

BISHOP STUART UNIVERSITY



HYBRID LEARNING AND STUDENT ACHIEVEMENT PRE AND POST COVID-19

PANDEMIC IN SECONDARY OF SHEEMA MUNICIPALITY,

SHEEMA DISTRICT

BY

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Declaration

I, Annet Asiimwe, do hereby declare that the work contained in this dissertation is my original work and has never been submitted to any other institution of higher learning for any award.

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Approval

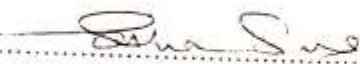
This dissertation has been under our supervision and is now ready for submission with our approval.

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Dedication

This work is dedicated to my family members for supporting my studies. Your efforts towards the success of my studies represents the highest degree of love and care. May God through Jesus Christ reward you richly.

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List of Acronyms

BSU	Bishop Stuart University
DEO	District Education Officer
MEAP	Master of Education Administration and Planning
SPSS	Statistical Package for Social Sciences

Abstract

This study was about the impact of hybrid learning on student achievement in secondary schools in Sheema Municipality, Uganda, before and after the COVID-19 pandemic. It sought to determine the extent of hybrid learning adoption, evaluate student achievement levels, and examine the relationship between the two. Employing a descriptive cross-sectional survey design, data was collected from 399 respondents (head teachers, teachers, and students) using questionnaires and interview guides. Findings revealed the widespread adoption of blended learning approaches utilizing online platforms like Google Classroom and Zoom alongside traditional classroom sessions. These approaches often included recorded lessons, online platforms, and face-to-face interactions. It was revealed that there was a positive perception of student achievement within a hybrid learning environment, as evidenced by survey results highlighting improved attendance, participation, and performance in assessments (mean score of 3.61). Furthermore, a strong positive correlation (Pearson Correlation 0.971, $p < 0.001$) was found between hybrid learning implementation and student achievement. In conclusion the study

demonstrates that hybrid learning models, incorporating online platforms and in-person sessions, can ensure continuous learning and foster positive student achievement. It was recommended that teachers should actively explore engaging online instructional strategies that promote collaboration and active learning.

Chapter One

Introduction

Introduction to the chapter

This chapter presents background of the study, statement of the problem, purpose of the study, objectives of the study research questions, scope of the study, significance of the study, and conceptual frame work.

Background to the Study

Hybrid learning, also known as blended learning, combines traditional face-to-face classroom instruction with online learning. The concept of hybrid learning has been around for several decades, but its popularity has increased significantly in recent years due to the advancements in technology and the need for flexible learning options (Cooper, 2021). The COVID-19 pandemic of 2020 led to the widespread adoption of hybrid learning in many educational institutions, including secondary schools. With the closure of schools and the need to maintain social distancing, hybrid learning became an essential tool for delivering education to students.

Research has shown that the implementation of hybrid learning can have a significant impact on student achievement. A study conducted by the U.S. Department of Education found that students who participated in blended learning environments performed better than those who received only face-to-face instruction (Huck & Zhang, 2021). Another study conducted by the RAND Corporation found that students who participated in blended learning environments scored higher on standardized tests than those who received only traditional classroom

instruction (Sahu, 2020). The study also found that the benefits of blended learning were particularly pronounced for students from low-income families.

However, the success of hybrid learning depends on several factors, including the quality of the online materials and instruction, the level of student engagement, and the teacher's ability to effectively blend the online and in-person components of the course. Overall, the historical background of hybrid learning dates back several decades, but its popularity has increased significantly in recent years due to the advancements in technology and the need for flexible learning options. With the COVID-19 pandemic, hybrid learning has become an essential tool for delivering education to students, and research has shown that it can have a significant impact on student achievement (Garet et al., 2020).

In Africa, despite advancements in educational technology toward hybrid learning (Corlatean, 2020), teachers, students, parents, and other relevant educators encountered numerous challenges they were unprepared to overcome. These challenges significantly contributed to low student achievement. The ministry of education rushed to completely redesign educational delivery models including implementation of hybrid learning. Parents were responsible for ensuring that their children access online learning content and improve students' achievement. The rapid changes and disruptions in hybrid learning were caused by the unprecedented spread of the COVID-19 Era (Ali, 2020).

The design of a hybrid learning is an aspect of instruction to foster students' achievement in Uganda. It is noted by Kintu et al., (2017) that hybrid learning is very important for stimulating and supporting students' learning. The transition is geared towards exploring various alternatives that can foster exploration in hybrid learning by applying the use of modern information communication technologies.

Theoretical background

This study employed the equivalency theory. The equivalence theory developed by Simonson, (1999) holds that for distance learning to be considered a success, it must provide learning experiences for every student, either locally or distant. The model states that distance learning is not the same as physical learning, but the two approaches are equivalent. This means that the term equivalency should not be confused to mean equal, but it is a situation in which learning experiences that students receive are considered to give them similar experiences for similar outcomes. However, the main emphasis of the theory is not to expect that every student to be taught or learn in a similar manner. There are three major aspects of the theory: Distant and local students essentially are in different environments; Digital technology is used synchronously and asynchronously; Learning experiences have anything happening with or to learners to boost learning. This theory was useful in this study because it explained how physical and virtual education were different and how the difference mattered.

Conceptual background

Hybrid Learning is independent variable. Hybrid learning is a teaching and learning model that combines elements of both traditional classroom-based learning and online learning (Muller & Mildenerberger, 2021). In a hybrid learning model, students attend classes both in-person and online, with a mix of synchronous (real-time) and asynchronous (self-paced) learning activities. Typically, hybrid learning involves a combination of face-to-face instruction, online coursework, and virtual classroom activities (Sibuea & LIA, 2018). Students may attend in-person classes on certain days of the week and participate in online discussions or complete assignments on other days. Alternatively, some classes may be entirely online, while others may be entirely face-to-face. The goal of hybrid learning is to create a flexible and adaptable learning

environment that can meet the needs of students in a variety of different situations (Bidarra & Rusman, 2017). By combining the best elements of both online and in-person learning, hybrid learning can provide students with a more engaging and interactive educational experience that can enhance their learning outcomes.

Effective hybrid learning is based on the integration of traditional face to face and online teaching- learning paradigms has become popular with the improvement of technology (Kazu & Yalçin, 2022). This popularity creates a need for making a reinterpretation of the findings of recent empirical studies conducted on the hybrid learning (McCutcheon et al., 2015). Learning refers to the systematic acquisition of new preferences, attitudes, values, skills, behavior, knowledge, and understanding in schools and universities (Steinert et al., 2016). For a long period, approaches such as research, assignments, videos, storytelling, training, and discussion have been used to help learners acquire knowledge and values. Hybrid Learning was conceptualized as frequency of zoom meetings, number of times newspapers are distributed to students in a term, the duration and frequency students learn lessons on visual aids, and the duration and frequency students learn lessons on audio aids.

Student achievement in the Post Covid-19 is the dependent variable. Student achievement refers to the level of knowledge, skills, and competencies that a student has acquired through the educational process (Hartikainen et al., 2019). This can be measured in various ways, such as grades, test scores, academic awards, and other indicators of academic success. Student achievement also referred to performance outcomes that indicated the extent to which a person has accomplished specific goals that were the focus of activities in instructional environments (Steinmayr et al., 2014). In this study student achievement was referred to as performance in tests, performance in homework and assignments, critical thinking skills, and regular attendance.

Contextual background

Uganda has experienced growth in its hybrid learning sector over the past decade as the result of the liberalization of the acquisition, use, and application of ICT in 1996. A range of technologies adopted include cellular and mobile telephone networks, mobile radio communication, paging services, and courier services.

The coronavirus COVID-19 outbreak disrupted life around the globe in 2020. As in any other sector, the COVID-19 pandemic affected education in many ways (Tumwesige, 2020). Government actions have followed a common goal of reducing the spread of coronavirus by introducing measures limiting social contact. Ugandan government suspended face-to-face teaching and exams as well as placing restrictions on immigration affecting Erasmus students (Dwivedi et al., 2020). Where possible, traditional classes are being replaced with books and materials taken from school. Various platforms of hybrid learning enable interaction between teachers and students, and, in some cases, national television shows or social media platforms are being used for education (Protsiv et al., 2016). Some education systems announced exceptional holidays to better prepare for this distance-learning scenario. Fortunately, there is a range of modern tools available to face the challenge of distance learning imposed by the COVID-19 pandemic. There are however other important tasks in the learning process, such as assessment or autonomous learning, that can still be challenging without the direct supervision of teachers. On one hand, if students achieve higher scores than in previous years, this could be linked with cheating in online exams or with changes in the format of the evaluation tools. On the other hand, lower grades could also be caused by the evaluation format change or be attributable to autonomous learning as a less effective teaching method.

Secondary Schools of Sheema Municipality, Sheema District faced an unplanned, unwanted, inexperienced, tense test in online learning with Novel Covid-19 pandemic. For all the stakeholders participating in this type of training from teachers, students, and support ICT staff were stuck on how they have to go through. Early January 2020, the outbreak of the Covid-19 caused Ugandan secondary schools to close their physical campuses following a presidential directive. This prompts the researcher to carry out a study on Secondary Schools of Sheema Municipality, Sheema District. Therefore this study assessed the influence of hybrid learning on students' achievement in in secondary schools Pre and Post COVID-19 Pandemic in secondary Schools of Sheema Municipality, Sheema District.

Statement of the problem

Hybrid learning, which combines traditional face-to-face instruction with online learning, has become increasingly popular in Uganda and around the world. However, there is a lack of research on the relationship between hybrid learning and student achievement in Uganda. This presents a problem as it is unclear whether hybrid learning is effective in improving student achievement in Uganda, which could have significant implications for the country's education system and the future success of its students (MoES, 2021).

Students' academic achievement is important as far as development of a nation is concerned. Students' achievement leads to positive outcomes after finishing studies (Essays, 2018). Recognizing the importance of students' achievement, the government of Uganda put in efforts to improve performance of students by introducing / implementing Hybrid learning. Hybrid learning is a learning approach that combines both remote learning and in-person learning to improve student experience and ensure learning continuity. The Coronavirus disease

(COVID-19) pandemic has forced educational institutions, including higher education institutions, to shift face-to-face learning to online (Bhamani et al., 2020).

Despite of government efforts through implementation of hybrid learning, academic achievement of the students has remained poor in secondary schools of Sheema Municipality (Sheema Municipal education Officer's Report, 2021). Which is characterized by low academic performance (in test Scores, homework and assignment completion, low / poor mastery of subject content, low class attendance), In addition, there is a lack of research on the relationship between hybrid learning and student achievement, which presents a problem in determining the hybrid learning in improving student achievement in Uganda. In addition, most teaching staff have not been exposed to use of a learning management system. However, if the problem of academic achievement is not addressed, the development of the nation will go down. Studies (e.g. Annisia 2020, Echaune, 2021; Kadondi, 2021) have analyzed hybrid learning and student achievement. However, these studies were done outside the context of Sheema District Uganda. This created a contextual gap making it necessary for this study to seek to determine whether student achievement in the post COVID-19 is related to Hybrid Learning in secondary schools in the context of Sheema Municipality, western Uganda.

Purpose of the Study

The purpose of the study was to assess the influence of hybrid learning on student achievement in secondary schools Pre and Post COVID-19 Pandemic among O' Level students in secondary Schools of Sheema Municipality, Sheema District.

Objectives of the study

- (i) To evaluate the adoption of hybrid learning in secondary schools pre- and post-COVID-19 pandemic in Sheema Municipality, Sheema District.
- (ii) To assess the level of students' achievement during pre and Post Covid-19 in Sheema Municipality.
- (iii) To determine the relationship between hybrid learning and students' achievement during pre and post Covid-19 in Sheema Municipality.

Research Questions

- (i) What is the adoption of hybrid learning in secondary schools pre- and post-COVID-19 pandemic in Sheema Municipality, Sheema District?
- (ii) What is the level of students' achievement during pre and Post Covid-19 in Sheema Municipality?

Research Hypothesis

H₀: There is no statistically significant relationship between hybrid learning and students' achievement during pre and post Covid-19 in Sheema Municipality.

Scope of the Study

Content scope

The study assessed the influence of hybrid learning on student achievement in secondary schools Pre and Post COVID-19 Pandemic among O' Level students in secondary Schools. It was guided by the following objectives; evaluating the adoption of hybrid learning in secondary schools pre- and post-COVID-19 pandemic in Sheema Municipality, Sheema District., to assess

the level of students' achievement, and to determine the relationship between hybrid learning and students' achievement during pre and post Covid-19.

Geographical Scope

The study was carried out in secondary schools of Sheema Municipality, Sheema District. Sheema District is bordered by Buhweju District to the north, Mbarara District to the east, Ntungamo District to the south, Mitooma District to the southwest and Bushenyi District to the west. Sheema Municipality is located 33 Kilometres on west of Mbarara city. The coordinates of Sheema Municipality are: 00 32S, 30 24E. The study area was selected due to persistently low academic achievement among students in secondary schools, as reported by the Sheema Municipal Education Officer in 2021.

Time Scope

The study utilized a 10-year period of data from 2012 to 2022 to assess the influence of hybrid learning on student achievement in secondary schools Pre and Post COVID-19 Pandemic among O' Level students in secondary Schools of Sheema Municipality, Sheema District.

Population Scope

The study population consisted of head teachers, teachers, and students both males and females from Secondary Schools of Sheema Municipality, Sheema District.

Significance of the Study

The study findings could inform government policies and strategies related to hybrid learning. Understanding the impact of hybrid learning on student achievement would guide educational reforms and resource allocation.

Policy makers would use the study results to shape educational policies that enhance student learning outcomes. Evidence-based decisions could be made regarding the implementation and support of hybrid learning initiatives.

School administrators play a critical role in curriculum design, teacher training, and student support. Insights from this study would help administrators adapt teaching methods, allocate resources, and address challenges effectively.

Students' experiences and learning outcomes are directly affected by hybrid learning. The study could highlight areas for improvement and guide student-centered approaches.

This study would contribute to the existing body of knowledge on hybrid learning. Researchers and scholars could build upon these findings, explore related topics, and propose innovative solutions.

Justification

The COVID-19 pandemic has forced schools to adopt hybrid learning models that combine both online and in-person learning. The study can investigate the impact of hybrid learning on students' academic achievement in Uganda, especially in the wake of the pandemic (Corlatean, 2020). There is limited research on the hybrid learning models in Uganda. The study can, therefore, contribute to the body of knowledge on the subject by providing insights on the hybrid learning in Uganda. Hybrid learning models have the potential to increase access to

education in Uganda, especially for students in remote areas. The study can investigate whether hybrid learning models have improved access to education in Uganda and its impact on students' academic achievement. Hybrid learning is new especially in secondary schools particularly in Uganda. Most learners and teachers are getting slow to implement. Academic achievement of learners is very social. The effect of hybrid learning is very crucial. The implementation of hybrid learning leads to a positive students' achievement as far as the development of the education sector is concerned in the country (Huck & Zhang, 2021). This study is very important to influence policy making in education institutions.

Conceptual Framework

Independent Variable

Hybrid Learning

- Frequency of Zoom meetings
- Number of times newspapers are distributed to students in a term
- The duration and frequency students learn lessons on visual aids.
- The duration and frequency students learn lessons on audio aids.

Dependent Variable

Students' achievement

- Performance in tests
- performance in homework and assignments
- Class Participation and engagement
- Critical thinking skills
- Regular attendance

Extraneous Variables

- Incentives
- Interactive
- Rewarding

Source: Developed by author

The conceptual framework for studying hybrid learning and student achievement in secondary schools of Sheema Municipality, Sheema District, involves several key components. Firstly, in terms of hybrid learning, the frequency of Zoom meetings is a crucial aspect to consider. This refers to how often students engage in online synchronous sessions via Zoom or similar platforms. It can significantly impact their interaction with teachers and peers, as well as their access to real-time instruction. Additionally, the number of times newspapers are distributed to students in a term is another important factor. This metric measures the frequency of distributing newspapers, which could serve as a supplementary learning resource. It assesses the impact of printed materials on students' understanding and engagement. Furthermore, the duration and frequency of learning lessons using visual aids must be examined. This aspect evaluates how often and for how long students are exposed to visual aids during their learning sessions. Visual aids play a crucial role in enhancing comprehension and retention of information. Similarly, the duration and frequency of learning lessons using audio aids should be considered. Like visual aids, audio aids such as recordings or podcasts can significantly impact students' learning experience and outcomes. Moving on to students' achievement, various factors come into play. Performance in tests is a fundamental aspect that measures students' academic proficiency through formal assessments. Similarly, performance in homework and assignments reflects students' grasp of the material and their ability to apply it independently. Their involvement and contribution during class activities and discussions indicate their level of interest and understanding. Moreover, critical thinking skills are essential for students' academic success. The ability to analyze, evaluate, and synthesize information is crucial for problem-solving and higher-order thinking. Finally, regular attendance is a key indicator of students' commitment to their education. Additionally, extraneous variables such as incentives,

interactivity, and perceived rewards must be considered. Incentives, including rewards or recognition, may influence students' participation and performance in hybrid learning.

Interactivity within the learning environment, including student-teacher and peer interactions, can also affect engagement and learning outcomes. Moreover, the perceived value or benefit students associate with participating in hybrid learning activities may influence their level of effort and commitment.

Chapter Two

Literature Review

Introduction

This chapter is about presentation of theoretical review and literature review about hybrid learning and student achievement in the post covid-19 in secondary schools as it was given by different scholars and researchers.

Theoretical Review

This study employed the equivalency theory developed by Simonson, (1999). The Equivalency Theory posits that the effectiveness of different modes of instructional delivery (such as face-to-face, online, and hybrid) depends on the extent to which three fundamental elements of instruction are equivalent: learner, instructor, and instructional content. This aspect of the theory emphasizes the importance of ensuring that learners have equitable opportunities to engage with and benefit from instructional activities, regardless of the mode of delivery. In the context of hybrid learning in secondary schools in Sheema Municipality, this would involve considering factors such as students' access to technology, digital literacy skills, and socio-economic backgrounds to ensure that all learners have equitable opportunities for learning and achievement.

The Equivalency Theory emphasizes the role of the instructor in facilitating effective learning experiences across different instructional modalities. In the context of hybrid learning, instructors must adapt their teaching strategies and practices to effectively engage students both in traditional classroom settings and online environments. This may involve leveraging technology for interactive and collaborative learning experiences, providing timely feedback, and fostering a supportive online learning community. In the study examining hybrid learning and

student achievement pre and post-COVID-19 pandemic in secondary schools of Sheema Municipality, the Equivalency Theory serves as a guiding framework for assessing the effectiveness of hybrid learning approaches. Central to this study is the Equivalency Theory developed by Simonson in 1999, which posits that effective distance education should provide equivalent learning experiences to all students, regardless of their physical presence in the classroom¹. This theory underpins the hybrid learning model, suggesting that when designed properly, hybrid learning can offer experiences of equal value to both remote and in-person students.

The extent to which hybrid learning has been adopted in secondary schools Pre and Post COVID-19 Pandemic in secondary Schools

Hybrid learning has experienced significant change due to the exponential growth of the internet and information technology (Dangwal, 2017). New e-learning platforms are being developed for teachers to facilitate assessments and for learners to participate in lectures. Both assessment processes and self-evaluation have been proven to benefit from technological advancement. Even courses that solely offer online contents such as Massive Open Online Courses (MOOCs) have also become popular. The inclusion of e-Learning tools in higher education implies that a greater amount of information can be analyzed, improving teaching quality.

Within few days, the COVID-19 pandemic enhanced the role of remote working, e-learning, video streaming, etc. on a broad scale (Favale et al., 2020). The most popular remote collaboration tools are private chat messages, followed by two-participant-calls, multi-person-meetings, and team chat messages. In addition, several recommendations to help teachers in the

process of online instruction have appeared. Furthermore, mobile learning has become an alternative suitable for some students with fewer technological resources.

A study by Means et al. (2019) found that hybrid models that incorporated online learning led to increased student achievement in science, math, and social studies. Hybrid learning can offer increased flexibility for students, allowing them to learn at their own pace and on their own schedule. This can be particularly beneficial for students who have other commitments outside of school, such as work or family obligations.

Hybrid methods can offer a more engaging learning experience for students by incorporating a variety of instructional methods, including multimedia content, interactive exercises, and collaborative activities. A study by Sun and Chen (2016) found that hybrid models that incorporated gamification led to increased engagement and motivation among students.

Hybrid learning can also lead to improved teacher effectiveness by providing teachers with more tools and resources to support student learning. A study by Cavanaugh et al. (2018) found that hybrid models that included professional development for teachers led to increased teacher effectiveness and improved student outcomes. Despite the benefits of hybrid learning, there are also some challenges and limitations to its implementation. For example, hybrid methods may require additional resources, such as technology and professional development, which may be difficult for some schools to acquire. There may also be challenges related to student access to technology and reliable internet connections.

The post COVID-19 world demanded each establishment to remodel digitally (Sharma & Alvi, 2021). This digitalization is taking place in India, but the overall speed of change has increased dramatically after the pandemic. In the present times, due to the exceptional situation

of COVID-19, the education pedagogy and mode of hybrid learning methodologies are to be changed overnight.

There are numerous hybrid learning platforms providing different programs with distinctive methodology, evaluation outcomes and certificates but what is needed is an integrated learning system (Krasnova & Shurygin, 2020). Students registering in hybrid learning courses have been rising dramatically and this overall multiplying demand for online learning has been accelerated by various reasons which included cost effectiveness, the flexibility of time and place, opportunity to attend classes digitally, space for performing different wide and varied works of day to day lives of adults, a reduced amount of distraction in comparison to face-to-face learning.

The hybrid learning has always been connected with several risks like lack of teachers' presence, lack of interaction with peers in comparison to face-to face learning, poor motivation, unsuccessful management of time schedules, and lack of individual learning abilities (Singh et al., 2021). In Post-COVID times educators and learners are forced to adopt web-assisted learning. Web-assisted ways of e-learning use internet, websites, telecommunication, radio, video recording etc. for performing different activities like delivering lectures, providing study materials, assignments.

Classroom dynamics and social activities which are essential parts of face-to-face regular learning encourage learning engagement that results in successful, productive and meaningful learning with better results (Bali & Liu, 2018). Students' perception of hybrid learning in secondary education tend to be greatly influenced by factors like age, gender, learners' computer knowledge and technology tolerance, patterns of learning, lack of awareness, interest, personal touch, and interaction due to connectivity issues.

The levels of Student Achievement in the Post Covid-19

Several studies have found that the COVID-19 pandemic has had a negative impact on student achievement. A study by Kuhfeld et al. (2020) found that students experienced significant learning loss in reading and math as a result of school closures and the transition to remote learning. The pandemic has also widened achievement gaps between students from different socioeconomic backgrounds. A study by McKinsey & Company (2020) found that students from low-income families and students of color experienced greater learning loss than their peers.

The impact of COVID-19 on student achievement has varied widely depending on a variety of factors, including students' access to technology and resources, the quality of remote instruction, and the level of family support. A study by Engzell et al. (2021) found that the impact of school closures on student achievement was mitigated in countries where students had greater access to technology and where remote learning was of higher quality.

The pandemic has also highlighted the importance of social-emotional support for students, particularly those who have experienced trauma or significant stress. A study by Park et al. (2021) found that students who received social-emotional support during the pandemic were more likely to have positive attitudes towards learning and to experience less stress. Despite the challenges posed by the pandemic, there have also been opportunities for innovation in education. Many schools and teachers have developed new strategies for remote and hybrid learning that may have lasting benefits beyond the pandemic. Although school closures are considered to be one of the most efficient interventions to curb the spread of the virus (Viner et al., 2020), many educators and researchers raised concerns about the effects of COVID-19-related school closures on student academic achievement and learning inequalities.

The negative effects of school closures due to summer vacation or natural disasters, and of absenteeism on student achievement are already well documented in the literature. Less is known, however, about the impact of COVID-19-related school closures on student achievement. The primary focus of the literature on COVID-19-related school closures to date was on the reception and use of digital learning technologies and remote learning. The psychological impact of COVID19-related school closures, the use of school counseling in connection with COVID-19 (Haleemunnissa et al., 2021).

In considering the emerging findings on the impact of COVID-19 on academic achievement, it is important to remain cautious about an overemphasis on learning loss (Whitley et al., 2021). Learning loss have permeated news media, policy briefs, opinion pieces, and research. Learning loss is typically defined as the discrepancy between the assessed academic skills and knowledge of students and grade-level curricular expectations and (or) gaps between the academic performance of some groups of students compared to others.

The notion that learning is lost suggests that it is unlikely to be recouped (Garbe et al., 2020). However, most skills, competencies, and knowledge related to reading and mathematics, the arts, history, and social studies can be engaged with successfully at any point in an individuals' lifespan, albeit potentially requiring greater intensity and personalization of instruction and practice.

The relationship between hybrid learning and student achievement in the post Covid-19

The pandemic resulted in widespread school closures, which had a significant impact on student learning. Hybrid learning has been suggested as a potential solution to mitigate the impact of school closures by providing students with access to remote instruction and online resources. A study by Huang et al. (2020) found that schools that adopted hybrid learning during

the pandemic were able to maintain student engagement and improve student achievement compared to schools that relied solely on traditional face-to-face instruction or fully online learning.

While hybrid learning has the potential to improve student achievement, the quality of the hybrid model is important. A study by Engzell et al. (2021) found that the impact of school closures on student achievement was mitigated in countries where remote learning was of higher quality. Schools that are able to provide high-quality remote instruction and support for students are more likely to see positive outcomes from hybrid learning. There are also challenges and limitations to the implementation of hybrid learning. For example, some students may not have access to reliable internet or technology, which can limit their ability to participate in online learning. Additionally, hybrid learning may require additional resources and training for teachers, which can be difficult for some schools to acquire.

Related to autonomous learning, many studies have been performed regarding the concept of self-regulated learning (SRL) (Saks & Leijen, 2014), in which students are active and responsible for their own learning process as well as being knowledgeable, self-aware and able to select their own approach to learning. SRL significantly affected students' achievement and learning performance. Students with strongly developed SRL skills were more likely to be successful both in classrooms and hybrid learning.

Family choice, digital access, and academic achievement have been closely intertwined with race and social class (Fan & Wolters, 2014). For instance, students belonging to minoritized groups often have lower achievement in school as evidenced by test scores and graduation rates that are less than those of their White counterparts due at least in part to structural inequities in society. Further, recent studies of virtual learning have shown differences by student and

classroom characteristics, with educational inequities often appearing even more salient when examining the use of technology in education due to differential access to and experiences within the instructional environment.

Students belonging to marginalized groups were more likely to attend schools that remained fully virtual during the COVID-19 pandemic; these schools reported lower rates of curriculum coverage and instructional time nationally (Page et al., 2021). Further, early in the COVID-19 pandemic, the Los Angeles Unified School District found lower engagement among students identified as low-income, belonging to minoritized groups, English language learners (ELL) and students receiving special education services (SPED) (Besecker and Thomas 2020). Similarly, over half of all middle school students across six Tennessee districts reported challenges with motivation during fall 2020, with students identified as ELL and SPED reporting less frequent engagement in virtual learning.

Chapter Three

Methodology

Introduction

This chapter presents the research methods that were employed in the study. The chapter constitutes the following: research design, areas of study, research approaches, population and sample size, sampling strategy, data collection procedure, data collection instrument, data analysis, validity and reliability of instruments, data quality control, ethical considerations and limitations.

Research Design

In this study, the descriptive cross-sectional survey design was employed to collect data from head teachers, teachers, and students. According to Brady (2008), a cross-sectional design is where data is collected based on what was going on at the particular point adopted. A cross-sectional design enabled researcher to collected data and make interpretations about a population of interest at one point in time. The descriptive cross-sectional survey was used because it enabled the researcher to gather views from different respondents in a short time at one point in time. The research used both quantitative and qualitative approaches during data collection and analysis. The use of two approaches provided reliable and valid results.

Study Population

The study population was the subset of the target population available for study. In this study, the population included head teachers, teachers, and students, both males and females. Head teachers participated in the study because they were implementers of hybrid learning and contributors to student achievement. Teachers participated in the study because they were

responsible for students' achievement. Students participated in the study because they were the primary beneficiaries.

Target population

The target population referred to the subset of the entire study population from which the study collected data. The target population is the group of individuals that the intervention intended to conduct research in and draw conclusions from. Therefore, this study targeted head teachers, teachers, and students. These categories of people enabled the researcher to obtain reliable and valid data for the study.

Sample Size

The study targeted 399 people out of 5000, comprising 6 head teachers, 351 students, and 42 teachers from 6 secondary schools. This sample size of 399 respondents was considered large enough to represent the target population. The researcher carefully selected a specific number of elements from an accessible population to be representative of the entire population concerning salient characteristics. The researcher used Krejcie and Morgan's (1970) table to determine the sample size for the study (Table 3.2).

Table 3. 1: Showing target population and sample size

Category of respondent	Target Population	Sample size	Sampling technique
Head teachers (Government Aided schools)	6	6	Purposive Sampling
Teachers	120	42	Simple random and stratified
Students	4,874	351	Simple random and stratified
Total	5,000	399	

Sampling Techniques

Selection of teachers and students: The study used a simple random sampling technique to select 7 teachers from each school and 59 students from each school. Initially, the researcher employed stratified sampling to ensure an equal number of teachers and students were selected by gender. Later, simple random sampling was applied to eliminate bias. Under the simple random sampling technique, the Rota method was used, involving a blindfold. Names of the respondents were written on papers, folded, and then coiled; whoever was picked was included in the study. Simple random sampling was chosen because it ensures that every member of the population has an equal chance of being selected, thereby enhancing the representativeness of the sample and reducing bias. The use of the Rota method added an additional layer of randomness in the selection process, contributing to the impartiality of the sample. This approach aimed to increase the generalizability of the findings to the larger population. The selection of head teachers followed a similar procedure.

Selection of head teachers: Purposive sampling technique was used to select head teachers from each of the 6 secondary schools because they were the ones in a position to provide real information, which supplemented information from other respondents. This approach helped the researcher obtain the required information in line with the objectives of the study. Purposive sampling assisted the researcher in maximizing the utility of a small population of interest and yielded valuable research outcomes. The choice of purposive sampling was made due to its cost-effectiveness and efficiency in resource utilization, especially when dealing with small or hard-to-reach populations. By selecting individuals based on specific criteria, researchers were able to concentrate their efforts on individuals most likely to offer valuable data.

Data Collection Methods

Questionnaire: The questionnaire was a data collection method employed in the research to gather information from participants. It served as a self-report instrument comprising a series of questions on a specific topic, with respondents required to provide answers. The questionnaire could be administered in either printed or electronic format and completed in person or online. The decision to use a questionnaire was based on its efficiency in quickly producing results, as highlighted by Amin (2005). This method was applied to both students and teachers.

Interview: The interview served as a data collection method utilized in the research to directly gather information from participants. It involved a conversation between the researcher and the participant, conducted in person, by phone, or via video conferencing. Interviews were specifically employed with head teachers as they possessed detailed information that supplemented data from other respondents. This method was chosen because interviews can yield rich, detailed information, aiding researchers in comprehending the experiences and perspectives of the participants.

Documentary Checklist: The documentary data collection method was a research technique employed to gather information from existing documents, including books, newspapers, government reports, academic publications, and other written or visual sources. The process involved several steps, such as identifying relevant sources, accessing and obtaining the documents, reviewing and analyzing the content, and interpreting and presenting the findings. This method was considered less costly and time-consuming than other data collection methods, as the documents were already available for analysis. The documentary method was utilized to collect data about UCE results before and after the COVID-19 outbreak.

Research Instruments

The following research instruments were used to collect data. / tools

Questionnaire: Both closed and open-ended questionnaires were administered to teachers and students due to their ease of reading and interpretation. The questionnaire was designed to be self-administered, providing the advantage of allowing respondents to complete it at their convenience. Additionally, the use of questionnaires was preferred for their time-saving benefits, as it required minimal time to move from one respondent to another during the data collection process.

Interview Guide: Interview guides were used to collect data from head teachers because they provided detailed information concerning hybrid learning and student achievement in the post-COVID-19 period in secondary schools of Sheema Municipality. This information supplemented data from other respondents. The interview guide was selected as it enabled the researcher to generate first-hand and reliable data, allowing respondents to provide immediate feedback. This approach aimed to gain in-depth information beyond what was obtained from teachers and students.

Documentary Checklist: The documentary checklist served as a data collection method used to gather information from documents, including reports, articles, books, and other written materials. It was chosen to provide detailed information about a specific topic or issue, particularly when primary data collection was difficult or impossible. This method was also considered less costly and time-consuming than other data collection methods, as the documents were already available for analysis. The documentary method was applied to collect data about UCE results before and after the COVID-19 outbreak.

Research Procedure

A ethical letter was obtained from the Research Ethics Committee of Bishop Stuart University with No: BSU-REC-2023-211. This letter was presented to the District Education Officer to secure permission to conduct the study in the sampled schools. The DEO granted permission for the researcher to collect data from the selected schools. Participants were required to sign a consent form, affirming their willingness to participate in the study. Confidentiality was maintained throughout the entire research process. The researcher personally administered the instruments to the respondents, explaining the purpose of the instruments. Subsequently, the respondents filled in the questionnaires. The researcher then collected the instruments from the respondents, preparing them for data processing and analysis.

Data Quality Control

Reliability of Research Instruments: Reliability was the measure of the degree to which a research instrument yielded consistent results or data after repeated trials. The reliability of the instrument was expressed as a correlation coefficient, typically presented in the form of a Pearson product-moment correlation coefficient. Ideally, the reliability coefficient should have been 0.7 and above for the instrument to be considered reliable. Two forms of instruments designed to measure the same variable were administered consecutively to the same group or individuals. The obtained scores from the two administrations were correlated using the Pearson's Product Moment Correlation Coefficient. The reliability of each result was a coefficient of equivalence. After the two tests, the Pearson's Product Moment Correlation Coefficient was computed. The Pearson's product moment correlation coefficient of 0.82 was obtained therefore the research instruments

were reliable, because according to Mugenda & Mugenda (1999), a correlation coefficient of 0.7 or above was considered appropriate and hence reliable for collecting data.

Validity of Research Instruments: Validity was considered to be the degree to which the tool measured what it intended to measure. In this case, validity was equivalent to accuracy. It was determined using content-related evidence of validity. A list of objectives, which guided the construction of the instrument, and a separate list of items designed specifically to answer the research questions were provided to two knowledgeable persons in the area of content. These knowledgeable persons were independently asked to conduct a thorough inspection of the items. The researcher computed the level of agreement on the items between the two knowledgeable persons as the inter-rater agreement, computing the Content Validity Index (CVI).

$$CVI = \frac{\text{Number of items rated quite relevant and very relevant}}{\text{Total number of items in the questionnaire}}$$

Therefore Content Validity Index was given as;

$$CVI = 55/58$$

= 0.9. This shows that the instruments were Validity, since a Content Validity Index of 0.7 and above according to Amin (2005) qualifies the instrument to be used to determine the validity of the questionnaire.

Data Analysis

Qualitative Data Analysis: In the qualitative data analysis for objectives one and two, the researcher focused on the responses obtained from the respondents. The data was examined and organized based on common themes or patterns that emerged from the participants' answers. The information collected from respondents, such as their opinions, experiences, or narratives, was carefully reviewed and described. Similar responses were grouped together to form

categories or themes. This step helped to identify commonalities and variations within the data. The categorized data was organized according to the research objectives. Themes or patterns that reflected the research goals were identified and highlighted. The purpose of this approach was to gain a deeper understanding of the qualitative data by extracting meaningful insights, trends, and perspectives. The process enabled the researcher to draw valid inferences and interpretations from the qualitative data, enhancing the overall conclusions of the study. The framework from Hsieh and Shannon (2005) guided this approach.

Quantitative Data Analysis: In quantitative data analysis for objective three, the focus was on numerical data, involving statistical procedures to quantify relationships and patterns. The analysis comprised two levels: Under univariate level, the data was analyzed individually. This included calculating percentages, frequencies, and mean scores from the collected data. Frequency tables with percentages provided a clear overview of the distribution of responses for each variable. Under bivariate level, the quantitative involved examining relationships between variables. The findings under dependent variable (DV) were correlated with findings under independent variables (IVs) to determine if there were any significant associations or patterns. The data analysis for the quantitative part was performed using the Statistical Package for the Social Sciences (SPSS) version 22.0. SPSS is a software tool for statistical analysis, providing various functions to process and analyze numerical data. By employing both qualitative and quantitative data analysis techniques, the researcher aimed to comprehensively explore the research questions, provide a multi-faceted understanding of the study's subject, and derive robust conclusions from the collected data.

Ethical considerations

The most essential ethical issues that needed to be clearly and thoroughly addressed in this study comprised approval from Bishop Stuart University REC, informed consent, privacy and confidentiality, anonymity, and the researcher's responsibility. In respect to consent, the study was conducted in a humane manner, and all participants were treated with dignity and due respect. The researcher sought approval from Bishop Stuart University Research Ethics Committee before collecting data from the field.

The researcher permitted sufficient time to explain to the respondents the objectives and purpose of the study, and how the data collected would be used, along with what would be expected of them in the study. The researcher also ensured that the respondents had a proper understanding of the various items in the research questionnaires with the aid of some of the teachers selected in the schools.

Concerning privacy, confidentiality, and anonymity, participants were assured that their identities or names would remain confidential and a secret. In other words, their names would never be released or published in any manner, and the information collected from the participants would not violate their private lives.

Regarding competence, honesty, and reporting feedback, the researcher avoided using biased language in any form because it was unethical to invent or bend findings in any way or for any purpose. The competence of the researcher was guaranteed by their knowledge and skills in providing valid and reliable feedback. Lastly, no harm was done to the participants in this study except for the time they volunteered for the study.

Community engagement plan

The preceding community engagement plan encompassed forging collaborations with local organizations, facilitating workshops and guest lectures, crafting collaborative projects aligned with community challenges, arranging virtual field trips to nearby sites of interest, and extending invitations to community members for participation in school events. All of these efforts were made with the goal of embedding students' learning within practical contexts, nurturing their sense of societal duty, and enhancing their educational journey through impactful community involvement.

Dissemination of results

Results were published on international educational journals and engagement with local educational bodies aimed to facilitate wider adoption of effective hybrid learning practices.

Covid-19 and Ebola risk mitigation plan

The research plan adhered strictly to all anticipated public health guidelines. This included regular sanitization of research materials and equipment, mandatory mask-wearing, and physical distancing during data collection. Hand hygiene facilities were readily available, and the research team stayed informed about local health advisories, adapting protocols as needed.

Chapter Four

Data Presentation, Analysis and Interpretation

Introduction

This chapter presents data from field, analysis and interpretation of findings for study about hybrid learning and student achievement pre and post COVID-19 Pandemic in Secondary Schools of Sheema Municipality, Sheema District.

Table 4.1: Response Rate

Respondents	Sample size	Returned/responded	Response Rate
Headteachers	6	6	100%
Teachers	2	40	95.2%
Students	351	310	88.3%
Total	399	356	89.2%

The response rate for headteachers is 100%, indicating that all headteachers in the sample responded. For teachers, the response rate is 95.2%, suggesting a high level of participation from this group. Students had a response rate of 88.3%, indicating a relatively good level of engagement. The overall response rate for all groups combined was 89.2%.

Table 4.2: Background Characteristics

Respondents	Frequency (f)	Percentage (%)
Gender		
Male	213	59.8
Female	143	40.2
Age in years		
Below 18 years	310	87.1
18-30 years	45	3.7
31-40 years	18	4.2
41-50years	16	3.9
Above 50 years	10	1.1
Highest level of education		
Secondary school	310	87.1
Bachelor's Degree	38	10.7
Postgraduate	8	2.2

The results reveal that, among the total respondents, 213 (59.8%) were male, while 143 (40.2%) were female. This indicates a higher representation of males in the sample population. The distribution of respondents across different age groups is as follows: Below 18 years: 310 (87.1%), 18-30 years: 45 (3.7%), 31-40 years: 18 (4.2%), 41-50 years: 16 (3.9%), Above 50 years: 10 (1.1%). This suggests that the majority of respondents were below 18 years old, with a smaller representation from older age groups. The distribution of respondents based on their highest level of education is as follows: Secondary school: 310 (87.1%), Bachelor's Degree: 38 (10.7%), Postgraduate: 8 (2.2%). This indicates that a significant majority of respondents had completed secondary school education, with a smaller proportion having attained higher education qualifications.

The extent to which hybrid learning has been adopted in secondary schools Pre and Post COVID-19 Pandemic in secondary Schools of Sheema Municipality, Sheema District

This section presents data in relation to Objective One, which stated as “to assess the extent to which hybrid learning has been adopted in secondary schools Pre and Post COVID-19 Pandemic in secondary Schools of Sheema Municipality, Sheema District” The findings are presented using qualitative methods;

The study findings showed that schools have implemented a robust hybrid learning model that seamlessly integrates online platforms such as Google Classroom and Zoom with in-person classes for practical subjects. This approach, supported by a learning management system, enables students to access course materials, submit assignments, and engage in discussions. Through a blended approach, we offer recorded video lessons for self-paced learning, coupled with face-to-face sessions for interactive discussions and collaborative activities. The school's commitment to continuity of learning is evident in the alternating schedule, allowing students to participate in both physical and virtual classes. These findings were supported by the following responses;-

One of the headteachers noted that:

“We utilize online platforms such as Google Classroom and Zoom for virtual lessons, while also conducting in-person classes for practical subjects like science experiments and art projects. Our school has integrated a learning management system where students can access course materials, submit assignments, and engage in discussions. Additionally, teachers use video conferencing tools for live lectures and tutorials.”

One of teachers revealed that;

“The school employs a blended approach by providing recorded video lessons for students to review at their own pace, complemented by face-to-face sessions for interactive discussions and group activities. Hybrid learning in our school involves the use of educational software for self-paced learning, combined with traditional classroom instruction to ensure comprehensive understanding of the curriculum”

Another Headteacher said that

“We have established a system where students attend classes on alternate days, with one group participating in physical classes while the other accesses virtual lessons through online platforms, ensuring continuity of learning for all students. The school has implemented a flipped classroom model, where students engage with instructional materials independently through digital resources before attending in-person sessions focused on collaborative projects and problem-solving activities”.

Another teacher noted that

“Approach to hybrid learning includes providing access to digital libraries and resources for research and self-study, along with scheduled face-to-face sessions for practical demonstrations and hands-on learning experiences. Teachers create interactive

multimedia presentations and simulations to deliver content online, followed by in-person workshops and laboratory sessions to reinforce theoretical concepts with practical applications.”

Another respondent revealed that

“We have adopted a flexible schedule that combines online tutorials, live streaming of classroom activities, and traditional teaching methods to cater to diverse learning preferences and ensure student engagement. The school has established communication channels such as email, discussion forums, and instant messaging platforms to facilitate continuous interaction between teachers and students, complementing traditional classroom interactions with virtual communication.”

The study findings revealed experiences with hybrid learning in several challenges that impacted both students and teachers. A notable hurdle was the limited access to technology for some students, hindering their participation in online classes due to a lack of devices or stable internet connections. Managing the blended learning environment proved challenging for teachers, who struggled to balance in-person and online instruction while monitoring student progress and engagement. Students faced difficulties in time management, juggling both types of classes, and coping with varying workloads. Issues with internet connectivity, particularly in rural areas, further exacerbated the challenges. These findings are supported by the following responses from respondents.

One of the respondents noted that;

“we faced was the lack of access to technology for some students. Some of them didn’t have devices or a stable internet connection, making it difficult for them to participate in online classes. Another challenge was the difficulty in managing the blended learning environment. It was hard for teachers to balance teaching both in-person and online students simultaneously, and also to monitor their progress and engagement.”

Another respondent revealed that;

“The students struggled with time management, as they had to juggle both in-person and online classes, and sometimes it was hard for them to keep up with the workload. We also faced issues with the quality of internet connectivity, especially in rural areas. This made it difficult for some students to attend online classes or submit their assignments on time.”

Another respondent noted that;

“In terms of resources, it was challenging for teachers to find and create engaging online content that would cater to the diverse needs of both in-person and online students. There is also a challenge of lack of proper training for teachers on how to use digital tools and platforms effectively, which made it difficult for them to adapt to the hybrid learning environment.”

One of the headteachers revealed that

“We faced some technical issues, such as students facing difficulty in accessing the online platforms, and some platforms not being user-friendly, which affected the learning experience. Parental involvement was another challenge. It was difficult for parents to monitor and support their children’s learning, especially when it came to online classes and assignments.”

Another the Headteacher noted that

“There was a lack of collaboration among teachers, which made it difficult to develop a cohesive hybrid learning strategy. Some students struggled with the social aspect of hybrid learning, as they missed out on face-to-face interactions with their peers, which affected their overall well-being and engagement in the learning process.”

The above study findings imply that there is a significant shift towards a robust hybrid learning model. The integration of online platforms such as Google Classroom and Zoom with in-person classes, supported by a learning management system, showcases a commitment to continuity of learning. The alternating schedule and blended approach, incorporating recorded video lessons and face-to-face sessions, contribute to a comprehensive learning experience. However, the study identifies critical challenges, including limited technology access for some students, issues with time management, and internet connectivity problems, especially in rural areas.

The levels of Student Achievement in the Post Covid-19 in Sheema Municipality

This section presents data in relation to objective two, which stated as “to assess the level of students’ achievement during pre and Post Covid-19 in Sheema Municipality” The findings are presented using qualitative methods;

The study findings found that the overall academic performance of students was commendable, with a majority achieving high grades in their exams. The heightened level of competition among students fostered a culture of hard work and excellence, despite facing challenges such as resource shortages and inadequate infrastructure. Active participation in extracurricular activities played a significant role in skill development and academic improvement. These findings are supported by the following responses;

One of the teachers noted that; *“The students were generally performing well, with many achieving high grades in their exams. Majority of the students were engaged in their studies and were putting in the necessary effort to succeed academically.”*

One of the headteachers said that

“The level of competition among the students was quite high, pushing them to work harder and strive for excellence. There were some challenges, such as a lack of resources and inadequate infrastructure, which affected the overall performance of the students. There was a strong sense of community among the students, which fostered a positive learning environment and encouraged academic success. Some students struggled with

mental health issues, which impacted their ability to focus and perform well academically”

Another respondents noted that

“The quality of teaching in some schools was not up to par, which affected the students’ understanding of the subject matter and their performance in exams. The local government provided some support to schools, such as funding for resources and infrastructure improvements, which positively impacted student performance.”

The relationship between hybrid learning and student achievement in the post Covid-19 in Sheema Municipality

This section provides data pertaining to Objective Three, which aims to determine the relationship between hybrid learning and students' achievement during the pre and post-COVID-19 period in Sheema Municipality. The findings are presented in tabular form to facilitate easy analysis and interpretation. Utilizing a five-point Likert scale, where 5=strongly agree, 4=agree, 3=undecided, 2=disagree, and 1=strongly disagree, mean scores were calculated by summing total responses and dividing by the total number of respondents. Mean scores above 3 indicate agreement with the statement, while mean scores below 3 indicate disagreement with the statement.

Table 4.3: Frequencies, percentages, and mean scores for the extent to which hybrid learning has been adopted in secondary schools

Statements	Strongly agree	Agree	Undecided	Disagree	Strongly disagree	Mean scores
The use of Zoom enhances students' engagement and participation in hybrid learning.	105 (30.0%)	182 (52.0%)	25 (7.1%)	21 (6.0%)	17 (4.9%)	3.96
Zoom effectively facilitates communication between teachers and students in the hybrid learning environment.	53 (15.1%)	252 (72.0%)	21 (6.0%)	14 (4.0%)	10 (2.9%)	3.93
Zoom provides a reliable platform for efficient and effective content delivery.	77 (22.0%)	231 (66.0%)	21 (6.0%)	14 (4.0%)	7 (2.0%)	4.02
Newspapers contribute to students' ability to retrieve relevant information for their studies in a hybrid learning setup.	63 (18.0%)	256 (73.1%)	18 (5.1%)	11 (3.1%)	2 (0.6%)	4.05
TV-based learning aids visual learners in better understanding and retaining educational content.	81 (23.1%)	224 (64.0%)	21 (6.0%)	14 (4.0%)	10 (2.9%)	4.01
TV-based lessons effectively capture students' attention and keep them engaged during hybrid learning sessions.	88 (25.1%)	185 (52.9%)	35 (10.0%)	28 (8.0%)	14 (4.0%)	3.87
Radio-based learning supports auditory learners in comprehending and retaining subject matter.	98 (28.0%)	200 (57.1%)	25 (7.1%)	18 (5.1%)	9 (2.6%)	4.03
Students' listening skills are enhanced when educational content is delivered through radio broadcasts.	94 (26.9%)	214 (61.1%)	21 (6.0%)	14 (4.0%)	7 (2.0%)	4.07

The hybrid learning approach, which includes Zoom, newspapers, TVs, and radios, enhances students' overall learning experience.	67 (19.1%)	256 (73.1%)	14 (4.0%)	11 (3.1%)	2 (0.6%)	4.07
The integration of various media platforms, such as Zoom, newspapers, TVs, and radios, contributes to effective hybrid learning in our government-aided secondary schools.	77 (22.0%)	224 (64.0%)	28 (8.0%)	14 (4.0%)	7 (2.0%)	4.00
Overall mean-score						4.00

The use of Zoom significantly enhances students' engagement and participation in hybrid learning, with 105 (30.0%) strongly agreeing and 185 (52.0%) agreeing. A mere 17 (4.9%) strongly disagree, resulting in a notable mean score of 3.96. This mean score indicates a predominant consensus among respondents affirming the positive impact of Zoom on hybrid learning dynamics. Similarly, Zoom proves to be effective in facilitating communication between teachers and students in the hybrid learning environment. A substantial 252 (72.0%) agree, and 53 (15.1%) strongly agree, leading to a commendable mean score of 3.93. This reinforces the notion that Zoom plays a pivotal role in fostering effective communication within the hybrid learning context.

Moreover, a significant majority of respondents, comprising 231 (66.0%) who agree and 77 (22.0%) who strongly agree, acknowledge Zoom as a reliable platform for efficient content delivery, reflected in the high mean score of 4.02. Turning to traditional media, respondents recognize the contribution of newspapers in aiding students' retrieval of relevant information in a hybrid learning setup. The mean score of 4.05, derived from 256 (73.1%) agreement and 63 (18.0%) strong agreement, highlights the perceived importance of newspapers in supporting students' studies.

TV-based learning is also well-regarded, particularly for visual learners, with 224 (64.0%) agreeing and 81 (23.1%) strongly agreeing. This positive sentiment is captured by a mean score of 4.01, indicating broad support for the effectiveness of TV-based educational content. Similarly, respondents acknowledge the attention-capturing potential of TV-based lessons, with 185 (52.9%) agreeing and 88 (25.1%) strongly agreeing, resulting in a mean score of 3.87.

For auditory learners, radio-based learning is seen as supportive, as 200 (57.1%) agree and 98 (28.0%) strongly agree, yielding a mean score of 4.03. This signifies a widespread belief in the effectiveness of radio-based learning for auditory comprehension. Furthermore, both the enhancement of students' listening skills through radio broadcasts and the overall effectiveness of a hybrid learning approach involving various media platforms garner significant agreement, with mean scores of 4.07.

When considering the contribution of various media platforms to effective hybrid learning, 224 (64.0%) agree and 77 (22.0%) strongly agree, resulting in a mean score of 4.00. The cumulative overall mean score of 4.00 for all statements underscores a consistent and high level of agreement among respondents regarding the adoption and effectiveness of hybrid learning approaches in secondary schools. This suggests strong support for the integration of radio-based learning and diverse media platforms in secondary school education.

Table 4 4: Frequencies, percentages, and mean scores for level of students' achievement

Statements	strongly agree	agree	undecided	disagree	strongly disagree	Mean scores
Students demonstrate satisfactory test scores in their assessments.	55 (15.7%)	200 (57.1%)	53 (15.1%)	28 (8.0%)	14 (4.0%)	3.73
Students consistently complete their homework and assignments.	73 (20.9%)	144 (41.1%)	70 (20.0%)	35 (10.0%)	28 (8.0%)	3.57
Students actively participate and engage in classroom activities.	66 (18.9%)	154 (44.0%)	63 (18.0%)	35 (10.0%)	32 (9.1%)	3.53
Students exhibit a strong mastery of the subject content.	80 (22.9%)	112 (32.0%)	77 (22.0%)	42 (12.0%)	39 (11.1%)	3.43
Students demonstrate commendable critical thinking skills in their learning.	73 (20.9%)	119 (34.0%)	70 (20.0%)	46 (13.1%)	42 (12.0%)	3.39
Students' performance on tests reflects a good understanding of the material.	52 (14.9%)	196 (56.0%)	49 (14.0%)	32 (9.1%)	21 (6.0%)	3.65
Students' assessments show positive growth and improvement over time.	62 (17.7%)	165 (47.1%)	60 (17.1%)	35 (10.0%)	28 (8.0%)	3.57
Students consistently attend classes and learning sessions.	65 (18.6%)	183 (52.3%)	63 (18.0%)	21 (6.0%)	18 (5.1%)	3.73
Students are actively involved and participate in class discussions and activities.	58 (16.6%)	203 (58.0%)	53 (15.1%)	21 (6.0%)	15 (4.3%)	3.77
Students in the post-COVID-19 era in Sheema Municipality have achieved commendable levels of academic success.	61 (17.4%)	193 (55.1%)	53 (15.1%)	25 (7.1%)	18 (5.1%)	3.73
Overall mean-score						3.61

Students demonstrate satisfactory test scores in their assessments, with 55 (15.7%) strongly agreeing and 53 (57.1%) agreeing. The collective agreement, as indicated by the mean score of 3.73, suggests a positive perception of students' performance in assessments among the majority of respondents. Regarding consistent completion of homework and assignments, 73 (20.9%) strongly agree and 144 (41.1%) agree. The results convey a positive perception that students consistently fulfill their homework obligations, supported by a mean score of 3.57.

In terms of active participation and engagement in classroom activities, 66 (18.9%) strongly agree, and 154 (44.0%) agree. Although the mean score of 3.53 is slightly lower compared to other criteria, it still signifies a positive perception that students actively participate in classroom activities. Concerning the mastery of subject content, 80 (22.9%) strongly agree, and 112 (32.0%) agree. The mean score of 3.43 suggests a general agreement that students exhibit a strong mastery of the subject, albeit relatively lower compared to some other criteria.

Regarding commendable critical thinking skills, 73 (20.9%) strongly agree, and 119 (34.0%) agree. The mean score of 3.39 indicates a positive perception regarding students' critical thinking skills, albeit slightly lower than other criteria. Students' performance on tests reflecting a good understanding of the material is affirmed by 52 (14.9%) strongly agreeing and 196 (56.0%) agreeing. The mean score of 3.65 suggests a positive perception of students' understanding demonstrated in their test performance.

In terms of assessments showing positive growth over time, 62 (17.7%) strongly agree, and 165 (47.1%) agree. The mean score of 3.57 indicates a positive perception that students' assessments exhibit growth and improvement over time. Concerning consistent attendance in classes and learning sessions, 65 (18.6%) strongly agree, and 183 (52.3%) agree. The mean score

of 3.73 reflects a positive perception that students consistently attend classes and learning sessions.

For active involvement in class discussions and activities, 58 (16.6%) strongly agree, and 203 (58.0%) agree. The mean score of 3.77 suggests a positive perception that students actively participate in class discussions and activities. Students in the post-COVID-19 era in Sheema Municipality achieving commendable levels of academic success are acknowledged by 61 (17.4%) strongly agreeing and 193 (55.1%) agreeing. The mean score of 3.73 indicates a positive perception of commendable academic success in the post-COVID-19 era.

The overall mean score of 3.61 across all criteria suggests a generally positive perception, emphasizing favorable views of students' achievement levels in the surveyed context. In summary, the survey results portray a positive perception of students' achievement levels, particularly emphasizing attendance, participation, and performance in assessments.

The relationship between hybrid learning and students' achievement pre and post Covid-19 pandemic in Sheema Municipality

To determine the correlation between hybrid learning and student achievement in the post-COVID-19 period in Sheema Municipality, the researcher conducted a Pearson coefficient correlation analysis. Mean scores from hybrid learning were then correlated with student achievement.

Table 4.5: Pearson coefficient correlation between hybrid learning and students' achievement pre and post Covid-19 pandemic in Sheema Municipality

		Hybrid learning	Student achievement
Hybrid learning	Pearson Correlation	1	0.971**
	Sig. (2-tailed)		0.000
	N	350	350
Student achievement	Pearson Correlation	0.971**	1
	Sig. (2-tailed)	0.000	
	N	350	350

**. Correlation is significant at the 0.01 level (2-tailed).

In the Sheema Municipality study, the Pearson Correlation between hybrid learning and student achievement was found to be 0.971 (sig. 2-tailed, $p < 0.001$). These correlation values indicate a significant positive relationship between hybrid learning and student achievement, suggesting that higher levels of hybrid learning are associated with students' achievement. Therefore the null hypothesis which stated that "There is no statistically significant relationship between hybrid learning and students' achievement during pre and post Covid-19 in Sheema Municipality." was reject.

These findings are consistent with responses from qualitative study. that is; the study findings showed that hybrid learning has exerted a positive and multifaceted influence on students' academic achievement. The flexibility inherent in hybrid learning allows for personalized learning experiences, catering to individual needs and learning styles, further contributing to positive outcomes. This is supported by the following responses;-

One of the respondents mentioned that

“Hybrid learning has positively influenced students’ achievement by enhancing their engagement with course materials through interactive online platforms and in-person discussions. The flexibility offered by hybrid learning has allowed students to engage in personalized learning experiences, catering to their individual needs and learning styles, ultimately contributing to improved academic performance.”

Another respondent noted that;

“The integration of technology in hybrid learning has equipped students with essential technological literacy skills, which are crucial for success in the digital age and have positively impacted their academic outcomes. Hybrid learning has expanded students’ access to a wide range of educational resources, including online libraries, multimedia materials, and virtual simulations, leading to enriched learning experiences and improved academic achievement.”

Another respondent noted that

“Through hybrid learning models, students have been able to participate in collaborative projects and discussions

both in person and virtually, fostering a sense of community and enhancing their overall academic performance. The flexibility offered by hybrid learning has empowered students to take greater control of their learning process, promoting autonomy and self-regulated learning behaviors that have positively impacted their academic achievement”

Another respondent revealed that

“Hybrid learning has allowed educators to adapt instructional strategies to accommodate diverse learning styles and preferences, leading to increased student engagement and improved academic outcomes across various student populations. The integration of real-world applications and simulations in hybrid learning environments has provided students with practical experiences that have translated into improved academic achievement and deeper understanding of course concepts.”

Another respondent showed that

“Hybrid learning has facilitated a continuous feedback loop between educators and students through online assessments, discussions, and interactive platforms,

enabling timely interventions that support student achievement. While hybrid learning offers numerous benefits, challenges related to technology integration have been reported by some respondents, impacting the overall effectiveness of this approach on students' achievement."

Additionally from qualitative findings, it was revealed that the consistency and predictability of student achievement before the adoption of hybrid learning have given way to a noticeable decline in performance. The comparison between the two periods underscores a significant difference, with students exhibiting higher engagement and academic success before the introduction of hybrid learning. The shift has adversely affected students' ability to grasp concepts effectively, leading to a decline in their overall academic performance. This supported by the following responses as given by respondents.

One of the respondents noted that

" The achievement of learners before the introduction of hybrid learning was more consistent and predictable. However, after the introduction of hybrid learning, there has been a noticeable decline in overall student achievement. Before the introduction of hybrid learning, student achievement was relatively higher as compared to after its introduction. The shift to hybrid learning has impacted the students' ability to grasp concepts effectively."

One of the respondents revealed that

“The comparison between the achievement of learners before and after the introduction of hybrid learning shows a significant difference. Before, students were more engaged and performed better academically. The achievement of learners before the introduction of hybrid learning was commendable. However, after its introduction, there has been a decline in the overall performance of students.”

Another Headteacher said that

“Before the introduction of hybrid learning, students seemed to grasp concepts more effectively and their academic performance was better. After its introduction, there has been a noticeable decrease in their achievement levels. The comparison between student achievement before and after the introduction of hybrid learning indicates a decline in performance. Students seem to struggle more with understanding concepts and applying them in their studies.”

Another respondent noted that

“Before the introduction of hybrid learning, students were achieving at a higher level compared to after its implementation. The shift to hybrid learning has affected

their overall academic performance negatively. The achievement of learners before the introduction of hybrid learning was notably higher than after its implementation. The transition to hybrid learning has impacted students' ability to excel academically.”

The above findings imply that the influence of hybrid learning on students' achievement is multilayered, encompassing aspects such as enhanced engagement, personalized learning experiences, technological literacy, improved access to resources, collaborative opportunities, flexibility and autonomy, adaptation to diverse learning styles, real-world application, continuous feedback loops, as well as challenges associated with technology integration.

Chapter Five

Discussion of Findings, Conclusions and Recommendations

Introduction

This chapter presents Discussion of Findings, Conclusions and Recommendations for study about Hybrid Learning and Student Achievement Pre and Post COVID-19 Pandemic in Secondary Schools of Sheema Municipality, Sheema District.

Discussion of findings

The findings were discussed according to objectives of the study;

The extent to which hybrid learning has been adopted in secondary schools Pre and Post COVID-19 Pandemic

The study revealed that schools incorporated online platforms such as Google Classroom and Zoom alongside traditional in-person classes. The blended approach employed recorded lessons, online platforms, and face-to-face sessions. The alternating schedule was implemented to guarantee continuity of learning for all students. These findings are in line with Dangwal, (2017) who found that Hybrid learning has experienced significant change due to the exponential growth of the internet and information technology. He further noted that new e-learning platforms are being developed for teachers to facilitate assessments and for learners to participate in lectures. Both assessment processes and self-evaluation have been proven to benefit from technological advancement. Even courses that solely offer online contents such as Massive Open Online Courses (MOOCs) have also become popular. The inclusion of e-Learning tools in higher education implies that a greater amount of information can be analyzed, improving teaching quality.

The finding further agree with Krasnova & Shurygin, (2020) who revealed that students registering in hybrid learning courses have been rising dramatically and this overall multiplying demand for online learning has been accelerated by various reasons which included cost effectiveness, the flexibility of time and place, opportunity to attend classes digitally, space for performing different wide and varied works of day to day lives of adults, a reduced amount of distraction in comparison to face-to-face learning.

From the researcher's perspective, the study unveils a noteworthy integration of hybrid learning in secondary schools both before and after the COVID-19 pandemic. The incorporation of online platforms such as Google Classroom and Zoom, coupled with traditional in-person classes. The researcher's view suggests that the adoption of hybrid learning not only responds to the challenges posed by the pandemic but also aligns with broader trends in education, offering diverse benefits such as enhanced teaching quality and flexibility for learners' daily lives.

The level of students' achievement during pre and Post Covid-19 Pandemic

The study finding showed a general positive perception of students' achievement levels. The survey results portray a positive perception of students' achievement levels, particularly emphasizing attendance, participation, and performance in assessments with an overall mean score of 3.61. These findings differ from a study by Kuhfeld et al. (2020) who found that students experienced significant learning loss in reading and math as a result of school closures and the transition to remote learning. The pandemic has also widened achievement gaps between students from different socioeconomic backgrounds. Similarly a study by McKinsey & Company (2020) found that students from low-income families and students of color experienced greater learning loss than their peers.

The findings also differ from Haleemunnissa et al., (2021) who found negative effects of school closures due to summer vacation or natural disasters, and of absenteeism on student achievement are already well documented in the literature. Less is known, however, about the impact of COVID-19-related school closures on student achievement. The primary focus of the literature on COVID-19-related school closures to date was on the reception and use of digital learning technologies and remote learning. The psychological impact of COVID19-related school closures, the use of school counseling in connection with COVID-19.

The researcher's perspective on the level of students' achievement during the pre- and post-COVID-19 pandemic suggests an overall positive perception, particularly emphasizing attendance, The researcher notes that the literature on COVID-19-related school closures has primarily focused on the reception and use of digital learning technologies and remote learning, leaving gaps in understanding the psychological impact and the role of school counseling in connection with COVID-19.

The relationship between hybrid learning and students' achievement during pre and post Covid-19 in Sheema Municipality

The study findings revealed a significant positive relationship between hybrid learning and student achievement, with a Pearson Correlation of 0.971 (sig. 2-tailed, $p < 0.001$). This finding suggests that higher levels of hybrid learning are associated with high student achievement. This is in line with findings by Huang et al. (2020) who found that schools that adopted hybrid learning during the pandemic were able to maintain student engagement and improve student achievement compared to schools that relied solely on traditional face-to-face instruction or fully online learning.

However, findings differ from Besecker and Thomas (2020) who found lower engagement among students identified as low-income, belonging to minoritized groups, English language learners (ELL) and students receiving special education services (SPED) (Besecker and Thomas 2020). Similarly, over half of all middle school students across six Tennessee districts reported challenges with motivation during fall 2020, with students identified as ELL and SPED reporting less frequent engagement in virtual learning.

Similarly, a study by Engzell et al. (2021) found that the impact of school closures on student achievement was mitigated in countries where remote learning was of higher quality. Schools that are able to provide high-quality remote instruction and support for students are more likely to see positive outcomes from hybrid learning. There are also challenges and limitations to the implementation of hybrid learning. For example, some students may not have access to reliable internet or technology, which can limit their ability to participate in online learning.

The researcher's perspective on the relationship between hybrid learning and students' achievement during the pre and post-COVID-19 periods in Sheema Municipality suggests a significant positive correlation. The researcher acknowledges challenges and limitations to hybrid learning implementation, including unequal access to reliable internet and technology, potentially hindering some students' participation in online learning.

Conclusions

In relation to objective one: It was concluded that online platforms like Google Classroom and Zoom with traditional classes, using recorded lessons and alternating schedules ensured continuous learning for all students, demonstrating adaptability and a commitment to evolving education methods.

In relation to objective two: It was also concluded that there was a generally positive perception of student achievement. Respondents expressed favorable views, with an average score of 3.61, emphasizing factors like attendance, participation, and performance in assessments.

In relation to objective three: It was further concluded that hybrid learning boosts student achievement. The strong statistical connection identified (Pearson Correlation 1.971, $p < 0.001$) suggests that schools should actively explore and implement hybrid learning strategies to maximize students' achievement.

Recommendations

The extent to which hybrid learning has been adopted in secondary schools Pre and Post COVID-19 Pandemic in secondary Schools

School administrators need to prioritize investing in technological infrastructure and resources to support hybrid learning models effectively. This includes providing devices and internet connectivity for students who lack access at home.

Teachers need to explore various instructional strategies that promote active learning and collaboration in an online environment. Furthermore, teachers should ensure equitable access to educational resources for all students, considering the diverse needs and circumstances of their learners.

Policy makers should prioritize the integration of hybrid learning into education policies and allocate sufficient funding to support schools in adopting this approach.

The level of students' achievement during pre and Post Covid-19 Pandemic in secondary Schools

School Administrators invest in modern infrastructure, including high-speed internet access, computers, and other necessary equipment to support online learning. This will ensure that students can access educational resources and participate in virtual classes effectively.

School Administrators offer training programs and workshops for teachers to develop their skills in delivering online education. This will enable educators to adapt their teaching methods to the virtual environment and effectively engage students.

The government should allocate sufficient funds for schools to invest in technology infrastructure, training programs for teachers, and educational resources that support online learning.

The relationship between hybrid learning and students' achievement during pre and post Covid-19 Pandemic in secondary Schools

The government should establish guidelines and standards for effective hybrid learning practices, ensuring equitable access to technology and addressing any potential barriers that may hinder its widespread adoption.

Parents should play a crucial role in supporting their children's learning during hybrid models. They should actively engage with their child's education, provide a conducive learning environment at home, and communicate regularly with teachers to monitor their child's progress.

Students should take responsibility for their own learning by actively participating in online activities, managing their time effectively, and seeking help when needed. Developing self-regulated learning skills will contribute to their success in hybrid learning environments.

Contribution to knowledge gap

This study demonstrated the adaptability of schools in Sheema Municipality to the COVID-19 pandemic by adopting flexible hybrid learning models that utilize readily available platforms such as Google Classroom and Zoom. The findings offer valuable guidance for schools in similar settings grappling with resource limitations. Additionally, by establishing a strong positive correlation between hybrid learning and student achievement, this study provides compelling evidence for the effectiveness of this model in resource-constrained settings. This discovery encourages further exploration of hybrid learning as a tool for enhancing academic outcomes in resource-limited areas.

Areas for further research

- Investigating the long-term impact of hybrid learning on student achievement and learning outcomes.
- Exploring the effective strategies for personalized learning and differentiated instruction within hybrid models.
- Analyzing the challenges and opportunities for developing digital literacy skills in students and teachers within hybrid learning contexts in resource-constrained settings.

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Appendices

Appendix 1: BSU-REC Approval Letter



BISHOP STUART UNIVERSITY
P.O. BOX 9, MBARARA

Tel: 0772 512551 Website: www.bsu.ac.ug
E-mail: rec@bsu.ac.ug / info@bsu.ac.ug

RESEARCH ETHICS COMMITTEE



To: Annet Asimwe

Bishop Stuart University
+256704321386

Type: Initial Review

Re: BSU-REC-2023-211: Hybrid Learning and Students' Achievement in secondary schools pre and post COVID-19 pandemic in secondary Schools of Sheema Municipality, Sheema District

I am pleased to inform you that at the 16 convened meeting on 14/09/2023, the Bishop Stuart University (BSU) REC meeting voted to approve the above referenced application.
Approval of the research is for the period of 23/11/2023 to 23/11/2024.

As Principal Investigator of the research, you are responsible for fulfilling the following requirements of approval:

1. All co-investigators must be kept informed of the status of the research.
2. Changes, amendments, and addenda to the protocol or the consent form must be submitted to the REC for re-review and approval **prior** to the activation of the changes.
3. Reports of unanticipated problems involving risks to participants or any new information which could change the risk benefit: ratio must be submitted to the REC.
4. Only approved consent forms are to be used in the enrollment of participants. All consent forms signed by participants and/or witnesses should be retained on file. The REC may conduct audits of all study records, and consent documentation may be part of such audits.
5. Continuing review application must be submitted to the REC **eight weeks** prior to the expiration date of 23/11/2024 in order to continue the study beyond the approved period. Failure to submit a continuing review application in a timely fashion may result in suspension or termination of the study.
6. The REC application number assigned to the research should be cited in any correspondence with the REC of record.
7. You are required to register the research protocol with the Uganda National Council for Science and Technology (UNCST) for final clearance to undertake the study in Uganda.

The following is the list of all documents approved in this application by Bishop Stuart University (BSU) REC:

No.	Document Title	Language	Version Number	Version Date
1	Assent form if applicable to your study	English	Version 4	2023-11-20
2	Assent form if applicable to your study	English	Version 4	2023-11-20
3	Protocol	English	Version 4	2023-11-20
4	Protocol	English	Version 4	2023-11-23
5	Compliance Report	English	Version 4	2023-11-20
6	Approval letter to BSU-REC	English	Version 1	2023-08-22
7	REC forms	English	Version 1	2023-08-23
8	Assent form if applicable to your study	English	Version 1	2023-08-22
9	Informed Consent forms	English	Version 1	2023-08-22
10	Data collection tools	English	Version 1	2023-08-22
11	Protocol	English	Version 1	2023-08-22

Yours Sincerely,

Godfrey Rukundo

For: Bishop Stuart University (BSU) REC



Appendix 2: Informed Consent Form



BISHOP STUART UNIVERSITY

RESEARCH ETHICS COMMITTEE

P.O. Box 09 Mbarara-Uganda Tel: +256 485-

433468 E-mail: rec@bsu.ac.ug

INFORMED CONSENT FORM

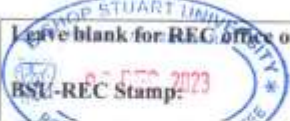
This document outlines the research study and expectations for potential participants. It should be written in lay man terms and typed on BSU-REC letterhead.

Instructions

1. The wording of this document should be directed to the potential participant not BSU- REC.
2. If a technical term must be used, then define it the first time it is used and any acronyms or abbreviations used should be spelled out the first time they are used.
3. All the sections of this document must be completed without any editing or deletions.
4. Please use a typing font that is easily distinguishable from the questions of this form. Preferably the font size should be 12.

Study title – Effectiveness of Hybrid Learning and Student Achievement in the Post Covid-19 in Secondary Schools of Sheema Municipality, Sheema District.

Principal: Investigator(s): Annet Asiimwe

<p>Leave blank for REC office only:</p> <p>BSU-REC Stamp: </p>	<p>REC OFFICE USE ONLY: APPROVAL</p> <p>DATE: 23-11-2023</p> <p>APPROVED CONSENT IRB VERSION NUMBER:</p> <p>BY NAME: A</p>
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Introduction

What you should know about this study:

1. You are being asked to join a research study.
2. This consent form explains the research study and your part in the study.
3. Please read it carefully and take as much time as you need.
4. You are a volunteer. You can choose not to take part and if you join, you may quit at any time. There will be no penalty if you decide to quit the study.

Brief background to the study

Hybrid learning, which combines traditional face-to-face instruction with online learning, has become increasingly popular in Uganda and around the world. However, there is a lack of research on the relationship between hybrid learning and student achievement in Uganda. This presents a problem as it is unclear whether hybrid learning is effective in improving student achievement in Uganda, which could have significant implications for the country's education system and the future success of its students (MOE, 2021).

Students' academic achievement is important as far as development of a nation is concerned. Students' achievement leads to positive outcomes after finishing studies (Essays, 2018). Recognizing the importance of students' achievement, the government of

Uganda put in efforts to improve performance of students by introducing / implementing Hybrid learning. Hybrid learning is a learning approach that combines both remote learning and in-person learning to improve student experience and ensure learning continuity. The Coronavirus disease (COVID-19) pandemic has forced educational institutions, including higher education institutions, to shift face-to-face learning to online (Bhamani et al., 2020). Students on hybrid learning are achieving better than those not on hybrid learning.

Despite this effort, academic achievement of the students remained poor (Sheema Municipal education Officer's Report, 2021). There is a lack of research on the relationship between hybrid learning and student achievement, which presents a problem in determining the effectiveness of hybrid learning in improving student achievement in Uganda. In addition, most teaching staff have not been exposed to use of a learning management system. However, if the problem of academic achievement is not addressed, the development of the nation will go down. Studies (e.g. Annisia 2020,

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Echaune, 2021; Kadondi, 2021) have analyzed hybrid learning and student achievement. However, these studies were done outside the context of Sheema District Uganda. This created a contextual gap making it necessary for this study to seek to determine whether student achievement in the post COVID-19 is related to Hybrid Learning

Purpose of the research project

Include a statement that the study involves research, estimated number of participants, an explanation of the purpose(s) of the research procedure and the expected duration of the subject's participation.

The purpose of the study is to assess the influence of hybrid learning on student achievement in the post covid-19 in government aided secondary schools of Sheema Municipality, Sheema District.

Why you are being asked to participate?

Explain why you have selected the individual to participate in the study.

You are invited to participate in this study because your perspective as a student in the secondary schools of Sheema Municipality, Sheema District is crucial in helping us understand the impact of hybrid learning after Covid-19.

Procedures

Provide a description of the procedures to be followed and identification of any procedures that are experimental, clinical etc. If there is need for storage of biological (body) specimens, explain

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why, and include a statement requesting for consent to store the specimens and state the duration of storage.

N/A

Risks or discomforts

Describe any reasonably foreseeable risks or discomforts-physical, psychological, social, legal or other associated with the procedure, and include information about their likelihood and seriousness. Discuss the procedures for protecting against or minimizing any potential risks to the subject. Discuss the risks in relation to the anticipated benefits to the subjects and to society.

Participating in this study poses minimal risks, including slight psychological discomfort and a potential breach of privacy. These risks are unlikely and not serious. Safeguards will be in place to ensure confidentiality, and participants can skip questions or withdraw without consequences.

Benefits

Describe any benefits to the subject or other benefits that may reasonably be expected from the research. If the subject is not likely to benefit personally from the experimental protocol note this in the statement of benefits.

Participating in this study offers participants the chance to contribute their experiences to the improvement of hybrid learning, potentially enhancing their own education. They will gain insights into their learning patterns.

Incentives or rewards for participating

It is assumed that there are no costs to subjects enrolled in research protocols. Any payments to be made to the participants will include token of appreciation (2000/= for water/Soda for refreshments) for time spent

Protecting data confidentiality

Provide a statement describing the extent, if any, to which confidentiality or records identifying the subjects will be maintained. If data is in form of tape recordings, photographs, movies or videotapes, researcher should describe period of time they will be retained before destruction. Showing or playing of such data must be disclosed, including instructional purposes.

Participant data confidentiality is a top priority. All collected information will be kept strictly confidential, with personal details replaced by codes.

Protecting subject privacy during data collection

Describe how the privacy of the participant will be ensured during the process of data collection.

Participant privacy will be upheld rigorously during data collection. All interactions will occur in private settings, and no personally identifiable information will be gathered. Unique codes will replace names in data records. Collected data will be securely stored in encrypted electronic databases or locked physical storage, accessible only to authorized team members.

Right to refuse or withdraw

Include a statement that participation is voluntary and that refusal to participate will involve no penalty or loss of benefits to which the subject is otherwise entitled.

Leave blank for REC office only:

BSU REC Stamp:



REC OFFICE USE ONLY: APPROVAL

DATE: 23-11-2023

APPROVED CONSENT IRB VERSION NUMBER:

PI NAME: ASIMUWE ARADET

IRB NO: BSU-REC-2023-211

Participation in this study is completely voluntary. You have the right to refuse to participate without facing any penalties or loss of benefits that you would otherwise be entitled to. If you choose to join the study and at any point decide to withdraw, you are free to do so without any consequences.

What happens if you leave the study?

Include a statement that the subject may discontinue participation at any time without penalty or loss of benefits.

You have the right to discontinue your participation in the study at any time, for any reason, without facing any penalties or loss of benefits. If you choose to withdraw, your decision will be fully respected, and no further data will be collected from you.

Who do I ask/call if I have questions or a problem?

Include contact for the researcher, and Chairperson, BSU-REC.

Ms. Annet Asimwe

Principal Investigator

Bishop Stuart University

Tel: +256 704 321386

Dr. Godfrey Zaari

Rukundo Chairman,

BSU-REC

P.O. Box 09

Mbarara Tel:

0772663671

<p>Leave blank for REC office only:</p> 	<p>REC OFFICE USE ONLY: APPROVAL</p> <p>DATE: 23-11-2023</p> <p>APPROVED CONSENT IRB VERSION NUMBER:</p> <p>PI NAME: Asimwe Annet</p> <p>IRB NO: BSU-REC-2023-211</p>
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What does your signature or thumbprint on this consent form mean? Your signature on this form means

- You have been informed about this study's purpose, procedures, possible benefits and risks
- You have been given the chance to ask questions before you sign
- You have voluntarily agreed to be in this study

Name of adult participant

Signature of participant or
Legally authorized
representative

Date

Name of person obtaining

Signature

consent

Date

Leave blank for REC office only:

BSU-REC Stamp:



REC OFFICE USE ONLY: APPROVAL

DATE: 23-11-2023

APPROVED CONSENT IRB VERSION NUMBER:

PI NAME: ASIMWE AMET

IRB NO: BSU-REC-2023-211

____ Print Name of witness

____ Signature or thumbprint or mark

____ Date

<p>Leave blank for REC office only:</p>  <p>BSU-REC Stamp: 11-11-2023</p>	<p>REC OFFICE USE ONLY: APPROVAL DATE: 23-11-2023 APPROVED CONSENT IRB VERSION NUMBER: PI NAME: ASUMWOC ARESET IRB NO: BSU-REC-2023-211</p>
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Appendix 3: Assent Form



BISHOP STUART UNIVERSITY

RESEARCH ETHICS COMMITTEE

P.O. Box 09 Mbarara-Uganda Tel: +256 485433468 Email:

rec@bsu.ac.ug

ASSENT FORM

This document outlines the research study and expectations for potential participants. It should be written in lay man terms and typed on BSU-REC letterhead.

Instructions

1. The wording of this document should be directed to the potential participant not BSU-REC.
2. If a technical term must be used, then define it the first time it is used and any acronyms or abbreviations used should be spelled out the first time they are used.
3. All the sections of this document must be completed without any editing or deletions.
4. Please use a typing font that is easily distinguishable from the questions of this form. Preferably the font size should be 12.

Study title –Hybrid Learning and Student Achievement in the Post Covid-19 in Secondary Schools of Sheema Municipality, Sheema District.

Principal Annet Asimwe

Introduction

What you should know about this study:

1. You are being asked to join a research study.
2. This Assent form explains the research study and your part in the study.
3. Please read it carefully and take as much time as you need.
4. You are a volunteer. You can choose not to take part and if you join, you may quit at any time. There will be no penalty if you decide to quit the study.

<p>Leave blank for</p> <p>BSU BISHOP STUART UNIVERSITY P.O BOX 09 MBARARA</p> <p>93 DEC 2023</p> <p>RESEARCH ETHICS COMMITTEE</p>	<p>REC OFFICE USE ONLY:</p> <p>APPROVAL DATE: 23-11-2023</p> <p>APPROVED ASSENT IRB VERSION NUMBER:</p> <p>PI NAME: ASIMWE ANNET</p> <p>IRB NO: BSU-REC-2023-211</p>
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Brief background to the study

Hybrid learning, which combines traditional face-to-face instruction with online learning, has become increasingly popular in Uganda and around the world. However, there is a lack of research on the relationship between hybrid learning and student achievement in Uganda. This presents a problem as it is unclear whether hybrid learning is effective in improving student achievement in Uganda, which could have significant implications for the country's education system and the future success of its students (MOE, 2021).

Students' academic achievement is important as far as development of a nation is concerned. Students' achievement leads to positive outcomes after finishing studies (Essays, 2018).

Recognizing the importance of students' achievement, the government of Uganda put in efforts to improve performance of students by introducing / implementing Hybrid learning. Hybrid learning is a learning approach that combines both remote learning and in-person learning to improve student experience and ensure learning continuity. The Coronavirus disease (COVID-19) pandemic has forced educational institutions, including higher education institutions, to shift face-to-face learning to online (Bhamani et al., 2020). Students on hybrid learning are achieving better than those not on hybrid learning.

Despite this effort, academic achievement of the students remained poor (Sheema Municipal education Officer's Report, 2021). There is a lack of research on the relationship between hybrid learning and student achievement, which presents a problem in determining the effectiveness of hybrid learning in improving student achievement in Uganda. In addition, most teaching staff have not been exposed to use of a learning management system. However, if the problem of academic achievement is not addressed, the development of the nation will go down. Studies (e.g. Annisia 2020, Echaune, 2021; Kadondi, 2021) have analyzed hybrid learning and student achievement. However, these studies were done outside the context of Sheema District Uganda. This created a contextual gap making it necessary for this study to seek to determine whether student achievement in the post COVID-19 is related to Hybrid Learning

Purpose of the research project

The purpose of the study is to assess the influence of hybrid learning on student achievement in the post covid-19 in government aided secondary schools of Sheema Municipality, Sheema District.

<p>Leave blank for</p> 	<p>REC OFFICE USE ONLY: APPROVAL DATE: 23-11-2023 APPROVED ASSENT IRB VERSION NUMBER: PI NAME: ASHIMWE Azezi IRB NO: BSW-REC-2023-211</p>
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Why you are being asked to participate?

You are invited to participate in this study because your perspective as a student in the secondary schools of Sheema Municipality, Sheema District is crucial in helping us understand the impact of hybrid learning after Covid-19.

Risks or discomforts

Participating in this study poses minimal risks, including slight psychological discomfort and a potential breach of privacy. These risks are unlikely and not serious. Safeguards will be in place to ensure confidentiality, and participants can skip questions or withdraw without consequences.

Benefits

Participating in this study offers participants the chance to contribute their experiences to the improvement of hybrid learning, potentially enhancing their own education. They will gain insights into their learning patterns.

Incentives or rewards for participating

It is assumed that there are no costs to subjects enrolled in research protocols. Any payments to be made to the participants will include token of appreciation (1,000/= for water/Soda for refreshments) for time spent

Protecting data confidentiality

Participant data confidentiality is a top priority. All collected information will be kept strictly confidential, with personal details replaced by codes.



REC OFFICE USE ONLY:

APPROVAL DATE: 23-11-2023

APPROVED ASSENT IRB VERSION NUMBER:

PI NAME: Asimwe Aswet

IRB NO: BSU - REC - 2023-21

Protecting subject privacy during data collection

Participant privacy will be upheld rigorously during data collection. All interactions will occur in private settings, and no personally identifiable information will be gathered. Unique codes will replace names in data records. Collected data will be securely stored in encrypted electronic databases or locked physical storage, accessible only to authorized team members.

Right to refuse or withdraw

Participation in this study is completely voluntary. You have the right to refuse to participate without facing any penalties or loss of benefits that you would otherwise be entitled to. If you choose to join the study and at any point decide to withdraw, you are free to do so without any consequences.

What happens if you leave the study?

You have the right to discontinue your participation in the study at any time, for any reason, without facing any penalties or loss of benefits. If you choose to withdraw, your decision will be fully respected, and no further data will be collected from you.

Who do I ask/call if I have questions or a problem?

Ms. Annet Asimwe
Principal Investigator
Bishop Stuart University
Tel: +256 704 321386

Dr. Godfrey Zaari
Rukundo Chairman, BSU-
REC
P.O. Box 09
Mbarara Tel:
0772663671

<p>Leave blank for</p> 	<p>REC OFFICE USE ONLY: APPROVAL DATE: 23-11-2023 APPROVED ASSENT IRB VERSION NUMBER: PI NAME: ASIMWE ANNET IRB NO: BSU-REC-2023-211</p>
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Statement of Consent

I have been informed about this study's purpose, procedures, possible benefits and risks I have been given the chance to ask all my questions and I have been given answers.
I have voluntarily agreed that my child takes part in this study.

Name of Parent

Signature of parent

Date

Print name of young participant

Signature of young participant

Date **Researcher's**

Signature

I have fully explained the research study described by this form. I have answered the participant and/or parent/guardians questions and will answer any future questions to the best of my ability. I will tell the family and/or the person taking part in this research of any changes in the procedures or in the possible harms/possible benefits of the study that may affect their health or their willingness to stay in the study.

Name of researcher

Signature

Date



REC OFFICE USE ONLY:

APPROVAL DATE: 23-11-2023
APPROVED ASSENT IRB VERSION NUMBER:
PI NAME: ASIMWA ARAAGI
IRB NO: BSJ-REC-2023

Appendix 4: Questionnaire for Teachers

Instructions: Tick the best alternative answer and fill in the spaces where necessary.

Section A: Background Characteristics

1. Gender

(1) Male ☐

(2) Female ☐

2. Age

(1) 30 years and below ☐

(2) 31-40 years ☐

(3) 41-50years ☐

(4) Above 50 years ☐

3. Highest level of education

(1) Diploma ☐

(2) Bachelor's Degree ☐

(3) Postgraduate ☐

(4) Others specify

4. Teaching Experience

(1) 1-2 years ☐

(2) 3-4 years\ ☐

(3) 5-6 years ☐

(4) Others specify

Section B: How hybrid learning was applied in government aided secondary schools in Sheema Municipality

5. Give channels of hybrid learning in this school.

.....

6. What could be the challenges met with applying hybrid learning in this school?

.....

Section C: To assess the levels of Student Achievement in the Post Covid-19 in Sheema Municipality.

7. Describe the performance of secondary school students before Covid-19 in Sheema Municipality.

.....

8. How do you compare the achievement of learners before introduction of hybrid learning and after?

.....

9. Please comment on the influence of hybrid learning on students' achievement?

.....

Section D: The relationship between hybrid learning and student achievement in the post Covid-19 in Sheema Municipality.

How do you rate the following items concerning the relationship between hybrid learning and student achievement in the post Covid-19 in Sheema Municipality. Where; 1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree

S/N	Hybrid learning	5	4	3	2	1
1	The use of Zoom enhances students' engagement and participation in hybrid learning.					
2	Zoom effectively facilitates communication between teachers and students in the hybrid learning environment.					
3	Zoom provides a reliable platform for efficient and effective content delivery.					
4	Newspapers contribute to students' ability to retrieve relevant information for their studies in a hybrid learning setup.					
5	TV-based learning aids visual learners in better understanding and retaining educational content.					
6	TV-based lessons effectively capture students' attention and keep them engaged during hybrid learning sessions.					
7	Radio-based learning supports auditory learners in comprehending and retaining subject matter.					
8	Students' listening skills are enhanced when educational content is delivered through radio broadcasts.					
9	The hybrid learning approach, which includes Zoom, newspapers, TVs, and radios, enhances students' overall learning experience.					
10	I believe that the integration of various media platforms, such as Zoom, newspapers, TVs, and radios, contributes to effective hybrid learning in our government-aided secondary schools.					

	Student achievement					
11	Students demonstrate satisfactory test scores in their assessments.					
12	Students consistently complete their homework and assignments.					
13	Students actively participate and engage in classroom activities.					
14	Students exhibit a strong mastery of the subject content.					
15	Students demonstrate commendable critical thinking skills in their learning.					
16	Students' performance on tests reflects a good understanding of the material.					
17	Students' assessments show positive growth and improvement over time.					
18	Students consistently attend classes and learning sessions.					
19	Students are actively involved and participate in class discussions and activities.					
20	Overall, I believe that students in the post-COVID-19 era in Sheema Municipality have achieved commendable levels of academic success.					

Thank You

Appendix 5: Questionnaire for Students

Instructions: Tick the best alternative answer and fill in the spaces where necessary.

Section A: Background Characteristics

1. Gender

(1) Male

☐

(3) Female

☐

2. Age

.....

3. Highest level of education

(1) S.1

☐

(2) S.2

☐

(3) S.3

☐

(4) S.4

☐

(5) S.5

☐

(6) S.6

☐

Section B: Hybrid learning methods applied in government aided secondary schools in

Sheema Municipality

(4) Give channels of hybrid learning in this school.

.....

.....

(5) What could be the challenges met with applying hybrid learning in your school?

.....

.....

Section C: To assess the levels of Student Achievement in the Post Covid-19 in Sheema Municipality.

(6) How do you compare your achievement before introduction of hybrid learning and after?

.....

(7) Please comment on the influence of hybrid learning on your achievement?

.....

Section D: The relationship between hybrid learning and student achievement in the post Covid-19 in Sheema Municipality.

How do you rate the following items concerning the relationship between hybrid learning and student achievement in the post Covid-19 in Sheema Municipality. Where 1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree.

S/N	Hybrid learning	5	4	3	2	1
1	The use of Zoom enhances my engagement and participation in hybrid learning.					
2	Zoom effectively facilitates communication between my teachers and me in the hybrid learning environment.					
3	I find Zoom to be a reliable platform for efficient and effective content delivery.					
4	Newspapers help me retrieve relevant information for my studies in a hybrid learning setup.					
5	TV-based learning helps me understand and retain educational content, especially as a visual learner.					
6	TV-based lessons effectively capture my attention and keep me engaged during hybrid learning sessions.					

7	Radio-based learning supports my understanding and retention of subject matter, especially as an auditory learner.					
8	My listening skills improve when educational content is delivered through radio broadcasts.					
9	The hybrid learning approach, which includes Zoom, newspapers, TVs, and radios, enhances my overall learning experience.					
10	I believe that integrating various media platforms, such as Zoom, newspapers, TVs, and radios, contributes to effective hybrid learning in our government-aided secondary schools.					
	Student achievement					
11	I believe I achieve satisfactory test scores in my assessments.					
12	I consistently complete my homework and assignments.					
13	I actively participate and engage in classroom activities.					
14	I feel confident in my mastery of the subject content.					
15	I think I exhibit commendable critical thinking skills in my learning.					
16	I believe my performance on tests reflects a good understanding of the material.					
17	I see positive growth and improvement in my assessments over time.					
18	I consistently attend classes and learning sessions.					
19	I am actively involved and participate in class discussions and activities.					
20	Overall, I believe that students in the post-COVID-19 era in Sheema Municipality have achieved commendable levels of academic success.					

Thank You

Appendix 6: Interview Guide for Head Teachers

1. How was hybrid learning implemented?
2. Give channels of hybrid learning in this school.
3. What could be the challenges met with applying hybrid learning in this school?
4. How do you compare the achievement of learners before introduction of hybrid learning and after?
5. In your one views, please comment on the influence of hybrid learning on students' achievement?
6. What should be done to promote hybrid learning and student achievement in the post covid-19 in secondary schools?

Appendix 7: Map of Uganda showing Sheema District

Appendix 8: Map of Sheema District



Appendix 9: Sampling table guide for determine sample size of known population

<i>N</i>	<i>S</i>	<i>N</i>	<i>S</i>	<i>N</i>	<i>S</i>
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	100000	384

Note.—*N* is population size. *S* is sample size.

Source: Krejcie & Morgan, 1970

Appendix 10: Summary of Raw Data

ID	IV	DV
1	3.96	3.88
2	4.00	3.77
3	4.02	3.79
4	4.05	3.91
5	4.03	3.77
6	3.87	3.64
7	4.03	3.80
8	4.02	3.79
9	4.01	3.78
10	4.00	3.77
11	4.02	3.79
12	4.07	3.84
13	4.01	3.78
14	4.02	3.75
15	4.01	3.65
16	4.01	3.78
17	4.07	3.71
18	3.87	3.64
19	4.07	3.78
20	3.87	3.64
21	3.87	3.64
22	4.01	3.78
23	4.07	3.78
24	3.93	3.70
25	4.02	3.79
26	4.07	3.84
27	3.96	3.73
28	4.00	3.77
29	4.02	3.79
30	4.05	3.82
31	4.03	3.80
32	3.87	3.64
33	4.03	3.80
34	4.02	3.79
35	4.01	3.78
36	4.00	3.77
37	4.02	3.79
38	4.07	3.84

39	4.01	3.78
40	4.02	3.79
41	4.01	3.78
42	4.01	3.78
43	4.07	3.84
44	3.87	3.64
45	4.07	3.84
46	3.87	3.64
47	3.87	3.64
48	4.01	3.78
49	4.07	3.84
50	3.93	3.70
51	4.02	3.79
52	4.07	3.84
53	3.87	3.64
54	4.01	3.78
55	4.07	3.84
56	3.93	3.70
57	4.02	3.79
58	4.07	3.84
59	3.96	3.73
60	4.00	3.77
61	4.02	3.79
62	4.05	3.82
63	4.03	3.80
64	3.87	3.64
65	4.03	3.80
66	4.02	3.79
67	4.01	3.78
68	4.00	3.77
69	4.02	3.79
70	4.07	3.84
71	4.01	3.78
72	4.02	3.79
73	4.01	3.78
74	4.01	3.78
75	4.07	3.84
76	4.07	3.84
77	4.01	3.78

78	4.01	3.78
79	4.02	3.79
80	3.96	3.73
81	4.00	3.77
82	4.02	3.79
83	4.05	3.82
84	4.03	3.80
85	3.87	3.64
86	4.03	3.80
87	4.02	3.79
88	4.01	3.78
89	4.00	3.77
90	4.02	3.79
91	4.07	3.84
92	4.01	3.78
93	4.02	3.79
94	4.01	3.78
95	4.01	3.78
96	4.07	3.84
97	3.87	3.64
98	4.07	3.84
99	3.87	3.64
100	3.87	3.64
101	4.01	3.78
102	4.07	3.84
103	3.93	3.70
104	4.02	3.79
105	4.07	3.84
106	3.96	3.73
107	4.00	3.77
108	4.02	3.79
109	4.05	3.82
110	4.03	3.80
111	3.87	3.64
112	4.03	3.80
113	4.02	3.79
114	4.01	3.78
115	4.00	3.77
116	4.02	3.79

117	4.07	3.84
118	4.01	3.78
119	4.02	3.79
120	4.01	3.78
121	4.01	3.78
122	4.07	3.84
123	3.87	3.64
124	4.07	3.84
125	3.87	3.64
126	3.87	3.64
127	4.01	3.78
128	4.07	3.84
129	3.93	3.70
130	4.02	3.79
131	4.07	3.84
132	3.87	3.64
133	4.01	3.78
134	4.07	3.84
135	3.93	3.70
136	4.02	3.79
137	4.07	3.84
138	3.96	3.73
139	4.00	3.77
140	4.02	3.79
141	4.05	3.82
142	4.03	3.80
143	3.87	3.64
144	4.03	3.80
145	4.02	3.79
146	4.01	3.78
147	4.00	3.77
148	4.02	3.79
149	4.07	3.84
150	4.01	3.78
151	4.02	3.79
152	4.01	3.78
153	4.01	3.78
154	4.07	3.84
155	4.07	3.84
156	4.01	3.78
157	4.01	3.78

158	4.02	3.79
159	3.96	3.73
160	4.00	3.77
161	4.02	3.79
162	4.05	3.82
163	4.03	3.80
164	3.87	3.64
165	4.03	3.80
166	4.02	3.79
167	4.01	3.78
168	4.00	3.77
169	4.02	3.79
170	4.07	3.84
171	4.01	3.78
172	4.02	3.79
173	4.01	3.78
174	4.01	3.78
175	4.07	3.84
176	3.87	3.64
177	4.07	3.84
178	3.87	3.64
179	3.87	3.64
180	4.01	3.78
181	4.07	3.84
182	3.93	3.70
183	4.02	3.79
184	4.07	3.84
185	3.96	3.73
186	4.00	3.77
187	4.02	3.79
188	4.05	3.82
189	4.03	3.80
190	3.87	3.64
191	4.03	3.80
192	4.02	3.79
193	4.01	3.78
194	4.00	3.77
195	4.02	3.79
196	4.07	3.84
197	4.01	3.78
198	4.02	3.79

199	4.01	3.78
200	4.01	3.78
201	4.07	3.84
202	3.87	3.64
203	4.07	3.84
204	3.87	3.64
205	3.87	3.64
206	4.01	3.78
207	4.07	3.84
208	3.93	3.70
209	4.02	3.79
210	4.07	3.84
211	3.87	3.64
212	4.01	3.78
213	4.07	3.84
214	3.93	3.70
215	4.02	3.79
216	4.07	3.84
217	3.96	3.73
218	4.00	3.77
219	4.02	3.79
220	4.05	3.82
221	4.03	3.80
222	3.87	3.64
223	4.03	3.80
224	4.02	3.79
225	4.01	3.78
226	4.00	3.77
227	4.02	3.79
228	4.07	3.84
229	4.01	3.78
230	4.02	3.79
231	4.01	3.78
232	4.01	3.78
233	4.07	3.84
234	4.07	3.84
235	4.01	3.78
236	4.01	3.78
237	4.02	3.79
238	3.96	3.73
239	4.00	3.77

240	4.02	3.79
241	4.05	3.82
242	4.03	3.80
243	3.87	3.64
244	4.03	3.80
245	4.02	3.79
246	4.01	3.78
247	4.00	3.77
248	4.02	3.79
249	4.07	3.84
250	4.01	3.78
251	4.02	3.79
252	4.01	3.78
253	4.01	3.78
254	4.07	3.84
255	3.87	3.64
256	4.07	3.84
257	3.87	3.64
258	3.87	3.64
259	4.01	3.78
260	4.07	3.84
261	3.93	3.70
262	4.02	3.79
263	4.07	3.84
264	3.96	3.73
265	4.00	3.77
266	4.02	3.79
267	4.05	3.82
268	4.03	3.80
269	3.87	3.64
270	4.03	3.80
271	4.02	3.79
272	4.01	3.78
273	4.00	3.77
274	4.02	3.79
275	4.07	3.84
276	4.01	3.78

277	4.02	3.79
278	4.01	3.78
279	4.01	3.78
280	4.07	3.84
281	3.87	3.64
282	4.07	3.84
283	3.87	3.64
284	3.87	3.64
285	4.01	3.78
286	4.07	3.84
287	3.93	3.70
288	4.02	3.79
289	4.07	3.84
290	3.87	3.64
291	4.01	3.78
292	4.07	3.84
293	3.93	3.70
294	4.02	3.79
295	4.07	3.84
296	3.96	3.73
297	4.00	3.77
298	4.02	3.79
299	4.05	3.82
300	4.03	3.80
301	3.87	3.64
302	4.03	3.80
303	4.02	3.79
304	4.01	3.78
305	4.00	3.77
306	4.02	3.79
307	4.07	3.84
308	4.01	3.78
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310	4.01	3.78
311	4.01	3.78
312	4.07	3.84
313	4.07	3.84

314	4.01	3.78
315	4.01	3.78
316	4.02	3.79
317	4.02	3.79
318	4.07	3.84
319	4.01	3.78
320	4.02	3.79
321	4.01	3.78
322	4.01	3.78
323	4.07	3.84
324	3.87	3.64
325	4.07	3.84
326	3.88	3.65
327	3.87	3.64
328	4.01	3.78
329	4.07	3.84
330	3.93	3.70
331	4.02	3.79
332	4.07	3.84
333	3.96	3.73
334	4.00	3.77
335	4.02	3.79
336	4.05	3.82
337	4.03	3.80
338	3.87	3.64
339	4.03	3.80
340	4.02	3.79
341	4.01	3.78
342	4.00	3.77
343	4.02	3.79
344	4.07	3.84
345	4.01	3.78
346	4.02	3.79
347	4.01	3.78
348	4.01	3.78
349	4.07	3.84
350	3.87	3.64