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Approval

We certify that we have read the thesis submitted by Melissa Rutendo Mutizwa titled **"Usage of Formative assessment tools during COVID 19** and that, in our combined opinion, it is fully adequate, in scope and quality, as a thesis for the degree of Master of Educational Sciences.

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Declaration

I hereby declare that all information, documents, analysis and results in this thesis have been collected and presented according to the academic rules and ethical guidelines of the Institute of Graduate Studies, Near East University. I also declare that as required by these rules and conduct, I have fully cited and referenced information and data that are not original to this study

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Abstract

Usage of formative assessment tools during Covid 19

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The COVID-19 epidemic has accelerated this tendency as online learning has increased in popularity over the previous years since 2020. Using formative assessment tools has never been more crucial, given schools and institutions' widespread use of online learning. A course's progress and students' knowledge are evaluated using formative assessment tools, including quizzes, surveys, and self-checks. These tools may give both students and teachers useful feedback. In order to shed more light on the usefulness and importance of formative assessment tools in the context of the recent pandemic and subsequent online learning, this study employs a quantitative research approach and a descriptive analysis method for data analysis. Participants were chosen from a sample of students taking online classes, and they were asked to respond to a survey about their experiences with formative assessment. The summarisation was done using descriptive statistics like frequencies and percentages, and associations between variables were examined using inferential statistics like one-way ANOVA, Cronbach's alpha, and t-tests. The study's findings provide important information regarding the usage of formative assessment tools in online learning during the COVID-19 epidemic. It also offers information on how formative assessment technologies might be enhanced to improve student learning and success. In order to successfully manage the difficulties of online instruction and enhance student achievement, teachers and educational leaders should benefit from knowing about these results. It was determined that the current transition to online teaching brought on by the COVID-19 epidemic has made using formative assessment tools in online learning more crucial.

Keywords: Assessment, Online Learning, formative assessment, tools, COVID 19

Özet

Covid 19 sırasında biçimlendirici değerlendirme araçlarının kullanımı

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Çevrimiçi eğitimin popülaritesi son birkaç yılda artmıştır, COVID-19 salgını bu eğilimi daha da hızlandırmıştır. Çevrimiçi öğrenmenin okullar ve kurumlar tarafından yaygın olarak kullanılması göz önüne alındığında, biçimlendirici değerlendirme araçlarının kullanımı hiç bu kadar önemli olmamıştı. Bir kursun ilerlemesi ve öğrencilerin bilgisi, sınavlar, anketler ve kendi kendine kontroller gibi biçimlendirici değerlendirme araçları kullanılarak değerlendirilir. Bu araçlar hem öğrencilere hem de öğretmenlere yararlı geri bildirimler verebilir. Son salgın ile birlikte çevrimiçi öğrenme bağlamında biçimlendirici değerlendirme araçlarının yararlılığına ve önemine daha fazla ışık tutmak için bu çalışma da, nicel bir araştırma yaklaşımı olan betimleyici bir analiz yöntemi kullanılmıştır. Bu araştırma, biçimlendirici değerlendirme yaklaşımının değerlendirilmesine yönelik üniversite öğrencileriyle gerçekleştirildi. Veriler, frekanslar ve yüzdeler gibi tanımlayıcı istatistiklerin yanında değişkenler arasındaki ilişkileri, tek yönlü ANOVA, Cronbach alfa ve t-testleri gibi çıkarımsal istatistikler kullanılarak incelendi. Çalışmanın bulguları, COVID-19 salgını sırasında çevrimiçi öğrenmede biçimlendirici değerlendirme araçlarının kullanımına ilişkin önemli bilgiler sunmaktadır. Ek olarak, öğrencilerin öğrenmesine daha iyi yardımcı olmak için biçimlendirici değerlendirme teknolojilerinin nasıl geliştirilebileceği ve halihazırda ne kadar başarılı oldukları hakkında bilgi sunulmaktadır. Çevrimiçi öğretimin zorluklarını başarılı bir şekilde yönetmek ve öğrenci başarısını artırmak için öğretmenler ve eğitim yöneticileri bu sonuçlardan faydalanmalıdır. Bu çalışma sonucunda, COVID-19 salgınının getirdiği mevcut çevrimiçi öğretime geçişin, çevrimiçi öğrenmede biçimlendirici değerlendirme araçlarının kullanımını daha önemli hale getirdiği belirlendi.

Anahtar kelimeler : Değerlendirme, Çevrimiçi Öğrenme, biçimlendirici değerlendirme, araçlar, COVID 19

TABLE OF CONTENTS

List of Tables

Page

List of Abbreviations

LMS   Learning Management System

SPSS   Statistical Package for the social sciences

Q&A   Question and Answer

US   United States

ICT   Information and communication technology

CRS   Common Reporting Standard

CHAPTER 1

Introduction

  The Background, issue, goal, significance, study limits, and a summary of the thesis are all included in this chapter.

Background of the Study

  Both learners and educators engage in formative assessment as a planned, continuing process during teaching and learning to obtain and then use evidence of student accomplishment to enhance awareness of targeted curricular academic achievement and encourage students to become conscience thinkers. The meaning of the term "assessment" began with a notion crucial that was derived from an early Latin word called assidere, according to Loacker et al. (1985), not in a classroom or on a college campus as presently presumed. The Latin verb assidere, which means to sit besides, is the source of the term assess. The literal definition of assessment is to sit next to the learners. Original usage of the phrase was largely concerned with calculating the financial value or worth of something, but there was always a component of expert opinion based on careful supervision at the core of these early uses. In light of this, it appears to be a word that educators will use. In the framework of general education, the term "assessment" is relatively recent; in the past, phrases like "tests," "examinations," and "grades" were commonly used instead. The term assessment, though, started to be generally linked with these practices in the early 1970s (Heywood, 2000). Today, assessment when compared to teaching has a large impact on students' education because it focuses attention on what is crucial. Additionally, evaluation lets them know what they can and cannot accomplish, which boosts their self-assurance for future endeavours. Others believe that it affects their faith in their ability to perform well in their future employment and demonstrates how poor they are as learners (Boud &Falchikov 2007).

  The word "formative assessment" was introduced by Scriven in 1967 to describe the evaluation of educational programs, including curriculum, educational materials, and general teaching methods. According to Duchesne et al. (2013), assessment is a crucial part of the educational process, and formative evaluations have been used to enhance learning since education and evaluation are intertwined, enabling teachers to employ both to accomplish their intended learning goals. As a part of students' learning, Bloom (1971) initiated the terms formative and summative assessment. He defined them in that they support both the teaching

and learning process, allowing teachers to intervene and identify areas that require correction so that instantly following instruction and study can be more useful and relevant (Lau,2015). Boston (2002) distinguishes formative assessment as an indicative procedure that includes feedback over the entire program whist summative is the final assessment made at the end of the study period when comparing summative and formative assessment. The benefits of recovering information and stabilizing items that have been known about but have not been used because of a lack of understanding or practice have been suggested to represent the formative assessment's impact on long-term memory (Yang et al., 2019).

Utilizing new tools for continual formative evaluation in schools has been demanded recently to the point that it has become essential, particularly during the COVID 19 epidemic. The concepts of feedback and development that underpin formative evaluation came from a different place of constructivist and cognitive learning theories these first appeared in the 1930s and gave rise to this idea (Roos & Hamilton, 2005). According to Black and William (2009), formative evaluation or assessment is also known as classroom evaluation, teacher evaluation and assessment for learning. The form of it can differ base don the learning goal but its primary objective is to improve learning throughout a learning session mostly through feedback (Wijesooriya et al., 2015). Enhancing learning procedures is another goal in order to get better results.

The Problem of Study

Learning assessment offers educational methods that let students' reason and think, rather than just follow instructions, and it gives both teachers and students ongoing feedback. However, because of a lack a clear understanding of formative assessment, the rate of formative assessment tool adaption is poor (Musa & Islam, 2020). The main reason formative assessment is used in the classroom is because of inadequate training of educators. To examine the potential of certain formative assessment techniques employed during the pandemic and maybe in the future, there are always some gaps in formative assessment for learning that need to be addressed in the academic sector. As online learning's importance to educational innovations increases, finding a fair balance between formative assessment tools' usability and accuracy will be a long-term topic that has to be thoroughly studied.

Despite the widespread acceptance of its advantages, formative assessment research has few difficulties, according to (Bhagat & Spector 2017). Determining the impact of formative assessment on learning with regard to how and when formative assessments are

administered is one difficulty. Determining if a formative evaluation has a greater influence on learning than other factors is another problem that is seldom studied in a controlled way. There is a chance that a student may start to produce self-assessments that resemble the sort of formative feedback that is anticipated to be most effective in terms of learning gains. Such a metacognitive learning outcome is measurable and desired, and it is consistent with the idea of self-regulated learning (Butler & Winne, 1995).

The Aim of Study

The primary goal of this study is to give more insight on the applicability and significance of formative assessment and its tools in the context of the recent pandemic and in subsequent learning. In order to fully understand the study's purpose, this research will examine certain relevant research questions and responses from online questionnaires. The research questions are stated below:

1. Did the rate at which gamification was incorporated increase during the pandemic?
2. What were the commonly used tools and the level of satisfaction?
3. Is there any difference on acceptance/ of gamification tools and online learning based on gender?

The Significance of Study

The COVID-19 pandemic caused the majority of colleges to start using distance learning resources. Some Jordanian colleges have created "mobile learning platforms" as a new method of distance teaching and learning for students in order to deal with these emergency situations (Almaiah,2021). Since the covid 19 pandemic started in early 2020, schooling has undergone tremendous transformation. The World Economic Forum published an essay titled "The covid 19 pandemic has transformed schooling forever." Over a billion students were impacted by the epidemic, which led to disruptions and state-wide closures of educational institutions in an effort to stop the virus's spread. With this fast movement away from traditional schools in many parts of the world some question whether the adoption of online learning will remain after the epidemic and how such a change would affect the worldwide education system (Li & Lalani, 2020).

It is obvious that this epidemic has completely upended an educational system, which many claims was already losing its relevance. However, thanks to learning systems and formative assessment tools, the educational system managed to stay on its feet throughout the pandemic. E-learning platforms have recently taken over as the standard method of

instruction, learning, and communication in tertiary education. As a result institutions that provide distance education notably those in developing nations have achieved substantial success in supporting their students and teachers with e-learning technologies. For instance, universities all over the world have switched to online classes. These changes in the learning paradigm during the pandemic and even today in educational systems have demonstrated the critical importance of online education and formative assessment.

Limitations of Study

There are some limitations to this study that we ought to consider in future investigations. There are the following restrictions:

- The technique of gathering questionnaire survey was time limited. The gathering of questionnaire responses took up to Nine (9) months.
- Respondents took longer to answer to the questionnaire survey since there were no regional restrictions and no participant supervision.
- A questionnaire survey was carried out using an online Google form, guaranteeing no feedback.

Overview of Thesis

This study, which has five chapters, undertakes a survey of the past, present, and future uses of formative assessment tools in online learning.

The issue statement, purpose, relevance, constraints, and an outline of the next chapters are all described in first section along with a brief introduction to the topic under study.

The report is thoroughly analysed in second chapter with focus on related research and the theoretical context.

The study's methodology including its strategy, method of data collecting, and methods of data analysis is thoroughly described in the third chapter.

By presenting research findings, outlining study characteristics, and discussing the findings, the fourth chapter addresses the survey.

The Fifth chapter of the report, which is the last chapter, offers the conclusions and suggestions for future research.

CHAPTER TWO

Theoretical framework and related studies

In-depth analysis of the study is provided in this chapter, which focuses on relevant research and theoretic basis.

Theoretical Framework

Formative assessment tool came to rise during the pandemic. In December 2019, Wuhan, China, saw the first reports of COVID 19 patients. On January 30, 2020, the coronavirus was deemed an international public health emergency. COVID 19 was classified as a pandemic by WHO on March 11 of 2020. (World Health Organization, 2020). People's mental health has been impacted globally as a result of the epidemic and the lockdowns implemented to contain it causing stress and anxiety raise among students (Cao et al., 2020; Islam et al., 2020). Students commonly find it challenging to adapt to online learning due to these mental health issues. It should be noted however that not every pupil has fair access to and skill with digitalization. That being said, the above inequality has always existed, but the COVID-19 This digital divide is becoming more evident because of the disease's spread (Jæger & Blaabæk, 2020).

Governments all over the world implemented policies to attempt and contain the virus in order to stop the disease's spread, including aircraft restrictions, mask requirements, and regular sanitization. Many nations temporarily went into lockdown in order to limit mass migrations. Many governments ordered institutions to stop offering face-to-face lessons to the majority of their students due to the global epidemic constraints noted above, such as lockdown, which led to academic institutions closing as well. This caused an overnight switch to online learning and digital education (Daniel, 2020). Learning management systems and open-source digital educational tools were embraced by institutions to offer online classes in order to ensure continuity (Preeti Tarkar, 2020). Covid 19 caused schools to close all across the globe and as a result of the remarkable development of internet-based learning, education has experienced a considerable shift. In accordance with demand, several web - based learning platforms are making their resources accessible completely free (Li and Lalani 2020). The biggest problem that national education systems have ever had is COVID 19. For the majority of their students, most governments required universities to convert relatively

immediately from face-to-face instruction which was replaced by online studying and virtual school (Daniel 2020).

Schools of advanced learning have attempted to use technology and provide classes online and learning experiences as a substitute for in-class time despite the lockdown. Many universities and colleges have switched from offline to online learning, and they are using online assessment methods for evaluation to ensure the continuity of education (Schleicher 2020). The worldwide use of virtual learning is a result of the COVID-19 epidemic. The extent of the issue is unparalleled, even though online and distant learning have been employed in the past to guarantee continuity in education, such as in the wake of earthquakes. Despite the fact that COVID-19 has generally had a negative impact on academic advancement, institutions may take advantage of this unusual chance to discover issues and speed up restructuring of online education through innovative curriculum planning, cutting-edge new tech, and efficient administration.. Humans must use this crisis as an opportunity to advance worldwide cooperation and exchange information, resources, and experiences in order to create an international digital education system (Chackraborty et.al, 2020)

Many people define formative assessment as the mix of feedback from community, individual, and lecture reviews that may be gathered and utilized to modify students' present learning strategies and material (Nguyen Hoang Tien et al., 2020). Due to the growth of formative assessment in higher education, evaluations should be considered both during the actual learning process and when evaluating students' final performance at the conclusion of the course. In order to affect the learning culture, formative assessment is modifying classroom procedures. The improvement of students' abilities and confidence in their ability to do independent research and study is significantly aided by formative evaluation. All of the class activities engage the students directly. Giving feedback is seen as the fundamental component of formative assessment, and research has shown that it is essential for maintaining students' interest in their studies.

The goal of assessment in education must be to facilitate learning; assessment has been shown to be a crucial component of learning. According to Black and William's (1998) definition of assessment, which includes any activities teachers and pupils take to collect information that could be used to diagnose issues and alter instruction, Assessment methods include teacher observation, class discussion, and inspection of student work, including assignments and exams. The success of students is improved when teachers are aware of

general student performance while taking note of the sections or parts where they are experiencing challenges. They may then utilize this knowledge to make the appropriate instructional modifications, such as relearning (Boston, 2002). According to Khalaf (2020), evaluation for learning is a concept in education that encourages both teachers and students to actively enhance the learning process and foster a positive attitude toward continuing their education.

Teachers may use evaluation to determine issues such as whether pupils have grasped enough or what and how to teach them. To promote students' academic advancement, teachers are supposed to use assessment data to improve their education and create a sound teaching material. Students' tactics, motivation, and learning results are significantly impacted by assessment (Lu & Law, 2011). The terms assessment and evaluation are frequently used interchangeably, but according to Bansal & Patnak (2019), assessment offers feedback on areas that need improvement while evaluation establishes the degree to which objectives are achieved. Assessment is a procedure that yields feedback on performance and suggestions for future performance improvement. To determine where students are in their performance, where they need to go, and the best way to get there, instructors and students conduct assessments of learning, which involve gathering and analysing information. For a more detailed explanation of this straightforward definition, consider how assessment is used in the classroom. The activities included in learning method, student-teacher contact, mental discipline, and other assessment processes will be shown as a complicated web of activities. This means that for example, lecturers must device activities in the learning environment and , students must participate in the evaluation of their education, and educators must determine the extent of the students' knowledge as they gain knowledge. To go to the next level in their learning, they must also challenge and assist these students. The following is a summary of the significance of assessment in education.

- Making excellent plans.
- Attention to how school is done.
- essential to classroom instruction and is an important professional competency.
- considerate , friendly.
- Encourages motivation.

Formative assessment

To establish the learners' current learning status, their intended target, and the best approach to get there, formative assessment, as defined by Çekiç and Bakla, (2021), is the process of looking for and analysing data to support decisions or judgments about the end result of a learning endeavour. The fact that teachers acquire information to make judgments regarding instructional practices and modify teaching and learning procedures as necessary is a key feature of formative assessment. Instead of coming after learning, evaluation for learning, or formative assessment, happens throughout learning. Nevertheless, more lately, it has been mentioned to also take into consideration the role the students themselves and their peer group engage each other in further assessments. Under normal circumstances, the instructor has been considered as someone who is in a position to determine where the students are in their learning, where they are going, and what needs to be done to get them there (Yarahmadzehi & Goodarzi, 2019). The student is accountable for the setting, and the instructor is tasked with creating and executing a successful learning environment.

Formative assessment relies heavily on the development and use of instructional emergency situations with the aim of managing learning processes (William & Thompson, 2017). It's a crucial component the job that a teacher does in the classroom and paying attention to developing one's methods will boost students' accomplishments The teacher's first recommendation in a formative mode aims to promote further thinking, the learner is more actively involved, and the teacher's work is much less predictable (Black and William, 2009). Black and William (2009) went further stating that, formative assessment is generally successful across a wide range of educational contexts, subject areas, types of knowledge and ability, and educational levels. The study also showed that grades and marks, especially for students of lesser aptitude, do not provide as much formative impact as personalized remarks and occasionally can even be detrimental. However, it also became clear that an important factor is the feedback's quality. Students need to be taught how to read feedback, the qualities of the work they generate, and ways to improve it in the future. It cannot be presumed that pupils would understand what to do after receiving comments (Sadler, 1998). The purpose of formative assessment is to improve learning, and its nature changes depending on the learning target; nonetheless, the formative assessment's essential functions must remain constant (Wijesooriya et.al. 2015).

Formative assessment process

Figure 1

strategies developed for formative assessments

	Where the learner is going	Where the learner is now	How to get the learner there
Teacher	Clarifying, sharing, and understanding learning intentions	Eliciting evidence of learning	Providing feedback that moves learners forward
Peer		Activating students as learning resources for one another	
Student		Activating students as owners of their own learning	

Williams and Thompson (2007,) evaluated the 5 formative assessment strategies as shown on Figure 1 above. The next section will summarise

- Clarifying, understanding and sharing learning intentions –this applies to the teacher, peer and learner as shown on Figure 1. Learning intentions are basically what the teacher wants the pupil to learn.
- Designing discussions, assignments, and activities that produce learning evidence in the context of responsive and instructive teaching.
- Providing feedback that moves learners forward –the only way feedback can be a successful tool is if students learning outcomes improve and this is dependent on their level of understanding
- engaging pupils in acting as the other's resources for learning -when teachers come up with strong learning procedures in a serious structured setting then the frequency of quality of student interactions with the knowledge being handed to them can increase remarkably
- Empowering students as authors of their own education can assist them to comprehend where they are on the syllabus and the direction which they are heading

Classroom Dialogue

To increase student participation by extending the time after questions are asked so that all students can actively participate in question and answer sessions and to give students more time to think about their answers, which will improve the interactive feedback that is essential to formative assessment.

Feedback though marking

Giving grades has a detrimental impact because when grades are issued, pupils ignore remarks. Teachers found that giving feedback in the form of comments rather than marks allowed students and their parents to get tips on how to go better. Additionally, it shifted the attention away from attempting to understand a mark or grade and onto the question of how to advance learning.

Peer and self-assessment

Essential to learning because students cannot succeed without a clear comprehension of the learning purpose and the processes required to get there. In as much as they do this, they start to create an overview of that task in order to manage and oversee it, or, in other words, they practice using metacognitive thinking. Self-assessment has proven to be greatly influenced by peer evaluation. Students appear to find it simpler to understand the criteria for their work if they analyse the work of other students in addition to their own by taking on the roles of teachers and examiners on others work.

Formative use of summative tests

Encourage them to think about the areas where they thought their knowledge was safe and the areas where they needed to focus their efforts. One justification for doing this was for professors to encourage pupils to consider where they should focus their efforts. Peer groups were used to grade each other's assignments and tests. This could be particularly difficult when they were required to create their own marking criteria because to do so, they had to consider the question's goal and the standards of excellence to use for responses. Teachers could set aside time after peer marking to discuss the questions that were particularly challenging. Studies have shown that students who are instructed to study for exams by coming up with and then responding to their own questions score better than similar groups

that study in the traditional manner. Students must alter their behaviour to avoid seeming as passive recipients during formative exams.

Types of assessment

There are many different assessment kinds, and this subsection will explain cognitive diagnostic, interim, summative assessments, and formative assessments, which have been the foundation of this study.

Cognitive Diagnostic Assessment

It is intended to assess students' proficiency with certain knowledge structures and processing abilities in order to reveal their cognitive strengths and shortcomings (Leighton & Gierl, 2007). Cognitive diagnostic testing integrates relevant theories of cognition with statistical models designed to draw conclusions about how well pupils have mastered so-called characteristics. The results of a cognitive diagnostic evaluation can be used to determine whether or to what degree pupils have mastered a certain set of clearly specified traits. Cognitive diagnostic tests can provide teachers with in-depth knowledge and assist them in creating individualized lesson plans for each student (Sun & Suzuki, 2013).

Interim assessment

This is referring to the usual program assessment that takes place during teaching and tries to pinpoint the program's shortcomings. Interim assessment provides standardized data that can be gathered and falls between formative and summative evaluation. Interim evaluations serve a variety of purposes. They may forecast students' performance on an end-of-year summative, accountability examination, give instructional data that identifies students' strengths and weaknesses, or they may offer evaluative data regarding the effects of a curriculum or program (Nodoushan, 2011). Because it gives information about programs rather than specific students, the evaluative application of interim evaluations is the widest (Shepard, 2009). Interim assessments and formative assessments have some similarities, but the two evaluations differ from one another in terms of how they are used and how much the information they produce is utilised. (Riggan & Oláh, 2011).

Using interim assessment tools, schools may measure student progress toward high stakes examinations, detect achievement gaps before the year's final exam, and meet testing and reporting obligations (Burch, 2010). When it comes to occurrence and proportion,

interim assessments fall between formative and summative evaluations (Perie et al., 2009) Teachers frequently utilize interim evaluations to pinpoint students' or curriculum weaknesses for future preparation (Gezer et al., 2021).

Summative assessment

The findings of summative assessment assist professors in determining the degree to which students are prepared to advance to the next level. This method of evaluation is quite common and trustworthy in the educational process due to its quantitative qualities (Tahereen, 2014). From the perspective of the students, this type of grading just serves to prolong the learning process because all they receive is a statistical grade that the teacher uses to determine who fails or fails the class. There is no space for a new chance beyond just redoing the class when solely summative assessment is employed in the classroom. Summative assessments employ data to assess students' knowledge and learning results. At the end of a lesson, it assesses the knowledge, competency, or achievement of the students. At the elementary school level, summative assessments are virtually always officially scored and frequently severely weighted, and the purpose of Summative assessments is to determine a student's competency once an educational period is complete (Vero & Chukwuemeka, 2019).

Summative evaluations are evaluations that are used to determine a student's grade in a course, module, level, or degree or to indicate their level of proficiency. Summative assessments are used to evaluate pupils at the end of a lesson session. However, they are often given throughout the course time rather than at the end (Knight, 2004The summative evaluation results in grades. Summative evaluations can take several forms, including:

- Examinations
- Final exams
- Term papers
- Projects
- Portfolios
- Seminar presentations

Summative evaluation, which includes all of the data gathered up to that time, assesses whether previously established standards, tasks, or goals have been met (Taras, 2005; Buchholtz et al., 2018). Despite the fact that summative assessments are evaluative in nature,

the combination of these assessment kinds greatly aids a teacher in planning the curriculum, choosing the technique to be applied throughout the teaching process, and doing so in accordance with the learner's needs (Bansal &Pathak, 2019).

Table 2.1

Difference between summative and formative assessment

Summative	Formative
Assessments frequently follow formal training and are cumulative.	Continuous, unofficial, and during lessons.
Summarizes the student's accomplishments over a period of time.	Occurs during a lesson or course and aims to increase how well students reach their learning goals.
Exams and projects	Exams and minute papers

Forms of assessment

The types of assessment are thoroughly explained in this section., their importance and how teachers incorporate them into their curriculum

Electronic Portfolio

Students may record their work, objectives, and accomplishments in an e-portfolio, which also allows them to share their learning and get feedback while also reflecting on their progress. It's a digital collection of coursework-related writing, including essays, posters, photos, and videos, that was put together by a student. E-portfolios, in accordance with Basken (2008), are a method of fostering learning since they give students a platform and a virtual environment in which to evaluate their academic performance. E-portfolios are a student-centered exercise wherein the student is independent to reflect on the procedure of their education. Bass and Eynon (2009) expressed the process of important analysis involved in the production of effective e-portfolios as one that helps make undetectable knowledge noticeable. Portfolio as an evaluation tool is characterized as a systematic and deliberate gathering of students' work products from their courses (Arter&Spandel, 1992; Chang, 2008). Portfolios may be used as a method for evaluating students' knowledge, skills, and work. (Barrett, 2002; Powell, 2013). According to Kaptan and Kokmaz (2000), maintaining a

portfolio involves keeping track of a student's progress and performance as they study. As a result, responses to queries like, "How did the student think? What did he discover? What type of learning methodology did he employ? What challenges did he encounter as a student? How did he phrase his queries? How did he evaluate and set up the knowledge?" are analysed with a portfolio.

According to Chang et al. (2013), teachers may utilize portfolios to assess the interests and skills of their students and provide effective guidance. Portfolios are useful tools for higher education since they inform professors and students about what is happening in their teaching program and enable them to acknowledge their own shortcomings (Eskici 2015). Portfolio data must be assessed by specialists and other educators in addition to the instructor who collected it (Dubrovich, 2002). The data generated by portfolios must be consistent, according to Kan, (2007). The portfolio is one of the evidence-based evaluation techniques utilized in the creation of a user-friendly, valuable e-portfolio system (Rahayu & Wulandari 2021). E-portfolio use has several benefits, such as students being permitted to participate actively in the learning and evaluation processes, supporting lifelong learning, and enhancing their creative thinking skills (Guven & Aydodgu, 2009).

Minute Paper

A technique for formative assessment whereby a learner is asked to spend one minute (or more) responding to two questions: what was the most crucial lesson they learnt today and what is still unclear. Minute papers developed by Thomas Angelo and K. Patricia Cross have been utilized increasingly frequently as a method of classroom evaluation since they offer a rapid and incredibly easy approach to get written input on students' progress (Holladay, 2002). It is frequently praised as a teaching tool for both teachers and students, according to Stead (2005), who uses the one-minute paper in lectures. Additionally, it has been described as a diagnostic and formative classroom evaluation method in the literature, and it is now in line with the idea of continuous quality improvement (Soetaert ,1998). The one-minute paper is a useful tool for engaging students and giving lecturers early feedback on classroom learning, as well as giving lecturers early feedback on classroom learning and giving lecturers an understanding of how effective their teaching methods are perceived by their students (Vonderwell, 2004).

Whittard's (2015) study details the minute paper's administration. A minute or two before the scheduled conclusion time, the lecturer asks the student to respond before

concluding. What were the two most crucial ideas you acquired in today's class, for instance? The one-minute essay provides the student with an instant opportunity to bring up subjects they may not have completely comprehended. The results of the case studies indicate that the pupils likely benefited much from this. The use of a minute paper enables the teacher to rapidly determine whether the pupils understand the key ideas covered in class and to provide clarification when necessary. Kwan (2011) continues by saying with the use of the minute paper, teachers may get inquiries from reserved kids and develop relationships with them. If students think the instructor is really interested in their learning, they get more involved in the lesson. The lecturer encourages students to provide honest, meaningful answers to these topics through the one-minute paper. The teacher also showed respect for and interest in the students' opinions and encouraged their active role in the learning experience (Chizmar and Ostrosky, 1998).

Quizzes

Exercises and activities can be used to gauge and challenge students' understanding of the course material. In their article from 2001, Brothen & Wambach discuss how computerized tests are being used more and more by students and teachers. Advantages of online tests with comments (McDaniel et al., 2011). Online tests give information and feedback that may be used to adjust teaching and learning as needed (Cohen and Sasson 2016). Their instructional value is sometimes trivialized by widespread use, which renders them an unlikely instrument for promoting deep learning. Formative testing may not always improve learning. They must be used with other methods of summative and formative evaluation (cox and clark 1998).

The usage of online quizzes was linked to increases summative test results, and quizzes helped students by encouraging them to read more material before lectures. Because they were comparable in nature and examined the same subject matter as summative examinations, online quizzes were good formative assessments. The instructor may use online quizzes in addition to giving students' insightful feedback on how they are performing to aid those students who are most likely to score badly on cumulative exams (Dobson, 2008).

Group work and discussion

Group activities involve careful preparation and facilitation, as well as close student supervision and high expectations (Jaques, 2000 and Brookfield & Preskill, 1999). Group projects are becoming more and more common in education as an evaluation approach. Self and peer assessment have been promoted as ways to improve group work and prevent having certain members of the group who do not participate equally. Students frequently value learning from and with others, and they frequently prefer working in groups (Jacques, 2000).

The instructor can assign distinct duties to each student and cycle those positions until each student has been in charge of each role in order to prevent group members from trying to take advantage of one another's labour (Johnson & Johnson, 1990). Some benefits of employing group work as a type of assessment can be found in the literature, including the fact that, when done correctly, it is an effective approach to cope with the rising student population in higher education. Group work encourages "active" rather than "passive" learning, ensuring that students acquire transferrable abilities for lifetime learning (Watkins, 2005). The issue with group work, according to Davis (2009), is that certain group members are less motivated and hence hesitant participants in evaluation activities.

Gamification

Some instructors have attempted to employ game dynamics in the curriculum to increase student engagement and achievement, with successes that vary. (Scott and Neustaedler, 2013). The idea of giving the classroom itself a new edge is becoming more popular, inviting students to participate in "gamified" learning through the use of gaming education tools (Kapp, 2013). In the realm of education, boredom or a lack of involvement are factors in dropouts or poor performance. As a method to encourage specific behaviours, increase motivation, and enhance engagement in today's digital youth, gamification has grown in popularity. (Huang&Soman, 2013). Deterding et al. (2011) described gamification as the use of game design features. Gamified applications just use game mechanics, according to Dicheva et al., (2015) is the practice of incorporating elements of game design into non-game activities. It has been used in a number of settings, including education. Gamification has employed a number of components, such as credits, medals, scoreboards, and stories, to boost user engagement. The gamification of education, in which teachers design gamified learning environments to increase student engagement and boost learning outcomes, is a topic that interests academic institutions.

Significant attention has been paid to gamification, particularly in educational settings. In the context of education, wherein sustaining and maintaining interest is a continuous struggle, gamification has been specifically addressed and used (Majuri et.al, 2018). Gamification is applying game design principles and game mechanics to situations outside of traditional gaming. In both formal and informal settings, using game elements enhances motivation and learning. The biggest issues in modern education are caused by students' lack of interest in and desire for participating fully in the learning experience. To encourage student participation and motivate them to participate in training, teachers aim to employ novel tactics and strategies (Kiryakova et al.,2014). By utilizing game features to keep students engaged and motivated often through a compensation package or by signaling their level of achievement, gamification turns the learning process into an educational game (Furdu et al.,2017). There are various tools available for gamification; some of which are web-based (cloud services), don't need to be installed, and can be used from anywhere at any time. Socrative, Kahoot, and flip quiz are a few of the most well-liked options. Gamification is a powerful strategy for improving students' motivation and engagement by affecting their behaviour and mindset toward learning (kiryatova ,2004).

Online Education Systems

Offering entirely online or hybrid courses that combine online training with in-person instruction is becoming more and more frequent at many higher education institutions (Sun & Chen, 2016). New paradigms for transferring information and skills have also been implemented by the education sector. Teachers must work harder to prepare for online courses since face to face was no longer plausible; they must be innovative by creating lessons that will increase students' attention spans. It also calls on teachers to slowly transform students from unengaged audience members into active learners through engaging presentations, Q&A sessions and exams (Sun et al, 2020). The idea of remote education was developed in the US during the 1800s when teachers and students at the University of Chicago attempted to communicate through online studies despite being in different places (McIsaac& Gunawardena, 1996). As computers and internet technology improved during the 1970s and 1980s, distance learning considerably grew. Since then, universities and colleges all over the world, including those in the United States of America, have begun to provide whole academic programs online in addition to virtual courses (Wallace, 2003).

Online learning has traditionally been regarded as a practical choice, especially for adult learners who are looking for alternatives to traditional higher learning. But nonetheless, the spread of the COVID-19 epidemic has prompted educators and learners across all educational levels to quickly adapt to online courses. Additionally, Lesson preparation is anticipated to be adversely impacted by the COVID-19 outbreak in the long run. The limitations imposed by the pandemic offered educators time to consider fresh approaches to teaching specific subjects. (Lockee, 2021). Therefore, all structures that endorse online learning content are considered to be online education systems. Assessment is crucial for educators, and different tools are available for the creation of variety types of assignments, including tests, multiple-choice questions, and other types of assignments (Paulsen, 2002).

E-learning is active learning where the course materials are available online and students receive immediate feedback on their progress. An LMS is a piece of software that offers the foundation for managing every facet of the learning experience. The advantages of implementing an LMS include cost savings, uniformity in training because it is centrally located and simple progress monitoring for students. To maintain the learning experience and provide a variety of online courses with learning materials and activities, educational institutions use learning management systems (LMS). LMS integration improves their functionality, adapts to new educational paradigms, and provides the tools required for collaboration and cooperation among all learners. Because they contain features for automatically tracking students' performance and development, LMS are a good setting for gamification as well (Piccoli et al., 2001). Because e-learning systems can rapidly offer applicable and higher information about learning tools and components, they are extremely valuable to the twenty-first-century students who are confronted with an ever-changing educational environment and must constantly enhance their knowledge in order to remain ahead (Almaiah et.al., 2020).

Challenges in Online Assessment

Students who took online tests in various studies reported that it was simple to falsify. According to evidence gathered through surveys by Ozden (2004), the major part of the students felt that cheating in online examinations was simple. As a result, to reduce dishonesty in online formative assessment, teachers should be educated about dishonest techniques and create solutions. (Alharbi et al., 2021). According to Fageeh (2015), time constraints were the greatest and significant challenge for students in using online exams.

Chiang (2020) addressed internet connection problems in his study, which examined Kahoot (a game-based learning platform), as well as time constraints as the primary drawbacks of online tests.

Web 2.0

Websites that prioritize user-generated content, usability, peer interaction, and accessibility are referred to as web 2.0 tools. The first technology in use allowed for email and web browsing. They lacked communication and teamwork, though. With these tools, which were sometimes referred to as Web 1.0 tools, users were only passive consumers of the material. Web 2.0 relates to these technologies, and their primary feature is active user engagement in content development. Web 2.0 tools, according to Ajjan and Hartshome (2008), are an upcoming development in web technologies that have various features that enhance teaching and learning. Many benefits of web 2.0 technologies have also been a reaction to concerns about their use in distant learning since they enable interaction activities (Usluel & Mazman, 2009). The switch to web 2.0 opened up several prospects for the development of learning tools at a reasonable cost (Stanca& Cristina, 2014). In general, adopting web 2.0 technologies seems to benefit students' learning. Websites may be personalized using this idea, which enables people to work together and contribute to the authorship of material. Web 2.0 has made it possible for anyone with minimal technological expertise to contribute to the internet (Hew& Cheung, 2013).

The words "web 2.0" and "social media," as per Constantinides and Fountain (2008), are frequently used synonymously. However, some commentators equate the terms "web 2.0" and "social media" to refer to primarily to online applications and social features of web 2.0, respectively. The simplicity of web 2.0 technologies is their main advantage. Web 2.0 apps are regarded as being straightforward and uncomplicated. Less bloated user interfaces are present. Programs only provide a small number of features, and the participant's positioning statement is obvious. Spite of the good viewpoints, there's still some suspicion about Web 2.0: some researchers made an argument that the Web 2.0 and particularly applications based on user-generated content introduce a real threat to the existing culture. For instance, the full loss of control and responsibility means allowing everybody becoming an ego specialist and impact those that can distinguish between reliability and ridiculous contents.

Related Studies

This part comprises summaries of earlier studies on formative assessment instruments which are essential to the primary function of assessment in learning management systems used for classroom observation in academia.

Past Research on Formative Assessment tools

According to Bezerra (2020), the development of information technology tools into Universities has recently been the focus of discussion regarding its significance and the method of instruction, ICT improvements within the framework of institutions of higher learning are used as proof. However, it is crucial to emphasize that In order to change how people view teacher-student interaction, technologies that may be utilized in both face-to-face and distance learning modes are determining an increase in the demand for continuing education, as well as in the areas of research and teaching. Incorporating ICTs into the curriculum is seen to be a way to encourage, develop, and increase their use as well as open up new teaching techniques.

Guilding et al. (2020) made the case that frequent formative assessments that include feedback and active, collaborative learning practices enhance student learning results. Students are especially eager to participate in formative assessments that are available online and mirror their summative examinations so they may do them on their own schedule. While students saw value in writing and peer discussion, they expressed the most interest in answering questions, stating that doing so allowed them to fill in knowledge gaps, assess their understanding, and refine exam skills. Another research discussed how summative assessment, which is just the score, is frequently compared with formative assessment. The author discussed how formative assessment aids in teaching students why their responses are incorrect and how to avoid making the same error in the future. Students can only benefit from formative evaluation when they are producing their own work (Frost et. al., 2021). Additionally, performance-based evaluation of learning is the most effective method since it demonstrates how well students can use their newly gained information, skills, and talents (Jacob, 2020).

According to a research by Baig et al. (2020), faculty members and students are increasingly getting more familiar with learning management systems (LMS). Blended learning combines traditional in-person instruction with online learning. LMS is employed on a global scale. Blackboard is a specially created e-learning platform and course management

system that serves as a key example of a virtual learning environment. It offers online examinations and organizes and distributes coursework, among other benefits.

Digital formative assessment methods were discussed in a paper by Cekiç & Bakla in (2021). Technology may be used in conjunction with conventional ways to conduct formative assessment. Even though formative assessment has been shown to have good effects on instructional processes via empirical study, research into this exciting field has gotten far less attention than it should in the fields of education and language. According to the study's conclusions, the most widely used and extensively explored technologies were Socrative, plickers, kahoot, google forms, quizzes, and Nearpod. Additionally, there are gamification programs like Socrative and Kahoot that offer competitive and teamwork-focused quizzes that are gamified. To sum up, online formative assessment technologies include essential elements that might support formative assessment, enhance education, and increase student motivation and engagement. Gamification and engaging classrooms should be introduced by instructors. Online formative assessments technologies assist integrate assessment into training.

The purpose of Yenmez and Gokçe's study from the year 2021 was to assess the impact of web 2.0 technologies used for assessment and evaluation in distant learning. For instance, Web 2.0 apps are a technological advance that influence teaching and learning settings and advance advancement. The CRS includes a number of Web 2.0 tools to help teachers assess the knowledge and abilities of their pupils. With gamification as a vehicle for formative assessment, there is an indisputable additional benefit regarding the result of examination. Quizizz, Kahoot, and Socrative Gamification could serve as an acceptable alternative to pair the requirement for interactive elements and digital expertise on the one side with the source of assessment formats instructors have at their disposal.

In their study, Choudhari et al. (2020) explored the introduction of formative evaluation for postgraduates across all constituent institutions. As a result, the postgraduate student's scores significantly increased from semester to semester. Formative evaluation of practical's was viable, agreeable, efficient, and proficient for postgraduate students.

The field of assessment is expanding quickly, and creating learning objectives has turned into a science. There are a number of important findings that might influence how classroom teachers decide whether to employ effective learning in their own classes. The ability to categorize cognitive accomplishments and turn them into countable categories has

been passively improved by other developments in educational evaluations evaluation methods. When educational practices are changing significantly, evaluation techniques are extremely important because they inform any considerable change in institutional structures. All course components should be included in a reliable evaluation system (Nix & Levy, 2021).

Cojocariu and Mares (2019)'s paper suggested one possibility for a successful solution is the formative method. It offers, among other things, undeniable gains through its reflective component, which influences both the reliability of learning and the meta-reflexive component. The study stressed how crucial it is for instructors to keep working harder to shift the emphasis to the formative phase and lessen the overly preoccupation with the final products. Reflective teaching approaches need consistent work to implement.

According to Mahajan (2021) the use of assessment task has grown because of the surfacing of e-learning and web-based schooling to give or enhance education opportunities. This use of assessment task will continue to expand as e-learning usage spreads further. Due to the asynchronous form of the online participants' interaction, e-assessments differ from traditional techniques in some ways. Through digital numerous questions, digital assessments may be widely utilized to evaluate knowledge. The present testing periods caused by COVID 19 have called for extraordinary changes to the assessment system, with the majority of institutions embracing e-learning and e-assessments as a necessary but under-utilized learning method and assessment. The COVID epidemic has made it necessary to adopt digital sites for instruction and evaluation. The use of digital learning resources, instructing, and evaluation tasks has become unavoidable as a result of lockdown and university closures, even during the post-lockdown era.

The Haskova et al. (2020) research focused on how instructors had difficulties carrying out instruction in the manner they were accustomed to following the proclamation of the emergency status in the majority of nations in 2020. If both the instructor and the pupils had access to the equipment that would operate these teaching aids, the significance of employing them as the only method of conducting lessons has increased to previously unheard-of levels. The corona epidemic is to blame for the shift in schooling toward augmented worlds. Digital cross platform technologies and instructional resources are utilized to assist remote learning at all levels.

The purpose of Arif et al's study was to ascertain how paired standardized testing affected students' learning. Schools and colleges have implemented stringent evaluation platforms inside their school institutions stemming from the increasing demand on schools to reach high attainment targets. The medical college participants who took part in this study were regularly exposed to the conservative or conventional personality. Students construct and negotiate their own meaning and knowledge of the subject during peer learning. The results of studies showed that cooperative strategies used in peer assessment enhanced student performance. Students exposed to paired techniques were able to earn a higher score than control class, who had finished the specific task as an antiquated custom strategy.

The application of online casual formative assessment, in which response is immediate, as an educational alliance for online lecturing to big audiences was investigated by Archila et al., in 2022. The purpose of the study was to offer proof that students may be explicitly given the chance to participate in an instructor's conversational discussion through informal online formative evaluation. The Covid 19 issue has significantly disrupted and uncertainly affected many facets of daily life. It is important to note that this type of conversation served as a forum for the conversation of claims and explanations in various contexts. This is consistent with the idea that a fruitful adversarial interaction is one in which students are given chances to practice the creation of multiple aspects.

According to the research on evaluation for learning by Gotwals and Cistema from 2022, it is a regular educational activity integrated into classroom discussion and observation to assist learning outcomes. Formative evaluation has also been discussed in academic discussions of what constitutes excellent instruction. But because Formative Assessment is frequently considered an assessment activity rather than a classroom method, discussions regarding balanced assessment methods may focus more on formative assessment research. Instructors struggle to apply formative assessment throughout their careers, despite studies suggesting that when done correctly, formative assessment procedures can enhance student achievement without help. Since teacher candidates frequently have clear ideas about assessments and these ideas frequently result from uncomfortable experiences with summative assessments that are used to properly assess rather than formative assessment, linking formative to the key processes of instruction is especially vital to consider.

The study by Minn (2022), focused on personality tests and Artificial Intelligence methods that have given birth to effective knowledge evaluation. As a response to the

COVID-19 epidemic, many institutions devised unique educational interventions, which were examined and evaluated in this study. In order to provide adaptable educational experiences, approaches for knowledge evaluation that are helped by artificial intelligence have moved from research labs into practical use in real-world classrooms. Due to the danger of COVID 19, the year 2020 served as a demonstration of the value of online learning systems that had gained broad adoption. Whenever a student uses an integrated learning system to learn, they practice a particular skill by responding to a number of questions, and they evaluate their mastery of that ability based on whether they were able to give accurate answers in their prior difficulties.

Succar et al. (2021) talked about COVID 19 and academia, saying that it has been one of the biggest obstacles medical educations has ever faced. Due to the inspiration this gave educators to create creative teaching strategies, medical students are now able to complete their ophthalmology study despite these difficulties. This research examined and evaluated unique educational initiatives adopted by several universities in response to the COVID 19 epidemic, bringing to light their merits and drawbacks while suggesting paths for the future that go beyond the pandemic. In the university research described in this work, an e-learning tool was created and put into use to lessen cognitive overload during the video-based education of ophthalmology to medical students.

Kahoot, a game-based platform intended to assess student understanding, was the subject of a research by Martín-Sómer et al., in 2021. The usage of Kahoot for formative assessment expanded significantly in 2020. The success of Kahoot is a result of the company's primary goal, which is to make learning enjoyable through a game-based learning system. Kahoot encourages student engagement by giving right answers greater scores and moving students to the top of the leaderboard. The use of kahoot was well regarded by a significant portion of pupils, who felt it to be beneficial. Wang and Tahir (2020) also noted in their research that it might be difficult to maintain students' interest and involvement in a lecture over the long term. In university education with large courses, lack of motivation can reduce learning results and create a hostile environment. The study's findings confirmed that enjoyment, motivation, and engagement all go hand in hand with learning, and that Kahoot's promotes all.

Through the use of two different forms of pedagogical interventions, Zamzami et al. (2020) examined the discrepancies in efficiency and subjective participation among students

across a group. The results show that using game mechanics including points, advancements, medals, contests, certifications, parodies, and leader boards, gamified e-quiz activities are effective at encouraging students to acquire new material.

The study's goal, according to Julia (2020), was to provide light on the instructional architecture of Massive Open Online Courses, namely on their sustainability. The investigation concentrated on when, how, and from whom students got formative input with the aim of identifying scalable guiding principles in formative feedback and engagement. The author additionally looked at the difficulty levels at which those scalable best practices were offered in order to gain further knowledge. The findings demonstrate that MOOCs can deliver scalable formative feedback and interactivity through a variety of forms, including tests, student feedback, and scenarios.

Hanham et al. (2021) attempted to document undergraduates' interactions with a substantial online teaching service and how these interactions related to the students' assessments of their academic achievement and ability. Students' evaluations of the perceived utility of an online teaching service were significantly influenced by the infrastructure features of the service.

In order to better comprehend the connections among instructors' usage rates of computer-based formative assessment and their opinions of educational technologies, Sulivan et al. (2021) looked into the computer-based learning strategies of traditional academic teachers working in a one-to-one computing environment. To ascertain each student's present level of comprehension in the class, formative assessments call for rapid examination of student data. The principal drivers of the shift in formative assessment procedures were cited as the simplicity with which instructors may formatively evaluate learning outcomes, give immediate feedback, and inspire students. Results show that Google Forms Quiz, Kahoot, and Quizlet, which are three of the most popular computer-based peer feedback programs, are used routinely by teachers across all subject areas.

In their work, Opdecam and Evergert (2022) described formative assessment as interfering with the educational process to enable changes in teaching and learning by letting students know which subjects, they have understood and which materials they still need to do well in a summative exam. With the help of a formative assessment, learners have the opportunity to grow from their errors and receive feedback on how they are performing in relation to the desired learning goals. According to research by Coveney et al. from 2022,

game-based education has several benefits that are documented in the literature, including better course grades, higher student engagement, involvement in classroom, and course successes.

Elzainy et al. (2020)'s paper detailed the steps used to expedite the urgent switch to online education and evaluation during the Covid 19 epidemic and to emphasize the benefits and effects it is projected to have on student and staff performance. The findings revealed that using digital assessment guaranteed that students made fewer mistakes while filling out bubbles and that online assessment gave staff confidence that students were meeting learning objectives. The article by Saleh et al. (2021) offers data-driven insights and focuses on remote evaluation in medical training during the COVID 19 lockout. Many factors need to be considered when conducting e-assessments, including choosing the best evaluation modality, adopting a practical and user-friendly framework that is acceptable to both learners and lecturers, and preserving validity by enhancing evaluation security and reducing misconduct. The study also emphasized ways to prevent cheating while utilizing evaluation tools, such as questions that are given to students at random.

In their research, Romero et al. (2021) outlined how factor education frequently exhibits a lack of student desire, involvement, and self-efficacy. Incorporate quizzes in the lessons as a technique to enhance learning by giving students the opportunity to develop new abilities, receive feedback, practice self-control, and take charge of their own knowledge construction. This study found that the preparation of the subject's theoretical contents was aided by Moodle exams and Socrative quizzes. The input these tools provided for their learning process was treasured by the students. In their research, Tuma et al. (2021) examined remote learning. Although consumers believed that distant education was less successful than traditional face-to-face instruction, they nonetheless considered it to be a valuable substitute during the epidemic. During COVID 19, online classes offered a beneficial option.

Formative assessment tools have been challenging for many educators and students. One major gap in these tools is the lack of in person contact and feedback between teachers and students. In a traditional classroom setting, teachers are able to observe and provide feedback on students' progress and understanding in real-time. However, in an online learning environment, this type of interaction is often not possible, which can make it difficult for teachers to gauge students' understanding and provide appropriate support. Another gap in formative assessment tools in online learning during COVID-19 is the lack of

access to technology and resources for some students. Many lacked a solid well-connected internet, laptops or other devices, or even a quiet place to learn at home.

Additionally, the rapid shift to online learning in response to the pandemic has left many educators with limited time and resources to develop and implement effective formative assessment tools. This can lead to a lack of consistency and effectiveness in the assessment processes, which can impact students' learning and achievement. Overall, the COVID-19 pandemic has highlighted the need for improved formative assessment tools in online learning, and for increased support and resources for educators to develop and implement these tools effectively.

CHAPTER 3

Methods of research

The research method is covered in this chapter. It includes the study idea, participants, information gathering, and analysis techniques.

Research Strategy

The quantitative research approach, which involves collecting and analysing numerical data to answer research questions, was used in this study to investigate participants' opinions and experiences using formative assessment tools in order to assess the study's goal. This may entail developing a survey or quiz in Google Forms and then sending it to a sample of people who can then complete the survey online. The data obtained may then be evaluated statistically to detect patterns and trends (Walter & Andersen, 2016). In general, the goal of quantitative research is to measure social fact. Quantitative study looks for numbers everywhere and utilize them to build their theories. Strict criteria for data collection and analysis are essential because quantitative researchers view the world as an established fact that can be measured objectively (Sukamolson, 2007).

Research Participants

This research has three hundred (300) respondents, with around 46.3% female and 53.7% male respondents. The survey was conducted within Northern Cyprus among students from various nationalities and education level with around 61.7% bachelors' students, 23.3% masters' students and 15.0% PhD students, which was a special condition for conducting this survey.

Demographic information of participants

In this survey, approximately 46.3% of respondents at a frequency of 139 are identified as female and 53.7% at a frequency of 161 are identified as male. This demonstrates a roughly equal distribution of male and female participants in the survey.

Of the 300 respondents, 61.7% (n=185) are at their Bachelor's degree level, 23.3% (n=70) are at their Master's degree level, and 15.0% (n=45) are at their Doctorate degree level. This indicates that the majority of respondents had at least a Bachelor's degree, with a smaller portion holding advanced degrees.

A summary of the gender and educational level of the participants in this study are presented in Table 3.1 below

Table 3.1.

Participants' demographic information n=300

Demographic Variable		Frequency	Percentage
Gender	Male	161	53.7%
	Female	139	46.3%
Education level	B.Sc.	185	61.7%
	M.Sc.	70	23.3%
	Ph.D.	45	15.0%

For this study, 300 participants responded, with overall mean of 4.152414 and a standard deviation of 3. 365279.The distribution of respondents is summarized below:

Table 3.2.

Descriptive Statistics

N	Mean	Std. Deviation
300	4.152414	3.365279

Data Collection Tools

The study investigated the usage of formative assessment tools in Online Learning during the Covid 19 Pandemic. The research was conducted within the frame of a questionnaire can be seen in Appendix 1. in order to obtain and accurately achieve the Aim the preparation of the questionnaire and application are described below. Appendix 2 contains the letter of approval from the Ethical Committee.

In order to develop the questionnaire, the researcher had to decide how to collect the required data for example which scaling method to use? Does number of responses matter? Is there an optimal number of alternatives for the sale? Researcher took permission from an

author or a paper Online Assessment in the era of Digital Natives in higher Education Institutions. This can be seen in Appendix 3, some of the close ended questions where obtained from a table in his study. The rest of the questions and formats the researcher and supervisor composed of them.

The survey monkey questionnaire was administered via google forms to students from various universities in Cyprus with the intention of getting a general overview of online assessment. The respondents on the close ended questions indicated their responses on a 5-point Likert scale of satisfied to very dissatisfied and agree to strongly disagree with 5 to 1 scoring values which were apportioned to their responses respectively. According to Ary et al (2012) Likert scale gauges people's views and attitudes towards a highlighted topic in this context, online assessment. Each question in the paper was phrased in such a way that satisfied or agree represented a positive reaction

A Google form was utilized to obtain information from students on their perspectives on the use of formative assessment tools in online learning. Google Forms is a free data collection tool that is part of the Google Drive suite of productivity tools. It allows users to create simple online surveys, quizzes, and forms that can be filled out by anyone with an internet connection. Google Forms is a powerful tool that can be used for a variety of purposes, including market research, customer feedback, event registration, and more (Vasantha Raju N, 2016). One of the main benefits of using Google Forms for data collection is its simplicity. Anyone with a Google account can create a form in just a few minutes, and the forms can be shared via a link or embedded in a website or blog. Respondents can complete the form on any device, and their responses are automatically recorded and stored in a Google Sheets spread sheet. Google Forms is a useful and easy-to-use data collection tool that is suitable for a wide range of purposes. Whether a researcher is conducting market research, gathering customer feedback, or organizing an event, Google Forms can help you collect and analyse the data needed. With its simplicity, customization options, and integration with other Google tools, it is an invaluable tool for anyone looking to collect and analyse data online (Torrentira, 2020). The questionnaire comprised of three sections which include:

Section 1 Demographic Information: this section includes questions that obtain the participants demographic information which includes their gender, nationality, education level and whether or not a participant has used online quiz or gamification to learn.

Section 2 Participant General Information in relation to assessment tools: this section includes questions to assess which tools participants have used and type of exam questions and, if overall, they were satisfied with formative assessment

Data Analysis Methods

This study used a Descriptive Analysis method for data analysis. Descriptive analysis is a technique for arranging and summarizing a collection of observations in order to gain a better understanding of the data. It entails recognizing patterns and trends in the data and summarizing the data in a clear and helpful manner (Lawless & Heymann, 2010). Summary statistics were used to compute metrics such as mean and standard deviation to describe the data's central tendency and spread. Also, frequency tables were used to arrange the data into tables that display the amount of times each value or category occurred. The data analysis for the research was performed using SPSS (Statistical Package for the Social Sciences), a software tool that may be used for a range of statistical analytic tasks, including descriptive statistics. Frequency tables and descriptive statistics to compute a variety of descriptive statistics are two examples of descriptive statistics procedures conducted with SPSS (Gupta et al., 2019).

Procedure

The gathered information was saved to the Google cloud, where only the researchers with their email address and password could view them. Afterwards, for statistical analysis, the data was exported to an Excel spreadsheet and entered into SPSS. Using, the information gathered from all three sections. The version in use was IBM SPSS Statistics version 29

All the results were analysed using descriptive statistics (frequency, percentage, and descriptive), an independent t-test, and Cronbach's alpha to determine whether the questionnaire was reliable. The findings were analysed, presented as tables and figures, and further discussed in the paper. The following below are the step-by-step strategies for carrying this out.

- To acquire a better understanding of the study, previous studies on the chosen research subject were studied.
- A research subject proposal was submitted for consideration to the computer information systems faculty.
- Appendix 1 shows the ethics committee approval after the application was submitted for approval.

- Following ethical approval, a Google form survey was created and distributed to participants through a link for their feedback on the research topic. Appendix 2
- The participants' responses were collected and analysed using spss for descriptive statistics analysis.
- The report was completed and sent to the supervisor for evaluation and adjustments.

Reliability Test of Survey Dimensions

SPSS was used calculate Cronbach's Alpha to test the reliability of the questionnaire scales. Cronbach's alpha is used as a way to estimate the variance's proportion that's consistent in a set of test scores Brown (2002), It measures the internal consistency of test items to indicate how interrelated the questions or items may be. The more interrelated the items are the higher the calculated reliability coefficient (Ekulu & Quainco ,2019). The table below shows the overall Cronbach's Alpha for all dimensions was .485 and it will be clearly explained in the results chapter

Table 3.3

Reliability Test of the Questionnaire

Cronbach's alpha	N of Items
.485	29

CHAPTER 4

Results and Discussion

This chapter highlights the study's findings. This chapter explains the research questions and presents the responses from participants.

Did the rate at which gamification was incorporated increase during the pandemic?

The following sections will seek to answer this research question

Online learning or online quiz or gamification platform for learning:

The determining factor in the survey was checking if the participants had used online quiz in this survey, 38 out of 300 participants (12.7%) responded that they had not used online learning platforms to learn. The remaining 262 respondents (87.3%) reported that they had used online platforms, such as online quizzes or gamification, for learning purposes. The Valid percent 87.3% as shown on table 4.1 show that more participants answered yes to using gamification. This shows that the greater part of survey participants has experience with online learning methods

Table 4.1

Have you used online learning or online quiz or gamification platform to learn?

	Frequency	Percent	Cumulative Percent
No	38	12.7	12.7
Yes	262	87.3	100.0
Total	300	100.0	

Gamification for learning satisfaction:

Of the respondents who provided an answer, 28 (9.3%) reported that they do not enjoy using gamification for learning, while 235 (78.3%) reported that they do enjoy it. This suggests that the majority of respondents find gamification to be a useful and enjoyable learning tool and the mean obtained of 2.66 also explains the increase in usage of gamification. In addition to that the survey participants had a positive view of online education. 51 (17.0%) responded that they feel good about online education, 87 (29.0%) found online education satisfactory, and 96 (32.0%) had a very good opinion of it. These outcome suggest that the majority of participants have a beneficial view of online education and find it to be a satisfactory or very good way to learn.

Table 4.2

Do you enjoy using gamification to learn?

	Frequency	Percent	Mean	Standard Deviation
			2.66	.687
No	28	9.3		
Yes	235	78.3		
Total	300	100.0		

In addition to that when survey participants where asked if online assessment improves technological technical skills, many of participants agreed that online assessments improve their technological technical skills. 55 participants (18.3%) strongly agreed and only 2 participants (0.7%) disagreed. By engaging with online assessments, students can gain experience with different types of technology and become more proficient in using them. This can be a valuable asset in today's digital world and can open up new opportunities for learning and career advancement.

Satisfaction with This Mode of Learning Using Interactive Gamification and Quizzes:

In this survey, the respondents who did provided an answer, 32 (10.7%) reported that they were not satisfied with this mode of learning, while 228 (76.0%) reported that they were

satisfied. This suggests that the majority of respondents found this method of learning to be effective and satisfactory. This result is similar to the one Urh et al. (2015) came up with in their paper they addressed the importance of technology because it paves way for better communication and implementing new information systems such as games. The structure of games according to their research allows participants to restart or play again after a mistake, this freedom to fail makes students more accepting to experimenting with new technologies and increases student engagement.

When responding to the question about whether online assessment is appropriate for learning for all students and those with disability, the majority of the participants strongly agreed These results suggest that the majority of survey participants believe that online assessments can be a useful tool for learning for all students, including those with disabilities. By providing immediate feedback and the opportunity to correct errors, online assessments can help students to become more independent and proactive in their learning process. This can lead to improved learning outcomes and the development of valuable skills that can be applied beyond the classroom

Table 4.3

Are you satisfied with this mode of learning using Interactive gamification and quizzes?

	Frequency	Percent	Mean	Standard Deviation
	40	13.3	2.63	0.709
No	32	10.7		
Yes	228	76.0		
Total	300	100.0		

Gamification and quizzes improvement on academic performance:

Out of 300 survey participants, 37 (12.3%) did not respond to the question about whether gamification and quizzes improved their academic performance. Of the respondents, 38 (12.7%) reported that gamification and quizzes did not improve their performance, while 225 (75%) reported that it did.

Table 4.4

Did gamification and quizzes improve your academic performance?

	Frequency	Percent	Valid Percent	Cumulative Percent
	37	12.3	12.3	12.3
No	38	12.7	12.7	25.0
Yes	225	75.0	75.0	100.0
Total	300	100.0	100.0	

Referring to table 4.4 above, in total, 263 participants (87.7%) reported that gamification and quizzes either improved their performance or had no effect on it, while 37 (12.3%) did not provide a response. It appears that the majority of respondents found gamification and quizzes to be helpful in improving their academic performance. Survey results when participants where asked if online assessment provides an unbiased grading which improves learning process,14.7% agreed and 51.3% strongly agreed these results suggests that the majority of the survey participants believe that online assessment can be a useful tool for providing for providing an unbiased evaluation of their learning progress. This can help ensure that students are being fairly and accurately assessed, which can be motivating for their learning process. It can also help instructors to identify areas where students may need additional support, leading to improved learning outcomes.

A similar observation was made in 2021 by Nurtanto et al. (2021) about how the incorporation of gamification learning programs has a remarkable positive impact on increasing learning outcomes. The keenness of students in game-based learning comes from internal motivation and that's why during the pandemic it was an acceptable adjustment as students were eager to try this model of learning

Distraction when using games, quizzes or any other formative assessment tools:

Out of 300 survey participants, of the respondents, 73 (24.3%) reported that they do not get distracted, while 105 (35%) reported that they sometimes get distracted and 84 (28%) reported that they often get distracted. In total, 189 participants (63%) reported getting distracted either sometimes or often when using games, quizzes, or other formative assessment tools to learn. This suggests that a significant number of respondents find these

tools to be distracting, although substantial portions also find them helpful for learning. A study by Rohan et al. (2021) also highlighted that gamification could be endorsed as a solution for enhancing learner engagements and also motivation. At the same time, allowing students to achieve their own goals through the deployment of gaming elements.

Have your grades changed as compared to previous semesters when you only used traditional learning methods (face to face education)

According to the survey results, 190 participants (63.3%) reported that their grades had changed compared to previous semesters when they only used traditional learning methods. While 67 respondents (22.3%) answered that their grades had not changed. These results suggest that most people saw a boost in their grades. when switching to online education, with the majority of those changes being positive. It is worth noting that the results may be influenced by the fact that some participants did not provide a response. The survey results show that the majority of participants agreed or strongly agreed that online assessments enhance self-learning and problem-solving skills. 162 participants (54.0%) agreed, and 47 participants (15.7%) strongly agreed. 22 participants (7.3%) disagreed, while 22 participants (7.3%) strongly disagreed. Only 1 participant (0.3%) had a neutral response, and 1 participant (0.3%) disagreed. These results suggest that the majority of survey participants believe that online assessments can be a useful tool for developing self-learning and problem-solving skills. By providing immediate feedback and the opportunity to correct errors, online assessments can help students to become more independent and proactive in their learning process. This can lead to improved learning outcomes and the development of valuable skills that can be applied beyond the classroom.

The commonly used tools and the level of satisfaction were two important factors.

The next session will highlight the results which answer the research question which tools were most popular and where students satisfied with using them

Which of the following tools have you used before (can select more than one)

Out of the survey participants, 51 (19.3%) have used Edpuzzle, 157 (59.5%) have used Google Classroom, 188 (71.2%) have used Google Forms, 38 (14.4%) have used Near

Pod, 52 (19.7%) have used Kahoot, 134 (50.8%) have used Quizlet, and 30 (11.4%) have used Peer grade. The chart on Figure 4.1 illustrates these figures in percentage It seems that the most popular tools among the survey participants are Google Forms, Quizlet, and Google Classroom, while the least popular are Peer grade and Edpuzzle. This result is similar to Thuan (2018) in their research stated that most students showed a positive response and were motivated in the learning process.

Figure 4.1
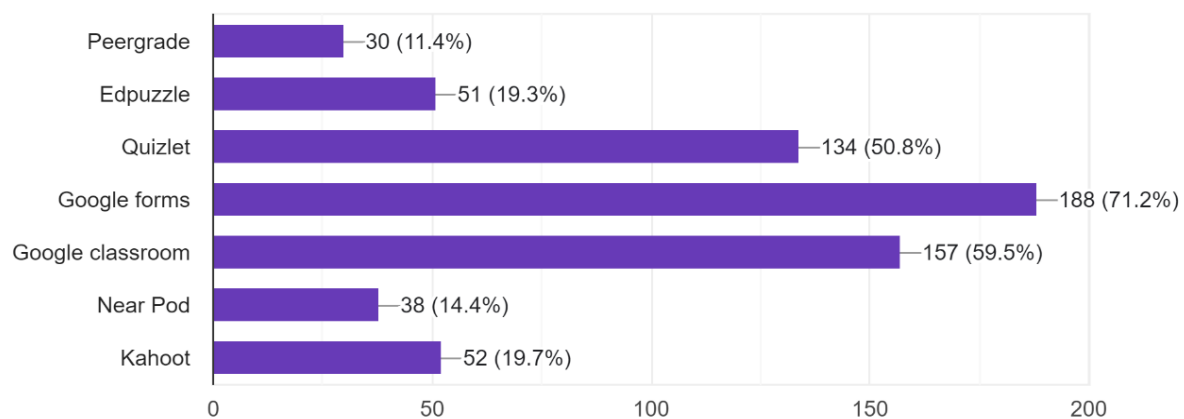
Do you think tools such as quizlet, quizzes, and kahoot make it easy for students to cheat?

Out of a total of 300 survey participants, 103 (34.3%) said that they think tools such as Quizlet, quizzes, and Kahoot make it easy for students to cheat, while 158 (52.7%) said that they do not think these tools make it easy for students to cheat. It is worth noting that these results may not be representative of the larger population, as they are based on a sample of survey participants and may not be fully representative of the views of all students.

Table 4.5

Do you think tools such as quizlet, quizzes, and kahoot make it easy for students to cheat?

	Frequency	Percent	Valid Percent	Cumulative Percent
	39	13.0	13.0	13.0
No	158	52.7	52.7	65.7
Yes	103	34.3	34.3	100.0

Total   300   100.0   100.0

The poll in section 4.2.2 was further examined for further information by asking participants who replied "YES", an open-ended question how teachers might assure authenticity in examinations and quizzes. Only 48 (46.6%) participants out of the 103 that responded "YES" replied to this poll. The 48 responses were classified into 4 themes as shown in the table below

Table 4.6

Theme	f
Monitoring	7
Remove internet	4
Secure Exam Structure	24
Invigilation	7

It can be noted that from themes that most of students stated that using secure exam type questions that cannot be seen on the internet will make it challenging for students to cheat during online assessment, some suggested invigilation/ monitoring will create better unbiased results in exams. Some of the student views on this question are quoted below S=Student

S1: "*It's hard to avoid cheating but if we could personalize the quizzes it would be better*

S2*:" Teachers should only make the questions according to their slides not based on quiz easily available on the internet*

S3*:" By setting different questions for every person this way they won't be able to ask their friends about answer in exams*

S4*:" Use more calculation and open-ended questions and not multiple choices*

Level of satisfaction for the following tools on the ones you have used.

This poll was determining the level of satisfaction from very satisfied to very dissatisfied. Google forms had the highest percentage 27% as most participants highlighted they were very satisfied

Table 4.7

Level of Satisfaction

	Satisfied	Very Satisfied	Dissatisfied	Very Dissatisfied	Mean	Standard Deviation
Peer grade	20%	9.7%	3.7%	1.7%	2.57	1.684
Edpuzzle	17.3%	14%	3.3%	1.3%	2.67	1.803
Quizlet	30.3%	22%	3%	1.7%	3.35	1.874
Google Forms	33.7%	27%	3%	1.7%	3.70	1.809
Google Class	32%	22%	4.3%	1.7%	3.47	1.789
Near Pod	17.7%	15.7%	3.3%	1.7%	2.73	1.585
Kahoot	20%	14%	7.7%	2.7%	2.80	1.799

How often do you have a one on one discussion with your teachers?

According to the survey results, approximately 29.7% of participants reported having one-on-one discussions with their teachers "after the class," 5.7% reported having them "before the class," 38.7% reported having them "during the class," and 12% reported having them "never." As shown on table 4.6 below, it is worth noting that the majority of participants (77.7%) reported having one-on-one discussions with their teachers at least occasionally, either during or after class. However, a significant minority (38.7%) reported having these discussions during class, which may suggest that they feel comfortable approaching their teachers with questions or concerns during class time. On the other hand, a

significant number (12%) reported never having one-on-one discussions with their teachers, which could potentially indicate a lack of opportunity or willingness to engage with their teachers on a more personal level.

Closely related to this is an item which asked whether Participants can evaluate their learning accomplishments with the aid of system feedback the majority of participants agreed or strongly agreed that system feedback helps them to reflect on their merits in learning. 169 participants (56.3%) agreed, and 40 participants (13.3%) strongly agreed. 20 participants (6.7%) disagreed, while 19 participants (6.3%) strongly disagreed. Only 1 participant (0.3%) had a neutral response, and 1 participant (0.3%) disagreed. These results suggest that the majority of survey participants believe that system feedback can be a helpful tool for reflecting on their learning progress and identifying areas where they may need to improve. By providing immediate and detailed feedback, online assessments can help students to become more self-reflective and proactive in their learning process, leading to improved learning outcomes.

Table 4.8

How often do you have a one on one discussion with your teachers?

		Frequency	Percent	Cumulative Percent
Valid		42	14.0	14.0
	After the class	89	29.7	43.7
	Before the class	17	5.7	49.3
	During the class	116	38.7	88.0
	Never	36	12.0	100.0
	Total	300	100.0	

Descriptive Statistics from Learning opportunities from online assessment

The table below shows a summary of the learning opportunities provided by online assessment

The table highlights the mean and standard deviation of all the items

Table 4.9

Summary of the learning opportunities provided by online assessment

		Standard Deviation
Online assessment enhances my thinking beyond four walls of learning		1.112
Online assessment offers the possibility of self-checking on the current level of knowledge which motivates me for further work	2.34	1.434
Immediate result obtained upon test completion is really motivating for further learning	3.04	1.945
Online assessment offers the possibility of verifying errors and making corrections at any time for filling in my knowledge gaps	2.81	1.563
Online assessment provides instructors with immediate feedback to improve my learning	2.65	1.512
Online assessment provides an unbiased grading which improves my learning process	3.29	2.391
Online assessment enhances self-learning and problem-solving skills	2.71	1.512

Online assessment improves my technological technical skills	3.08	1.944	
Online assessment is appropriate for learning for all students and those with disability	3.02	1.922	
System feedback helps me to reflect on my merits in learning	2.82	1.901	

The relationship between gender and the acceptance/usage of gamification tools and online learning.

In this section we will determine the differences that exist among the variables independent -gender and dependent -usage of formative assessment tools. Hence an independent t-test was done to try and answer the research question

Table 4.10

Statistical difference between gender of participants and usage. Item (Have you used online learning or online quiz or gamification platform to learn)

Gender	N	Mean	S. D	Mean Difference
Male	161	1.86	.345	0.22
Female	139	1.88	.320	

In Reference to the item have you used online learning shown in table 4.8 results showed no difference in significance Mean difference (-0.22) with outputs showing Males (M= 1.86, SD=0.345), females (M=1.88 SD=0.320), finalizing that the mean difference are most probably coincidental.

Table 4.11

Statistical difference between gender of participants and usage. Item (Do you enjoy using gamification to learn)

Gender	N	Mean	S. D	Mean Difference
Male	161	2.65	.711	0.30
Female	139	2.68	.662	

As seen in table 4.9 results for whether participants enjoy using gamification to learn, showed no difference in significance Mean difference (0.30) with outputs showing Males (M= 2.65, SD=0.711), females (M=2.68, SD=0.662), the difference in the means goes on to show that that the mean difference are most probably coincidental and gender does not determine the level of enjoyment

Table 4.12

Statistical difference between gender of participants and usage. Item (Are you satisfied with this mode of learning)

Gender	N	Mean	S. D	Mean Difference
Male	161	2.61	.742	0.25
Female	139	2.64	.670	

With reference to the item Are you satisfied with this mode of learning, the chances that the the mean difference is probably coincidental are highly proven and not because of the difference in gender hence gender does not determine satisfaction of mode of learning

Table 4.13

Statistical difference between gender of participants and usage. Item (did gamification and quizzes improve your academic performance

Gender	N	Mean	S. D	Mean Difference
Male	161	2.63	.742	-0.01
Female	139	2.63	.673	

As seen in table 4.11 results for whether gamification and quizzes improved academic performance, showed no difference in significance Mean difference (-0.01) with outputs showing Males (M= 2.63, SD=0.742), females (M=2.63 SD=0.673), the means for male and female are exactly the same which means gender does not determine whether there was improved performance or not

Table 4.14

Statistical difference between gender of participants and usage. Item (Do you get distracted when you learn using games)

Gender	N	Mean	S. D	Mean Difference
Male	161	2.75	.714	0.82
Female	139	2.83	.985	

In Reference to the item do you get distracted when you learn using games shown in table 4.12 results showed no difference in significance Mean difference (0.82) with outputs showing Males (M=2.75, SD=0.714), females (M=2.83 SD=0.985), finalizing that the mean difference are most probably coincidental.

Table 4.15

Statistical difference between gender of participants and usage. Item how do you feel overall about online education?

Gender	N	Mean	S. D	Mean Difference
Male	161	3.39	1.513	0.191
Female	139	2.59	1.351	

Table 4.13 depicts gender against the listed item how participants feel about online education as show there is not a slight difference with mean difference (0.191) with outputs showing Males (M=3.39 SD(1,513) Female (M=2.59, SD=1,351),the small difference can be said to mean females are more appreciative of online education, According to some researchers their findings indicate that gender is a key factor ,a paper by Shahzad et al.(2021) investigated how male and female students supported e-learning portal and the results showed it was more towards female students. This can be taken to mean that female students have higher motivation in online learning than males because they are more eager about using communication and technological tools for teach Tang et al. (2021).

To conclude, as seen from all 6 items evaluated after the analysis with gender we can strongly conclude that gender is not a determining factor in the usage/ acceptance of gamification tool and online learning

T-Test

To ascertain if the population's mean is equal to a given value, a t-test is a statistical process. It is utilized when you have a single sample of data and wish to compare the sample mean to a predetermined or speculative value. The test entails contrasting the sample mean with the given value and calculating the likelihood that the discrepancy between the two means is the result of chance. It is possible to draw conclusions about the population mean from the t-test findings, which are presented as a t-value and a p-value. For the findings of the assessment tools survey in this research, a t test was used

Table 4.16

One Sample Statistics.

	N	Mean	Std. Deviation	Std. Error Mean
Peergrade	300	2.57	1.684	.097
EdPuzzle	300	2.67	1.803	.104
Quizlet	300	3.35	1.874	.108
Google Forms	300	3.70	1.809	.104
Google Classroom	300	3.47	1.789	.103
Near Pod	300	2.73	1.858	.107
Kahoot	300	2.80	1.799	.104

The One-Sample Statistics table in the table above shows the results of a study analysing the effectiveness of several educational technology tools. Each tool's mean, standard deviation and standard error of the mean are provided, along with a sample size of 300 users. Among the tools available are Peergrade, EdPuzzle, Quizlet, Google Forms, Google Classroom, Near Pod, and Kahoot. Peergrade had the lowest mean, 2.57, while Google Forms had the highest mean, 3.70, as determined by the one-sample data. Furthermore, Google Forms had the highest standard deviation (1.799), whereas Kahoot had the lowest (1.809).

Table 4.17

One Sample Test

	t	df	Significance One-Sided p	Two-Sided p	Mean Difference	95% Confidence Interval of the Difference Lower	Upper
Peer grade	26.403	299	<.001	<.001	2.567	2.38	2.76

EdPuzzle	25.681	299	<.001	<.001	2.673	2.47	2.88
Quizlet	30.933	299	<.001	<.001	3.347	3.13	3.56
Google Forms	35.456	299	<.001	<.001	3.703	3.50	3.91
Google Classroom	33.599	299	<.001	<.001	3.470	3.27	3.67
Near Pod	25.475	299	<.001	<.001	2.733	2.52	2.94
Kahoot	26.954	299	<.001	<.001	2.800	2.60	3.00

The outcomes of one-sample t-tests evaluating the average difference between a test result of 0 and the average scores of various instructional technologies are shown in the table below (Peergrade, EdPuzzle, Quizlet, Google Forms, Google Classroom, Near Pod, Kahoot). Each tool is given its t-value, degrees of freedom (df), significance level, mean difference, and 95% confidence range of the difference. The mean difference is statistically significant at a very high degree of confidence when the significance threshold is less than.001 for all tools. The 95% confidence intervals for the mean differences vary from 2.38 to 3.91, with values between 2.567 and 3.703. This could be a sign that the tools had a real effect on how well students performed.

Table 4.18

One-Sample Effect Sizes

		Standardizer [a]	Point Estimate	95% Confidence Interval Lower	Upper
Peergrade	Cohen's d	1.684	1.524	1.357	1.690
	Hedges' correction	1.688	1.521	1.354	1.686
EdPuzzle	Cohen's d	1.803	1.483	1.318	1.646

	Hedges' correction	1.808	1.479	1.315	1.642
Quizlet	Cohen's d	1.874	1.786	1.603	1.968
	Hedges' correction	1.879	1.781	1.599	1.963
Google Forms	Cohen's d	1.809	2.047	1.847	2.246
	Hedges' correction	1.814	2.042	1.843	2.240
Google Classroom	Cohen's d	1.789	1.940	1.747	2.131
	Hedges' correction	1.793	1.935	1.743	2.126
Near Pod	Cohen's d	1.858	1.471	1.307	1.634
	Hedges' correction	1.863	1.467	1.304	1.629
Kahoot	Cohen's d	1.799	1.556	1.387	1.724
	Hedges' correction	1.804	1.552	1.384	1.720

The findings from measurements of the one-sample effect sizes for various instructional technologies are shown in the table above (Peergrade, EdPuzzle, Quizlet, Google Forms, Google Classroom, Near Pod, Kahoot). Cohen's d and Hedges' correction, two distinct metrics of effect magnitude, are provided. The point estimate and 95% confidence interval of the effect magnitude for each tool are provided. The effect sizes for Cohen's d and Hedges' adjustment, respectively, vary from 1.684 to 2.047 and 1.688 to 2.042, respectively. Since all of the impact sizes are positive, the mean score for assessment tools is greater than zero. According to the measures of impact sizes, all assessment instruments have significant effects. This also demonstrates that, generally speaking, Peergrade and Quizlet were the tools that students did best with compared to other tools. The tools appear to improve student performance based on all of the statistically significant impact sizes.

One-Way ANOVA

An analysis of variance, or ANOVA, is a statistical method for comparing the means of two or more groups. It may be used to identify whether group(s) has means that differ from the others and to assess whether there is/are substantial differences in the means of the groupings.

Table 4.19

One Way Anova

		Sum of Squares	df	Mean Square	F	Sig.
Peergrade	Between Groups	2.006	1	2.006	.707	.401
	Within Groups	845.660	298	2.838		
	Total	847.667	299			
EdPuzzle	Between Groups	7.985	1	7.985	2.469	.117
	Within Groups	964.001	298	3.235		
	Total	971.987	299			
Quizlet	Between Groups	2.201	1	2.201	.626	.429
	Within Groups	1047.746	298	3.516		
	Total	1049.947	299			
Google Forms	Between Groups	.140	1	.140	.043	.836
	Within Groups	978.456	298	3.283		
	Total	978.597	299			
Google Classroom	Between Groups	.001	1	.001	.000	.983
	Within Groups	956.729	298	3.210		
	Total	956.730	299			
Near Pod	Between Groups	.872	1	.872	.252	.616
	Within Groups	1031.794	298	3.462		

	Total	1032.667	299			
Kahoot	Between Groups	6.371	1	6.371	1.974	.161
	Within Groups	961.629	298	3.227		
	Total	968.000	299			

The results of experiments using ANOVA to compare the means of various instructional technologies are shown in the table below (Peergrade, EdPuzzle, Quizlet, Google Forms, Google Classroom, Near Pod, Kahoot). Both the between-groups and the within-group sources of variation are presented, together with the sum of squares, degrees of freedom (df), mean square, F-value, and significance level. The F-values vary from .043 to 2.469, and the significance threshold is above.05 for every assessment tool with the exception of EdPuzzle and Kahoot, demonstrating that there is no statistically significant difference in the results between the assessment tools. The findings imply that the methods of educational technology do not significantly differ from one another, that each teaching approach is equally successful, and that the best teaching strategy should be determined by the particular requirements of each student.

ANOVA Effect Sizes[a,b]

		Point Estimate	95% Confidence Interval	
			Lower	Upper
Peergrade	Eta-squared	.002	.000	.025
	Epsilon-squared	-.001	-.003	.022
	Omega-squared Fixed	-.001	-.003	.022
	Omega-squared Random	-.001	-.003	.022
EdPuzzle	Eta-squared	.008	.000	.040
	Epsilon-squared	.005	-.003	.037
	Omega-squared Fixed	.005	-.003	.037
	Omega-squared Random	.005	-.003	.037

Quizlet	Eta-squared	.002	.000	.025
	Epsilon-squared	-.001	-.003	.021
	Omega-squared Fixed	-.001	-.003	.021
	Omega-squared Random	-.001	-.003	.021
Google Forms	Eta-squared	.000	.000	.013
	Epsilon-squared	-.003	-.003	.009
	Omega-squared Fixed-effect	-.003	-.003	.009
	Omega-squared Random-effect	-.003	-.003	.009
Google Classroom	Eta-squared	.000	.000	.000
	Epsilon-squared	-.003	-.003	-.003
	Omega-squared Fixed-effect	-.003	-.003	-.003
	Omega-squared Random-effect	-.003	-.003	-.003
Near Pod	Eta-squared	.001	.000	.019
	Epsilon-squared	-.003	-.003	.016
	Omega-squared Fixed-effect	-.002	-.003	.016
	Omega-squared Random-effect	-.002	-.003	.016
Kahoot	Eta-squared	.007	.000	.036
	Epsilon-squared	.003	-.003	.033
	Omega-squared Fixed-effect	.003	-.003	.033
	Omega-squared Random-effect	.003	-.003	.033

This table displays the findings from ANOVA effect size calculations for several evaluation techniques (Peergrade, EdPuzzle, Quizlet, Google Forms, Google Classroom, Near Pod, Kahoot). The point estimate and 95% confidence interval of the effect magnitude

for each technology are provided. The effect sizes for Eta-squared, -.003 to.005 for Epsilon-squared,.002 to.007 for Omega-squared Fixed-effect, and.002 to.007 for Omega-squared Random-effect, vary from.002 to.008. Since the impact sizes for each measure are all smaller than.05, only a small percentage of the variance in the dependent variable can be attributed to the independent variable. The effect size analyses imply that the mean differences between the assessment tools are not significant. The largest impact sizes, meanwhile, are shown for Peergrade, Quizlet, Near Pod, and Kahoot, while Google Forms and Google Classroom have the smallest effect sizes. The finest tools for instructors to utilize in their classrooms are therefore Peergrade, Quizlet, Near Pod, and Kahoot, according to this data.

Cronbach's Alpha

In order to assess the consistency and stability of a research instrument, reliability statistics are a crucial component of psychological research. The statistical measure of internal consistency known as Cronbach's Alpha is one of the most often used dependability indicators. As a measure of internal consistency, Cronbach's Alpha assesses how closely linked the components of a research instrument are to one another. This measurement is determined by examining the relationship between each instrument item and the instrument's overall score. The coefficient of .485 indicates how closely connected the items are to one another and how well they reflect the same notion. A coefficient of .485 suggests that the research instrument is assessing the same construct and that the elements inside it are fairly connected to one another.

Table 4.20

Cronbach's alpha

Case Processing Summary		N	%
Cases	Valid	300	100.0
	Excluded	0	.0
	Total	300	100.0

Reliability Statistics

Cronbach's Alpha	N of Items
.485	29

It is crucial to take the study environment into account when evaluating the reliability statistics of Cronbach's Alpha with a coefficient of .485 and 29 items. For instance, a coefficient of .485 may be regarded as appropriate if the study instrument is assessing a complicated construct, such as mental health. A coefficient of .485 may be seen as inadequate if the research tool is assessing a simpler construct, such as customer satisfaction with a product. In addition, the complexity of the construct being assessed should be considered while determining the number of elements in the research instrument. For a simpler build, a study instrument with 29 elements could be deemed excessive, but it can be acceptable for assessing a complicated construct. Internal consistency is measured by Cronbach's Alpha, which is frequently used to assess the dependability of research tools. The 29 items in the research instrument and the coefficient of .485, which shows that the items are fairly connected to one another, show that the instrument is assessing the same construct. When assessing the reliability statistics, it is crucial to consider the research's context, the items' quality and relevance, the sample size, and the type of sample that was employed. Overall, the idea of a research instrument's dependability is intricate and multifaceted, requiring careful evaluation of several elements.

CHAPTER 5

Conclusion

Since the epidemic began, online education has grown in popularity and has been on the rise. Literature shows that the Covid 19 Pandemic increased the rate at which institutions adapted to online education and came up with ways such as formative assessment to increase the quality of education. Hence using the Survey questionnaire method this study has investigated if students were satisfied with formative assessment and which tools they had encountered and mostly preferred.

Results from the study showed that 262 respondents (87.3%) reported that they had used online platforms such as online quizzes or gamification for learning purposes; this suggests that the majority of survey participants have experience with online learning methods. According to a study by Peat and Franklin (2003) students who did not use any particular formative assessment tool, it could be attributed to lack of knowledge or time or even motivation or an awareness of the resources could be the primary reason for non-use.

This investigation suggests that there was an increase in the usage of formative assessment tools during the pandemic and students preferred this mode of learning as majority agreed that their grades improves, 63,3% said their grades changed as compared to previous years before using formative assessment tools in online education's result is similar to a paper by Wafubwa and Csikos (2022), in their study they concluded that formative assessment tactics can result in better academic achievement, and their research showed that formative assessment techniques can raise the performance of underachievers

When comparing the formative assessment tools that are mostly preferred for learning ,the most used were google forms, google classroom and quizziz.This result is similar to Thuan (2018)in their research they stated that most student showed a positive response and were motivated in the learning process.The data highlighted a moderate level of agreement among students in their use of google classroom and google forms in that it create not only an enjoyable environment for learning but it made learning easier for them

Results also show that when it comes to level of satisfaction for formative assessment tools, google forms and google classroom had the highest percentage as well

It is an important result that most students when responding to the question about how often they have one on one discussion with their teachers, the majority highlighted that during online assessment they can have discussions during the class which can be interpreted to mean they feel at ease to ask questions and also answer them while class or assessment is in progress this in turn provides feedback to teachers. A paper by Leighton (2019) spoke about how the interpretation of formative assessment feedback is crucial. If for example the student is to use feedback especially formative assessment feedback, understanding how the student interpreted the feedback would be useful. Also, instructors measure learning activities to ascertain the instructional objectives Adedoyin and Soykan (2020)

Based on the independent sample t test, most difference found between genders is not very high. There is a statistically significant difference between genders on learning opportunities provided by formative assessment. The means where higher for items on males as compared to females. However, on level of satisfaction the study has shown that there is no significant difference on level of satisfaction for formative assessment tools for academic performance male and female have the same mean.

The results indicated that for learning opportunities from online assessment most of the responses leaned toward agree and strongly agree for all items. Paper by Mushtaha et al (2022) had similar findings. Their study indicated how assessment made teachers and students excited about learning activities because a high number of student indicated a high level of satisfaction and that online assessment introduced students to new experiences by studying various online media applications that they had never studies before covid 19 pandemic broke out.

This study makes some suggestions for enhancing usage of formative assessment tools in learning online. It's critical to make sure the tools are well-made and in keeping with the learning objectives of the course. The usage of the tools and the purpose for the outcomes should also be made apparent by the teachers through instructions and examples. Another approach to enhancing the existing level of formative assessment is to provide students regular opportunity to apply them, such as include them in weekly assignments or conversations.

Additionally, teachers should try to provide each student individualized feedback on their development and utilize the outcomes of formative assessment tools to guide their future

lessons. The various learning requirements and learning styles of students must also be considered when using formative assessment tools and a range of assessment methods must be offered to account for these variations. Last but not least, formative assessment tools may be a helpful resource in online learning, but they must be used wisely and intelligently to be useful.

And lastly in future it might be beneficial for the The Computer information Systems department to design or come up with their own formative assessment tool one that is specially formulated to meet the specific requirements of the school curriculum designed by the department this can go a long way to make sure assessment will continue to be in use

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APPENDICES

APPENDIX 1 QUESTIONNAIRE

QUESTIONNAIRE FORM

Section 1: Demographic Information.

1- Gender   A. Male ☐

          B. Female ☐

2- Nationality --------------------------------------

3- Education Level.

A. Bachelor   B. Master ☐   C. PhD ☐

4- Which of these devices you use to get online.

A. Desktop Computers ☐   B. Laptop Computers ☐

C. Mobile Phones ☐   D. Tablets ☐

Section 2:

1. Have you used online quiz and gamification platform to learn?

a. Yes ☐   b. No ☐

If your answer is yes, you can proceed to the next question. If you do not have experience in the use of formative assessment you can close the survey

2. Do you enjoy using gamification to learn?

a. Yes ☐   b. No ☐

3. Are you satisfied with this mode of learning using interactive gamification and quizzes?

a. Yes ☐   b. No ☐

4. Did gamification and quizzes improve your academic performance?

a. Yes ☐   b. No ☐

5. Do you get distracted when you learn using games, quizzes or any other formative assessment tools

a. Yes ☐   b. No ☐

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6. Which of the following tools have you used before

Peer grade ☐   Edpuzzle ☐   Quizlet G☐le Forms   Google C☐room   ☐

Near pod ☐   Kahoot ☐

7.How do you feel overall about online education (Please select one)

Very good ☐

Satisfactory ☐

Good ☐

Neutral ☐

8.Have your grades changed as compared to previous semesters when you only used traditional learning methods (face to face education)

9. Do you think tools such as quizlet, quizzes , kahoot make it easy for students to cheat?

Yes ☐   No ☐

10. If your answer to the above question is yes, how can teachers ensure authenticity in tests and quiz

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11.Please set your level of satisfaction for the following tools on the ones you have used.

	satisfied	Very satisfied	Neutral	Dissatisfied	Very dissatisfied
Peergrade					

EdPuzzle					
Quizlet					
Google Forms					
Google class					
Near Pod					
Kahoot					

12.How often do you have a one on one discussion with your teachers

Before the class ☐   During the class After the class   Never ☐   ☐

13. Indicate by selecting the forms of assessment you have used (Can select more than one)

Electronic Portfolio ☐

Minute Paper ☐

Group Work ☐

Quizzes ☐

Discussion ☐

14. In the forms of assessment used, which of these type of exam questions did you encounter in assessment (can select more than one)

Fill in the blank ☐

Essay questions ☐

Word response ☐

Numeric questions ☐

Matching/ranking (term with definition or meaning etc) ☐

Hotspot (choosing among images, diagrams etc) ☐

Matrix (several multiple questions together**)** ☐

15. Leaning opportunities from online assessment.

	Strongly disagree	Disagree	agree	Strongly agree
Online assessment enhances my thinking beyond four walls of learning				
Online assessment offers the possibility of self checking on the current level of knowledge which motivates me for further work				
Immediate result obtained upon test completion is really motivating for further learning				
Online assessment offers the possibility of verifying errors and making corrections at any time for filling in my knowledge gaps				
Online assessment provides instructors with immediate feedback to improve my learning				
Online assessment provides an unbiased grading which improves my learning process				
Online assessment enhances self-learning and problem solving skills				
Online assessment improves my technological technical skills				
Online assessment is appropriate for learning for all students and those with disability				
System feedback helps me to reflect on my merits in learning				

APPENDIX 2
 Ethics Approval

09.03.2022

Dear Melissa Rutendo Mutizwa

Your application titled "**Usage of formative assessment tools in online learning during COVID 19**" with the application number NEU/ES/2022/808 has been evaluated by the Scientific Research Ethics Committee and granted approval. You can start your research on the condition that you will abide by the information provided in your application form.

Assoc. Prof. Dr. Direnç Kanol

Rapporteur of the Scientific Research Ethics Committee

Note: If you need to provide an official letter to an institution with the signature of the Head of NEU Scientific Research Ethics Committee, please apply to the secretariat of the ethics committee by showing this document.

APPENDIX 3

Request for **permission** External › Inbox ×

MELISSA_RUTENDO MUTIZWA <20204919@std.neu.edu.tr>   Wed, Dec 1, 2021, 11:11AM
to ndibaplac ▾

Dear Sir/Madam

I am a graduate student at Near East University in North Cyprus and I am writing this email to request **permission** to use your questionnaire from an article you wrote with the title

Online Assessment in the Era of Digital Natives in Higher Education Institutions

I am doing my thesis on formative assessment, hence I am requesting for the use of your questionnaire

Thank you and Best Regards

ndibalema mali <ndibaplac@yahoo.com>   Wed, Dec 1, 2021, 11:21AM
to me ▾

Hello Melissa
This to inform you that I have received your request and you are allowed to used the tool you have requested.
Best of luck.

Placidius Ndibalema (PhD)
Senior Lecturer
Dept. of Educational Foundations and Continuing Education- College of Education,
The University of Dodoma.
P.O.Box, 523 Dodoma-Tanzania
Phone: +255 735066932/+255717066932
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APPENDIX 4 SIMILARITY REPORT

MsC Thesis

ORIGINALITY REPORT

13%	12%	4%	4%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	docs.neu.edu.tr Internet Source	1%
2	files.eric.ed.gov Internet Source	1%
3	Submitted to Yakın Doğu Üniversitesi Student Paper	1%
4	phaidra.univie.ac.at Internet Source	<1%
5	www.daneshnamehicsa.ir Internet Source	<1%
6	www.researchgate.net Internet Source	<1%
7	archives.univ-biskra.dz Internet Source	<1%
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