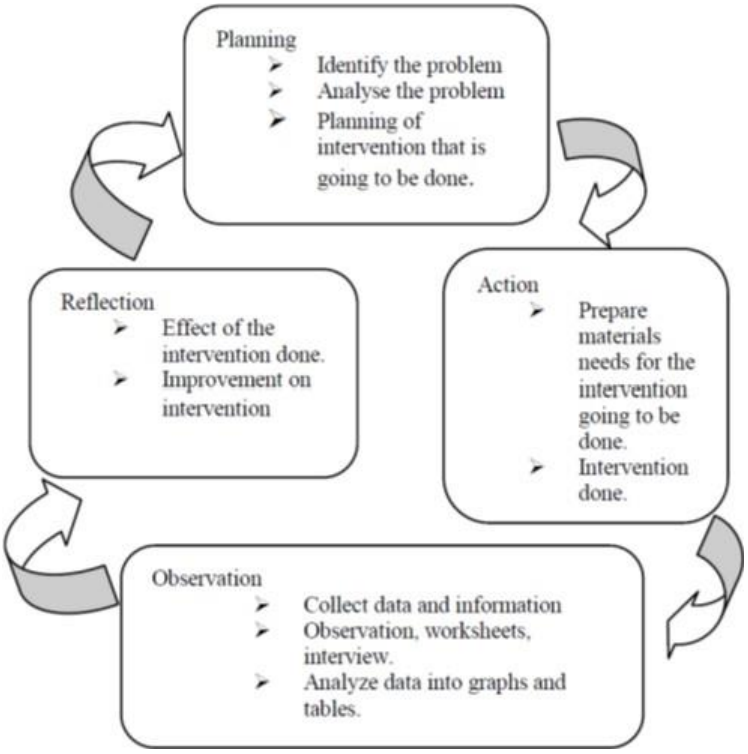

Figure 1.3 Kurt Lewin Model adapted from Tivaraju, Yunus & Badusah (2017)

3.1 Qualitative Research Approach

A research approach delineates the chosen methodology for gathering, scrutinizing, interpreting, and assessing data while considering the specifics of the study objectives (Rattray et al., 2023). There are mainly three research approaches which are widely used; quantitative approach, qualitative approach, and the mixed methods approach (Creswell and Clark, 2011, 2014, 2017). The current study focused on investigating the effectiveness of utilizing Kahoot as an online formative assessment tool in online learning. The nature of the research question demanded a more subjective inquiry. The research question was about gathering students' perspective after working with Kahoot as a formative online assessment tool. In order to answer this question, focus group discussions were conducted with the students after practically utilizing Kahoot as an online formative assessment tool in online learning.

3.2 Participants of the Study

The aim of current research was to improve the process of formative assessment in online learning for which it was planned to use Kahoot as an online formative assessment tool. The intervention was planned for entire semester. The selected participants were the students from B.ED (Hons), 3rd semester, taking the Basic Research Project Course that were 40 students in total. Hence, a consent form was distributed among the whole class where they were informed regarding the aim and procedure of the study. All of the students were willing

to take part in the research.

3.3 Procedure of the Study

In the current research, Kahoot was used as an online formative assessment tool in online learning. First, instructional material was shared in the form of notes with the whole class. The online session was arranged with them to deliver a thorough lecture and clear the queries. Presentation slides were also used during the lecture. Then intervention was given and same pattern was followed. Soon after the instructional session ended students were asked to attempt the quiz on Kahoot. Kahoot was utilized as an online formative assessment tool there to identify their level of understanding and give them instant feedback. The next day, students were invited to take part in the discussion related to the topic. Five formative assessment quizzes through Kahoot were given to the students. After attempting the quiz, their weekly task was scheduled so they may work on their final proposal alongside as well. It was presumed that one topic may take two to three weeks, depending on the students' completion of task and the detailed feedback given to them. At the end, focus group discussions were conducted with the participants where their shared their experience of working with Kahoot as an online formative assessment tool.

4. Findings of the Research

Primarily three theories provided theoretical background to the current research which included; social constructivist theory, activity theory and self-directed learning theory. Mainly, game-based learning was utilized in current research which is built upon constructivist thoughts. It focused on providing learners technological tools so they may interact with their peers and learn to solve their problems. It presented the components of practice, interaction, and experiential learning during game-based learning which was utilized while practicing Kahoot as a formative assessment tool. Activity theory assists in understanding how the activity system works during game-based learning, utilizing Kahoot (Narayan et al., 2021). Furthermore, self- determination theory explained the components of autonomy, competence and relatedness which were also considered in current research. The findings of the current research are explained in the following text.

4.1 Experiential Learning

During the use of Kahoot as an online tool for formative assessment, the main objective was to offer students experiential learning opportunities. Subsequently, the students were surveyed to gather their perspectives on their online learning experience and to inquire about their overall learning experience using Kahoot. Every kid expressed that the activity was novel and captivating. One of the students commented that,

"Although we attempted the quizzes on LMS and there was timer for that activity however, quizzes on Kahoot were very attractive in terms of colors used and the sound effects were highly attractive."

The majority of students reported that using Kahoot during online learning was highly effective, as it not only improved their knowledge but also facilitated self-assessment of their academic achievement. Students valued the idea of using Kahoot as an online formative assessment tool because it helped them apply the concepts, they learned to solve real-life

challenges. As one student shared,
"I remember one of the statements from the quiz which was related to investigating the effects of yoga on increasing the mental abilities of the students. It catches my attention as I always remain interested in Yoga. I tried to connect the presented situation with my real-life yoga experiences. Hence, such questions helped in understanding the application of abstract concepts in more affective way."
Another student added,
"I am a visual learner. Thus, videos always attract me. I still can recall the videos related to the research method, cross-sectional design, and experimental research design specifically."
In addition, the students recognized that regularly taking quizzes helped them to excel in the final assessment. At the conclusion of each session, the students participated in an engaging and visually appealing quiz using Kahoot. This quiz effectively addressed any misunderstandings or uncertainties they had about the concept. The participants greatly valued the use of formative assessment, as it allowed for the consideration of diversity among learners through the inclusion of a wide range of materials, videos, and photographs, among other things. In addition to taking the quiz individually, students were also offered the opportunity to participate in a group quiz where they engaged with one other through a WhatsApp group. After making the necessary preparations, each group accessed the online Kahoot room using a single ID or pin. They then proceeded to participate in the quiz either by consulting with each other or by engaging in lengthy discussions over a WhatsApp group. The activity enhanced the students' understanding and provided them with hands-on learning opportunities as they shared their knowledge in a collaborative game. One of the students shared that,
"We were more eager to learn from others while interacting through WhatsApp group as we contributed in enhancing each other's knowledge so that our group may get more points in quiz or rewards".
One of the students added,
"Practicing formative assessment in the form of games was totally a new experience for me. Being a part of WhatsApp group, where all of the group members tried to assist each other, I also remained more vigilant to perform in the group task."

4.2 Practice

Throughout the intervention time, the primary objective was to ensure that the students were actively applying their information through various methods. Initially, the primary objective was to guide the students towards the pinnacle of Bloom's taxonomy, emphasizing the practical application of abstract concepts. Quizzes were designed to provide students with real-world challenges for a specific purpose. Furthermore, students actively engage in hands-on practice to familiarize themselves with the functionality of Kahoot, the creation of quizzes, and the process of assessment using this platform. During the Kahoot practice session, the main objective was to progress gradually from simple to more challenging tasks. As one of the students pointed out,
"We started with selecting a research topic, taking a quiz regarding how research questions are formed, hypothesis is developed, and gradually moved towards how analysis is made."
Another student added that,

"Later on, such practice with Kahoot that started from idea selection, research questions and hypothesis development moved towards performing analysis. It helped us to perform better in our final research project as well."

Students confirmed that the teacher used Kahoot to administer quizzes for formative assessment after explaining the research-related subjects through conversation. It enabled the students to demonstrate their level of comprehension. The students unanimously believed that knowledge was imparted to us and we were able to apply it with increased enthusiasm and motivation. According to one of the students,

"While practicing Kahoot, we were actually applying the learned concepts to solve concrete problems. It let us know how much we learned and where gap exists. Hence, we discuss our queries with the instructor."

Another student added,

For instance, although, I was interested to work in the area of leadership and management. Still, I was much confused regarding the selection of my research topic. At the end of first two weeks when we were done with the introduction and literature chapter. I was very clear about the research gap that exists in our context and the research questions that need to be answered.

The majority of students expressed that providing an opportunity to practice using a technology tool prior to its real implementation can enhance its effectiveness. Prior to implementing Kahoot in the research course, the instructor should introduce students to the fundamental characteristics, functionalities, and uses of Kahoot. This practice should be continued in the future. Subsequently, the subsequent quizzes administered during various online research course sessions proved to be manageable for the students. A student expressed,

"Everything needs practice. The more we practice the more we learn how to use Kahoot in an effective manner."

4.3 Interaction

Kahoot activities provided students with the chance to communicate with both their teacher and their peers. Following the intervention, students expressed their perspectives on how Kahoot facilitated the emphasis on interaction during the learning process. During the focus group talks, it was emphasized that students' engagement in a game-based learning environment enhanced their aptitude to perform within a designated timeframe and their motivation to outperform their peers. The majority of students reported that Kahoot provided them with an opportunity to acquaint themselves and engage with one another. As one student emphasized,

"I came to know about most of my class fellows after watching their names on the ladder board."

While asking about the students' experience of online sessions one student shared his views that,

"My experience of Kahoot sessions was highly motivating for me as there was a healthy competition held among students so everyone tried to perform well. I was more enthusiastic to remain at the top of ladder board and get as many points as possible."

Students also expressed that the online sessions offered us the chance to immediately engage

with our teacher and inquire about topics that required additional clarification. The majority of students believed that the learning atmosphere should be conducive and participatory in order to stimulate students' minds to ask questions. The application of technology can aid in the creation of such a conducive learning environment. The incorporation of diverse multimedia elements such as video clips, sounds, and photos in the Kahoot quizzes enhanced the learning environment by making it more captivating and interactive. A student recounted her experience with Kahoot, stating that,

"Having a strong background in mathematics and statistics I outperformed in those quizzes which were based on the research analysis. I also assisted others in understanding the reason behind choosing certain analysis type. However, I found difficulty in finding the research gap while reviewing the relevant literature. Therefore, when I attempted the second quiz regarding literature review, I found that certain points were still not so clear. Hence, when I interacted with my teacher and peers in the discussion session, all of my doubts were cleared."

Another one added,

"A healthy competitive environment always makes wonders."

4.4 Activity System

The activity system consists of several sub-themes, namely: a game-based learning tool, subject and object, division of work, community, and rules. All the students unanimously believed that it offered them a beneficial and enriching learning experience. The students mainly emphasized the interactive element of Kahoot and its ability to provide quick feedback within the context of game-based learning. According to one of the students,

"I felt like participating in a game where timer was on and soon the countdown started. It made the learning fun for me. I didn't feel exhausted due to such assessments."

Another one added,

"After the quiz, teacher shared the results and elaborated the highlighted wrong question before students so that their concepts could be clear on time without any further delay. Those questions were specifically discussed during the online session."

During the focus group talks, all students enthusiastically shared their experiences of using Kahoot in online learning. The majority of students emphasized that the competitive character of the Kahoot experience served as a strong source of motivation for them. A student pointed out that,

"We enjoyed attempting the quizzes that were given in the form of games. The feedback which we received soon after marking the question, helped in clearing our ambiguities on time."

Another student said,

"I loved the rush of competition. I felt being a part of the group where everyone was struggling to bring improvement. It was just because Kahoot gave us a completely new experience where there was no burden of rote memorization."

Students were given the option to participate in the Kahoot quiz on their mobile devices without the need to download or install any additional applications. Students expressed that they did not feel overwhelmed because they were motivated and intrigued to engage in the game. A student expressed,

"As everyone played on his/her own device or mobile, therefore, they were not interrupted while attempting the quiz."

During the focus group discussion, it was emphasized that erroneous answers were not viewed as failures, but rather as opportunities for further progress. Students clarified that in order to ensure a seamless progression of tasks, specific regulations were established and communicated. The restrictions implemented in game-based learning fostered an equitable atmosphere for students, hence augmenting their comprehension levels. Shortly after the quiz was taken, a scoreboard displayed on the screen to indicate the ranking based on performance. One student expressed their appreciation for this function by commenting that, "I knew what I need to do. I was very much clear about that. Furthermore, the point system on Kahoot encouraged me to participate more in Kahoot sessions. I think it was a good reward system."

4.5 Autonomy

In the present study, the students were granted autonomy, allowing them to exercise control over their learning and make choices and decisions inside a game-based environment. As majority of the students agreed that Kahoot provided them an opportunity to reflect back on their actions. Through utilization of Kahoot, instant result was shared with them which made them able to know about the week areas. Instant feedback was also given during the discussion session which guided them for bringing further improvement. One of the students shared such views that,

"Sharing instant results soon after attempting the quiz, let us know about our performance. We were able to evaluate our preparation and performance through it."

Another student added,

"We do not completely rely on the teachers' feedback instead we were assessing our performance through attempting the weekly quizzes. For instance, the weekly quiz assisted in understanding the reason behind choosing a specific research design in multiple situations. Thus, while selecting a design for my own research all those examples were in back of my mind and I was continuously recalling it".

The examination of qualitative data indicated that the utilization of various technological tools, particularly gamified tools such as Kahoot, allowed the learners to autonomously complete the assignment. A significant proportion of the students emphasized and praised the autonomous and flexible nature of Kahoot. Additionally, students emphasized the ability to track their individual progress and engage in self-directed learning. Students found the aspects of Kahoot enjoyable, and one student in particular expressed their satisfaction.

"It motivated me when I saw my name at the top of ladder board. I felt more ownership towards learning and took more responsibility towards learning to compete with others."

Every student unanimously agreed that since the tests were not assessed, they were not particularly frustrated or concerned about their marks. Their primary emphasis was on acquiring knowledge. Students also concurred that students were enthusiastic to acquire further knowledge and assess their intrinsic comprehension of research themes. One student recounted her experience that,

"When I came to know that I was not being graded and my performance in the quizzes would not affect the final assessment, it made me feel more relaxed."

All of the students agreed that utilization of Kahoot in online learning sessions made them more eager to learn as they believed that they were taken as an individual learner. They were

given more autonomy during the learning process where the timely feedback given to the individual students kept them focused, active, motivated, and engaged into their learning. One among students shared that,
"Definitely Kahoot increased our eagerness to learn more as it was user-friendly and do not require advance technological skills."
Another student added that,
"As we were connected with our peers and instructor during the whole semester, so we feel more connected with our learning."

4.6 Competence

During the use of Kahoot as an online tool for formative assessment, the main emphasis was on helping students improve their level of competence. The method of initially providing simpler tasks and progressively transitioning to more complicated ones, resulted in an enhanced degree of confidence among the students. The majority of students said that they were able to establish connections between their prior knowledge and the new information. As one of the students pointed out,
"Initially we were introduced with the basic concepts of research. Kahoot assisted in getting enough understanding of those concepts. Gradually, based on that knowledge, we learned the advance research skills like applying the learned concepts for solving research problems."
Another student added into that,
"I performed well in the small weekly quizzes based on each research topic. I updated my work side by side. Only then I was able to complete the final project."
The participants acknowledged the importance of receiving immediate response from Kahoot right after submitting their answers. Due to this reason, Kahoot was praised for its ability to immediately rectify misconceptions. Students also valued the fact that a comprehensive leaderboard was provided following the quiz, which displayed the proportion of questions answered correctly, the percentage of questions left unanswered, and the final score. As one of the students pointed out,
"I really like the way Kahoot displayed podium at the end of game. Where every student can look at the final score and their place in relation to other students."
Sharing the same views one of the students shared that,
"The instant feedback feature of Kahoot is great. It really helped me to identify the weak areas. I came to know how competent I am and where I need to work more."
All of the students acknowledged that Kahoot helped in fostering a sense of accomplishment which is very much important for getting enough competency. When students answered the questions correctly, it enhanced and contributed towards their feelings of achievement. Students appreciated and liked the Kahoot competitive feature that when their names were displayed on the screen, according to their performance, it motivated them and they actively participated while attempting the quizzes. As one of the students shared her experience that,
"Watching my name on the ladder board raised a sense of accomplishment which gave me more courage to perform confidently in the upcoming quiz."
Another student commented that,
"I was more eager in getting more points. It was like adding into my achievements each time".

4.7 Relatedness

The theme 'relatedness' refers to the connection between teacher, students, peers and with the content provided to them. The students expressed their enjoyment and appreciation for the contact with both their teacher and their peers. Students also recognized participating in collaborative online group quizzes with their peers. During the discussion, one of the students emphasized that,

"Having discussion with teacher and peers helped to engage in the collaborative learning environment. I enjoyed talking to my group members while discussing important concepts of research. Sometimes, we discussed for hours on Whatsapp group and eventually came to some conclusions. Even it was virtual and on distance."

Another student shared the same views and said that,

"It was a great opportunity of discussion after the quiz, as we shared and heard different perspectives. I learned a lot from the group discussions."

Providing students with real-life experiences in online learning is equally crucial as it is in a traditional face-to-face classroom environment. Relating abstract concepts to tangible events facilitates beneficial enhancement in students' learning.

During the focus group discussions, students emphasized that the gamification aspect of Kahoot facilitated the creation of a favorable environment for them to engage in solving real-world problems. Additionally, it contributed to the improvement of their logical thinking abilities and their level of innovation. According to one student's account,

"Examples shared via Kahoot were based on solving real-world problems. I still remember the examples of mental sickness, yoga, academic stress and fatigue which were asked in the quiz."

Majority of the students acknowledged that Kahoot provided an opportunity to increase their attention and engaged them towards learning. Other features of Kahoot also provided students with the opportunity to actively participate and obtain real life experiences. For instance, obtaining points and badges on podium and leaderboard motivated students to take part in any game which is based on connecting abstract concepts with real life problems. While appreciating the use of videos, one of the students said that,

"The videos, audios or moving images converted the deadly research concepts into lively one."

Another student highlighted the same views and said that,

"I was active all the time to attend the sessions because of the interactive simulations, pictures and videos inserted in the questions."

5. Discussion and Conclusion

The findings of this study shed some light on the effectiveness of Kahoot and students' positive perceptions towards Kahoot utilization as a formative assessment tool in online learning. Findings of current study revealed that Kahoot was reported as an effective formative assessment tool in online tool. The findings showed that students highlighted the significance of promptly obtaining feedback on formative assessment results, as it aids in swiftly identifying areas of weakness and improving comprehension. Kahoot received acclaim for its capacity to correct misunderstandings and deliver a thorough leaderboard after the quiz. Findings revealed that students valued the chance to obtain additional

information about the findings, including explanations for incorrect responses, which eventually enhanced their comprehension of the subject matter. Conducting onlinediscussion sessions following each quiz served as an additional means of providing and receiving feedback. Students recognized that the on-spot comments provided throughout the online sessions increased their level of engagement. The results also indicated that the feedback method was centered around fostering reflective learning, whereby students critically reconsidered their learning and endeavored to make more enhancements. These findings are similar to Faulconer et al., (2022) where researcher explained that instant feedback mechanism helped students in clarification of their misconceptions. Students become able to know about where they need to work more and make improvement.

Moreover, the combination of peer assessment and feedback from teachers was also highly meaningful. Students actively employed critical thinking skills when answering questions, and teachers saw that Kahoot offered prompt feedback in various formats, facilitating their comprehension of students' grasp of the material. Yang et al., (2019) also highlighted that, a live leaderboard which was shared by a teacher provided real-time feedback thus created a sense of participation among students towards their learning. By providing immediate feedback to the students, it led positive perceptions towards their learning. It gave rise to and encourage students' participation and motivation towards active involvement of students.

Furthermore, students shown increased engagement and participation when trying Kahoot quizzes, as the primary objective was to identify areas of weakness, provide feedback for ongoing growth, and facilitate a better comprehension of the topic. The users particularly appreciated the formative feedback method of Kahoot, as it reduced students' dependence on their instructors by providing fast feedback on their performance. Reyes (2019) mentioned the same concern that prompt feedback provided to the students make them aware about the discrepancy between what they already know and what they should have toknow about. It also helped them to know about how they have to perform to meet the learning objectives of particular activity.

Independent learning is a cognitive process in which individuals exercise autonomy and agency in their educational pursuits, making informed decisions and assuming accountability for their individualized learning requirements. Qualitative findings showed that Kahoot offered learners the chance to complete assignments autonomously, enabling them to monitor their progress and assume accountability for their learning. Students also valued theflexible and individualized approach of Kahoot, as it enables them to complete assignments at their preferred speed and meets the requirements of distance and online learning. Such practice promoted independent learning while limiting the existing practice of spoon feeding. This finding is similar to Zhang (2018) that Kahoot foster independent learning among students therefore, they rarely dependent on their instructor. The results showed that Kahoot also facilitated in creating an environment where students were engaged in quizzes withoutany interruptions or criticisms, thereby encouraging critical thinking and emphasizing the importance of quality over quantity. Post-quiz discussions facilitated active student engagement and enhanced comprehension, hence fostering independent work among students on the final research project. Findings of the current study are backed by the findings of Mada and Anharudin (2019) that Kahoot resulted in increased students' independence and they act as responsible students by performing the activity on time and with full attention.

Students further acknowledged that Kahoot motivate them to concentrate on enhancing their competence by emphasizing on the highest level of cognitive function. Teachers have the ability to participate in sessions from any location and using any device, enabling students to have control over their learning and be responsible for their academic progress. Kahoot also facilitates individual student assessment and enables teachers to deliver personalized feedback, hence streamlining the teaching process. This finding is similar to Yudkowsky et al., (2020) that teachers are able to utilize many online resources to customize their teaching methods, offer specific assistance, establish a student-focused learning atmosphere, and consistently track students' advancement.

Moreover, Findings showed that Kahoot is inclusive of all types of learners as it offers a diverse range of features such as a wide color scheme, several item possibilities, utilization of images and videos, background music, visually appealing text, and customizable templates, all of which adapt to the unique requirements of each student. The finding is comparable to Saputri (2024) that Kahoot is beneficial for the improvement of students understanding, in creation of fun learning environment and in balance implementation of activities to meet the diversified needs and learning styles of students.

This study revealed that the students' enjoyment with the online formative assessment practice and the game-based classroom atmosphere provided by Kahoot resulted in a high level of engagement and motivation for both students and teachers, encouraging them to improve their performance in future activities. Overall, Kahoot has demonstrated its efficacy as a beneficial instrument for augmenting students' interest and involvement in the educational process. Lashari et al (2024) also presented the same findings that Kahoot positively influence students' motivation therefore, take interest towards their learning.

Additionally, the importance of student-teacher connection should not be underestimated, as conventional online learning systems do not provide students with the option to directly engage with their instructors or peers which leads to segregation. Qualitative findings revealed that facilitating student engagement in the learning process through interactions and discussions is crucial for augmenting their comprehension. As in this research students were provided multiple opportunities to interact with their peers like they prepared and assisted each other in a group-based quiz. The students also interacted with each other through WhatsApp group. Moreover, it was also found that engaging students in an online discussion session after attempting Kahoot quiz, proved to be very useful for improving students' performance. Thus, Kahoot activities facilitated student communication with both their teacher and peers, thereby boosting their competence and motivation to surpass their peers. According to students, Kahoot sessions were quite stimulating because they allowed them to get to know each other through the ladder board and actively participate while attempting the quizzes. The integration of multimedia components such as video clips, audio, and images in Kahoot quizzes augmented the educational setting by rendering it more engaging and interactive. Findings of current study are akin to the findings of Weiser et al (2018) where researcher found out that peer assessment and collaborative activities helped students develop a sense of cooperation and critical thinking skills. Pham (2022) also mentioned that well designed online formative assessment tools that are attractive stimulate students' curiosity and motivate them towards their learning. Interactive assessment tools encourage students' participation and create friendly competitive environment therefore,

provided an effective way to assess students' level of knowledge and their progress.

5.1 Future Research Possibilities

- In the future, research can be undertaken to investigate additional behavioral changes that arise in students as a result of using Kahoot. Students' enhanced engagement in their learning, innate drive, and cultivation of analytical thinking abilities, as well as problem-solving and teamwork skills, can contribute to these outcomes.
- Given that the current study employed a mixed method approach and spanned a semester, it would be worthwhile to explore the long-term effects of Kahoot in future research. Specifically, this may involve examining how Kahoot impacts students' academic performance and their ability to retain information over an extended period of time.
- In the future, study might be undertaken to examine the efficacy of Kahoot in different educational contexts. Kahoot can also be applied for teaching other academic disciplines.
- Furthermore, Kahoot can serve as a formative assessment tool in several courses, including mathematics, physics, languages, etc., at the higher education level in online learning. This will allow for the evaluation of subject-specific advantages and potential challenges across multiple disciplines.
- Research can be undertaken to compare the efficacy of Kahoot with other technology tools like Socrates, Quizzes, and Google Forms. Comparative research can be undertaken to analyze the efficacy of Kahoot as a formative assessment tool in online learning, as compared to traditional techniques of formative assessment. This study could identify the strengths and weaknesses of each approach.

6. Conclusion

The research on Kahoot, an online formative assessment tool, presents compelling evidence of its effectiveness in delivering timely feedback, enabling students to recognize their strengths and areas for improvement. This tool is essential for instructors, enabling them to efficiently assess student comprehension and adjust their teaching strategies. The popularity of Kahoot among students and its effectiveness in enhancing information retention and comprehension make it a valuable tool to include in the array of formative assessment tools. This study emphasizes the potential of Kahoot to revolutionize traditional formative assessment methods, boosting student engagement, motivation, and academic performance. It emphasizes the significance of Kahoot in improving student satisfaction and understanding of the educational process. The captivating and interactive features of Kahoot, along with its competitive elements, greatly enhance the enjoyment and ease of the learning process for students. Nevertheless, the study recognizes the difficulties that come with utilizing Kahoot, including technical glitches and the possibility of causing anxiety in certain students because of its competitive nature. It is crucial to tackle these issues in order to fully maximize the advantages of Kahoot and foster an inclusive and supportive learning environment. Ultimately, Kahoot proves to be a valuable resource for educators aiming to cultivate an interactive and fruitful educational setting. It facilitates active student involvement, offers prompt feedback, and enhances overall contentment. This research adds to the increasing evidence that supports the incorporation of advanced technological tools in education.

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