

**AKENTEN APPIAH-MENKA UNIVERSITY OF SKILLS TRAINING AND
ENTREPRENEURIAL DEVELOPMENT**

**THE NEXUS OF THE COVID-19 PANDEMIC AND ONLINE FORMATIVE
ASSESSMENT**

ANDREWS ADOMAKO BARFI

(7201000002)

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DECLARATION

Student's Declaration

I, Andrews Adomako Barfi, declare that this dissertation, except quotations and references contained in published works that have all been duly acknowledged, is entirely my work, and it has not been submitted, either in part or whole, for another degree elsewhere.

Signature:.....

Date:.....

Supervisor's Declaration

I / We hereby declare that the preparation and presentation of this work were supervised under the guidelines for supervision of thesis/dissertation/project as laid down by the Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development.

Signature:.....

Date:.....

Dr. Adasa Kofi Frimpong Nkrumah

DEDICATION

This work is dedicated to my father, Mr. Andrews Konadu, and my children, Emmanuella & Emmanuel Konadu Barfi, and Eastwood Adomako Barfi.

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ABSTRACT

The COVID-19 pandemic brought much attention to the fact that teachers and students do not necessarily have to be physically present for teaching and learning to take place. Online teaching and learning have now become an integral part of the Ghanaian educational system. This leaves teachers with no option but to adopt an online mode of assessment to evaluate their lessons. Thus, this research investigates the perceived significance of online formative assessment, students' attitudes towards online formative assessment and how they affect its acceptance, and teachers' attitudes towards online formative assessment and how they influence its adoption.

A descriptive quantitative method was used to collect and analyze data from Mansoman Senior High School in the Ashanti region of Ghana, West Africa. The adoption of an Online Formative Assessment Model was proposed and tested using Partial Least Square-Structural Equation Modelling (PLS-SEM). The findings revealed that teachers' perceived significance of online formative assessment will not necessarily compel them to adopt it in class but students' perceived significance of it will cause them to adopt it. Also, the teachers would like to adopt the online formative assessment when they have a positive attitudes towards it but students' attitudes toward online formative assessment are inconsequential to their use and adoption of it.

CHAPTER ONE

INTRODUCTION

1.0 Background

Online education before the covid-19 pandemic was considered an option for the minority few who were mostly older compared to the regular students on campus (Hussein, Daoud, Alrabaiah, & Owais, 2020). It is admitted that the pandemic interrupted the education system throughout the world when schools were closed down and over 1.7 billion were affected (Crawford et al., 2020; Worldbank, 2020). Online learning, therefore, became the only option available for many institutions even though not all of them were ready in terms of logistics (Hussein et al., 2020). But now it is no longer an alternative or option but has become an integral part of the education system even though some students have expressed that it can never replace face-to-face teaching and learning (Xhelili et al., 2021). In fact, Bahasoan et al. (2020) commented that online learning has now become a modern, fully integrated educational phenomenon. This is because its importance was evidenced during the lockdown period when face-to-face teaching and learning were not possible (Gonzalez, et al., 2020). In Ghana, schools from creche to universities were all closed down (Kokutse, 2020). In the wake of this, some universities resorted to the online learning (Anaba, 2020.; Ashesi University, 2020).

Whether in an online setting or a traditional classroom setting, assessment holds a central place in the teaching and learning process (William et al., 2013). It is a useful activity that informs the teacher and even the learners whether they are on track to the achievement of the goals set for a particular instruction. Assessment is so important that it is asserted that without it teaching and learning activities are pointless. It is quite insightful to note that regardless of how thoughtful the

teachers design the lesson plan, and how engaging the learning experience is, if the assessment does not exist, the goal of learning cannot be gauged (Sari et al., 2020).

The assessment could be for summative purposes, that is, to determine what students have achieved in terms of knowledge and skills. However, the assessment may also be used for formative purposes, that is, to provide students with feedback on how they are performing and to give them guidance on what they need to do to remedy apparent weaknesses (Browne et al., 2004). Regardless of its form, the central aim of the assessment is to realize students' needs, monitor learning and instructional processes, diagnose student learning difficulties, and confirm learning achievement (Matlock-Hetzel, 1997). This study focuses on the formative form of assessment, hereafter referred to as assessment.

Given the inarguable importance of formative assessment in teaching and learning, it was expected that teachers unquestionably employ and make it central to their teaching process but that is not the case. This is because research shows that in the real classroom setting, teachers find it complicated to assess students' performance due to time, energy, and other obstacles. This makes the process of assessment sometimes a very tedious activity especially when it comes to large classes (Sari et al., 2020). Instead of it being an enjoyable phenomenon in the teaching and learning process, the assessment is considered a heavy workload that tends to discourage teachers (Lancaster & Clarke, 2017). This is typically the case for the traditional paper-and-pen mode of assessment which demands teachers to mark, score, and give feedback to learners in a stipulated period.

Web-based assessment is an electronic assessment in which all the procedures from the start to the end of the assessment is carried out using Information and Communication Technology (ICT) tools (Alruwais et al., 2018). By implication, the design, administration, recording, analysis, and giving back feedback are all carried out using computer resources and the internet. The design of the electronic assessment system, per the analysis by PingSoft (2007) includes a complete examination process comprising the proposition, composing papers, signing up, examining, batching, statistics, and analysis.

Online assessment tools were opted for on the premise that it is an alternative formative assessment tool that has been successful in accommodating students' feedback for the improvement of the course instruction (R. J. Haddad, 2014). Moreover, studies show that it is an ideal tool teachers use to assess students because of its features such as the various types of questions, means of administrating tests, and automatic scoring (Alharbi, A. S., Alhebshi, A. A., 2021). Conclusively, it is a very simple, systematic, and easy-to-implement tool that supports a wide range of question types and options that are usually not supported in most online survey applications(R. J. Haddad, 2014).

Many web-based applications have been developed and proven to be effective tools for assessing teaching and learning. Some of the common ones were found on e-learning platforms such as WebCT 4.1Campus Edition, Blackboard 6.0, Click2Learn Aspen 2.0, EduSystem, and The'Leaming Manager 3.2 (Gamulin et al., 2010).

This study notwithstanding employs the Icampusgh e-learning platform as an online assessment tool to investigate the attitudes of teachers and students towards web-based assessment in Senior High Schools in Ghana

Given the limited features of Online assessment tools in the area of subjective questions, attention will be given to formative assessment or performance assessment which measures students' progress towards intended instructional goals. Besides, formative assessment has proven to be more effective because it is primarily concerned with the monitoring of student progress to help students identify and overcome existing weaknesses (Browne et al., 2004).

The Icampusgh application as an online assessment tool is chosen over other equally effective applications because it is an online platform that is open to most senior high school students in the country. Even though the primary intent of the introduction of the application is to help the students learn while they are at home during vacations or outside the classroom. The researcher considers the assessment aspect of the application to be an opportunity for teachers to integrate online formative assessment into the classroom. Also, it is both time and cost-efficient since it is an already-made application for use by all teachers irrespective of their computer skills.

Using a web-based application such as the Icampusgh to conduct the assessment is so important as research has shown that Web-based assessment provides students with more chances for practice, self-testing, self-regulation, and self-evaluation, while teachers receive more feedback from students, save time in reading and grading, and have closer interactions with students (Nguyen et al., 2006). This is the very essence of formative assessment.

1.1 Statement of the problem

In as much as assessment cannot be done away with within the teaching and learning process, the heavy burden and anxiety placed on teachers by the traditional paper-and-pen mode of assessment must be replaced by a more convenient but equally effective mode of assessment. The use of technology and the internet in teaching and learning today has made web-based assessment the best option and a compliment to the traditional mode of assessment (Bahasoan et al., 2020). It is the best option because it has the potential to meet authentic assessment standards (Linke et al., 1994).

But the major concern raised by some researchers is the ability of this online learning to effectively and efficiently assess the learners as they learn (Holmes, B., & Gardner, 2006). Some also have even suggested that assessment in online studies is likely to create problems (Hamid et al., 2020).

Thus, the study is conducted to explore the efficiency and effectiveness of online formative assessment and how its perceived significance and the attitudes of both teachers and students towards it influence its integration into the senior high schools in Ghana.

To the best of the researcher's knowledge, no research has been carried out on the use of Online assessment tools (specifically the Icampusgh) to conduct a formative assessment in Senior High Schools in Ghana.

1.2 Aim of the study

Teachers and students are considered the two major actors in the teaching and learning process therefore their attitudes towards technology must be thoroughly studied before such technology is accepted and integrated into classroom activities (Qing, 2007). This is because if the teachers

and the students do not exhibit any confidence in the online assessment tools and procedure, integrating them into the classroom will create a negative atmosphere for teaching and learning (Bower, 2019). In this regard, the study seeks to examine the extent to which teachers' and students' attitudes towards online formative assessment and its perceived significance influence its acceptance and adoption in the Ghanaian high schools

1.3 Objectives of the Study

1. To investigate the influence of perceived significance of online formative assessment on its acceptance and adoption
2. To examine students' attitudes towards online formative assessment and how they affect its acceptance
3. To identify teachers' attitudes towards online formative assessment and how they influence its adoption.

1.4 Research Questions

Given the objectives above, the study seeks to find answers to the following questions

- a. To what extent does the perceived significance of online formative assessment influence its adoption?
- b. In what ways do the students' attitudes toward online formative assessment affect its adoption?
- c. What are teachers' attitudes towards online formative assessment and how do they influence its adoption?

1.5 Significance of the Study

The findings of this study are going to serve as a foundation for further research into the incorporation of online assessment applications and their impact on learning, particularly the Icampusgh learning platform in senior high schools in the country. Moreover, it will make educators, administrators, and management of Senior High Schools become aware of the possibility, effectiveness, and efficiency of using the Icampusgh platform as an online assessment tool to conduct a formative assessment in the teaching and learning process.

1.6 Delimitation of the Study

The study was limited to the Amansie West District Education Directorate and covers only the students and teachers in the Mansoman Senior high School. This is because the emphasis of the study is on the web-based aspect of the Online assessment application which requires strong internet connectivity and the availability of enough computers for students. Therefore, the school was chosen for the study, with the premise that “if it can happen there, it can happen anywhere” (Patton, 1990).

1.7 Limitations of the Study

The study was conducted within a limited time with inadequate financial resources but the researcher tried as much as possible to make efficient use of the resources available to make the work more representative. Limitation also existed for the participants especially the teachers who had to squeeze time out of their busy schedules to respond to the questionnaire.

CHAPTER TWO

LITERATURE REVIEW

1.0 Introduction

This section provides a general overview of the Online assessment tools application and also reviews the theories and empirical studies on the importance of using Online assessment tools as a web-based application to conduct the formative assessment, and teachers' and students' attitudes towards online formative assessment. The essence of the review of these constructs is to justify the fact that the acceptance of any technological tool into the classroom largely depends on its importance, and the perception of both teachers and students towards that tool (Basaran et al., 2016; Qing Li, 2003).

2.1 The Icampusgh Application

The application is an online learning platform for all senior high school students created by the Ministry of Education in Ghana. It is designed to engage students while they are away from school and on vacation. But the assessment engine of the application can be a very useful and creative avenue for teachers to adopt formative assessments of students during the teaching and learning process. This assessment aspect supports multiple types of questions and a variety of test types and also facilitates extensive reporting on test results. Students can access all core and selected elective subjects, as well as video lessons, virtual labs, simulations (in some cases), and an online test after each session through the site. The focus of this study is on the online assessment section of the application. Below are the procedures followed to access the Icampusgh platform.

1. Visit onlineassessmenttools.com using any browser

2. Students must enter their BECE index number as the username. This is a requirement that ensures that only authorized students have access to the platform.
3. The default login password is ghana@12345.
4. Students are required to change the default password before they can continue to use the platform.
5. Students then click on ‘View all courses’ to see the subjects available and then click on any of the courses available and enroll.

Once the students log into the application, the teacher directs them to select the subject and the topic being treated. There is a link that is labeled with the class name, the subject, and the number of the quiz (e.g., SHS 2 ENG QUIZ 1). Students click on this link to access the test items. After a student finishes answering the questions, he/she clicks the “finish attempt” button, this allows the student to go through the work again to make any necessary corrections. If the student is satisfied with his work, he/she then clicks the “submit all and finish” button, and the scores are collated and automatically shown to the student. Students have the opportunity to attempt the questions again when they are not satisfied with the score obtained. However, the application displays all the right and wrong answer questions and then provides the right answers to the questions students answered wrongly. One useful feature of the quiz is the display of the time used by each student to answer the questions. One of the benefits of the application is the possibility of its use regardless of specific platforms. The only things needed are computers and the Internet. The application of mobile devices such as personal digital assistants and mobile phones is envisaged as the future development of the application even though these devices are not allowed in senior high schools in the country.

2.2. The Technology Acceptance Models

Technology Acceptance refers to the readiness, willingness, and purposeful intention to adopt and use technology (Aguilera-hermida, 2020). Technology Acceptance Models on the other hand determine or explain the factors that influence technology acceptance by a group of people (Teran-Guerrero, 2019). Specifically, Technology Acceptance Models (especially in the case of the first Technology Acceptance Model) are used to comprehend respondents' behavior toward acceptance of remote learning (Aguilera-hermida, 2020). The first Technology Acceptance Model has undergone a lot of review by different researchers over time. For instance, Terzis & Economides (2011) reviewed The Technology Acceptance Theory propounded by (Davis et al., 1989) to explain the behavior and intention of students toward online assessment. This model is made up of eight criteria that are used to determine learners' intent to use online assessments or computer-based assessments. systems.

The factors are: “Perceived enjoyment”, "perceived usefulness”, “perceived ease of use”, “perceived computer self-efficacy,” “social impact”, “facilitative conditions”, “goal anticipation”, and “content” (Yurdugul, H., & Bayrak, 2014). The level of belief that students' utilization of the assessment system enhances their performance is referred to as perceived usefulness. The term "perceived ease of use" relates to a student’s view that the system can be used with minimal effort (Davis et al., 1989). Students' belief in their ability to utilize computers is referred to as computer self-efficacy (Compeau & Higgins, 1995). The impact of one's immediate surroundings (teachers, parents, peers, etc.) on a student’s behavior and beliefs are referred to as social influence and the relationship between the assessment questions and the value of the subject is referred to as content (Terzis & Economides, 2011).

Also, Kemp, Palmer (2019) proposed the following model (Taxonomy) based on the review of different Technology Acceptance Models:

1. attitude, affect, and motivation;
2. social factors;
3. usefulness and visibility;
4. instructional attributes;
5. perceived behavioral control,
6. cognitive engagement, and
7. system attributes

Also, the theories of reasoned action and planned behavior have been used to understand users' acceptance of technology (Ajzen & Fishbein, 1975). The emphasis of these theories was on the behavioral intentions of users and their attitudes toward the use of technology.

This study however adopts the attitude, affect, and motivation theory from the Kemp & Palmer (2019) taxonomy. This is because they directly touch on the users' attitudes towards technology adoption and use.

2.2.1 Influence of Attitude on Technology Acceptance

Attitude toward technology refers to a person's favorable or unfavorable assessment of the given technology which influences the likelihood of its usage (Ali, 2020). Both teachers' and students' attitudes toward a particular technology greatly affect their intention to adopt and use that technology (GarcíaBotero Questier Cincinnato, He, & Zhu, 2018). However, positive attitudes

and behaviors toward online learning are important and necessary for its acceptance and adoption (Selim, 2007).

Studies have shown that a favorable attitude towards a particular technology influences its adoption and continuous use and vice versa (Kim et al., 2009). Attitude toward technology includes a person's appraisal that the use of a particular technology is favorable or unfavorable (Ajzen, I., & Fishbein, 1980).

However, attitude towards online assessment is largely influenced by external factors such as strong internet connectivity, active online learning platform, and availability of enough technological tools to ensure independent work (Aixia, D., & Wang, 2011; Klomsri, T., & Tedre, 2016). However, the availability of enough electronic tools in the school is not as important as regular access to these tools (Sweeney, T., 2010). Research findings have also proven that students who do not have personal computers and even smartphones or tablets have a negative attitude toward the use of computers in the classroom environment (Motshegwe & Batane, 2015). Part of the reason could be that they will not have the opportunity to frequently practice the test outside the classroom setting.

Also, personal characteristics such as the ability to use a computer, familiarity with online surfing, and the level of enjoyment derived from using the technology are all major factors that influence attitude (Chu, R. J., & Chu, 2010; Liaw, S. S., & Huang, 2011). Moreover, anxiety that comes with the use of a particular technology also affects individuals' attitudes towards that technology (Abdel Karim & Shukur, 2016).

2.2.2 Individual's Affect and Technology Adoption

Users' level of satisfaction and enjoyment of using technology also play a crucial role in technology acceptance. This is the affect aspect of the Kemp & Palmer (2019) taxonomy which is adopted by this study. It also involves a person's emotions and mood such as the feeling of stress and anxiety with the use of a particular technology (Clore, 2005). It simply explains how a person likes something (McGuire, 1985). It is very essential to consider teachers' and students' affect because it can predict the adoption of online formative assessment in the classroom (Songpol et al., 2018).

An individual's affect has effects on his/her attitude; positive feelings lead to a positive attitude whereas negative feelings lead to a negative attitude (Clore, 2005). If the teachers and students can use the online formative assessment to successfully achieve teaching and learning goals, they will develop a positive effect towards its adoption and vice versa (Howard, 2011).

Affective manifestations influence attitude in two ways: Evaluation and Perception of importance. These suggest that anytime an individual perceived that something is of utmost importance or feels that it is irrelevant, his/her emotions are aroused (Clore, 2005). Interestingly, certain individuals may also not like the adoption of technology in the classroom for no apparent reason (Batra, 1991).

2.2.3 Effects of Motivation on Technology Adoption

More importantly, users tend to develop an interest in a particular technology based on their eagerness to achieve a goal and the satisfaction derived from using that technology. This importance and satisfaction that comes with the use of technology serve as a source of intrinsic

motivation for learners. Motivation is defined as the ‘engine of learning’ by (Paris & Turner, 1994). Motivation answers the question, of how well a user achieves a goal through the use of technology (Kemp, Palmer, 2019). Online learning has its challenges and poses challenging tasks (Bahasoan et al., 2020) but self-motivated learners can undertake these challenging learning tasks by adopting appropriate learning strategies (Ryan, R. M., & Deci, 2000). Intrinsic motivation concerns the users’ internal derivation of joy, satisfaction, and enthusiasm towards a particular thing (Ryan, R. M., & Deci, 2000). Contrary, if the users perceived that the use of a particular technology will not yield any fruitful results they become unwilling to learn (Harnett, 2016).

A study conducted by the Swedish National Agency for Education indicates that the majority of teachers have perceived control over technology which is likely to motivate them to embrace online teaching and learning systems (de Vries, 1991). Emphatically, the level of motivation that technology has on users influences their attitude toward it (Nassoura, 2012). Also, when the teachers and the students determine to adopt the online formative assessment, they tend to develop a positive attitude towards it (Deci, E.L., Ryan, 2012).

2.3 Perceived Significance of Online Formative Assessment

Formative assessment is conducted to monitor the instruction process and determine whether learning is taking place as planned and provide continuous feedback. It is increasingly being used to refer only to assessment that provides immediate feedback to students (and teachers) about learning that occurs during the period of instruction (Gamulin et al., 2010). Rooted in constructivist theory, formative assessment aims to empower the students to actively construct

rather than passively receive knowledge. The benefit of formative assessment cannot be overemphasized in the sense that it ensures the adjustment of teaching strategies and the application of appropriate remedial techniques (Bell & Cowie, 2005). As the use of technology and online teaching and learning platforms are making fast inroads into the education process, it is imperative to also assess students' knowledge with the help of web technology (Gamulin et al., 2010).

Electronic assessment, among other explanations, is considered as the use of technology to facilitate the entire process of assessment, starting from designing and delivering the assignments to marking either by computers or human-assisted digital tools, reporting, scoring the results, and/or making the statistical analysis (Osuji, 2012). Students nowadays have been the central focus of the teaching and learning process and they inform the learning strategies, time of teaching, method of teaching, and also the assessment methodologies. Therefore, one strategy to promote a student-centered educational model is online assessment; which can be the main component of effective learning (Jazil et al., 2020) because it adds value to students learning (Sorensen, 2013). Moreover, generally, electronic assessment supports educational goals, by supporting high-order thinking skills such as critiquing, reflection on cognitive processes, and facilitating group work projects (Ridgway et al., 2007)

Thus, electronic assessment is now counted as one of the positive effects of technology in education (Spires et al., 2008). And it is preferable to the traditional paper-and-pencil approach because it is often seen as a means of promoting self-reflection and students taking control of their learning (Section, 2007). There are several web-based applications in the system today but

the general characteristics that make them very important and preferable are outlined in the following paragraphs.

Web-based applications have features that provide various types of questions, apply the validation option and watch students' progress. This feature allows the teacher to design various types of tests and also supports teachers to design the test based on their needs (Djenno et al., 2015; R. Haddad & Kalaani, 2014; Nadeem et al., 2018). Distribution and editing of questions in a web-based assessment are very easy and flexible even if the assessment is for a large class (Dalziel, 2000). The validity and dependability of the questions are also secured (Maughan, S., Peet, D., & Willmott, 2001).

The applications have a question base from which teachers can select questions for assessment. The number of answers offered to a question could vary from 3 to 5 according to the teacher's judgment and the answering time can be adjusted to suit students' learning levels. The sequence of questions is each time different to make the possibility to cheat as small as possible. (Gamulin et al., 2010).

One of the most intriguing features of web-based assessment tools is that the test results are immediately visible to the teacher (for the whole group) and the student (on a personal level by the end of each test. Correct answers to wrongly answered questions normally come with the results and the most wrongly answered questions are detected. This allows teachers to give much attention to these areas or specific topics in the subsequent class. The effect of this is that it helps

the teachers to tailor instruction according to learners' immediate needs (Vonderwell & Boboc, 2013).

Teachers can set questions or import new questions into the applications and this does not require any programming or in-depth computer skills and knowledge. Again, the applications allow the simple statistics of true/false answers and the number of students with no answers at all.

The most burden-reduction feature of web-based assessment applications is their high re-usability of the authored content which ensures the use of a simple repository from which questions can be picked up when a test must be created (Feng et al., 2009). This is very salient in the e-learning environment, where content development is quite a time-consuming task (Chen & Chen, 2009).

Another important feature of these applications is that they can be accessible by any device that has internet connectivity. This feature allows the student to use the application at their convenience outside the classroom. This in effect promotes students' self-assessment and peer assessment. Once the link is sent, any further question added immediately takes effect which enables teachers to add questions at any point in time. The questions mostly used in these applications are multiple-choice and those that require specific short answers. History of students' performance is also saved and some of the applications allow for the import of the results into a spreadsheet for decision-making and diverse analysis (Gamulin et al., 2010).

Web-based assessment applications present students with the opportunity for self-assessment (Bijol et al., 2015), and this feature has made it often seen as a means of promoting self-reflection and students taking control of their learning (Whitelock, 2007). This provides the students with the opportunity to be self-regulated, self-testing, and self-evaluating learners (Ellis & Goodyear, 2010; Fleishman et al., 2001). This might be the more reason why it is asserted that Web-based formative assessment tools have widely become valuable resources for self-directed learning (Bijol et al., 2015). In effect, it creates a shift in focus, whereby students are seen as having a proactive rather than a reactive role in generating and using feedback.

Not only that, as students take charge of their learning through self-reflective assessment, it has profound implications for how teachers organize assessments and support learning (Nicol & MacFarlane-Dick, 2006). It is asserted that in an attempt to improve the quality of feedback messages, teachers should focus much more effort on strengthening the skills of self-assessment in their studies (Nitta et al., 1975). And quite interestingly, this is exactly what the introduction of formative electronic assessment seeks to achieve as it provides students with immediate feedback and automated scores that lead them to have more control over their work and effort (Nguyen et al., 2006).

Web-based assessment applications enable teachers to handle a large number of classes because tests and grading are done automatically (Osuji, 2012). It affords a large number of randomized items with immediate scoring and feedback, a rapid return of a large number of tests and survey results (Linn et al., 2002), and an automatic diagnosis system for performance evaluation (Nguyen & Kulm, 2005). This reduces the heavy burden of teachers trying to score a large class

of students and determine the level of difficulty from the assessment scores (Sung et al., 2005). In addition, it enables teachers to have more feedback from students, save time in reading and grading, and have closer interactions with students (Ellis & Goodyear, 2010; Fleishman et al., 2001). This immediate feedback in turn helps students to improve their learning levels (Crews & Curtis, 2011; Gilbert et al., 2011; Osuji, 2012; Ridgway et al., 2007). Again, given the relatively limited time allocated for teaching and learning activities in the classroom, online assessment tools can also help increase the teacher's presence, which enhances motivation and engagement. This is achieved through the tools' inherent feature that reduces the scoring time (Robertson et al., 2019)

Moreover, by using a web-based assessment tool, teachers can integrate the different content areas for their students and enhance students' attitudes and motivation towards the learning subject. At the same time, students can use online technology in learning and help themselves succeed (Poudjom Djomani et al., 2001). Again, the Assessment that is provided on the web-based medium allows students to have more control over their practice and to receive reinforcement that can help them to build intrinsic motivation and improve their confidence (Middleton & Spanias, 1999; Nguyen & Kulm, 2005). This form of motivation enhances students' performance (Marriott, 2009) and provides a sense of satisfaction as it involves elements of competition, mastery, cooperation, and purpose (Muhd Al-Aarifin et al., 2019; Natalia V. Iaremenko, 2017).

Web-based testing is also convenient, cost-effective, and efficient (Gordon, 1997). This is due to the automatic scoring of the test, especially for large-scale testing (Audette, 2005). It is also fast and easy to use (Eljinini et al., 2012). For its cost-effectiveness, studies have shown that using electronic-assessment decrease the cost for the institution to assess student, as the time is reduced

(Crews & Curtis, 2011; Osuji, 2012). In a situation where the teacher wants students to perform the assessment test outside class hours, the online assessment application provides the luxury of that flexibility (Osuji, 2012; Ridgway et al., 2007). Furthermore, electronic assessment has its own set of security systems that prevents impersonation by checking the identity of students through password verification (Crews & Curtis, 2011). Web-based tools allow teachers to provide different questions in different order which also helps to prevent cheating (Mellar et al., 2018).

Again, it provides more accurate results than paper tests, through adaptive testing, which changes the difficulty of the test depending on the user's response, by increasing the difficulty if he/she responds correctly and decreasing the difficulty if he/she chooses the wrong answers more often (Ridgway et al., 2007).

It is also discovered that using a web-based application for formative assessment generates various effects, including planning future direction, managing the learning process, improving the quality of lesson delivery, reflecting on advantages/disadvantages of learning, increasing students' motivation, improving interactive learning among peers, accelerating development and growth, and ensuring that students benefit from the lesson outcome (Chen & Chen, 2009). In addition, it allows for more interactive learning, encourages more active student participation, and increases retention (Whitelock, 2007).

The use of electronic formative assessment tools enables Students to have the opportunity to participate in the assessment whenever and wherever they want which makes learning very flexible for them (Bilgisi, 2020). As students engage in online formative assessment, they get motivated to read and prepare well before each class. This in turn has a positive effect on their

scores in summative exams (Dobson, 2008; Kesavan & Palappallil, 2018). Students can study independently, engage well with the learning activities, increase their creative thinking skills, and adopt a deep learning strategy when teachers use electronic tools to conduct a formative assessment (Bilgisi, 2020).

The use of Online assessment tools has proven to be a very useful medium for assessment (Djenno et al., 2015). This is partly because the test is designed based on students' learning needs and towards achieving assessment goals. For instance, in designing a test, the developers may have some choices to construct good test items before they post them to the platform.

It is also asserted that formative feedback in online assessment has the potential to encourage student engagement, bolster student enthusiasm to learn, and lead to improved academic achievement (McLaughlin & Yan, 2017). It also enables them to review their learning process (Bilgisi, 2020). Moreover, studies conducted by (Sari et al., 2020) shows that the use of online tools for assessment improves students' grade due to the developed instructional teaching that is based on the students' feedback. This is very true, especially in the area of Mathematics learning (Nguyen et al., 2016). Also, it is found that the use of Online assessment tools demands less cost and can reach out to more respondents from different populations (Raju, N. V., & Harinarayana, 2016). Online assessment tools and worksheets used as an engaging learning environment save time in the scoring process (Nadeem et al., 2018). Recent studies by (Agung et al., 2019) have also affirmed that Online assessment tools establish efficient, effective, and attractive activities for students.

Online assessment tools can be seen as an alternative formative assessment tool that has been successful in accommodating students' feedback for the improvement of the course instruction. As it is generally accepted, the result of the assessment provides real-time feedback so that it enables the teachers and school management to act promptly toward any challenges students may be facing (R. J. Haddad, 2014). This has a long-term effect on improving students' performance because teachers can offer prompt solutions to all areas of weakness students face in learning.

Test items are accessed by several students at a time on the learning platforms and do not limit the number of questions that can be created or the number of students who can access the test item. Scores are collated and analyzed automatically.

Also, the Online assessment creates an engaging learning environment and saves time in the scoring process (Nadeem et al., 2018). This makes Online assessment tools beneficial to students in the sense that students can view their scores once they submit their answers (Sari et al., 2020). As postulated, this helps to reduce students' anxiety in waiting for feedback (T. H. Wang et al., 2008).

Also, the teacher or assessor can see how long a student thinks about a question and what choices they make. Thus the teacher can review this information regularly to improve their teaching and the students learning (Robles & Braathen, 2002).

Icampusgh as an example of an online assessment tool promotes student-centeredness which is an effective learning process in the educational model (Jazil et al., 2020). Again, it is propounded

that teaching and learning processes need to be assessment-centered to provide learners with opportunities to demonstrate their skills development and receive support to enhance their learning (Gikandi et al., 2011). One surest way to realize this is through the use of Online assessment tools for assessment purposes. Online assessment tools are very effective in conducting assessments because an empirical study has revealed that it poses a new challenge to students by providing direct results with discussions that allow students to learn directly (Jazil et al., 2020). The same study again revealed that Online assessment tools are mostly preferred by students because it enables them to get several attempts to achieve the target score as long as the teacher permits them to do so. In addition to this, it helps students develop their metacognitive knowledge and therefore become more responsible for their academic success (R. J. Haddad, 2014).

This has led (Djenno et al., 2015) to conclude that Online assessment tools are useful media for assessment even though it is not independent of carefully designed instruction. (McLaughlin & Yan, 2017) also concluded that formative feedback in the form of online assessment has the potential to encourage student engagement, bolster student enthusiasm to learn, and lead to improved academic achievement.

To better understand students' output and the learning process, it is expedient for teachers to resort to Online assessment tools to conduct an assessment (Bilgisi, 2020). As much as possible, the content in the Online assessment tools used for the formative assessment can be repeated many times. This is part of the time-saving package of using Online assessment tools for formative assessment (Bilgisi, 2020).

The use of web-based tools for formative assessment has the potential to replace the traditional large-scale paper-and-pencil assessment because it (e.g. Online assessment tools) outperforms it (paper-and-pencil) and also allows for a greater focus on the current curriculum (Bennett, 2001). It is emerging as one of the best media for user interface and instructional delivery and assessment (Nguyen et al., 2006). This is because (a) technology can improve test scores, grades, and overall student learning (Bain & Ross, 2000), (b) it increases knowledge and opportunities for students (Tienken & Wilson, 2007), and (c) it motivates students in the learning process (Spires et al., 2008). It must also be stressed that even though both the traditional paper-and-pencil and web-based assessment tools have a significant impact on students, the use application of online assessment provides higher motivation to the students (Frankel, 2002; Kobrin & Young, 2003). Moreover, it has the capacity and authenticity to boost the students' progress (Maccini, Gagnon, & Hughes, 2002).

The use of Online assessment tools is beneficial to students in terms of accessibility, renewability, and flexibility because it enhances autonomous access at any given time. It can also be quickly and frequently adjusted, and be easily customized to suit students at various levels or needs (Chetchumlong, 2010).

The use of web-based applications for formative assessment should thus be integrated into the teaching and learning process because it contributes to meaningful learning and delivers the concepts of the learned information to the student as feedback (Basaran et al., 2016). Again, it helps in improving students' performance and shapes teachers' teaching strategies (Martinez,

2002). Teachers also find the use of electronic tools for formative assessment desirable because it helps them to provide learning assistance and individual study to students (Baker, 2003).

Moreover, online formative assessment reduces teachers' workload in preparing and implementing assessment activities.

Assessment scores can be made available to students at any time which can help them to monitor their learning. Icampugh Online assessment tools, as with any online assessment tool also enable teachers to create an assessment bank that they can make available to students at any point in time (Gardner et al., 2002). This has a meaningful effect on students learning interests as well as their learning achievement (C. Wang et al., 2011).

2.4 Students' Attitude towards online formative assessment

Digital learning has been taking its place in the education field since technology is accessible and easy to reach. Studies have confirmed that students who use social media and apply it in their learning process increase rapidly. It can also be defined that digital learning is effective to strengthen students' learning experience (Jazil et al., 2020). However, positive attitudes and behaviors of students toward online learning are important and necessary for its acceptance and adoption (Selim, 2007). Moreover, it is argued that students' attitudes constitute one of the most important processes that increase academic achievement (Gül et al., 2015) and it becomes a determiner of academic achievement (Basaran et al., 2016). Specifically, studies conducted in Iran showed that students' attitudes are the major determining factor for the acceptance and adoption of online learning (Omidinia, Masrom, & Selamat, 2011).

It is also expedient to consider students' attitudes towards the use of electronic formative assessment because understanding student perception of different forms of electronic formative assessment is critical in helping teachers to utilize tools that students perceive positively. This can reduce biases that students might have toward a particular form of electronic formative assessment (Ogange et al., 2018). Students, like teachers, are seen as one of the major actors in the classroom environment therefore their perceptions should holistically be understood and considered in the attempt to introduce online assessment into the classroom (Qing Li, 2003). Moreover, the introduction of a web-based assessment is likely to bring computer anxiety among students so it is necessary to examine the students' attitudes so that possible anxieties can be kept to a minimum level (Massoud, 1991).

Attitude, therefore, is defined as the way of one's thinking and behavior toward a certain term like a person, a thing, or an event sometimes (Selim, 2007). On the other hand, (Eshreteh et al., 2017) defined attitude as the way one thinks or behaves, a complex mental state involving feelings, values, and dispositions to act in certain ways. In light of this definition, (Jazil et al., 2020) postulated that it is possible that while exploring students' attitudes, students will show positive or negative views toward the use of Online assessment tools as an online assessment.

It is important to consider students' attitudes when adopting the online mode of assessment of any kind because it is shown that attitude affects a student's ability to do the test (Jazil et al., 2020). A study conducted by (T. H. Wang et al., 2008) highlights some of the reasons why students manifest positive attitudes towards online assessments such as Online assessment tools. First, the students enjoy taking the online assessment anytime as long as it falls within the deadline. Second, the students feel free to have several attempts at the test until they can achieve

the minimum score. Third, it can reduce students' anxiety in waiting for feedback. It is thus important to note that students demonstrate a favorable attitude towards the use of Online assessment tools when it is used for formative assessment (Blayney & Freeman, 2003; O'Hare, 2001).

On the contrary, (Abdel Karim & Shukur, 2016) outline the following negative attitudes students show toward online assessment; students feel anxiety as they have a time limit to do the test, students are worried since there is no time to open the book or ask someone else, and students' unwillingness in terms of the unstable internet connection.

An experimental study revealed that students show a positive attitude toward the use of online assessment tools for assessment because it poses a new challenge to them. However, this same new challenge makes some students feel nervous. The same study also revealed that the immediate feedback produced by Online assessment tools makes some of the students feel nervous (Jazil et al., 2020). Another experimental study revealed that students in the online formative assessment test group generally learned more and demonstrated more positive attitudes toward learning materials and future learning (Sirriyeh et al., 2012).

(McLaughlin & Yan, 2017) also concluded that students become enthused to learn when online formative assessment is employed by the teacher. It is also pointed out that one of the students' positive attitudes in online assessment is that the students feel free to have several attempts at the test until they can achieve the minimum score (T. H. Wang et al., 2008). Some students have also mentioned that they feel very awkward using Online assessment tools for assessment due to their

limited ICT knowledge. While others also expressed no attitude because to them there is no significant improvement in learning either by using online assessment or the traditional model of assessment (Jazil et al., 2020).

Additionally, it is very crucial to ascertain the level of students' acceptance of Online assessment tools. The immediate feedback provided by the Online assessment tools in assessment is likely to increase the level of students' acceptance (Karay et al, 2012). Also, the flexible and authentic features of the Online assessment tools, and how it provides individualization of students' work have a positive influence on students' acceptance of it (Cook, 2000; Lin, 2003). The level of student confidence is also increased which leads to greater learning outcomes (Cook, 2000).

The stress-relief feature of using Online assessment tools boosts students' level of enjoyment which sustains their desire and interest in learning and assessment (Beverly, Beverly, Clarke, & White, 2001). However, if the school's internet is not stable and causes a delay in the conduct of the exams, the students tend to get frustrated and hence develop an ill attitude towards the assessment (Klomsri, T., & Tedre, 2016)

It is very important to examine the students' attitudes towards the use of Online assessment tools to conduct formative assessments because the kind of attitude exhibited by students towards assessment can influence their learning outcome and the sustainability of the assessment tools (Chetchumlong, 2010). The students' attitudes undoubtedly dictate their response to what is introduced into the teaching and learning process (Paris, 2004). This explains why teachers/assessors cannot just design any online system for assessment because the use and sustainability of the assessment system are also very important (Usluel & Mazman, 2010). Moreover, When the students perceive that the assessment tools can assist them to visualize

solutions to questions that seem abstract and also find vital and reliable information then they are likely to develop a positive attitude towards them(Qing, 2007; Şad & Özhan, 2012).

It is also assumed that students who have personal computers or other smart devices are likely to have a positive attitude towards online assessments because of accessibility to the questions at any given time (Jan, 2018). However, empirical evidence shows that students with a negative attitude towards online assessment hold the view that using computers for classwork is irrational compared to the paper-and-pen mode (D'Souza & Wood, 2004).

2.5 Teachers' Attitude towards the Use of Online Assessment.

Attitude can be defined as the mental propensity to judge an object or action in terms of its satisfactory or unsatisfactory qualities (van Aalderen-Smeets, et al., 2012). Attitude is a composition of a person's psychological variables such as personality and cognitive type, demographics, self-efficacy, and situations (Alavi, & Joachimsthaler, 1992). Teachers' attitudes towards the use of technology are a composition of the relationship between these variables. For instance, the cognitive style of a teacher toward online assessment tools manifests in their perceived ease of use and usefulness of the tool which depends on the demographics and situations of the teacher. The cognitive propensity of the teacher in turn serves as the driving force of his/her behavior which then forms their personality (Burton-Jones, & Hubona, 2005).

Generally, the attitude teachers have toward their subjects affects what they teach (van Aalderen-Smeets, 2013). More specifically, (Nordlöf et al., 2017) asserted that teachers' attitude toward what they teach is consequential to their motivation and the amount of time they spend teaching it. Again, it is shown that teachers who exhibit favorable attitudes and opinions toward the use of online assessment tools are more willing to use them (Holden & Rada, 2011). It is thus opined

that teachers with low self-confidence in what they teach tend to have negative or low attitudes (Nordlöf et al., 2017). The damaging effect of this is the fact that such teachers are not able to encourage students to develop confidence in what they learn (Holroyd, Colin, 1996).

The key components of attitude as developed by Van et al (2012) are applied in this study. The model, as described by the researchers shows that teachers' attitude toward what they teach and how they teach it is influenced by the relevance of teaching the subject, the perceived difficulty of teaching the subject, enjoyment, and anxiety that comes with teaching the subject, perceived control over the subject and the tools used to teach it, and the level of confidence they have in teaching the subject.

The concept and attitude of teachers toward technology have also been a major theme in a lot of research work because it is postulated that teachers' perception of the easiness of using technology has a great influence on their adoption of it (de Vries, 1991). A study conducted by the Swedish National Agency for Education indicates that the majority of teachers have perceived control over technology which is likely to motivate them to embrace online teaching and learning systems (de Vries, 1991). Teachers develop an ill attitude toward the use of technology when they lack confidence in technology (Nordlöf et al., 2017). This is because it is established that a lack of confidence and understanding influences teachers' attitudes toward teaching (Holroyd, Colin, 1996).

It is important to also ascertain the level of teachers' education and in-service training in technology because teachers' attitude is linked to them (Nordlöf et al., 2017). It is noteworthy that teachers with a positive attitude toward technology can influence the students to develop an interest and a positive attitude toward the subject (Nordlöf et al., 2017).

It is important to also explore the attitude of teachers toward the use of Online assessment tools for assessment because there is a mixed feeling among teachers concerning the use of online assessment tools (Jazil et al., 2020). Teachers are likely to develop positive attitudes towards online assessment tools when they perceive that the tool is usable and useful (Holden & Rada, 2011). Usability and usefulness in this context mean that if teachers find online assessment tools to be effective, efficient, easy to learn, and easy to memorize then they are likely to develop a positive attitude towards their use (Preece & Rodgers, 2002). In reverse, it is found that teachers can still develop a negative attitude toward the use of online tools for assessment regardless of their usefulness and usability (Dillon, 2001).

To ensure full integration of online assessment into the classroom, it is imperative to ascertain the attitude of teachers on the usefulness of online assessment tools. This is because the teachers' perception of the usefulness of the online assessment tools will determine their intention to use them (Hu, Clark, T. H., & Ma, 2003; Ma, Andersson, & Streith, 2005). It also helps in the smooth integration of online assessment tools and procedures in the teaching and learning process (Bitner & Bitner, 2002). Teachers with a positive attitude to embracing creative and adaptive teaching methods are likely to integrate online assessment into the classroom environment (Holden & Rada, 2011). It is simply noted that the more teachers demonstrate a positive attitude toward the use of online assessment tools, the better these tools are utilized in the classroom environment (Boser, Palmer & Daugherty, 1998).

Again, to predict the success of the future integration of online assessment into the teaching and learning process, it is imperative to ascertain the attitudes shown by teachers towards their usage

(Akturk et al., 2015). The teachers are the managers of learning, that is, they create the environment for the students to construct their knowledge. For this reason, it is important to critically examine and understand their perception before any form of technology (online assessment tools) is integrated fully into the teaching and learning environment (Qing, 2007). The attitudes of the teachers which encompass their beliefs about the role and significance of technology, the students learning, and the method of teaching greatly influence their willingness to integrate technology into the teaching and learning environment (Garthwait & Weller, 2005; Kim, Grabowski & Song, 2003).

It should be emphasized that the ability to use technology effectively begins with the teachers' attitudes towards the technology (Hardin, 2006; Tabata & Johnsrud, 2008). One key role of the teacher is to guide the students to acquire knowledge and so if a teacher demonstrates a lack of self-efficacy in using the online assessment, the students cannot be properly guided to appreciate it (Seferoğlu, 2007).

The demands of a digital age suggest to teachers that they must prepare students to embrace technology as part of their daily lives. And so it is paramount to ascertain the attitudes the teachers themselves show toward the use of technology in teaching and learning (Akturk et al., 2015). This is important because the kind of attitudes the students show towards online assessment largely depends on the teachers' attitudes and their willingness to integrate the online assessment into the teaching and learning environment (Teo, 2006; Zhang & Espinoza, 1997). This assertion by the researchers is rooted in the fact that teachers are seen as agents of change in the educational settings of society. So their position and perspectives on online assessment are very consequential to teaching and learning (Marcinkiewicz, 1993; Teo, 2008).

Teachers are more likely to integrate online assessment tools in the classroom if they perceive that these tools will make teaching and learning more flexible and active and also motivate the learners to learn (Qing, 2007). However, any perceived obstacle to the integration of online assessment, such as a lack of enough computers for students and an unstable network is likely to make teachers develop negative attitudes towards it (Demetriadis, Barbás, et al., 2002; Pelgrum, 2001).

2.6 Research Model and Hypotheses Formation

Based on the Technology Acceptance Model designed by Kemp and Palmer (2019) and adopted for the study, and the review of the extant literature on the constructs, the Model and the hypotheses for the study were proposed.

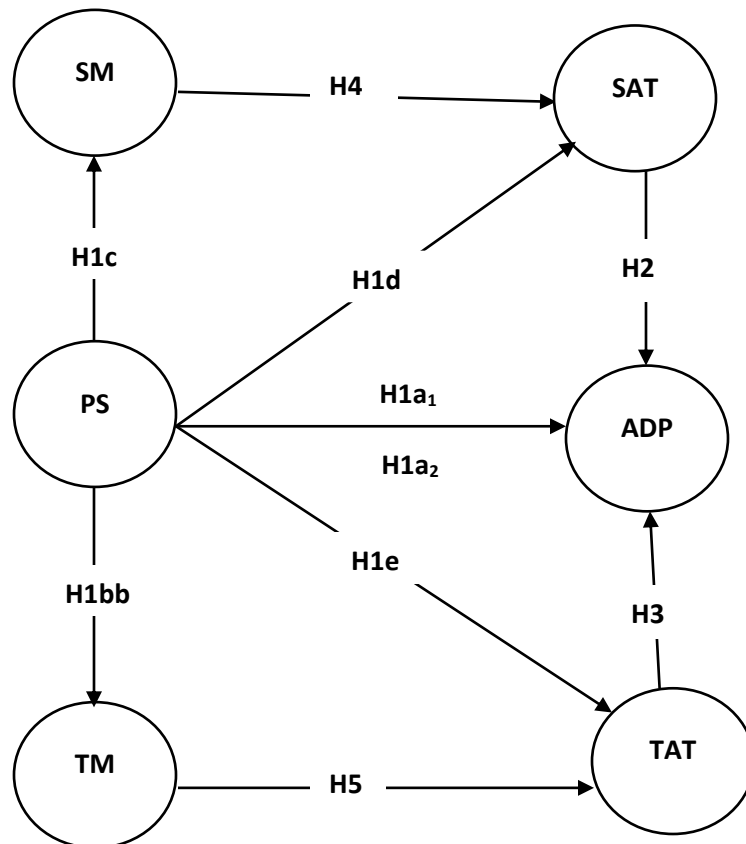


Figure 1: Proposed Model for Online Formative Assessment Adoption

The model depicts the relationship between the various constructs of the study. The main constructs of the study are the Perceived Significance of online formative assessment (PS), Teachers' Motivation (TM), Students' Motivation (SM), Teachers' Attitudes (TAT), and Students' Attitudes (SAT). Perceived Significance of online formative assessment and the attitudes of both teachers and students towards online assessment influence its adoption in the classroom. However, the attitudes of teachers and students are also influenced by the perceived significance of the online formative assessment. The Model also seeks to establish that the teachers' and students' perceived significance of the online formative assessment largely has an impact on the level of their motivation. Also, Teachers' and Students' motivation has an impact on their attitudes. Based on this, the following hypothesis is projected:

H1a₁: Teachers' Perceived significance (TPS) of online formative assessment positively influences the adoption of online formative assessment in the classroom (ADP).

H1a₂: Students' Perceived significance (SPS) of online formative assessment highly influences the adoption of online formative assessment in the classroom (ADP).

H1b: Perceived Significance (PS) of online formative assessment serves as a source of motivation to teachers (TM).

H1c: Perceived Significance (PS) of online formative assessment serves as a source of motivation to students (SM).

H1d: Perceived Significance (PS) of online formative assessment enables teachers to develop a positive attitude towards it (TAT).

H1e: Perceived Significance (PS) of online formative assessment enables students to develop a positive attitude towards it (SAT).

H2: Students' attitudes (SAT) towards online formative assessment promote its adoption

H3: Teachers' attitudes (TAT) towards online formative assessment promote its adoption

H4: Students' attitudes (SAT) towards online formative assessment are influenced by their motivation to use the online platform (SM)

H5: Teachers' attitudes (TAT) towards online formative assessment are influenced by their motivation to use the online platform (TM).

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This section comprises six sections (subheadings) categorized as 3.1 to 3.6. Section 3.1 deals with the research approach, section 3.2 deals with research design, section 3.3 talks about the participants of the study, section 3.4 also describes the research instruments, section 3.5 is devoted to the systematic approach to the data collection, and section 3.6 deals with the ethical considerations of the study and 3.6 summarize the chapter.

3.1 Research Approach

The study adopted a quantitative approach which is assumes objectivity in collecting and analyzing data (Johnson & Christensen, 2012). A quantitative approach is one in which the investigator primarily uses positivist claims for developing knowledge as it leads to a scientific and systematic approach to research (Creswell, 2014). A quantitative approach was used in this study as it allowed the researcher to carry out an objective analysis and generate factual knowledge through measurement. Quantitative data is a numerical representation and manipulation of observations to describe and explain the phenomena (Tewksbury, 2009). It can also be presented in tables for easier analysis and interpretation because it consists of quantifiable information (Rasinger 2008). This allows the researcher to quantify the magnitude and scope of the problem under investigation to find out how a particular population feel about certain issues (Hoy, 2010).

The study employed a quantitative method to examine the attitudes of teachers and students toward online formative assessment. Descriptive statistics was used to collect and analyze the

data from the participants. Closed-ended questions were asked and the responses were used to draw statistical conclusions based on sets of assumptions, particularly regarding teachers' and students' attitudes toward online assessment. This method is also seen as appropriate when participants' perceptions about or the importance of a current phenomenon are examined (Lodico, Spaulding, & Voegtle, 2010).

3.1 Research Design

A research design is a detailed outline of how an investigation is carried out in a study. It includes how data is collected, the research instruments to be used, and the means of analyzing data (Creswell & Creswell, 2018). It is a framework for data collection, measurement and analysis (Kothari, 2009). It provides the most concrete answers to the research questions stated in the study. Willis (2007) asserted that the research design projects the basic structure of a study, the nature of the hypothesis and the variables involved in the study. The design indicates whether there is an intervention and what the intervention is, the method being used to control the variables and enhance the study's interpretability, data collection procedure and settings and how results are communicated to the intended audience (Lodico, Spaulding, & Voegtle, 2010).

This study is survey research in education that sought to collect information from members of a group of learners and teachers on educational issues. A survey allows the researcher to collect data from a large sample of participants relatively quickly and inexpensively (Ary, Jacobs and Razavieh, 2002). The descriptive survey was chosen because it is the dominant form of collecting data in education which aims at constructing an accurate account of a situation (Kano, 2015). Descriptive survey is considered the most appropriate design for this study since it is the one that deals with current predominant phenomenon (Kothari, 2009). It involves observing,

describing, analyzing and interpreting aspects of a situation as they naturally exist and therefore provides a 'snapshot of how things are at a specific time' (Creswell & Creswell, 2018).

Despite the descriptive survey's effectiveness, there are still certain challenges. Some drawbacks to its use were noted by Kelley et al. (2003). These included the risk that the importance of the data would be overlooked if the researcher places an excessive emphasis on the breadth of coverage at the expense of a thorough analysis of the implications of those data for pertinent issues, problems, or ideas. Additionally, it may be difficult to evaluate the clarity and precision of study questions because respondents' private affairs may be pried into, leading to incorrect results (Kelley et al., 2003). In spite of these demerits, the descriptive survey was appropriate for the study. This was due to the research's use of inductive-deductive reasoning, which encompassed a wide range of subjects or events.

The descriptive survey design was opted largely because it employs the quantitative method of data collection which permitted accurate generalization of the numerical connections that were present in the data and that represented the characteristics of the entire population. One of the quantitative technique's key characteristics is that the sample accurately represents the wider population. As a result, the conclusions reached reflect the overall characteristics of the entire population.

3.2 Participants of the Study

Mansoman Senior High School was chosen for the study. Mansoman SHS is one of the two schools in the Amansie West district in the Ashanti region. It is located in a rural community called Manso Atwere. The school has an enrolment of about 1001 students. The teacher

population stands at 74. The school has one ICT lab with few computers and one Wi-Fi connection which does not span across the entire campus. The school has no local network.

The study adopted the critical case sampling technique to choose the school. This is because the study emphasizes a web-based aspect of the Online assessment application which requires strong internet connectivity and the availability of enough computers for students. Therefore, Mansoman SHS was chosen for the study, with the premise that “if it can happen there, it can happen anywhere” Patton (1990).

Participating students were selected using the simple random method and the tool used for the selection was the random digit table while census sampling was employed to select the participating teachers. This was to ensure that all members of the population had an equal and independent chance of being selected for the study. All 74 teachers were considered for the study. An online sample size calculator was used to determine the sample size. Using a confidence level of 95% and a 5% error margin, 278 students were sampled. So, in total, 352 participants were used for the study.

3.3 Data Collection Instruments and Procedure

Self-administered printed questionnaires were used to collect data from the respondents. The questionnaires involved close-ended questions on the participants' demographics and all the other constructs of the study. The head of the ICT department was used as the point of contact to reach out to the participating teachers. The teachers were thoroughly briefed on the subject matter and the questionnaires were given to them. They were given 3 weeks to use the platform to conduct formative assessment and then used the fourth week to answer the questionnaire. The

head of the ICT department guided the students to answer the questionnaire by reading and explaining each question to them.

The questionnaires were adapted and modified from similar studies (Bijol et al., 2015; Daniel et al., 2010; Jazil et al., 2020; Nguyen et al., 2006; Sorensen, 2013).

36 questions (excluding the demographic questions for both the teachers and the students) were used on 15 teachers, and 37 questions were used for 50 students for a pilot study. It was revealed that they understood and interpreted the questionnaire accurately. The reliability and validity of the various constructs were tested using Cronbach's Alpha. Even though Cronbach's alpha of the constructs exceeded the recommended threshold of >0.70 , the items were scaled for higher reliability. The questions were thus reduced to 30 (14 questions for the students and 16 questions for the teachers) and administered to the 352 participants. The structure of the questionnaire was as follows:

3.3.1 Participants demographics

The participating teachers were asked to indicate their sex, class (s) taught, subject taught, and years taught. And the students also were asked to indicate their sex, class, and course offered. No statistical conclusions were made in connection with these demographics though.

3.3.2 Significance of the web-based formative Assessment

This variable was explored to find out the degree of importance that is perceived by the respondents on the online formative assessment. A quantitative method was used to collect data from the students on this variable. The degree of the importance of the online formative assessment was measured using a five-point Likert scale (1= Strongly Agree to 5= Strongly Disagree). The participants were asked close-ended questions to ascertain how they perceive the

importance of the online formative assessment. 16 and 12 items were initially used for the teachers and students respectively but they were reduced to only 5 and 4 items respectively after the analysis of the pilot study.

3.3.3 Teachers' and Students' attitudes towards the online formative assessment

(Icampusgh platform)

This variable sought to examine the attitude the teachers and the students exhibit towards the online assessment especially using the Icampusgh platform. The questions focused on the cardinal variables that influence attitude, and the observable factors that influence users' motivation (Yang & Yoo, 2004). For the teachers' and students' attitudes, 10 and 11 items were initially used for the students and teachers respectively but they were all reduced to only 5 after the analysis of the pilot study. And 10 and 14 items were used on motivation respectively. These were also reduced to 5.

The participants were asked close-ended questions which required them to indicate the degree to which they either agree or disagree with it. Again, a five-point Likert scale was used (1= Strongly Agree to 5= Strongly Disagree)

3.4 Data analysis technique

The study adopts Partial Least Square-Structural Equation Modelling (PLS-SEM) which is a widely used technique for measuring the factors that influence the acceptance of a particular technology (Chau, 1997; Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, 2003). The SEM was used to measure the relationships between the constructs of the study and also measure the indicators for each variable (Chau, 1997). Also, Partial Least Square-Structural Equation

Modelling (PLS-SEM) was used to measure the relationships between the variables in the study and to measure the measurement and structural model (Cheng et al., 2013). It is a composite-based form of SEM (Rigdon et al., 2017). It is an ideal approach for the study because it is applied when unobserved variables are involved in a model (Richter et al., 2016). Moreover, it is an effective approach for a prediction-oriented study (Cepeda et al., 2016; Shmueli, 2016). Also, it is established that Structural Equation Modelling (SEM) techniques are the best techniques for measuring users' acceptance of technology (Venkatesh, Morris, Davis & Davis, 2003). SmartPLS 4 software was used as a tool for the data analysis (Ringle et al., 2015).

The variables of the study (all latent) will be modeled using the two models of the PLS-SEM namely structural and measurement models (Ifinedo, 2014). The structural model (Inner model) explains the relationships between the independent and dependent latent variables in the study while the measurement model, also called the outer model specifies the relationship between the unobserved variables and their observed variables (Skotnes, 2015a).

3.6 Ethical issues addressed

Articles, journals, and conference papers cited in this study are properly cited. The comments of participants will be kept strictly confidential, and the study's findings will not be used publicly or privately to malign the participating schools.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF RESULTS

4.0 Introduction

This section presents the analysis of the data collected from the participants i.e., the teachers' and students' demographics, the measurement model, and the structural model of the study. The analysis covered the relationships between observed variables and unobserved variables of the study and testing of all the hypotheses, using Smart PLS.

4.1 Presentation of Results

This section presents the analysis of respondents' responses.

4.1.1 The Students' demographics

Two hundred and seventy-eight (278) students took part in the study. 167 of them, representing 60.2% were males while 111 of them, representing 39.9% were females. 55 (19.4%) of the students were in SHS 1, 81 (29.1%) were in SHS 2, and 143 (51.4%) were in SHS 3. 81 (29.1%) of the students offered General Arts. 104 of them, representing 37.4% also offer General Science. 39 of them, representing 14% offer Business while 54 (19.4%) of them offer Visual Arts. This is shown in Table 3.

This is shown in Table 1.

Table 1: The Students' Demographics

Items	Frequency	Percentage
<i>Gender</i>		
Male	167	60.1
Female	111	39.9
<i>Class</i>		
Form 1	54	19.4
Form 2	81	29.1
Form 3	143	51.4
<i>Course offered</i>		
General Arts	81	29.1
General Science	104	37.4
Business	39	14.0
Visual Arts	54	19.4

4.1.2 The Teachers' Demographics

74 teachers took part in the study. 46 of them, representing 62.2% were male while 38 (32.8%) were female. 6 of the teachers teach English Language, 4 teach Biology, 4 teach Elective Mathematics, 3 teach Business Management, 2 teach Management in living, 2 teach Geography, 2 teach Costing, 2 teach Accounting, 2 teach Economics, 2 teach Asante Twi, 7 teach Core Mathematics, 3 teach French, 3 teach History, 2 teach Food and Nutrition, 2 teach Picture Making, 5 teach Integrated Science, 4 teach Social Studies, 4 teach ICT, 4 teach General Knowledge in Arts, 2 teach Textiles, 3 teach Chemistry, and 3 teach Physics.

Also, 11 of the teachers (14.9%) have spent less than 2 years teaching their subjects in the school. 38 of them (51.4%) have spent between 3-6 years teaching their subject. 13 of them, representing 17.6% have also spent between 7 to 10 years teaching their subject while 12 of them (16.2%) have spent more than 10 years teaching their subject. This is shown in Table 2.

Table 2: The Teachers' Demographics

Items	Frequency	Percentage
Gender		
Male	46	16.5
Female	28	10.1
Subject		
English	6	2.2
Biology	4	1.4
Elective	4	1.4
Mathematics		
Business	3	1.1
Management		
Management in Living	2	0.7
Geography	2	0.7
Costing	2	0.7
Accounting	2	0.7
Economics	5	1.8
Asante Twi	2	0.7
Core Mathematics	7	2.5
French	3	1.1
History	3	1.1
Food and Nutrition	2	0.7
Picture Making	2	0.7
Core Science	5	1.8
Social Studies	4	1.4
ICT	4	1.4
GKA	4	1.4
Textiles	2	0.7
Chemistry	3	1.1
Physics	3	1.1
Years Spent		
Less than 2 years	11	4.0
3-6 years	38	13.7
7-10 years	13	4.7
More than 10 years	12	4.3

4.1.3 The Measurement Model

The relationships between the latent variables and their indicators were used to establish the validity and reliability of the constructs of the study (Skotnes, 2015a). Reliability is established when loadings are equal to or exceed 0.70 (Hair et al., 2011). The internal reliability of the constructs is also established when the composite reliability for the constructs is equal to or exceeds 0.70 (Hair, et al, 2011; Wong, 2013). The reliability and the internal consistency of the constructs were determined by finding Cronbach's Alpha and the composite reliability of them using the SmartPLS 4. In this study, as shown in Table 3, the composite reliability (CR) of the constructs exceeded the threshold.

The Cronbach's Alpha of Perceived Significance of online formative assessment by teachers and students is 0.802 and 0.81 respectively. The Teachers' and Students' Attitude is 0.759 and 0.771 respectively. And Teachers' and Students' Motivation is 0.777 and 0.844 respectively. The results indicated the high reliability of the constructs because their values exceeded the recommended threshold of $>.70$

The validity of the measurement models was also determined by finding the convergent and discriminant validity of them (Hair, et al, 2011; Wong, 2013). Convergent validity determines the extent to which the unobserved variables explain the variance of its indicators on average (Skotnes, 2015). The Average Variance Extract (AVE) value greater than or equal to 0.5 is used to determine the acceptability of the convergent validity of constructs (Henseler et al, 2015).

The Average Variance Extract (AVE) of the teachers' perceived significance of online formative assessment is 0.571, the teachers' attitude is 0.617, and the teachers' motivation is 0.595. Also,

the Average Variance Extract Students' Perceived significance is 0.65. The AVE of their attitudes and motivation are 0.513 and 0.62 respectively. This shows that the Average Variance Extracts of the constructs also exceeded the 0.5 threshold. Therefore, the convergent validity of the constructs is established (Gefen D, Straub DW, 2000).

Table 3: The Assessment of the Measurement Model

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
SA	0.771	0.831	0.838	0.513
SM	0.844	0.879	0.889	0.62
SPS	0.81	0.885	0.878	0.65
TA	0.759	0.877	0.842	0.617
TM	0.777	0.829	0.852	0.595
TPS	0.802	0.878	0.862	0.571

SA= Students' Attitude, SM= Students' Motivation, SPS = Students' Perceived Significance, TA= Teachers' Attitude, TM = Teachers' Motivation and TPS = Teachers' Perceived Significance

Also, the correlations among all the constructs were found using the Heterotrait-monotrait ratio matrix (HTMT). It is shown from Table 4 that the discriminant validity between teachers' and students' perceived significance and Online Formative Assessment Adoption is 0.231 and 0.242 respectively. The discriminant validity between Students' Attitudes and Online Formative Assessment Adoption is 0.357. Students' Motivation and Adoption is 0.4 and Students' Motivation and Students' Attitude is also 0.653.

However, the discriminant validity between Teachers' Attitudes and Students' Attitudes and Students' Motivation is 0.579 and 0.493 respectively. Teachers' Attitudes and Students' Perceived Significance is 1.013. Teachers' Motivation and Online Formative Assessment Adoption is 0.339. That of Teachers' Motivation and Students' Attitude and Motivation is 0.504 and 0.449 respectively. The discriminant validity between Teachers' Motivation and Students' Perceived Significance and Teachers' Attitudes is 0.835 and 0.91 respectively. The discriminant validity between Teachers' Perceived Significance and Students' Attitudes and Motivation is 0.592 and 0.449. Teachers Perceived Significance and Students' Perceived Significance is 0.449. Lastly, the discriminant validity between Teachers' Perceived Significance and Teachers' Attitude and Motivation is 0.974 and 1.047.

Conclusively, the correlations between all the constructs, except between the Students' Perceived Significance and Students' Motivation (1.013), Teachers' Motivation and Teachers' Attitude (0.91), and Teachers' Perceived Significance and Teachers' Attitude (0.974) and Teachers' Perceived Significance and Teachers Motivation (1.047) are all below the threshold of 0.90. This indicates that most of the constructs are each discriminant from the other.

Figure 2: The Discriminate Validity of Constructs

	ADP	SA	SM	SPS	TA	TM	TPS
ADP							
SA	0.357						
SM	0.4	0.653					
SPS	0.242	0.643	1.013				
TA	0.242	0.579	0.493	0.613			
TM	0.339	0.504	0.449	0.835	0.91		
TPS	0.231	0.592	0.449	0.499	0.974	1.047	

ADP=Adoption of Online Formative Assessment, SA=Students Attitude, SM=Students Motivation, SPS=Students Perceived Significance, TA=Teachers Attitude, TM=Teachers Motivation, and TPS=Teachers Perceived Significance.

The measurement of the constructs is shown in Table 4 below. The items were adopted and modified from similar studies (Bijol et al., 2015; Daniel et al., 2010; Jazil et al., 2020; Nguyen et al., 2006; Sorensen, 2013).

Table 4: Assessment of the Measurement Model

Variable	Item Sample
Students' Perceived Significance (SPS)	<p>The timing of the test makes the assessment effective and efficient</p> <p>The use of the tool for formative assessment saves time</p> <p>Undertaking the online assessment has challenged me to learn harder as I take the test within a limited time.</p>
Students' Attitude (SA)	<p>The immediate feedback helps me to evaluate my learning timely</p> <p>Adoption of the online assessment tool has nothing to do with my attitude</p> <p>There is no need to understand students' attitudes before integrating technology into the classroom</p> <p>My attitude affects my ability to do the test</p> <p>The use of the platform for assessment makes me feel awkward</p> <p>I don't like the online formative assessment tool because it's frustrating to use</p>
Students' Motivation (SM)	<p>The questions are available all the time. This motivates me to learn at any time.</p> <p>It is very easy to use the online application</p> <p>I am determined to take part in the online formative assessment</p> <p>I can assess my learning progress</p> <p>The teachers can address learning challenges immediately</p>
Teachers' Perceived Significance (TPS)	<p>The immediate feedback helps me to assess the performance of students.</p> <p>The use of the tool for formative assessment saves time</p> <p>I prefer the online assessment to the paper-and-pencil test</p> <p>The online assessment helps me to achieve the lesson objectives</p> <p>The immediate results ensure timely remedial for learning gaps</p>
Teachers' Attitude (TA)	<p>I feel comfortable using the online assessment</p> <p>I feel very confident using the online assessment tool to assess my students</p> <p>The online formative assessment has changed my attitude toward assessing students</p> <p>I don't have any anxiety using the online formative assessment to assess students</p> <p>My attitude toward the online formative assessment does not affect my</p>

Teachers' Motivation (TM)	teaching I feel motivated to use the online assessment because of its positive impact on teaching and learning I feel motivated to use the online assessment because the assessment tests are appropriate to the content taught in class. I feel motivated to use the online assessment because I have control over ICT tools. I have determined to use the Icampushg to assess my students I like the online formative assessment because it comes with no personal cost
Online Formative Assessment Adoption (ADP)	I would like the Online Formative assessment with the Icampushg to be integrated into the classroom

4.1.4 The Structural Model

The structural model (inner model) explains the relationships among the latent variables. To assess the strength of these relationships, the path coefficient (β) and squared R (R^2) of the constructs were examined by running the PLS algorithm and PLS- Bootstrapping using Smart PLS 4.0. These are used to demonstrate the significance and strength of the hypothesized relationships of the constructs (Skotnes, 2015b). The R^2 which is the coefficient of determination was used to assess the precision of the projected model (Henseler et al., 2015). R^2 around 0.75 is deemed a significant level of accuracy, 0.50 is considered a moderate level of accuracy, and 0.25, is a weak level of accuracy (Zia-Ur-Rehman et al., 2018). Table 5 shows that there is a significant accuracy of the predictive model because the majority of the endogenous variables are above the significance level of 0.75 (Students' motivation (SM)=0.766, Teachers' Attitude (TA)=0.823 and Teachers' Motivation (TM)=0.737) while the remaining two, that is, Adoption of the Online Formative Assessment (ADP) and Students Attitude (SA) have R^2 of 0.319 and 0.329 which are above the weak level of accuracy.

Table 5: Projected Accuracy and Significance of Model

	R-square	R-square adjusted
ADP	0.319	0.291
SA	0.329	0.315
SM	0.766	0.763
TA	0.823	0.819
TM	0.737	0.734

4.1.4.1 Testing the Hypotheses

To ensure a certain degree of impact among the latent variables within the model, the values of the path coefficient should be greater than 0.100 and be considered significant at 0.05 level (Huber, F., Herrmann, A., Meyer, F., Vogel, J., 2017). Whether the hypotheses would be accepted or rejected and be seen as strong or weak is determined by the path coefficient t and p values (Mohamed et al., 2018). The p values are also interpreted as follows: (i) $p < 0.05$ suggests a statistically significant relationship; (ii) $p < 0.01$ suggests a highly statistically significant relationship; and (iii) $p < 0.001$ indicates a very highly statistically significant relationship (Mohamed et al., 2018).

The values of the coefficients revealed that the relationships between most of the constructs were significant and supported. 8 out of the 10 hypotheses have a strong positive significance support whereas only one has negative significant support, meaning that there was no support for it by the study. The hypotheses with strong positive significant influences (their coefficient values, t -values, and p -values) are as follows:

H1a₂: Students' Perceived significance of online formative assessment highly influences the adoption of online formative assessment in the classroom ($\beta=0.331$, t -value= 3.407 & $P=0.001$)

H1b: Perceived Significance of online formative assessment serves as a source of motivation to teachers ($\beta=0.858$, $t\text{-value}= 32.29$ & $P=0.000$)

H1c: Perceived Significance of online formative assessment serves as a source of motivation to students ($\beta=0.875$, $t\text{-value}= 58.205$ & $P=0.000$)

H1d: Perceived Significance of online formative assessment enables teachers to develop a positive attitude towards it ($\beta=0.817$, $t\text{-value}= 17.295$ & $P=0.000$)

H1e: Perceived Significance of online formative assessment enables students to develop a positive attitude towards it ($\beta=0.201$, $t\text{-value}= 1.387$ & $P=0.165$)

H3: Teachers' attitudes towards online formative assessment promote its adoption ($\beta=1.495$, $t\text{-value}=5.995$ & $P=0.000$)

H4: Students' attitudes toward online formative assessment are influenced by their motivation to use the online platform ($\beta=0.389$, $t\text{-value}= 2.062$ & $P=0.039$).

H5: Teachers' attitudes toward online formative assessment are influenced by their motivation to use the online platform ($\beta=0.103$, $t\text{-value}= 1.879$ & $P=0.06$).

H2: Students' attitudes towards online formative assessment promote its adoption ($\beta=0.057$, $t\text{-value}= 0.312$ & $P=0.755$).

However, H1a₂, Teachers' Perceived significance of online formative assessment positively influences the adoption of online formative assessment in the classroom was not supported by the study ($\beta= -1.379$, $t\text{-value}= 5.493$ & $P=0.000$)

Table 6 shows the path coefficient and p-values evaluation of the hypothesized relationships of the constructs

Table 6: Path Coefficient, p-values, and hypothesis evaluation

Hypothesis: Influence of Construct A on Construct B (A -> B)	Path coefficient	P-values	Rejected/Supported
H1a ₁ Teachers Perceived Significance -> Adoption	-1.379	0.000	Rejected
H1a ₂ Students perceived significance -> Adoption	0.331	0.001	Supported
H1b Teachers perceived significance -> Teachers' motivation	0.858	0.000	Supported
H1c Students perceived significance -> Students' motivation	0.875	0.000	Supported
H1d Teachers perceived significance -> Teachers' attitude	0.817	0.000	Supported
H1e Students perceived significance -> Students' attitude	0.201	0.165	Supported
H2 Students' attitude -> Adoption	0.057	0.755	Rejected
H3 Teachers' attitude -> Adoption	1.495	0.000	Supported
H4 Students' motivation -> Students' attitude	0.389	0.039	Supported
H5 Teachers' motivation -> Teachers' attitude	0.103	0.06	Supported

4.2 Discussion of Results

The study revealed that teachers believed that online formative assessment is very helpful due to its numerous advantages but that will not necessarily compel them to adopt it into the teaching and learning process. This is a bit surprising when empirical pieces of evidence suggest that teachers find the paper-and-pencil mode of assessment a huge workload and discouraging (Lancaster & Clarke, 2017). Based on this study's findings, the assumption that teachers' perceived significance of online formative assessment positively influences its adoption was not supported.

Moreover, the results from the students revealed that if they perceive the online formative assessment to be beneficial, they would like it to be adopted into the classroom. This supports the assumption that students' perceived significance of online formative assessment has a positive influence on its adoption.

It was found that the teachers' perceptions of the significance of online formative assessment have a great influence on their motivation to use it. This confirms the fact that online formative assessment enhances teachers' motivation and engagement because they don't necessarily have to be present to assess the learners (Robertson et al., 2019). This also supports hypothesis H1b (Perceived Significance of online formative assessment serves as a source of motivation to teachers). Also, the study revealed when students perceive that online formative assessment is useful, they feel motivated to use it. This is consistent with the findings of similar studies (Marriott, 2009; Muhd Al-Aarifin et al., 2019; Natalia V. Iaremenko, 2017; Nguyen et al., 2006). This also supported the assumption that students' perceived significance of online formative assessment serves as a source of motivation to them.

According to the findings of the study, when teachers perceive that online formative assessment is useful, they tend to develop positive attitudes toward its usage. This was also postulated by a model proposed by Van et al (2012). The hypothesis, the perceived significance of online formative assessment enables teachers to develop a positive attitude towards it was also supported by the study. Likewise, it was also shown from the study that students develop positive attitudes towards online formative assessment when they perceived that it is useful for teaching and learning. This supports our hypothesis H1e (Perceived Significance of online

formative assessment enables students to develop a positive attitude towards it) and similar studies (Wang et al., 2008).

Again, the study showed that students' attitudes have no bearing on whether they want online formative assessment to be integrated into the classroom or not. This means that their positive attitudes do not mean they would want it to be adopted and vice versa. On one hand, this confirms similar findings (Jazil et al., 2020) whereas, on another hand, it runs contrary to similar findings which revealed that the kind of attitude exhibited by students towards the online assessment can influence their acceptance and the sustainability of the assessment tools (Chetchumlong, 2010; GarcíaBotero et al., 2018). Hence, hypothesis H2 (Students' attitudes towards online formative assessment promote its adoption) was not supported. However, teachers' attitudes were found to have a greater influence on the adoption of online formative assessment. Hence, the hypothesis, teachers' attitudes towards online formative assessment promote its adoption was supported by the study. Results from a similar study also confirm this finding (GarcíaBotero et al., 2018; Holden & Rada, 2011).

Finally, the study showed that both teachers' and students' attitudes towards online formative assessment are also influenced by their motivation to use the assessment as also revealed by a similar study (Nordlöf et al., 2017). Thus, hypotheses H4 (Students' attitudes towards online formative assessment are influenced by their motivation to use the online platform and H5 (teachers' attitudes towards online formative assessment are influenced by their motivation to use the online platform were confirmed by the study.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

This section discusses the summary of findings of the study concerning the research objectives, the conclusions and recommendations.

5.2 Summary of Findings

A questionnaire was designed and administered on 74 teachers and 278 teachers. The data collected was analyzed using Partial Least Square-Structural Equation Modelling (PLS-SEM) technique. The summary of the findings of this study with regards to the research objectives are discussed below.

The study revealed that the teachers believed that online formative assessment is very helpful due to its numerous advantages but that will not necessarily compel them to adopt it into the teaching and learning process. Moreover, the students revealed that if they perceive the online formative assessment to be beneficial, they would like it to be adopted into the classroom.

It was found that the teachers' perceptions of the significance of online formative assessment have a great influence on their motivation to use it. Also, the study revealed when students perceive that online formative assessment is useful, they feel motivated to use it. Also, according to the findings of the study, when teachers perceive that online formative assessment is useful, they tend to develop positive attitudes toward its usage. Likewise, it was also shown from the study that students develop positive attitudes towards online formative assessment when they perceived that it is useful for teaching and learning.

Again, the study showed that students' attitudes have no bearing on whether they want online formative assessment to be integrated into the classroom or not. However, teachers' attitudes were found to have a greater influence on the adoption of online formative assessment.

Finally, the study showed that both teachers' and students' attitudes towards online formative assessment are also influenced by their motivation to use the assessment.

5.3 Conclusion

The study was designed to examine the nexus between COVID-19 and Online Formative Assessment. It investigated the following:

- a. To what extent does the perceived significance of online formative assessment influence its adoption?
- b. In what ways do the students' attitudes toward online formative assessment affect its adoption?
- c. What are teachers' attitudes towards online formative assessment and how do they influence its adoption?

Thus, it could be concluded that both the teachers and the students admitted that the use of online formative assessment is very important but on the part of the teachers this has no significant impact on their intention to adopt it. The students expressed mixed attitudes towards the use of online formative assessment but admitted that these attitudes have no bearing on their intention to adopt online formative assessment or the assessment tool. On the other hand, the teachers indicated that the kind of attitudes they exhibit towards the online formative assessment and the assessment tool will determine whether they will adopt them or not.

The results of the study revealed that most of the endogenous variables were above the significance level so the proposed model accurately predict the adoption of the online formative assessment.

5.4 Recommendations

Even though the findings of this study are not far different from many research findings, it is still recommended that a more pragmatic approach is used to investigate the phenomenon using different variables. This is because the teachers expressed that the online formative assessment and the assessment tool have a significant impact but they have no intention to adopt it. Therefore, an approach that focuses more on the school's demographic factors such as the availability of enough computers and ICT tools, strong internet connectivity, and ICT-friendly classrooms should be used for further studies.

Lastly, curriculum developers should focus more attention on online formative assessment and the Icampusgh assessment tool since their contributions to effective teaching and learning are enormous.

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APPENDIX 1
QUESTIONNAIRE

This is a questionnaire on a study being conducted by a student of Akenteng Appiah Minkah University of Skills Training (AAMUSTED) to examine the possibility of integrating the Icampusgh application as an assessment tool into senior high school education in Ghana. The questionnaire is categorized into four parts namely, demographics, students, and teachers. There are subdivisions under the students and the teachers and you are required to express your knowledge on each of the questions by ticking [] the appropriate box that corresponds to each question. The responses provided are meant for only academic purposes therefore be assured that your anonymity and confidentiality are guaranteed.

STUDENTS SECTION

Demographics

1. Sex.

Male []

Female []

2. Class

Form 1 []

Form 2 []

Form 3 []

3. Course offered.....

Perceived Significance of online formative assessment

Indicate your agreement or disagreement on each of the questions by ticking [] the appropriate box that corresponds to each question Please

1= Strongly Agree 2= Agree 3= Neutral 4= Disagree 5 = Strongly Disagree

S/N	STATEMENT	1	2	3	4	5
I prefer the online formative assessment because:						
PS1	The online assessment has increased my motivation to learn harder					
PS2	The online assessment has increased my confidence in using computers					
PS3	The online assessment decreased my anxiety about waiting for test results					
PS4	Using the online assessment will improve the student's level of learning.					
PS5	The timing of the test makes the assessment effective and efficient					
PS6	The use of the tool for formative assessment saves time					
PS7	I consider the online formative assessment appropriate and practical.					
PS8	I enjoy using the application for the tests					
PS9	The online assessment has increased my self-learning					

PS10	Undertaking the online assessment has challenged me to learn harder as I take the test within a limited time.					
PS11	The online test has challenged me to do independent work					
PS12	The immediate feedback helps me to evaluate my learning timely					

Students' attitudes towards online formative assessment (Icampusgh platform)

1= Strongly Agree 2= Agree 3= Neutral 4= Disagree 5 = Strongly Disagree

S/N	STATEMENT	1	2	3	4	5
Attitude						
SA1	My attitude towards the online assessment is very important					
SA2	My academic success is dependent on my attitude toward learning					
SA3	Adoption of the online assessment tool has nothing to do with my attitude					
SA4	There is no need to understand students' attitudes before integrating technology into the classroom					
SA5	The introduction of the web-based assessment brings anxiety					
SA6	My attitude affects my ability to do the test					
SA7	The use of the platform for assessment makes me feel awkward					
SA8	The introduction of the online formative assessment is not a major concern to me					
SA9	I don't like the online formative assessment tool because it's frustrating to use					
SA10	I don't have any interest in the online formative assessment					
Motivation						
M1	I like the online assessment because it challenges me to learn					

M2	The lack of computers in the school makes me dislike the online assessment					
M3	The weak internet connectivity kills my interest in the online formative assessment					
M4	I have the opportunity to do class assignments at home and this encourages me a lot					
M5	The questions are available all the time. This motivates me to learn at any time.					
M6	The online assessment makes me feel enthused to learn					
M7	It is very easy to use the online application					
M8	I am determined to take part in the online formative assessment					
M9	The immediate feedback is a source of motivation for me.					
M10	I can assess my learning progress					
M11	The teachers can address learning challenges immediately					
M12	Integrating technology into the classroom has increased my interest in learning					
M13	The tool gives me more chances to practice					
M14	The assessment tests are appropriate to the content learned in class.					

TEACHERS SECTION

Demographics

1. Sex

Male []

Female []

2. Class (s) taught

Form 1 []

Form 2 []

Form 3 []

3. Subject taught

4. Years taught

Perceived Significance of online formative assessment

Indicate your agreement or disagreement on each of the questions by ticking [√] the appropriate box that corresponds to each question Please

1= Strongly Agree 2= Agree 3= Neutral 4= Disagree 5 = Strongly Disagree

S/N	STATEMENT	1	2	3	4	5
TP1	The online assessment has increased my motivation to conduct formative assessment					
TP2	The online assessment has increased my confidence in using computers for teaching and learning					
TP3	The immediate feedback helps me to assess the performance of students.					
TP4	The immediate feedback helps me evaluate my lesson.					
TP5	The online assessment has decreased my anxiety about conducting the assessment.					
TP6	The web-based assessment tool gives me more chances to assess students in diverse ways.					
TP7	Using the online assessment will improve the student's level of learning.					
TP8	The use of the tool for formative assessment saves time					

TP9	I consider the online formative assessment appropriate and practical.					
TP10	I prefer the online assessment to the paper-and-pencil test					
TP11	The online assessment tool is very easy to use					
TP12	I enjoy using the application to conduct the assessment					
TP13	The online assessment has improved my teaching methods					
TP14	The timing of the test makes the assessment effective and efficient					
TP15	The online assessment helps me to achieve the lesson objectives					
TP16	The immediate results ensure timely remedial for learning gaps					

Teachers' attitudes towards online formative assessment (Icampusgh platform)

1= Strongly Agree 2= Agree 3= Neutral 4= Disagree 5 = Strongly Disagree

S/N	STATEMENT	1	2	3	4	5
Attitude						
TA1	I feel comfortable using the online assessment					
TA2	The online formative assessment is very interesting to me					
TA3	I feel very confident using the online assessment tool to assess my students					
TA4	The online formative assessment has changed my attitude toward assessing students					
TA5	The attitude of teachers towards the online assessment tool is very important					
TA6	I am not intimidated by the use of technology in teaching and learning					
TA7	I don't have any anxiety using the online formative assessment to assess students					
TA8	My attitude toward the online formative assessment does not affect my teaching					
TA9	I use the assessment tool because I am compelled to use it					
TA10	I just don't like the online formative assessment					
TA11	I have no confidence in the online assessment tool					
Motivation						
TM1	The lack of computers in the school makes me dislike the					

	online assessment					
TM2	The weak internet connectivity kills my interest in the online formative assessment					
TM3	I feel motivated to use the online assessment because of its positive impact on teaching and learning					
TM4	I feel motivated to use the online assessment because the assessment tests are appropriate to the content taught in class.					
TM5	I feel motivated to use the online assessment because I have control over ICT tools.					
TM6	The online assessment makes me feel enthused to assess what I teach					
TM7	It is very easy to use the platform to assess the students					
TM8	I have determined to use the Icampugh to assess my students					
TM9	I like the online formative assessment because it comes with no personal cost					
TM10	I am motivated to use the online assessment because grading students involves no stress					