ASSESSING THE IMPACT OF VIRTUAL LEARNING AND ONLINE TEACHING PLATFORMS ON ACADEMIC PERFORMANCE OF SENIOR SCHOOL STUDENTS TAKING INTERNATIONAL CURRICULUM: A CASE STUDY OF SHAH LALJI NANGPAR ACADEMY NAKURU

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A RESEARCH THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF ARTS IN COMMUNICATION STUDIES, UNIVERSITY OF NAIROBI
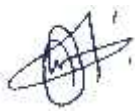
July 2022

DECLARATION

This research thesis is my original work and has not been presented for the award of a degree in any other institution of learning.

Signature …… ……………. Date 14TH NOVEMBER 2022

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This research thesis has been submitted for examination with my approval as the appointed university supervisor.

Signature   Date   14/11/2022

Dr. Isaac Mutwiri Mutunga

DEDICATION

This thesis is dedicated to my family for their incessant encouragement and reminder that I can achieve whatever I set my mind to, and that focus is the premise of all success.

ACKNOWLEDGMENT

I would like to express my gratitude to my supervisor Dr. Mutwiri for his role as my supervisor in this thesis and in the courses that he taught me. His guidance has been a sure blueprint that has provided the light necessary to complete this project.

Special thanks also go to all my lecturers at the School of Journalism and Mass Communication for the knowledge they imparted; that has shaped me in more ways than one.

ABSTRACT

The main objective of this research was to assess the impact of virtual learning and teaching platforms on the academic performance of high school students taking international curriculum. The study was based on the following research questions; what was the extent of use of virtual learning platforms at Shah LaljiNangpar Academy; how are virtual learning and teaching platforms used at Shah LaljiNangpar Academy; what was the level of effectiveness of virtual learning platforms on the academic performance of the students at Shah LaljiNangpar Academy, and what were the challenges of using virtual learning and teaching platforms at Shah LaljiNangpar Academy. The study used a descriptive survey design in obtaining responses from the respondents. The target population for this research was 39 students (grades 11, 12 and 13) 23 teachers and 16 administrative staff from the Shah LaljiNangpar Academy Nakuru School Both stratified and simple random sampling methods were used to select the study respondents. Data were collected using questionnaires from the students, teachers, and key informants. The analysis of quantitative data was done using descriptive and inferential statistics. This data was then presented using frequency tables, graphs, and charts. Qualitative data were analyzed and organized thematically and presented using narratives and verbatim quotes. The study found that on average 60% of students agreed that virtual learning improves the accessibility of education while 15.5% disagreed. It was evident that there was a challenge of accessing alternative materials with the traditional mode of education delivery which necessitated the need to implement virtual learning. In addition, adequacy of learning materials is an important factor in promoting improved performance of students using the virtual learning platforms. The results show that 73.4% of the respondents agreed that virtual teaching platforms provide adequate learning materials while 11.1% disagreed. The respondents were asked whether the virtual learning and teaching platforms have an important influence in motivating students to learn. The results show that 53.4% of the respondents agreed that virtual learning platforms enhance motivation of students to learn while 20% disagreed. Descriptive statistics further indicate 22.2% of the respondents were undecided on how virtual platforms provide flexibility of learning process. Also, efficiency in the learning process particularly management of classroom time is required for improving academic performance. This study has concluded that use of virtual learning in higher education results in increased usefulness, effectiveness, and positive influence on student's performance. The study recommends that incorporating ICT training in virtual teaching and learning to bridge the challenge of inadequate skills and knowledge among teachers and students. It is important for proper strategies are developed to support the implementation of virtual teaching and learning platforms so that it can improve academic performance of students. Learning institutions should ensure adherence to all policies and regulations to reduce government interference in recognition of the international curriculum. Thirdly, there is need for orientation of both teachers and students on the use of technical skills to navigate technology, so that they can access online library resources and gain global perspectives via interaction through various virtual learning platforms.

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ACRONYMS AND ABBREVIATIONS

A level - Advanced Level

ANOVA – Analysis of Variance

AS level - Advanced Subsidiary level

CAT - Continuous Assessment Tests

CLRM - Classical Linear Regression Model

EFL - English as a Foreign Language

FAQ - Frequently Asked Questions

FGLS - Feasible generalized least squares

ICT - Information and Communications Technology

IGCSE - International General Certificate of Secondary Education

IS - Information Systems

IT- Information Technology

KIIs – Key Informant Interviews

LMS - Learning Management System

MCDM - Multi-Criteria Decision Making

OLME - Internet-delivered virtual multimedia education

PCA - Principal Component Analysis

PI - Personal Innovativeness

PIIT - Personal Innovativeness in Information Technology

S.E - Standard error of estimate

SPSS – Statistical Package for Social Scientists

TAM - Technology Acceptance Model

VIF - Variance Inflation Factor.

CHAPTER ONE
INTRODUCTION

1.0 Overview

This Chapter discusses the background, statement of the problem, the objectives of the study, research questions, significance, justification, scope, and limitation of the study. The chapter concludes with the operational terms used in the study.

1.1 Background of the Study

Digital technology has permeated all aspects of human life. Understanding technology use at the level of pedagogical engagement provides valuable insights into their relationship with teaching and learning. Pedagogy is about the various forms of interaction between three agents: teacher, student(s) and, knowledge domain. These three agents comprise three elements in a triangle of interaction (Garrison and Anderson, 2002).

Lockdown and social distancing measures due to the COVID-19 pandemic from early 2020 led to the closure of schools, training institutions and higher education facilities in most countries. This necessitated a paradigm shift in the way educators deliver quality education—through various online platforms as opposed to face-to-face interaction in a physical classroom setting. Online learning, distance and continuing education became a panacea for this unprecedented global pandemic, despite the challenges posed to both educators and the learners. Transitioning from traditional face-to-face learning to online learning can be an entirely different experience for the learners and the educators, which they must adapt to, with little or no other alternatives available. The education system and the educators adopted "Education in Emergency" through various online platforms were compelled to adopt a system that they were not prepared for.

The international curriculum was greatly affected by the closure of schools worldwide. The final exams that were to be done in April 2020 when schools closed were postponed. For the May/June 2020 series exam, schools were forced to use prediction results, while those students who were not comfortable with the prediction results were forced to sit for their exams in October/November 2020 thus affecting their academic year. After exams were cancelled, the British government decided to use a mathematical rule to predict how the students would have performed in their

exams and then used those estimates as a stand-in for actual scores. The British Government wanted to guess how well a student would have done if they had taken the exam. It used two inputs: the student's term's assessments and pre-mocks grades that year and the historical track record of the school the student was attending as a way of knowing students who qualified for college admission. The method affected the students' academic performance and results.

The most popular and common method of integrating digital technology in pedagogy is use of virtual learning and teaching platforms. Virtual learning and teaching platforms also known as virtual classrooms are online learning and teaching situation whereby the three agents; students, teachers, and knowledge domain (syllabus) interrelate through technical tools that are made available by the internet and the computer software. Virtual learning platforms are used by educational institutions to hold classes from a distance while at the same time ensuring that the traditional classroom environment is replicated in terms of functionality.

Virtual learning and teaching platforms share online spaces that enable the learners and the trainers/lecturers to work together simultaneously. The communications and interchange of ideas are done through videoconferencing, online whiteboards, instant messaging, and participation controls. The students have tools to relay the varying formats, while at the same time implementing both group and individual activities which means that the teacher plays the role of moderating and guiding the process of learning while supporting discussions. The use of virtual learning and teaching platforms make the teacher the learning resource in the learning process, the message delivered are the learning materials received by the students who are the receivers of the message. In the process of learning to communicate the message of the teacher to the students, the messages need to be received well to affect their understanding and induce changes in their behavior (Anshari et al 2017). Therefore, the success of learning activities is dependent upon the effectiveness of communication process via virtual learning and teaching platform during the lessons.

Numerous virtual platforms have been shown to create a positive learning environment for learners. According to Brubaker, (2013) as learners create groups in social networks (online), they can engage with other learners in their class. Research by Olatokun and Ilevbare, (2014), suggested

that through peer interaction and group collaboration with social networks; virtual platforms, a constructive effect on learning occurs. Google classroom, Google meet, zoom, webinar, and Microsoft Teams are the most used applications for virtual learning and teaching environment.

Effective online education offers a wide range of opportunities and personal choice in schooling. A wider range of courses can be offered, and individual students can have more opportunity to advance at a pace suited to their individual needs. With this increased range of possibilities come administrative situations in the public schools that require a greater range of skills. Effective virtual schooling requires administrators and policy makers who can make wise decisions about resource allocation and to gather and analyze data that cross traditional categories and sectors.

Virtual Learning tools have played a crucial role during this pandemic, helping schools and universities facilitate student learning during the closure of universities and schools (Subedi et al., 2020). While adapting to the new changes, staff and student readiness needs to be gauged and supported accordingly. The learners with a fixed mindset found it difficult to adapt and adjust, whereas the learners with a growth mindset quickly adapted to the new learning environment. There is no one-size-fits-all pedagogy for online learning. There are a variety of subjects with varying needs. Different subjects and age groups require different approaches to online learning (Doucet et al., 2020). Online learning also allows physically challenged students with more freedom to participate in learning in the virtual environment, requiring limited movement (Basilaia & Kvavadze, 2020).

In a study conducted in Oman (Al-Maroof and Al-Emran 2018) examined the factors that affect the students' acceptance of Google classroom. The study showed that both the perceived ease of use and perceived usefulness positively influenced the behavioral intention, which in turn influenced the actual usage of Google classrooms thus making it the most used virtual platform used learning institutions.

Approaches to learning through Google classroom are a part of a strategy that uses technology to facilitate faculty and students in the learning process (Ocampo, 2017). Google classroom is a free web service developed by Google for schools that aims to simplify creating, distributing, and

grading assignments. The primary purpose of Google classroom is to streamline the process of sharing files between teachers and students. Google classroom enables teachers to create an online classroom area in which they can manage all the documents that their students need. Google classroom is a free collaboration tool for teachers and students. Using Google classroom, teachers can create an online classroom, invite students to the class then create and distribute assignments. Within the Google classroom platform, students and teachers can have conversations about the assignments and teachers are able track the student's progress (Rangie, 2020). Google classroom has been used to facilitate the interaction of a professor or teacher with a student or students in the virtual world (Liu & Chuang, 2016).

There being a universal recognition of the need to use technology in education, Kenya was under intense pressure to integrate the use of technology in education especially when schools were shut down at the height of the COVID-19 pandemic. While students in developing countries went on with their learning virtually, students in public schools in Kenya lost an academic year because studies could not proceed physically. Those schools that tried to do online teaching and learning encountered challenges such as, poor infrastructure; electricity and Internet, lack of gadgets such as smart phones, tablets, lack of skills and proper supervision. This also created education inequity because students from well of backgrounds and in private schools continued with their studies online while those from public schools did not even attempt online teaching and learning.

1.2 Shah LaljiNangpar Academy

Shah LaljiNangpar is one of the many schools that are run by the Visa Oshwal Community. The Visa Oshwal Community has schools offering both the International and the Kenyan curriculum. Shah Lalji is an International School in Nakuru County, offering the Cambridge Curriculum. It has three schools: Nursery, junior and senior school. Senior school, which will be the study's focus starts from Year 7 to Year 13. Students are between ages 13 to 19 years. Students sit for their international exam at Year 9 (Checkpoint), Year 11 (IGCSE), Year 12 (AS level) and Year 13 (A-level).

The school has a rich blend of students from different religious and cultural backgrounds. Being a community school, Shah LaljiNangpar academy, accommodates students from all backgrounds,

poor and rich, hence the findings can be generalized for all schools in Kenya. The school also happened to admit new students from the Kenyan curriculum during the pandemic. The school also being part of the Visa Oshwal Community, a community that offers both curriculums makes it the best-case study because findings will be from both international and national curriculums. However, the current study was interested in the international curriculum mainly hence the focus will be on international curriculum with only a few mentions of the National curriculum.

1.3 Statement of the Problem

Education is essential for the development and for continuity of society. According to Stephens & Schaben (2013) modern approaches of education emphasize an all-round development of the students. Ideally, a student's ability to perform in the National Examination is pegged on both academic and non-academic factors. Student academic performance is an issue of importance in all spheres of education, as teachers, students and all other stakeholders in academics work hard to improve the overall performance of students. The schools, teachers and student's excellence are measured by the performance in National and International exams.

The excellent academic performance of students is however pegged on several factors which impact on the overall outcome of the learning process. As time goes, the landscape of teaching and learning has changed tremendously as technology has become part and parcel of the teaching and learning process thus modifying the nature of the interactions between students and teachers. This was complicated even further by the emergence of the COVID-19 which made the whole concept of traditional classroom-based teaching and learning untenable.

The use of traditional methods of learning which mainly involves physical meetings in classrooms and physically attending class sessions has been the norm in many institutions of learning as it gave room for direct interaction between tutors, students, and knowledge. It has also been observed that this method of teaching offers advantages through educator control in learning though it has shortcomings in the form of passive students as educators are the dominant speakers (Paris, 2014). The integration of technology into education has been studied by several researchers such as Subandoro & Sulindra (2019) who analyzed the impact of Google Classroom on collaborative learning based on learners' perceptions. Harjanto & Sumarni (2019) reported a study on teacher's

perception of the use of Google Classroom as a learning medium. Azhar & Iqbal (2018) conducted a study on the effect of the platform based on teacher perceptions. From these studies, it can however be observed that very little has been researched on the impact of virtual learning and teaching on students' academic performance.

While technology in learning continues to advance in developed countries, Kenya is still experiencing a lag in its implementation, widening the digital and knowledge divides. As students in developed countries continue to use advanced technology in learning, Kenyan students pursuing the international curriculum are left behind yet expected to sit for the same final exam as the students from developed countries. Also, as much as several institutions have embraced and incorporated technology into their programs, a lot remains undone in this area to ascertain the impact of digital technology (virtual learning and teaching platforms) on students' academic performance. This study, based on the above, seeks in general to investigate the impact of digital technology (virtual learning and teaching platforms) and specifically the impact of Google classroom on students' academic performance at Shah LaljiNangpar Academy.

1.4 Objective of the Study

1.4.1 General Objective

To assess the impact of virtual learning and online teaching platforms on academic performance of high school students taking international curriculum.

1.4.2 Specific Objectives

   i. To assess the extent of use of virtual learning and online teaching platforms at Shah LaljiNangpar Academy

  ii. To establish how virtual learning and teaching platforms are used at Shah LaljiNangpar Academy.

 iii. To assess the level of effectiveness of virtual learning and teaching platforms on the academic performance of students at Shah LaljiNangpar Academy.

iv.   To find out some of the challenges faced in using virtual learning and online teaching platforms at Shah LaljiNangpar Academy.

1.5 Study Questions

i.   What is the extent of use of virtual learning platforms at Shah LaljiNangpar Academy?

ii.   How are virtual learning and online teaching platforms used at Shah LaljiNangpar Academy?

iii.   What is the level of effectiveness of virtual learning platforms on the academic performance of the students at Shah LaljiNangpar Academy?

iv.   What are the challenges of using virtual learning and online teaching platforms at Shah LaljiNangpar Academy?

1.6 Justification of the Study

The learning landscape in Kenya has evolved over time because of the rapid changes in technology and the current COVID-19 pandemic which disrupted the traditional mode of learning and teaching. Since the outbreak of COVID-19 in early 2020 face to-face learning was disrupted. Learning institutions adopted distance/ remote learning using digital technologies. But in Kenya even though some learning institutions had put in place structures that support out of classroom learning, they were not serious enough with this new form of learning. Also, it was only used for students who were unable to physically come to the school premises. However, as time went and with the advent of COVID-19, schools found it more and more convenient to conduct classes virtually since physical meeting posed a lot of challenges to both students and teachers. Virtual learning platforms have been used extensively by some schools and teachers as instruction media. There have been questions of whether this form of learning can match the physical learning and until now, not much has been done to answer the questions raised. This has presented a major need for an investigation into the impact of virtual learning and teaching platforms on students' academic performance and therefore the current study sought to investigate the impact of virtual learning platforms on high school students taking the international curriculum academic performance using Shah LaljiNangpar Academy as a case study. The findings of the study lead to a complete understanding of how virtual learning and teaching platforms impact students' academic performance.

The study not only availed information on how virtual learning and online teaching platforms can be used fully within the international curriculum but also the local curriculum. This kind of information is helpful to learning institutions and other policy makers in coming up with structures aimed at improving the use of virtual learning platforms especially Google classroom for learning in Kenyan schools.

Teachers will benefit from the study findings since they will be guided on how virtual learning and teaching platforms can be used effectively to improve the teaching and learning process. This will result in the much-needed effectiveness for teachers, allowing them to maximize the potential for individual learning and improve the levels of individual student performance at all levels of learning.

1.7 Significance of the Study

The researcher hopes to use the research findings to propose recommendations on how Schools can improve learning through virtual learning and online teaching platforms. It is hoped that the findings and recommendations will justify intervention in improving students' performance.

The study is also relevant to the management of Shah LaljiNangpar Academy, other schools administering the international curriculum and schools administering the local curriculum that will get to understand how the use of technology influences learning outcomes. In understanding this, it is hoped that the school managers will establish effective approaches to incorporate the use of ICT and digital technologies in teaching and learning.

The findings from this research, its conclusions and recommendations provide a wealth of knowledge for future reference by other scholars and practitioners. Further, professional bodies like the Kenya Institute of Curriculum Development will greatly benefit from findings from this study in understanding the impact of Google Classroom as a medium of instruction.

1.8 Scope of the Study

The study looked at the impact of virtual learning and teaching platforms on high school students taking the international curriculum academic performance using Shah LaljiNangpar International

School as a case study. The data collection will be confined to this one school but will use other schools and learning institutions in the literature review. In the process, the study investigated the extent of use of virtual learning and teaching platforms; the level of effectiveness of virtual learning and teaching platforms in influencing the academic performance of students as well as the challenges faced in using virtual learning and teaching platforms at Shah LaljiNangpar International School. The study was conducted in 2022.

1.9 Limitation of the Study

According to Price and Murman (2004), limitations of the study are those characteristics of design or methodology that impacted or influenced the interpretation of the findings from your research. They are the constraints on generalizability, applications to practice, and/or utility of findings that are the result of the ways in which you initially chose to design the study, or the method used to establish internal and external validity or the result of unanticipated challenges that emerged during the study.

Though the study was conducted during COVID 19 pandemic characterized by limited movement that would have curtailed the researcher's ability to gain access to the appropriate type of geographical scope of participants. This was overcome by assigning research assistants specific areas of operations and adopting technology in data collection where virtual interviews will be conducted.

Since the study had an element of qualitative research, it may be difficult to verify the findings of the study statistically. This may make it hard for the findings to be conclusively used by other researchers in future as the basis for their studies. To mitigate against this, the researcher ensured that the instruments used in the study incorporated questions that could answer the research questions conclusively.

1.10 Operational Definition of Terms

Academic performance: This term has been used in the study to refer to the grades the students get in examinations.

Challenges: These are difficulties experienced in the process of conducting virtual learning and teaching. These can be on the side of the teachers, the students, or the systems.

Effectiveness: This term has been used to refer to the level to which the teaching and learning process is successful in producing a desired result.

Google classroom: A free web service developed by Google for schools that aims to simplify creating, distributing, and grading assignments. The primary purpose of Google Classroom is to streamline the process of sharing files between teachers and students.

International Curriculum: A system of learning that sets a global standard for education and is recognized by universities and employers worldwide.

Learning and Teaching Platforms: Educational tools proposed for use in the process of disseminating knowledge to students.

Virtual Learning and Teaching: learning and teaching experience that is enhanced through utilizing computers and/or the internet both outside and inside the facilities of the educational organization. In this arrangement, the teacher and learners are physically separated in terms of place, time, or both.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter provides the literature available related to the objectives of the study. The study describes evidence from other studies on how the public receive, understand, and interpret information. This section is composed of two sub-sections: theoretical review and empirical review. The conceptual framework of the study is also discussed in this chapter.

2.2 Theoretical Literature Review

Theoretical framework is the structure that holds or support a theory of a research study. The theoretical framework introduces and describes the theory that explains why the research problem under study exists.

2.2.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model has been one of the most influential models of technology acceptance, with two primary factors influencing an individual's intention to use new technology: perceived ease of use and perceived usefulness. The Technology Acceptance Model (TAM) is a theoretical model that explains how users come to accept/adopt and use a technological infrastructure. Original TAM was proposed by Davis in 1989. The model suggests that when a user is presented to a new technology, several factors influence their decision regarding how and when they will use it. This includes its perceived usefulness and its perceived ease of use. This model adopts well established causal chain of "beliefs, attitude, intention, actual behavior", which was developed from the theory of reasoned action by social psychologists. In Davis's study, two important constructs are identified: perceived usefulness and perceived ease of use.

The perceived ease of use (PEU) is defined as "the degree to which an individual believes that using a particular system would be free of physical and mental efforts". These perceptions predict attitudes toward the system/technology adoption. Then the attitude develops the intentions to use, and the intentions cause actual system usage. In many recent studies regarding technology, TAM is adopted extensively. Several multi-disciplinary studies have used the TAM as a grounding framework, either in its original form (Davis, 1989) or in the extended model (Venkatesh and

Davis, 2000). Collectively, the research suggests that although the model had limited predictive power for novice online learners or early course management systems (Arbaugh, 2000c; Arbaugh and Duray, 2002), the TAM has emerged as a useful framework for explaining course management system usage and satisfaction with the internet as an educational delivery medium (Arbaugh, 2000c; Arbaugh, 2000c; Arbaugh and Duray, 2002). Davis and Wong (2007) found that perceived usefulness and ease of use had moderate effects on student intentions to use the CECIL system at the University of Auckland, but that student perceptions of flow and the playfulness of the system (which, in turn, was highly influenced by the speed of the software) were stronger predictors of intentions to use. Arbaugh (2004) found that perceived usefulness and ease of use of Blackboard increased dramatically between the first and subsequent online course experiences. However, because studies examining a possible TAM-learning relationship have yet to find significant results, the TAM has been less useful for predicting learning outcomes (Arbaugh, 2000c, 2005b).

The concept of online learning as a form of technology use has not been in practice for a long time especially in the education sector and has therefore been met with varying levels of acceptance and dislike. The technology acceptance model has been one of the most influential models of technology acceptance and it investigates individuals' acceptance of technology. The level of acceptance of technology is determined by perceived ease of use and perceived usefulness of the specific technology. In the same way that the Technology Acceptance Model explains how users come to accept, adopt, and use a technological infrastructure, the current study look into how the use of online learning platform/virtual classroom influences the performance of students.

2.2.2 Diffusion of Innovations Theory

Diffusion of innovations is a theory that seeks to explain how, why, and at what rate new ideas and technology spread. Everett Rogers, a professor of communication studies, popularized the theory in his book Diffusion of Innovations; the book was first published in 1962, and is now in its fifth edition (2003). Rogers argues that diffusion is the process by which an innovation is communicated over time among the participants in a social system. The origins of the diffusion of innovations theory are varied and span multiple disciplines.

Rogers proposes that four main elements influence the spread of a new idea: the innovation itself, communication channels, time, and a social system. This process relies heavily on human capital. The innovation must be widely adopted to self-sustain. Within the rate of adoption, there is a point at which an innovation reaches critical mass.

The categories of adopters are innovators, early adopters, early majority, late majority, and laggards. Diffusion manifests itself in different ways and is highly subject to the type of adopters and innovation-decision process. The criterion for the adopter categorization is innovativeness, defined as the degree to which an individual adopts a new idea. In the sphere of IT, Personal Innovativeness (PI) is a personality trait that may explain how individuals respond to innovations (Jeong et al. 2009). In this context, Agarwal, and Prasad (1998) present the PIIT construct and explain its influence on adoption of IT. These authors define PIIT as the individual tendency or aptitude to try out new IT. However, PI has been neglected in the literature as potentially influencing the adoption of IT. Agarwal and Prasad (1998) studied the role of Personal Innovativeness in Information Technology (PIIT) as a moderator between individual perception of new IT and its antecedents. Although PIIT has been used in recent literature to explain individuals' acceptance of technology, according to Nov and Ye (2008) the personality traits underlying that behaviour have been neglected.

For Rogers (1962, 1995, 2003), individuals' profile determines the spread of innovation and people can be classified and grouped according to their attitude towards the adoption of technology. Individuals with a high degree of PIIT tend to develop a more positive attitude towards new IT and tend to use it more quickly (Agarwal and Prasad 1998; Jeong et al. 2009), meaning that highly innovative individuals are more willing to adopt new IT in their daily routine and cope well with the uncertainties arising from its use (Lee et al. 2007).

Individuals with a high degree of PIIT are more open to risk (Agarwal and Karahanna 2000; Jeong et al. 2009). PIIT affects users' acceptance of new technology (Agarwal and Prasad 1998; Noh et al. 2014). Agents with a high level of PI will be eager to repeat a behaviour if they have recognized the benefits of the IT used. Therefore, these agents are likely to benefit more from new IT (Lin and Filieri 2015). Aharony (2013) concludes that individuals with a high degree of PIIT and

extroversion tend to use Facebook better. Similarly, Karim et al. (2009) consider there is a relationship between a high degree of extroversion and students' PIIT and well-intentioned use of the Internet.

This theory has been used in the study to explain the reasons why new ideas and technology spreads while also indicating the rate of spread of new technology. Diffusion denotes the process by which an innovation is communicated over time among the participants in a social system. According to the theory, the spread of technology is influenced by; the innovation itself, communication channels, time, and a social system. In the context of the current study, the use of online learning platforms has spread in the schools at varying rates, and this can be attributed to several factors and these factors include the perceived relative advantage in terms of academic outcomes offered by technology over the physical forms of learning, compatibility to the existing infrastructure, systems of learning as well as teacher and students' beliefs. The use of online learning also spreads depending on how practical it is in terms of trialability and observability. The level of adoption of technology and online learning in Kenyan schools is believed to have been directly influenced by these factors.

2.3 Conceptual Framework

A conceptual framework is a hypothesized model identifying the variables under study and their relationships by use of diagrams (Mugenda & Mugenda, 2013). It demonstrates the linkages between study variables (Garg, & Kothari, 2014). The study's independent variable is online learning platform/ virtual learning, and this was measured using extent of use, methods of use, level of effectiveness and challenges of use. The dependent variable on the other hand was the students' academic performance. The relationship between these variables was moderated by policies and regulations, school ICT support infrastructure as well as teacher and student perceptions.

The extent of use of learning platforms as well as the method of use impacts on the level of performance exhibited by students by way of influencing their level of exposure to the online learning platforms. Extent of use can be either full use of online learning or partial use of online learning platforms whose effects can be traced directly to their final academic performance. The

method of use can be either asynchronous or synchronous which influence the academic outcomes of students. Online learning platforms have varying levels of effectiveness in terms of expected outcomes as some may be very effective and others ineffective. Various challenges are experienced in the process of using the online learning platforms which can largely impair the learning process and among the challenges mostly cited are lack of the know-how on usage together with lack of the direct student-teacher interaction as is experienced in the physical learning method.

Independent variable   **Dependent variable**

Online Learning Platform/Virtual Classroom   **Students' Academic Performance**
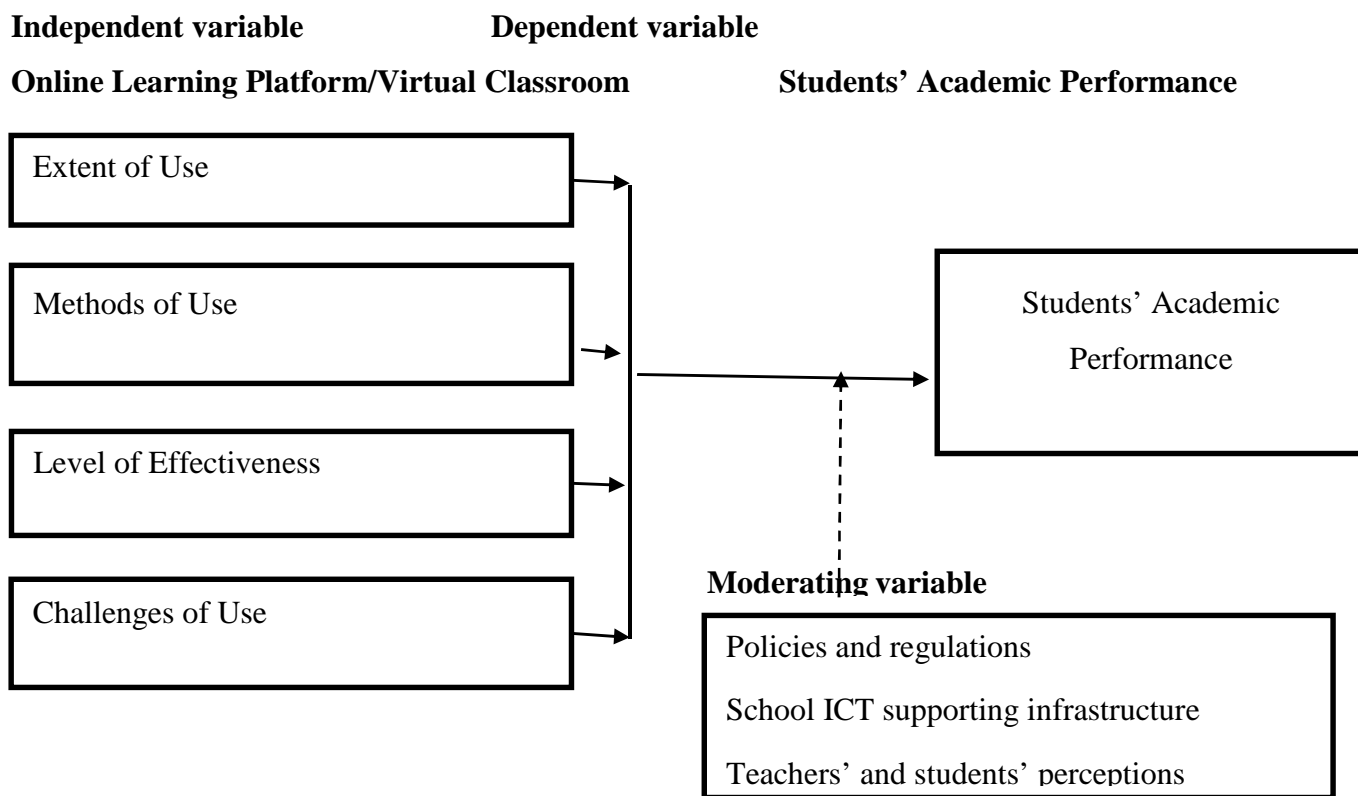
Figure 2.1: Conceptual Framework

From the figure above, the study's independent variable was online learning platform/ virtual learning, and this was measured using extent of use, methods of use, level of effectiveness and challenges of use. The dependent variable on the other hand was the students' academic performance. The relationship between these variables was moderated by policies and regulations, school ICT support infrastructure as well as teacher and student perceptions.

The extent of use of learning platforms as well as the method of use impacts on the level of performance exhibited by students by way of influencing their level of exposure to the online learning platforms. Extent of use can be either full use of online learning or partial use of online learning platforms whose effects can be traced directly to their final academic performance. The method of use can be either asynchronous or synchronous which influence the academic outcomes of students. Online learning platforms have varying levels of effectiveness in terms of expected outcomes as some may be very effective and others ineffective. Various challenges are experienced in the process of using the online learning platforms which can largely impair the learning process and among the challenges mostly cited is lack of the know-how on usage together with lack of the direct student-teacher interaction as is experienced in the physical learning method.

A number of factors moderated or intervened in the interaction of the independent variable and dependent variables in this study, and they include things such as policies and regulations that have been put in place by the government through the ministry of education, school ICT support infrastructure which may impact on the extent to which online learning is used, as well as teacher and student perceptions which determine how well the teachers and students accept these methods of learning and teaching.

2.4 Empirical Literature Review

Empirical literature review also referred to as a systematic literature review and examines past empirical studies to answer the study research questions. It is the summary of research studies that has been conducted in the past on a certain subject of interest. In this section the author reviews the information and theories currently available concerning the use of ICT and digital technologies in online / virtual learning and teaching.

2.4.1 Extent of Use of Virtual Learning and Online Teaching Platforms

Konlechner (2015) defined virtual-learning environments as a software solution that facilitates computerized learning. Dillenbourg (2000) stated that a virtual-learning environment should have several features: an information space; educational interaction; varying from text to 3D immersive worlds; students are actors; supports distance education and classroom activities; integrates

heterogeneous technologies and multiple pedagogical approaches; and is a place where virtual environments overlap with physical environments.

Broadband Internet access opens new opportunities and new challenges for primary, secondary, and tertiary education to go online, that is, for educational services to be delivered to students at home and in their workplace, overcoming the time and travel constraints of conventional place-based face-to-face educational methods.

Studies on blended learning carried out by means of other online platforms are still rare, especially in English Language Teaching context. Agustina and Cahyono (2017) reported EFL teachers and students' perceptions in using Quipper School as an online platform for extended EFL learning. Teachers and students in their study thought that Quipper School was good not only for coping with the limited time for learning at school, but the platform also contributed to the improvement of the students' EFL learning (Phas, 2018).

Learning activities require direct communication between educators and students so that the transfer of knowledge in building knowledge and learning outcomes can be well-formed so that the character of students can be directed through the guidance of educators (Nakintu and Neema-Abooki, 2011). Components that cannot be separated between schools as learning spaces, educators as educators and students as students in building knowledge and learning outcomes (Barreyro et al., 2019).

Generally, the lecture method offers advantages through educator control in learning and shortcomings in the form of passive students and educators as dominant speakers (Paris, 2014). The lecture method provides an advantage for educators in managing classes with many students in one study (Stearns, 2017). The lecture method is more dominant in teaching the delivery of learning material, question and answer between educators and students as part of the process of building knowledge and learning outcomes (Van der Steen dan Van Frissen, 2017). One of the supports in the lecture method is the process of reading in which reading is a supporting factor for students in building knowledge and learning outcomes (Fisher, Ros& Grant, 2010).

Today's technologies provide room for the expansion on the power of visuals to include experiential learning using virtual reality (VR) applications to promote understanding and to scaffold prior knowledge. Further, technology tools continue to enhance the ways teachers promote understanding of new concepts. (Michael & Jodi, 2018).

Google Apps for Education have offered a conducive online learning environment to all levels of learning around the world. Although large cloud service providers like Google do not encrypt all their stored electronic data and correlate identifiable data across accounts, Google Drive has been one of key features of Google for teachers and students (KrisawanPrasertsith, PenjiraKanthawongs and Tan Limpachote, 2016).

The teachers' course materials can be accessed by students using Google Drive at any time, any place with multiple devices like smart phones, computers, or tablets. Teachers can get a drive that stores their course materials and choose to share with specific student email addresses generating from the student email list, creating by the university or directly with the students that he had been added on his Google classroom (Issa, 2019).

Several suggestions have been made towards accompanying Google classroom with other applications. A study reported by Olagbaju & Popoola (2020), showed that using YouTube and WhatsApp enhanced academic achievement. Another strategy recommended by (Yigit, 2020) is using digital storytelling by using programs like Windows Movie Maker or IMovie. Therefore, combining the strategies with Google Classroom would raise student interest and motivation, and with this enhance learning and cognition.

Shohel and Shrestha (2010) contend that ICT has been used to increase access to authentic teaching and learning materials, which could be used at a time convenient to teachers, such as while preparing lesson plans or travelling to schools. Moreover, use of ICT may be a bridge to provide access to education and quality professional preparation (Omidinia, Masrom & Selamat, 2011). American and African universities are working in partnership to increase the number of teachers in Sub Saharan Africa who can successfully and fully teach through virtual platforms (Shohel and Shrestha, 2010). Prior to starting virtual learning classes, it is important to provide educator

orientation on the use of technical skills to navigate technology, to access online library resources and gain global perspectives via interaction through various virtual learning platforms. Further, the interaction of students and teachers from varying cultures provides diverse perspectives pivotal for teachers serving in a global society (Park, 2012).

Web-based training, Virtual learning systems, and Learning Management Systems, regardless of their name, all these systems have the use of the Internet in common, and certain features that allow registration, assessment of the activities of learners and teachers and as a result, enhancing interaction between teachers and students Costa, Alvelos, & Teixeira, 2012)., and that also facilitate the delivery of lectures and interaction between students, their colleagues, and teachers.

2.4.2 How Virtual Learning and Teaching Platforms Are Used

Over the last decade, educational institutions have turned to the internet as the primary mechanism for providing their distance learning offerings, using an array of asynchronous learning management systems. Asynchronous learning is a general term used to describe forms of education, instruction, and learning that do not occur in the same place or at the same time. It uses resources that facilitate information sharing outside the constraints of time and place among a network of people.

Asynchronous environments are not time bound and students can work on e-tivities on their own pace. E-tivities are exercises provided by the teacher for students to attempt within the online teaching platforms. Asynchronous mode of learning/teaching has been the most prevalent form of online teaching so far because of its flexible modus operandi (Hrastinski, 2008). Asynchronous environments provide students with readily available material in the form of audio/video lectures, handouts, articles, and power point presentations. This material is accessible anytime anywhere via Learning Management System (LMS) or other channels of the sort.

Asynchronous e-learning is the most adopted method for online education (Parsad & Lewis, 2008) because learners are not time bound and can respond at their leisure. The opportunity of delayed response allows them to use their higher order learning skills as they can keep thinking about a problem for an extended time and may develop divergent thinking. The spontaneity of expression

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is replaced by a constructed response. Therefore, asynchronous space leads to a self-paced, independent, student-centered learning (Murphy, Rodríguez-Manzanares& Barbour, 2011). Hence, asynchronous e-learning can scaffold students' previous knowledge with new concepts (Lin, Hong & Lawrenz, 2012). Less reliance on memory and notes and more opportunity of discussions with peer groups help build critical thinking and deep learning (Huang & Hsiao, 2012). Shyness is reduced due to the distance mode, which alleviates the fear of the teacher. As there is less pressure than a real time encounter, the affective filter remains low, and learners can respond more innovatively and creatively.

Asynchronous e-learning can be challenging as only a carefully devised set of strategies can keep students engaged and interested in this sort of learning environment to facilitate motivation, confidence, participation, problem solving, analytical and higher order thinking skills. Moreover, it is a self-paced system in which the students must be self-disciplined to keep themselves active as well as interactive to keep track of e-tivities. Whereas discussions on forums and blogs can keep them active, going off topics can also distract them. Delayed feedback can be another frustrating factor (Huang & Hsiao, 2012).

Online listening or observing is a complex phenomenon and a substantial component of learners' participation in online discussion. A group of researchers in their study of 96 participants in 3-weekonline undergraduate courses found that learners spent three quarters of their time listening or observing in online discussions (Wise et al., 2013).

In most online courses, instructors teach with predefined content. In these courses, instructors face the issue of lack of empowerment (Evrim, Correia, & Thompson, 2015). In such situations, the role of instructors in creating, shaping, and integrating their own experiences into the content of the courses has been downplayed (Rennert-Ariev, 2015). Online instructors are encouraged to engage in designing the content and adopting an autonomous and active role through constantly criticizing their assumptions toward online teaching (Evrim et al., 2011).Instructors may be responsible for preparing and planning materials for online courses. The task of generating new materials or adjusting the materials from face-to-face classes to an online setting can be very challenging (Li & Irby, 2018). Often proper training and support has not been provided to

instructors who are transitioning course content from face-to-face to online settings (Kyei-Blankson & Keengwe, 2014).

A virtual classroom session requires good preparation. Tutors should have a scenario of their lesson available and upload all the required materials to the classroom before the students enter the session. It is a bit more complicated to improvise during a virtual classroom session than it is in a real classroom, especially for the inexperienced tutor (Jano, 2019). One should also be aware that everything proceeds at a bit slower pace than in a normal classroom setting. Furthermore, the students who participate in the virtual classroom should be well prepared and instructed. Not only technical preparation is important, but students should also be aware of the basic 'etiquette' to adhere to in a virtual classroom. They should know how to ask a question, how to let the tutor know you have left for a minute to go to the bathroom, how to avoid interruptions from family members who enter their study or from their telephones. And what policy is used for students coming in late.

Among the most important functions of virtual learning platforms are forums that allow student-teacher communication and collaboration in an asynchronous way, web conferences that allow video, audio and written communication, and chat, where users can send messages and receive responses in real-time (Acheiro-Gonzalez, Medina-Rivilla, Domininguez-Garrido & Medina-Dominguez, 2019).

A Learning Management System is seen as a software that operates and encompasses many services that are meant to aid teachers in managing their lectures and courses (Ouadoud, Chkouri and Nejjari, 2018), and they were created to monitor and evaluate students, give grades, to monitor course attendance or additional administrative actions that can be demanded by educational institutions (Ninoriya, Chawan and Meshram, 2016). These systems can be divided into two categories: open-source platforms, and commercial or proprietary, where platforms like Blackboard are included (Dagger, O'Connor, Lawless, Walsh & Wade, 2018).

Open-source software has an available source code through the internet, and it is available for modification by computer programmers so that it can incorporate additional costs without any

significant charges. The process of software development is done and tested through collaborations and left under the management of open-source community. Based on functionality, open-source software is used to support both the community and for commercial purposes because it is accessed free of charge. Examples of open-source software include Android and Firefox.

Secondly, proprietary software does not have available source codes and it is concealed by the manufacturing company. Development and testing of the software are done by private individuals or company who do not owe the public anything. Users must pay to access the software and the commercial support function can be provided for maintenance. The developing company will provide an authentication license before an individual is able to access the software. The main common examples of proprietary software include Windows, Microsoft Office, Internet Explorer and macOS.

Designed to offer students, teachers, and administrators a system that can help them create an enhanced and customized learning climate, Google classroom is considered a web-based flexible learning environment that facilitates collaboration between users (Benta, Bologa and Dzitac, 2014). Through these platforms, teachers can upload and supply students with information and resources to which they would not have had access during face-to-face classes, and students can easily share information, state their difficulties, and receive feedback (Martin-Blas and Serrano-Fernandez, 2017). Thus, Google classroom includes diverse features such as forums; chats, private messaging, and higher education institutions can use it as an additional method to traditional education, or for exclusively online learning (Oproiu, 2015).

2.4.3 Level of Effectiveness of Virtual Learning and Teaching Platforms on the Academic Performance of Students

A study by Victoria, Mislinawati and Nurmasyitah (2018), focusing on student's perception on the implementation and integration of Virtual learning platforms while using TAM model as a theoretical background, revealed that all students were of the belief that the Virtual learning module they took was useful and easy to use, stating that they understood information, and navigated and accessed documents effortlessly. A similar study based on the TAM model and

developed at the University of Jordan (Imarabeh, 2014), confirmed that both perceived usefulness and ease of use directly influence the attitude that students have towards using Virtual learning.

About the use of virtual learning in higher education, generally, the literature provides results in favor of its usefulness, effectiveness, and positive influence on student's performance. According to a study on the impact of Virtual learning on students and teachers (Burac, Fernandez, Cruz, and Cruz, 2019), most of the respondents, represented by teachers, believe in the potential of Virtual learning to enhance the educational process, and affirm that it improves collaboration and communication with students, and that it offers flexibility and helps students to better understand the lectures. Investigating students' attitude towards Virtual learning, Dookhan revealed that their attitude was positive and that it improves when they perceive that virtual learning systems are easy to access (Odit-Dookhan, 2018).

Another study (Lochner, Wieser, Waldboth and Mischo-Kelling, 2016) pointed out that, when used as an additional method to traditional classes, virtual learning enhanced students' learning experience and increased their engagement with the lectures. Research focused on comparing traditional with virtual learning (Alsaaty, Carter, Abrahams and Alshameri, 2016) showed that a high percentage of the students who completed the survey stated that they have assimilated more information in face-to-face classes than virtual, but they positively perceived their overall online experience, even though they have encountered difficulties while using virtual learning platforms.

With Google classroom, teachers can create an online classroom, invite students to the class then create and distribute assignments. Within the Google Classroom students and teachers can have conversations about the assignments and teachers can track the student's progress (Vangie, 2020). Besides, Google Classroom was used to facilitate the interaction of a professor or teacher with a student or students in the virtual world (Liu & Chuang, 2016).

In Google Classroom, teachers freely hand out a scientific assessment and provide an independent assessment for students (Wijaya, 2016). Teachers can provide materials on the subject being taught. The teacher can post some teaching materials, assign tasks for students, and upload the students' grades so that they can immediately see the scores obtained in the course. Google

Classroom also minimizes the costs incurred due to the use of more affordable stationery and other materials and can minimize time-released energy (Inoue & Pengnate, 2018). Generally, the time and energy spent by Google Classroom users will be lesser than the usual.

In their study, Zare, *et. al.* (2016) used five databases of scientific publications and the focus of their review was the identification of studies about virtual learning and MCDM (multi-criteria decision making), which is an efficient approach for evaluating multiple criteria. As a result, the following criteria in virtual learning evaluation were identified: usability; response-time; interactivity, web & course design, accessibility, reliability, cost-effectiveness, functionality, security, stability trust, accuracy, flexibility, interoperability, and continuity.

2.4.4 Challenges Faced in Using Virtual Learning and Teaching Platforms
Review of literature on Google Classroom shows that several studies focus on the effectiveness of E-learning Moodle, Google Classroom and Edmodo (Hakim, 2016), optimization of using Google Classroom as a learning media (Soni, 2018), Google classroom as an alternative way to enhance learning quality (Sewang, 2017), and Google Classroom as a media for Improving Attainment of Graduate Attributes (Madhavi, Mohan & Nalla, 2018). The study focused on ways in which Google Classroom could be used effectively as a learning medium. The effectiveness was analyzed from the aspects of message receiver, content, communication media, format, source, and appropriateness or timing. Moreover, the purpose of the study was to analyze the nature of Google Classroom utilization in the Faculty of Teacher Training and Education at IAIN Kendari, Indonesia.

Several challenges have been faced in relation to virtual learning in the Sub-Saharan Africa. However, obstacles encountered are not viewed as a hindrance to academic pursuits (Kashorda, 2016). Students struggle and endeavor to juggle their daily responsibilities with adapting to study online, which, although is not easy for them, they have worked hard to get used to. According to Frimpon (2018), power outages and sometimes Internet connectivity have acted as a challenge. In other cases, students have been reported to complain of limited time making it hard for them to complete assignments.

Studies reveal that educators report significantly higher course dropout and failure rates among virtual learners than among learners in traditional campus-based programs (Wojciechowsk & Palmer, 2016). Interestingly, there were no dropouts or failing grades reported in the program. Use of a cohort model and support systems provided by partners in Africa, as well as the reflective learning experience in the summer, enabled students to refocus and air out some of the challenges they encountered so that they could be amicably resolved in a timely fashion. Although students may be taking online classes, higher education institutions should seek to include support systems that are, by and large, meaningful for their students (Claudiu et al., 2020).

Studies suggest that for students to persist in virtual learning, communication with instructors who address students' needs in a timely manner is essential. Packard (2016) adds that the failure of instructors to communicate with students in a timely manner could negatively impact those students' learning and their ability to complete the course (Eke, 2015). Regarding communication and technology, findings indicated that this was the first time most of the participants had experienced virtual learning; indeed, many had never used *any* electronic tools in a learning environment. Neither inadequate prior knowledge of the use of computers and wireless modems nor the requirement of a higher academic language prevented participants from working to achieve their dreams and educational goals.

Studies have shown that ICT is an integral addition to high school education in Kenya particularly through incorporating the TMIS. Existing studies have shown that TMIS has supported use of online services like registration, tracking interview activities, pay slips services and third-party deductions (Go, 2016). ICT improves the competency of teachers and governance of secondary schools through training of principals on the integration of ICT in schools. For example, KICD, has used ICT to ensure increased access of education by using online teaching channels that delivers several education programmes. It is estimated that about 2700 radio programmes and 150 television programmes are provided by KICD for students to access education materials. Integration of ICT in secondary schools has enabled a greater diversity in the way they access education materials. For example, several subjects have their content digitized and the learning materials are available for secondary schools with a well-established ICT infrastructure.

The significant achievement of teaching and online learning platforms, several challenges has been identified. The main challenges affecting implementation of online learning platforms in secondary schools include inadequate funding, expensive costs in establishing an ICT infrastructure and poor data management at the schools (GoK, 2018). Integration of online teaching platforms is inevitable in secondary schools in Kenya, but this faces several challenges (GoK, 2019). According to GoK (2019), the main challenges affecting integration and operationalization of online teaching platforms include inadequate ICT infrastructure, low levels of internet connectivity, low capacity of educators, online safety, and security, outdated online learning content, expensive maintainace costs, negative attitude to online teaching platforms and poor governance of ICT in secondary schools.

Students need a strong personal discipline to complete schedule activities and may develop cognitive, psychomotor, and interpersonal skills (Theresiawati et al. 2020). These Information Systems (IS) can make learning more efficient and lead to an improved learning environment, thereby improving students' attitude towards the learning process and the use of LMS (Wu and Hwang 2010).

2.5 Chapter summary

The extent of use of learning platforms as well as the method of use impacts on the level of performance exhibited by students. This relationship relates on the student's level of exposure to the online learning platforms. Extent of use can be either full use of online learning or partial use of online learning platforms whose effects can be traced directly to their final academic performance. The method of use can be either asynchronous or synchronous which influence the academic outcomes of students. Online learning platforms have varying levels of effectiveness in terms of expected outcomes as some may be very effective and others ineffective. Various challenges are experienced in the process of using the online learning platforms which can largely impair the learning process and among the challenges mostly cited is lack of the know-how on usage together with lack of the direct student-teacher interaction as is experienced in the physical learning method.

A number of factors moderated or intervened in the interaction of the independent variable and dependent variables in this study, and they include things such as policies and regulations that have been put in place by the government through the ministry of education, school ICT support infrastructure which may impact on the extent to which online learning is used, as well as teacher and student perceptions which determine how well the teachers and students accept these methods of learning and teaching.

CHAPTER THREE
METHODOLOGY

3.1 Introduction

The chapter describes the methodology used in the study and contains the research design, study site, target population, sampling procedures, sample size, data collection methods and research instruments, data presentation methods, data analysis methods used as well as the ethical considerations.

3.2 Research Design

Robson (2013) states that the best design depends on the research question as well as the orientation of the researcher. According to Mugenda (2016), a research design is a procedural plan that is adopted by the researcher to answer questions validly, objectively, accurately, and economically. In this study, the research design was based on an approach developed by Basri and Suliman (2012). In their study, they established that quantitative approaches and tools like questionnaires are ideal for descriptive studies for data collection (Basri & Suliman, 2012).

Therefore, this study employed a descriptive survey design in obtaining responses from the respondents.

Descriptive studies can involve a one-time interaction with groups of people, or a study might follow individuals over time. Descriptive studies, in which the researcher interacts with the participant, may involve surveys or interviews to collect the necessary information. The merits of this design are that subjects, or participants are observed in a natural and unchanged environment (Kombo & Tromp, 2006). According to Shaughnessy et al, (2011), descriptive survey research is used to assess thoughts, opinions and feelings and consists of a predetermined set of questions that is given to a sample. A survey is an attempt to collect data from members of a status of that population with respect to one or more variables.

The data collection allows for gathering in-depth information that may be either quantitative or qualitative in nature. This allows for a multifaceted approach to data collection and analysis. Descriptive studies result in rich data that is collected in large amounts. A descriptive research design is ideal for this study because it permits use of quantitative tools and analysis of data using tables to elaborate on the findings of the study (Venkatesh et al., 2013). Similarly, an analysis that is founded on statistical data can be validated and hence reliable for professional use because it is devoid of individual bias and provides objective evidence. Since descriptive Survey Research is an approach of descriptive Research that blends quantitative and qualitative data to provide you with relevant and accurate information. This study used a mixed research method which is a procedure for collecting, analyzing, and mixing both quantitative and qualitative research and methods in a single study to understand a research problem.

3.3 Study Site

The study was conducted in Nakuru town, Nakuru County, Kenya. This was because of the location of the school that formed the focus of this study, Shah LaljiNangpar Academy.

3.4 Study Population

Kothari (2014) defines a population as a set of individual cases, people, or objects, which bear common observable characteristics. It is a set of entities concerning which statistical inferences

are to be drawn. On the other hand, target population refers to the entire group of individuals or objects to which researchers are interested in generalizing the conclusion. This study targets a population of all the teaching staff and students from the Shah LaljiNangpar Academy Nakuru School. Other than the students and teaching staff, the school management will also be included in the study for the purposes of diversity and clarity of information collected. It is estimated that the number of students (Grades 11, 12 and 13), teachers, and senior management at the school is about 78, which was used as the study population. This was broken down as follows:

Table 3.1: Study population

Category	Number
Grade 11	16
Grade 12	13
Grade 13	10
Teachers	23
Administration	10
Senior Management	6

3.5 Sampling Procedures

The study employed stratified sampling and simple random sampling technique in selecting the respondents. Students taking international curriculum were purposively selected because they use virtual learning. A simple random sampling was relied as the main basis of selecting respondents in the study. The population was first stratified into students and teaching staff. Stratification of the population was done to ensure that subjects with similar characteristics are grouped together. Win this case; students in the same grade were regarded as a stratum, while teachers, administrative staff and senior management were the other strata. Even though Kothari (2004) thinks about a sample size of between 10%to 30% of the objective populace as an ideal example which satisfies the necessities of effectiveness, representativeness, unwavering quality and adaptability, this review designated a sample size of 100% to take part in the study. Therefore, the study adopted a census method of selecting respondents.

Table 3.2: Sample size

Category	Number	Proportion	Sample
Grade 11	16	100%	16
Grade 12	13	100%	13

Grade 13	10	100%	10
Teachers	23	100%	23

A total of 62 respondents were expected to participate in the study. Purposive sampling technique was then used to select Key Informants who comprised of the administrative and senior management staff. Among these, the head teacher, deputy head teacher and ICT department were targeted.

3.6 Data Collection Methods and Research Instruments

The overall aim of data collection is to find out the respondents' views, opinions, and perceptions, regarding the topic of study. There are three ways of collecting data in mixed methods study depending on the sequence of qualitative and quantitative data collection; triangulation, explanatory, and exploratory method. This study used an exploratory data collection method using interviews. An exploratory research method was ideal in this study because it allowed the study to investigate research questions that have not been elaborated in previous studies.

An exploratory data collection approach is qualitative in nature, but since the study is using a large sample of students it is considered as quantitative. Data collection about the teaching and online platforms has been supported by a general idea in the literature review, but there is no clear information in the context of Shah LaljiNangpar Academy that the study sought to identify. Thus, the process of data collection will be done using primary and secondary methods.

Primary data collection methods were done through in-depth interviews using questionnaires with students, teachers, and school managers at Shah LaljiNangpar Academy. The in-depth interviews were derived from the results of the analyzed questionnaires administered to students by the researcher with the help of research assistants. The interviews were used mainly on the school management staff. The study collected its data using questionnaires because they provided a better way of objectively analyzing the hypothesis. In particular, the study relied on closed-end questionnaire to obtain statistical data for analysis. The questionnaires were divided into two parts; A and B whereby part A had the demographic information and part B addressed the specific information about the teaching content.

The questionnaire in the study was closed-ended so that it would be possible to collect statistical data. The questionnaires were divided into two parts; A and B whereby part A had the demographic information and part B addressed the specific information about the teaching content. Coding sheets were used to collect content analysis data. Secondary data collection was done was done through focusing on primary studies about teaching and online platforms provided in the literature review.

3.7 Validity and Reliability of Research Instruments

3.7.1 Validity of the Instruments

Guided by research recommendations, data collection instruments before being employed in the study were subjected to both validity and reliability test to ascertain their effectiveness in giving the needed data on the key issues of the use of virtual learning platforms and their effects on the academic performance of students at the Shah LaljiNangpar Academy Nakuru. The purpose of validating research instruments was to ensure that items in the research instruments were stated clearly and have the same meaning to all respondents (Mugenda and Mugenda, 2003). Thus, subjecting to both validity and reliability tests was to measure specific indicators outlined in the study objectives.

The study ensured the validity of the content collected by the questionnaire so that it is representative of the target construct. This is the degree in which the questionnaire was able to predict the content of the entire school population to support a generalization (Straub et al., 2004). The researcher evaluated the survey questionnaire so that it incorporated all the items that were crucial and eliminated undesirable items (Lewis et al., 1995). Secondly, the study used a judgmental approach as the basis of testing the validity of questionnaire content through aligning with the literature review and undertook a follow-up assessment. Therefore, the items of the questionnaire were derived from an extensive literature review, the items generated and a CVR calculated based on the Lawshe formula. This allowed all the items that are less significant eliminated and valid questionnaire developed for the study.

3.7.2 Reliability of the instruments

Reliability test in research is intended to measure the level to which the study tools produced dependable results after repeated trials on the same study variables (Heale & Twycross, 2015). Reliability of the instrument in this study was tested using Cranach's alpha coefficient. According to Cranach's alpha coefficient, if Cranach's alpha is > 0.70, rejection of reliability is valid. If the alpha coefficient is less than 0.70, reliability is accepted. Piloting of the research instruments allows for any adjustment to be done on the research instruments. The institutions and the respondents who appeared in the pilot study were not included in the main study.

Table 3.3: Reliability test

	Scale Variance	Corrected Item-Total Correlation	Cronbach's Alpha
Performance	11.594	.826	.873
Extent of use	12.024	.749	.890
Method of use	12.190	.720	.896
Effect of use	11.309	.879	.862
Enablers	12.536	.661	.908

3.7.3 Pilot study

A pilot study was performed prior to the main study to test the research instrument to develop methodological knowledge and awareness during the process of data collection (Baker, 1994). It was important for the study because the school system at the location was different to other public secondary schools in Nakuru. We developed the pilot study to incorporate a case study by reviewing extensive literature so that research quality is improved (Gudmundsdottir & Brock-Utne, 2010). According to Poggenpoel and Myburgh (2003), a pilot study uses an interviewer to act as an instrument during the process of data collection. As a strategy to avoid lack of trust in the research process, the study emphasized of using interviews to spend time during data collection.

The first step during the pilot study was to undertake in-depth interviews with some students at the school to act as a focus group. This was important to the study because it offered an opportunity to establish the issues during the actual data collection that would be addressed. Secondly, the questionnaire was piloted to determine the effectiveness of wording and the possible range of answers that would be changed during the main study. Thirdly, the pilot was done to test the

research process particularly determining the suitable way in which the questionnaires would be distributed and collected at the schools. The pilot study showed that students were willing to respond to the questions, but the wording contained terms that they were not aware of. We resorted to using simple language to ensure that they understood the questions. Lastly, the questionnaires were distributed and collected effectively during the weekends when the students had enough time to respond to the questions.

3.7 Data Presentation Methods

Analysis of quantitative data was done through cross-tabulation which mainly uses a basic tabular form to draw inferences between different datasets in the research study. This data was presented on frequency tables to aid in the process of interpretation of the findings. Frequency tables, graphs and pie charts were used in presenting data. The use of tables, graphs and percentage charts for result presentation ensured easy understanding of data and information collected because of its summarized nature and use of figures. The idea behind this type of research is to study frequencies, averages, and other statistical calculations. Presentation of interview and content analysis findings were however done using illustrative quotes which illustrated leaning of the study findings.

3.9 Data Analysis Methods

Both descriptive and inferential statistics were used in the process of data analysis. Descriptive statistics provides simple summaries about the sample and about the observations that have been made (Mugenda and Mugenda, 2013). Descriptive statistics specifically played an important role in the presentation and interpretation of analyzed data. The data was analyzed using IBM SPSS Statistics (version 25). Answers to the open items were analyzed qualitatively, by recoding them into categories which describe the basic answers to the research questions while the quantifiable answers to closed questions were analyzed quantitatively. In the study, analysis of interviews and content analysis was done through the identification, examination and interpretation of patterns and themes in the data. With these thematic patterns, the study was in a position of answering the research questions.

The used both qualitative and quantitative method and it was important to describe data analysis of qualitative data obtained from the study questionnaires. This was obtained from the open-ended

questions in the questionnaire and interview with the school management. This was done through identifying the themes in data collected using the theme and explore approach. The main themes in the data were determined and compare how different students and teachers responded to the themes. This was selected because students had a different understanding of learning and online teaching platforms. The themes obtained were categorized using a spreadsheet by arranging the themes in columns for further analysis.

3.10 Ethical Considerations

Ethical considerations represent a moral stance that involves conducting research to achieve not just high professional standards of technical procedures, but also respect and protection for the people actively consenting to be studied (Payne &Payne, 2004). To ensure that ethics is adhered to, the protection of confidentiality of the human subjects was considered. The respondents were assured of confidentiality while being made aware that their responses would not be misrepresented in any way. They were assured also that their identities would not be revealed. The study will also follow proper procedures for gaining access and acceptance to the school where data will be collected. This involved seeking for authorization through the right channels. The researcher ensured that the respondents were aware of the objectives of the research and their contribution to its completion. Inclusion of respondents in the study will be pegged on their understanding of the study as well as their own willingness to take part in it. To ensure the integrity of data, the accuracy of encoding of the responses was checked to ensure that the statistics generated from the study are truthful and verifiable. Finally, the study sought approval from the university to conduct the research and attach the approved documents in the appendix.

3.11 Chapter Summary

The chapter described the methodology used in the study and contains the research design, study site, target population, sampling procedures, sample size, data collection methods and research instruments, data presentation methods, data analysis method used as well as the ethical considerations. This study used a research design that was based on an approach developed by Basri and Suliman (2012). The study employed a descriptive survey design in obtaining responses from the respondents. The study used mixed research methods which was a procedure for collecting, analyzing, and mixing both quantitative and qualitative research and methods in a single

study to understand a research problem. The study was conducted in Nakuru town, Nakuru County, at Shah Lalji Nangpar Academy. The target population in the study were teaching staff and students from the Shah Lalji Nangpar Academy Nakuru School. Other than the students and teaching staff, the school management was also included in the study for the purposes of diversity and clarity of information collected. It was estimated that the number of students in the target grades 11 to 13, teachers, and senior management at the school was about 78, which formed the study population.

The study employed a stratified sampling and simple random sampling technique in selecting the respondents. Students taking international curriculum were purposively selected because they use virtual learning. A simple random sampling was relied as the main basis of selecting respondents in the study. The population was stratified into students and teaching staff. Stratification of the population was done in order to ensure that subjects with similar characteristics are grouped together. Simple random sampling was then used to select the sample size from all the strata. The study used an exploratory data collection method using interviews because it allowed the study to investigate research questions that have not been elaborated in previous studies. Primary data collection methods were done through in-depth interviews using questionnaires with students, teachers, and school managers at Shah Lalji Nangpar Academy. The in-depth interviews were derived from the results of the analyzed questionnaires administered to students by the researcher with the help of research assistants. Secondary data collection was done was done through focusing on primary studies about teaching and online platforms provided in the literature review. The study ensured the validity of the content collected by the questionnaire so that it is representative of the target construct. The researcher evaluated the survey questionnaire so that it incorporated all the items that were crucial and eliminated undesirable items. Secondly, the study used a judgmental approach as the basis of testing the validity of questionnaire content through aligning with the literature review and undertook a follow-up assessment. Reliability of the instrument in this study was tested by the use of Cronbach's alpha coefficient.

A pilot study was performed prior to the main study to test the research instrument to develop methodological knowledge and awareness during the process of data collection. Data was presented on frequency tables to aid in the process of interpretation of the findings. Frequency

tables, graphs and pie charts will be used in presenting data. Both descriptive and inferential statistics were used in the process of data analysis. The data was analyzed using IBM SPSS Statistics (version 25). Qualitative data was analyzed through identifying the themes in data collected using the theme and explore approach. The main ethical concerns in the study were confidentiality and voluntary participation of students and management staff. To ensure the integrity of data, the accuracy of encoding of the responses will be checked to ensure that the statistics generated from the study are truthful and verifiable. Finally, the study sought approval from the university to conduct the research.

CHAPTER FOUR
RESULTS AND INTERPRETATIONS

4.1 Introduction

This chapter covers the data analysis, presentation of findings and discussions on the impact of virtual learning and online teaching platforms on academic performance of senior school students taking international Curriculum at Shah LaljiNangpar Academy Nakuru. The study explored the extent of use of virtual learning and teaching platforms, established how virtual learning and teaching platforms are used, the level of effectiveness of virtual learning and teaching platforms on the academic performance and some of the challenges faced in using virtual learning and online teaching platforms at Shah LaljiNangpar Academy.

4.1.1. Response Rate

The data in this study was collected using questionnaires distributed to students and teachers at school. The response rate from the questionnaire distributed to the respondents is shown in the table below. The findings show a response rate of 72.6%, which is reliable for providing sufficient data for the Study that can be generalized for the school.

Table 4.1: Response rate

Category	Target	Response	Percentage
Students	39	26	66.7
Teachers	23	19	82.6

Response rate	62	45	72.6

4.2 Demographic characteristics of respondents

The demographic characteristics of the students and teachers involved in this study were classified according to their gender and level of education.

4.2.1 Gender

It is important for the study to assess the influence of gender on how virtual learning and adoption of teaching platforms can influence the student performance. The students were classified as male or female to distinguish their gender so that a proper influence of gender on performance through virtual learning can be established. The results showed that 26 students responded to the questionnaire and 13 of them were male while the remaining 13 were female. Concerning the teachers, a total of 19 respondents were sampled where 10 were male while the remaining 9 were women as shown in table 4.2 below. Overall, 23 of the respondents were males while the remaining 22 were females giving a 51.1 % and 48.9% respectively which minimises the impact of gender bias in assessing the impact of virtual learning on student performance.

Table 4.2: Distribution of respondents by gender

		Gender of respondent	
		Female	Male
Student	n	13	13
	%	50.0%	50.0%
Teacher	n	9	10
	%	47.4%	52.6%
Total	n	22	23
	%	48.9%	51.1%

4.2.2 Level of Education

The level of education is important in demonstrating the extent in which virtual learning and teaching platforms can be used in teaching international curriculum.
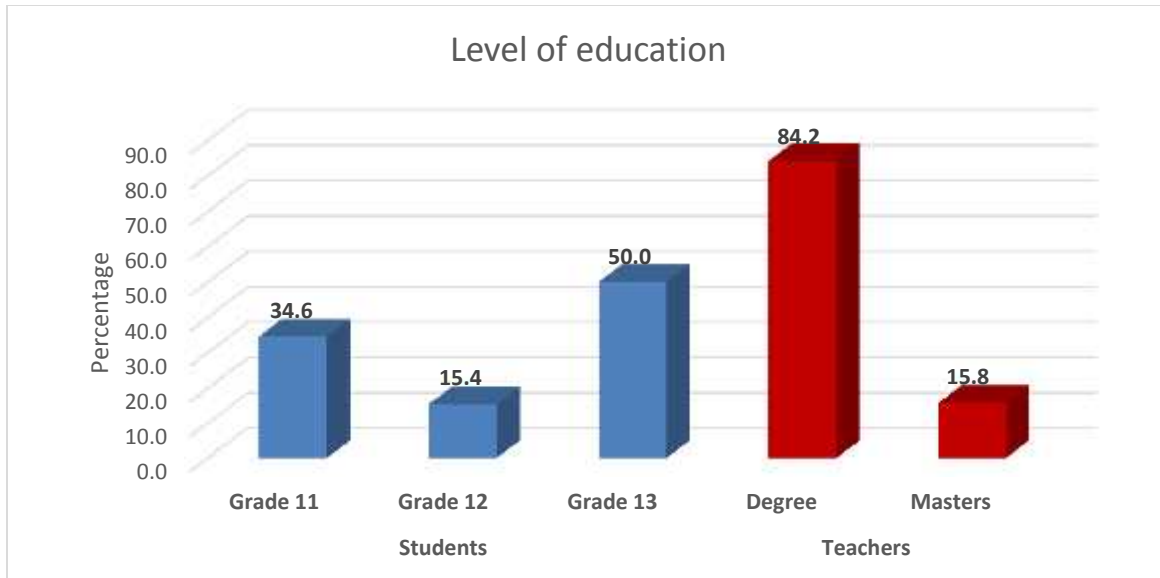
Figure 4.1: Level of Education

The students were sampled from grade 11, 12 and 13 while the teacher's level of education was classified on Degree and Masters. The findings of the study show that grade 11 students (34.6%), grade 12 students (15.4%), and grade 13 students (50.0%). The students were at IGCSE (equivalent to Form 4), AS and A Level (equivalent to Form 5 and 6). On the other hand, most of the teachers (84.2%) indicated that they had attained an undergraduate degree while 15.8% had a master's degree.

4.3 Descriptive analysis

In this section, the results are provided on the use and duration of using virtual learning and teaching platforms at the school. The descriptive statistics link virtual learning and duration of using virtual learning platforms in promoting academic success of students taking international curriculum at the school. The results provide specific issues in the duration of using virtual learning platforms to make inferences on the suitable methods of using teaching platforms to enhance performance of students.

4.3.1 The extent of use of virtual learning platforms at Shah LaljiNangpar Academy

The first objective sought to establish the extent to which virtual learning/teaching platforms have been used in Shah LaljiNangpar international school. The question was posed to both teachers and students and results were as shown in Figure 4.2.
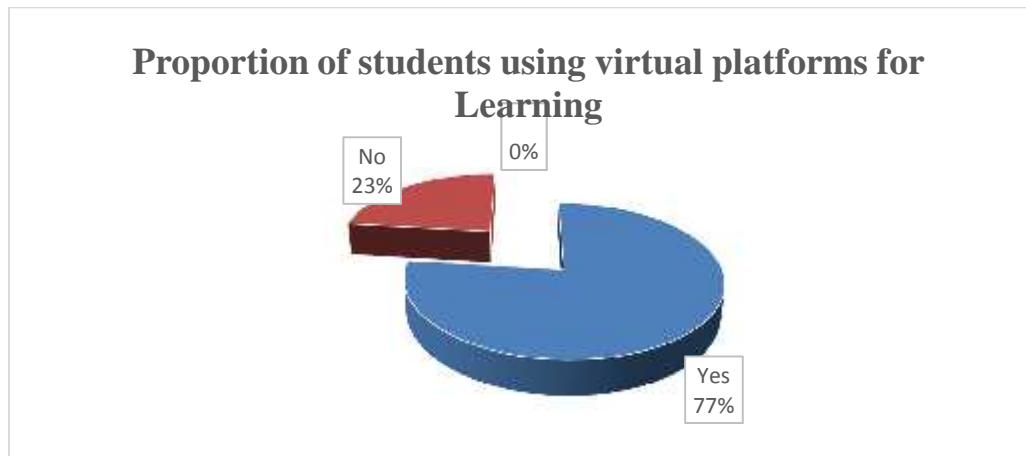
Figure 4.2: Proportion of respondents using virtual platforms for learning/teaching

Based on the findings, majority of the students (77%) agreed to be using virtual platforms for learning and teaching while only 23% stated that they do not use virtual learning platforms for learning the international curriculum. On the other hand, all the teachers (100%) reported to have used the virtual platforms in teaching the international curriculum at the school.

Duration of using virtual platforms

The respondents were asked the duration of time they have been using virtual platforms for teaching and learning international curriculum.
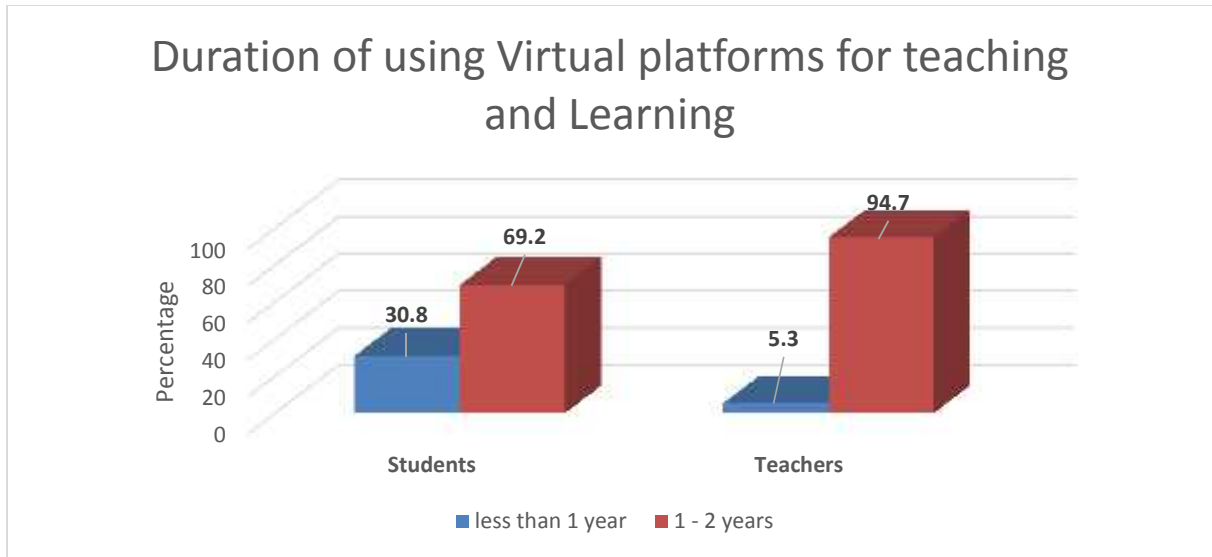
Figure 4.3: Duration of using Virtual platforms for teaching and learning

As evidenced in Figure 4.3 above, 30.8% of the students reported that they have been using the virtual learning platform for less than a year. In addition, most of the students (69.2%) had used the virtual platform for a period of between one and two years. The results indicate that majority of the students 80.8% have used the virtual platform for utmost two years. This implies that most of the students started using the virtual learning platforms following the onset of COVID 19 pandemic in March 2020 which resulted to closure of learning institutions. Since schools had to find an alternative learning methodology, most learning institutions adopted virtual learning and teaching.

On the other hand, most of the teachers (94.7%) reported to have used the online teaching platforms for a period between one to two years. Moreover, 5.3% of teachers had used the virtual platform for teaching for less than one year. Besides, there was a statistically significant different between the duration of using the virtual learning/teaching platforms between the teachers and student where teachers had used the platforms longer than the students ($X^2_{(3, 0.975)}$ = 8.324, p-value <0.05).

Moreover, the respondents were asked their level of agreement regarding statements concerning the extent to which the virtual learning/teaching platforms have been used at the institution. This was important in identifying the ways in which the usage of virtual platforms can influence the performance of students. The results were as illustrated in Table 4.3 below.

Table 4.3: The extent of use of virtual learning platforms

		Strongly disagree	Disagree	Undecided	Agree	Strongly Agree
Virtual learning and teaching platforms have been used extensively in the school	Students	7.7%	23.1%	7.7%	50.0%	11.5%
	Teachers	5.3%	15.8%	0.0%	57.9%	21.1%
	Overall	6.7%	20.0%	4.4%	53.3%	15.6%
Virtual learning and teaching have been integrated in delivery of learning content	Students	3.8%	11.5%	19.2%	46.2%	19.2%
	Teachers	10.5%	10.5%	0.0%	42.1%	36.8%
	Overall	6.7%	11.1%	11.1%	44.4%	26.7%
Virtual learning and teaching is used in assessments (administer exams)	Students	7.7%	26.9%	11.5%	38.5%	15.4%
	Teachers	15.8%	10.5%	10.5%	31.6%	31.6%
	Overall	11.1%	20.0%	11.1%	35.6%	22.2%
Virtual learning and teaching platforms are used in administrations of Continuous Assessment Tests (CATs)	Students	7.7%	26.9%	11.5%	38.5%	15.4%
	Teachers	15.8%	10.5%	10.5%	31.6%	31.6%
	Overall	11.1%	20.0%	11.1%	35.6%	22.2%
Virtual learning and teaching platforms have integrated ICT in the international curriculum	Students	7.7%	7.7%	23.1%	38.5%	23.1%
	Teachers	0.0%	0.0%	5.3%	47.4%	47.4%
	Overall	4.4%	4.4%	15.6%	42.2%	33.3%
Virtual learning platforms have given room for instructors to prepare and plan materials for online courses	Students	0.0%	7.7%	23.1%	42.3%	26.9%
	Teachers	0.0%	10.5%	5.3%	36.8%	47.4%
	Overall	0.0%	8.9%	15.6%	40.0%	35.6%

When asked about the extent of using virtual learning and teaching platforms at the school, 61.5% of students agreed that they have used it while only 30.8% disagreed that they do not use virtual platforms. On the same note, despite all the teachers indicating that they used virtual teaching platforms in the school, 79% of teachers agreed that they use virtual learning platforms extensively, while only 21.1% opined that although virtual platforms were used in delivering the curriculum, the use was not extensive. Moreover, regarding integration of virtual platforms in

delivering content, most of the students (65.4%) indeed ascertained that the virtual learning platforms had been integrated in delivering learning content at the institution. However, 15.3% of students disagreed. This finding was echoed by the teachers where 78.9% agreed that virtual platforms are integrated in delivering content while 21.1% indicated that it was not properly integrated to deliver content.

Further, the results showed that 57.8% of the respondents agreed that virtual platforms are used in administering Continuous Assessment Tests (CATs) while 31.1% of the respondents disagreed. Nonetheless, CATs and exams were administered but it came with challenges such as some students not submitting on time. Besides, majority (75.5%) of the respondents agreed that the virtual platforms have integrated ICT while only 8.8% held a contrary opinion. About preparation and planning of materials, three out of every four respondents (75.6%) agreed that the virtual platform was used to prepare and plan materials for international curriculum. However, 8.9% disagreed that virtual platforms can be used to prepare and plan online materials for teaching and learning. The third research question was to evaluate the extent in which virtual platforms have offered a mechanism for distance learning at the school. The results showed that 82.2% of the respondents agree that virtual platforms support distance learning while 11.1% disagreed that it is not a primary mechanism for distance learning.

4.3.2   How virtual learning and teaching platforms are used

The second objective of the study sought to examine how the virtual teaching/learning platforms were used at the learning institution. The follow-up questions to this section included determining how the virtual platforms support distance learning, whether virtual platforms can use IT to support online learning that is not provided by traditional education among other questions. The findings were as shown in Table 4.4 below.

Table 4.4: How virtual platforms were used in learning/teaching

	Strongly disagree	Disagree	Undecided	Agree	Strongly Agree
Students	0.0%	7.7%	11.5%	53.8%	26.9%

Virtual learning/teaching platforms have offered a primary mechanism for providing distance learning	Teachers	5.3%	10.5%	0.0%	26.3%	57.9%
	Overall	2.2%	8.9%	6.7%	42.2%	40.0%
Virtual teaching and learning has been successful as it allows video, audio and written communication	Students	3.8%	11.5%	11.5%	34.6%	38.5%
	Teachers	0.0%	15.8%	0.0%	47.4%	36.8%
	Overall	2.2%	13.3%	6.7%	40.0%	37.8%
Virtual learning and teaching can use IT as an additional method to traditional education, or for exclusively online learning	Students	0.0%	3.8%	11.5%	53.8%	30.8%
	Teachers	0.0%	10.5%	0.0%	42.1%	47.4%
	Overall	0.0%	6.7%	6.7%	48.9%	37.8%
Virtual learning and teaching makes use of diverse features such as forums, chats and private messaging which enhance the learning experience	Students	7.7%	3.8%	11.5%	38.5%	38.5%
	Teachers	0.0%	5.3%	5.3%	21.1%	68.4%
	Overall	4.4%	4.4%	8.9%	31.1%	51.1%
Virtual learning and teaching platforms have enhanced student engagement on virtual learning resources	Students	3.8%	15.4%	23.1%	34.6%	23.1%
	Teachers	5.3%	15.8%	0.0%	57.9%	21.1%
	Overall	4.4%	15.6%	13.3%	44.4%	22.2%
Virtual learning and teaching platforms have enhanced group interactions in virtual learning resources	Students	3.8%	34.6%	11.5%	23.1%	26.9%
	Teachers	5.3%	26.3%	0.0%	36.8%	31.6%
	Overall	4.4%	31.1%	6.7%	28.9%	28.9%
Virtual learning and teaching platforms have been incorporated in students' learning process by availability of eLearning "Live"	Students	0.0%	23.1%	15.4%	42.3%	19.2%
	Teachers	10.5%	5.3%	5.3%	47.4%	31.6%
	Overall	4.4%	15.6%	11.1%	44.4%	24.4%

Frequently Asked Questions
(FAQ) on technical areas

As evidenced in the table above, most of the respondents (77.8%) agreed that virtual platforms achieve success because of supporting video, audio and written communication that make it easy for learning and teaching while 15.5% disagreed. Moreover, 86.7% agreed that the virtual platforms can use IT as an additional method to traditional education to support online learning whereas 6.7% of the respondents held a contrary opinion. Regarding the suitability of virtual platforms was that it makes use of diverse features that enable the learning experience, results showed that 82.2% of the respondents concurred that virtual platforms indeed made use of diverse features like forums, chats, and private messaging to improve the overall learning experience. However, 8.8 % of the respondents refuted this assertion.

The other part in this section was to find out how the use of virtual platform has enhanced the level of student engagement. The results show that that 66.6% of the respondents (teachers and students) agreed that virtual platforms enhance the level of student engagement during the learning process. Another 20% of the respondents disagreed while 13.3% of the respondents were undecided on whether it enhances student engagement. Another aspect involved in the study was to determine whether virtual platforms promote the level of group interactions. Results from this question indicate that 57.8% of the respondents argue that it can improve the level of group interactions within the virtual learning environment. 35.5% disagreed while 6.7 were undecided about the impact of virtual platforms in creating an environment for group interactions.

It is important that a relationship of virtual platforms and eLearning and FAQs concerning technical areas are evaluated. The results show that 68.8% of the respondents agreed that virtual platforms have been incorporated into the student learning process through availability of eLearning and FAQs sections. This is important because it provides students with an opportunity to seek clarification of the issues that are not properly understood. 20% of the respondents disagreed that virtual learning is not integrated into student learning process while the remaining 11.1% are undecided.

4.3.3 The level of effectiveness of virtual learning platforms on the academic performance of the students

The study's third objective sought to determine the effectiveness of the virtual learning platforms on the academic performance of students. Under this objective, the respondents were asked whether virtual platforms have increased benefits in the teaching process because of offering **visibility** of the virtual teaching status among other questions.

Table 4.5: Effectiveness of virtual learning platforms on the academic performance of the students

		Strongly disagree	Disagree	Undecided	Agree	Strongly Agree
Virtual teaching platforms have been very instrumental in improving the performance of students	Students	15.4%	26.9%	19.2%	19.2%	19.2%
	Teachers	0.0%	21.1%	15.8%	52.6%	10.5%
	Overall	8.9%	24.4%	17.8%	33.3%	15.6%
The school has registered improved performance since it started using virtual teaching fully	Students	7.7%	11.5%	50.0%	26.9%	3.8%
	Teachers	0.0%	21.1%	36.8%	42.1%	0.0%
	Overall	4.4%	15.6%	44.4%	33.3%	2.2%
Virtual Teaching platforms have increased benefits on Teachers' teaching process by providing visibility of virtual teaching system status	Students	3.8%	11.5%	34.6%	38.5%	11.5%
	Teachers	0.0%	15.8%	10.5%	42.1%	31.6%
	Overall	2.2%	13.3%	24.4%	40.0%	20.0%
Virtual Teaching platforms have increased benefits on Teachers' teaching process by recognition rather than recall of virtual Teaching tools and functionalities	Students	3.8%	7.7%	38.5%	42.3%	7.7%
	Teachers	0.0%	10.5%	31.6%	26.3%	31.6%
	Overall	2.2%	8.9%	35.6%	35.6%	17.8%
Virtual Teaching platforms have increased benefits on Teachers'	Students	3.8%	15.4%	30.8%	42.3%	7.7%
	Teachers	0.0%	10.5%	21.1%	52.6%	15.8%

learning process are enhanced by the ease to understand and navigate through virtual teaching system		2.2%	13.3%	26.7%	46.7%	11.1%
	Overall					
Virtual Teaching platforms have increased benefits on Teachers' learning process are enhanced by memorability - how easy is it to remember and use virtual teaching system	Students	7.7%	3.8%	26.9%	50.0%	11.5%
	Teachers	0.0%	5.3%	26.3%	36.8%	31.6%
		4.4%	4.4%	26.7%	44.4%	20.0%
	Overall					

Based on the findings, generally (combining both teachers and students), 48.9% of the respondents agreed that use of virtual platforms had been very instrumental in improving the academic performance of students taking international curriculum. In addition, 17.8% of the respondents (were not sure whether virtual platforms have played a role in improving the performance of students taking international curriculum while one third (33.3%) of the respondents disagreed that it has not played a role in improving the performance of students taking international curriculum. With regard to registration of virtual platforms, 35.5% reported that the school had registered improved performance since it started using virtual teaching fully, while 20% of the respondents contradicted.

The second aspect was to establish the impact of using virtual platforms to improve the teaching process by offering visibility. The results showed that 60% of the respondents agreed that virtual platforms increase benefits on the teachers' teaching process because of providing visibility while 15.5% of the respondents disagreed. Students are important in determining how visibility of the teaching process can be achieved. The results show that a majority of the students (51%) agreed that virtual platforms increase the visibility of teaching processes while 14.3% disagreed. On the other hand, teachers had an important perception of virtual platforms in enhancing visibility in the teaching process. In this regard, 73.7% of teachers agreed that using virtual platforms improves the visibility of teaching process while 15.8% of the respondents disagreed. This indeed

underscored the importance of using virtual learning/teaching platforms especially during pandemics which impede physical meetings.

In traditional teaching, students and teachers are expected to recall the teaching tools so that they can improve understanding. The respondents were asked whether virtual teaching platforms have increased benefits on teachers' teaching process by recognition and understanding rather than recall of the virtual teaching tools and their functionalities. From the results, 53.4% of the respondents (50% of the students and 58.2% of the teachers) agreed that virtual platforms improved the recognition of virtual teaching tools and their functionalities while 11.1% held a contrary opinion. It was important to interrogate how students perceive the overall influence of virtual tools in enhancing recognition of virtual tools and functionalities. This was important because it points on the need to improve training of students on how to use the virtual tools. Teachers had a better understanding of the virtual tools that improve recognition and functionalities in the teaching process.

Besides, the respondents were asked to whether using virtual teaching platforms have increased the benefits of teachers learning process by facilitating the ease of understanding and navigating through the virtual teaching system. Students provide a better response to correlate how the virtual platforms can be used to navigate through the virtual platform to foster understanding. While the ability of teachers to use the virtual learning platform provides an important part in understanding the overall use of the platforms. The results show that 57.8% agreed that virtual platforms improve the ease of understanding content by making navigation possible while 15.5% disagreed.

With regard to the role of virtual teaching tools to improve memorability of content so that students are able to have a better understanding of content, the results indicated that 64.4% of the respondents agreed that virtual teaching tools indeed improved the level of memorability of content while 8.8% disagreed. On this note, most of the students (61.5%) ascertained that they had a better memory of the content taught through the virtual platforms. Meanwhile, 68.4% of teachers agreed they had a proper mastery of the functionalities and tools of virtual platforms which enabled them to boost the level of memorability of content used in the virtual platforms.

4.3.4 The challenges of using virtual learning and teaching

The fourth objective of the study sought to determine the challenges faced by both the teachers and students in executing virtual learning. This section was divided into two parts; one seeking to find out the challenges faced by teachers and the second focusing on the challenges faced by the students while using the virtual learning platform.

Challenges faced by teachers in delivering virtual learning

There were several challenges that teachers faced while delivering the virtual learning and this affected performance of students. The teachers were asked to give their level of agreement on the effect the challenges had on their ability to deliver virtual learning to the students effectively. The results were as illustrated in Figure 4.4 below.
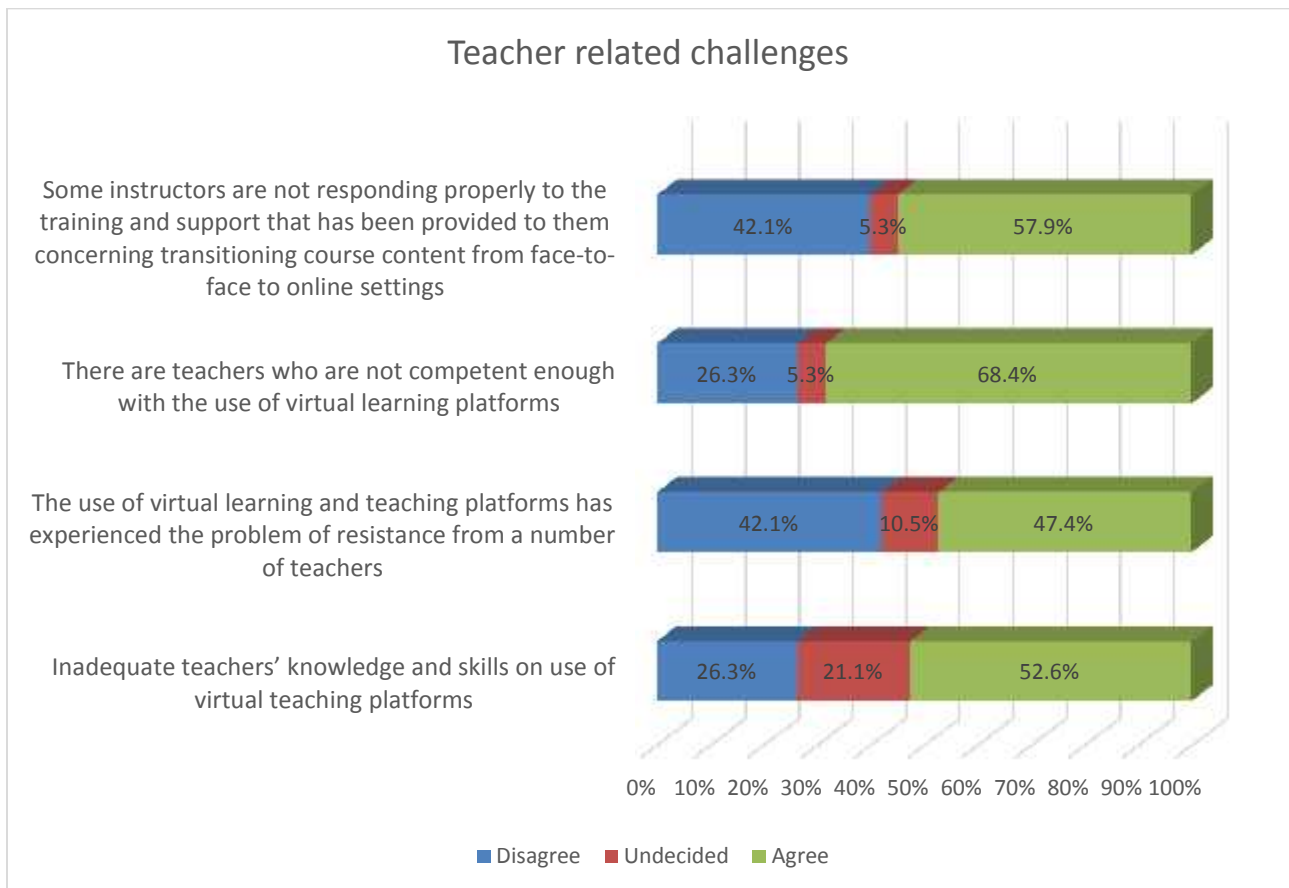
Figure 4.4: Teacher related challenges

Using technology in teaching is faced with several challenges that need to be addressed to improve the level of understanding. Virtual teaching platforms like any other technological innovation are faced with challenges. The teachers were asked whether instructors are not responding properly to transitioning and support offered for enhancing transition of course content from a face-to-face environment to an online setting. From the results in Figure 4.4, 57.9% of teachers agreed there were challenges in transitioning to online teaching setting while 36.9% indicated they did not face any transitional difficulties.

Mastery of using the virtual platforms is important in ensuring effectiveness in delivery of international curriculum content. When teachers were asked about incompetence in using the virtual teaching platforms, 68.4% agreed that the incompetence of using the virtual platforms was a major challenge while 26.3% disagreed. With regard to teachers' resistance to new technology, it was found out that majority of the teachers (57.4%) especially those who were used to the traditional teaching methodologies resisted virtual teaching platforms. However, 42.1% of the teachers did not find resistance as a challenge to executing online teaching. It is evident that technologies need skills and knowledge on how they operate to determine how effective they can be used to achieve their objectives. In this regard, teachers were asked about whether they have inadequate knowledge and skills about the virtual teaching platforms and 73.7% agreed that they lack knowledge and skills, while 26.2% disagreed.

Challenges faced by student in virtual learning

Similarly, there were several challenges that students faced while with the virtual learning and this affected their academic performance. They were asked to give their level of agreement on the effect the challenges had on their performance. The results were as illustrated in Figure 4.5 below.
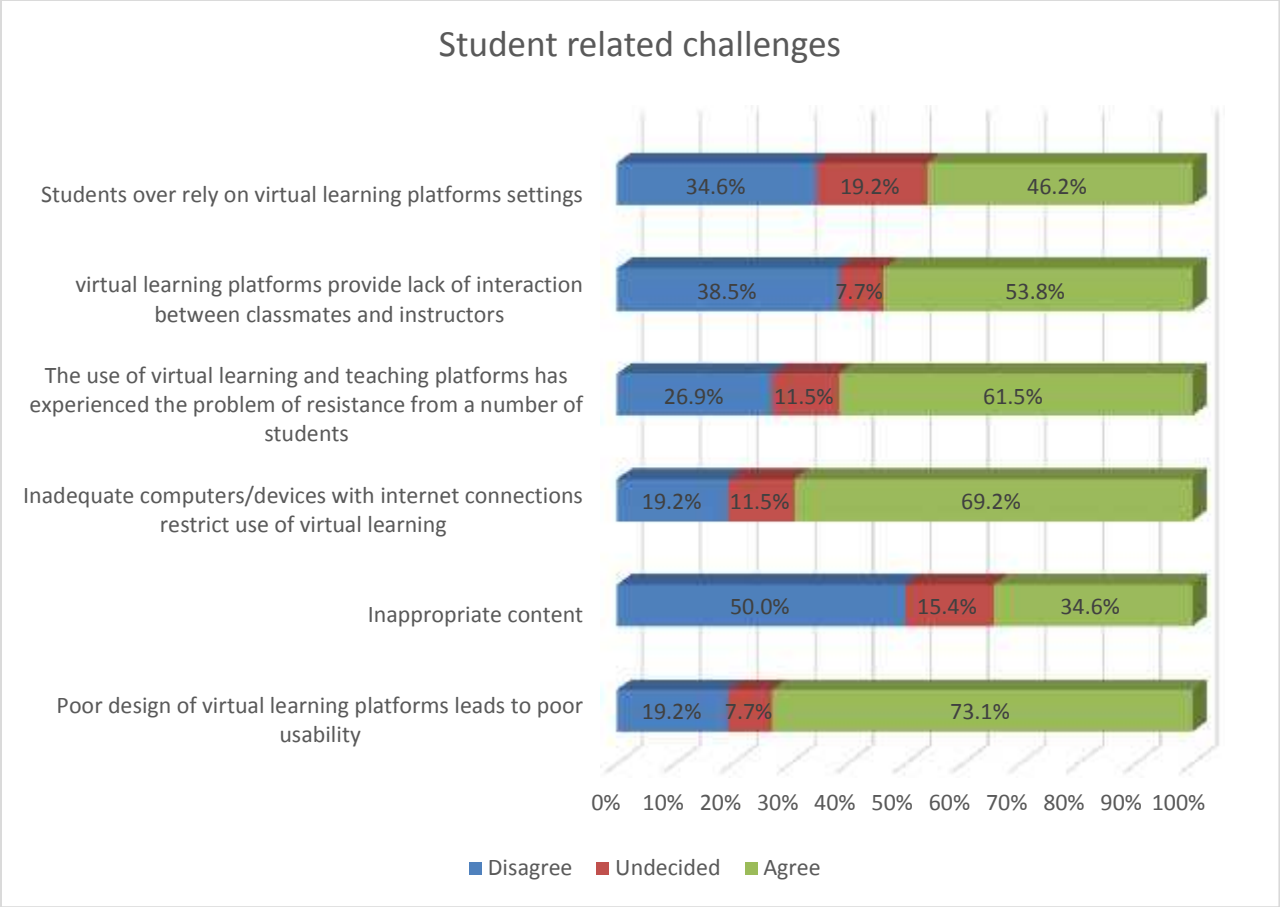
Figure 4.5: Student related challenges

Based on the results, students' **over-reliance** on virtual learning platforms was a major challenge to 46.2% of the students. Another challenge was **lack of interaction** between instructors and students especially while using the virtual learning platforms which posed a threat to the performance of 53.9% of students. Ideally, proper interaction is fundamental in ensuring students are able to understand course content and improve their academic performance.

Besides, the results show that 61.5% of students resisted of virtual teaching platforms which was a major challenge that impeded their performance. However, resistance on the use of virtual teaching platforms in learning international curriculum was not an issue to 26.9% of the students. Moreover, 69.3% of students reported to have difficulties in accessing devices that are connected to the internet which would aid the virtual learning while 19.2% did not encounter such difficulties. This is a big proportion bearing in mind that studies have shown that virtual teaching platforms

rely heavily on the internet to function properly, and all students must have access to network computer connected devices.

Further, students were asked about the appropriateness of content delivered through the virtual teaching platforms. The results show that 34.6% agreed that content shared through the virtual teaching platforms is inappropriate while 50% of the students disagreed. Regarding the design of virtual learning platforms, most of the students (73.1%) opined that the virtual learning platforms used at the institution were poorly designed and this contributed to poor usability.

4.3.5 External factors that influence success of Virtual teaching and learning platforms

The study further sought to determine the influence of factors such as policy and regulations, supporting school infrastructure and student' attitudes on virtual learning. Both teachers and students were asked if they thought the factors affected the delivery of virtual learning. The results were as shown in Table 4.6 below.

Table 4.6: External factors influencing success of virtual learning platforms

		Disagree	Undecided	Agree
Policies and regulations are sufficient to support virtual learning and teaching at the school	Student	23.1%	23.1%	53.8%
	Teacher	26.3%	15.8%	57.9%
	Overall	24.4%	20.0%	55.6%
The school ICT supporting infrastructure is sufficient for virtual teaching and learning at the school	Student	23.1%	19.2%	57.7%
	Teacher	15.8%	10.5%	73.7%
	Overall	20.0%	15.6%	64.4%
Teachers have a positive perception to virtual teaching and learning at the school	Student	26.9%	15.4%	57.7%
	Teacher	5.3%	26.3%	68.4%
	Overall	17.8%	20.0%	62.2%

The first factor examined was the influence of policy and regulations relating to virtual learning. The results indicated that 55.6% of the respondents agreed that policies and regulations were sufficient to support virtual learning and teaching at the school while 24.4% reported that the policies and regulations were not sufficient. Moreover, it was important to understand whether the ICT infrastructure laid by the school is sufficient in supporting virtual learning. The results show that 64.4% of the respondents agreed the school has a proper ICT infrastructure whole 20% disagreed. Lastly, the respondents were asked whether they have a positive perception to the virtual

teaching and learning. The results indicate that 62.2% of the respondents agreed that teachers have a positive perception to virtual teaching and learning while 17.7% disagreed.

4.3.6   Student Performance

The main focus of this study was student's academic performance. The respondents were asked to give their level of agreement with various statements regarding the contribution virtual learning/teaching platforms on the academic performance of students. The results were as shown in Table 4.7.

Table 4.7: Student academic performance

		Disagree	Undecided	Agree
Virtual learning and teaching has improved accessibility of education and learning leading to improved performance	Student	23.1%	26.9%	50.0%
	Teacher	5.3%	21.1%	73.7%
	Overall	15.6%	24.4%	60.0%
Virtual learning and teaching has improved adequacy of learning materials leading to improved performance	Student	11.5%	15.4%	73.1%
	Teacher	10.5%	15.8%	73.7%
	Overall	11.1%	15.6%	73.3%
Virtual learning and teaching has necessitated training on basic ICT skills leading to better understanding of content and performance	Student	7.7%	23.1%	69.2%
	Teacher	0.0%	10.5%	89.5%
	Overall	4.4%	17.8%	77.8%
Virtual learning and teaching is motivating students to learn leading to better performance	Student	26.9%	23.1%	50.0%
	Teacher	10.5%	31.6%	57.9%
	Overall	20.0%	26.7%	53.3%
Virtual learning and teaching enhances flexibility in learning leading to better performance	Student	19.2%	26.9%	53.8%
	Teacher	10.5%	15.8%	73.7%
	Overall	15.6%	22.2%	62.2%
Virtual learning and teaching has enhanced efficiency of classroom time learning leading to better performance	Student	23.1%	26.9%	50.0%
	Teacher	15.8%	15.8%	68.4%
	Overall	20.0%	22.2%	57.8%

As evidenced in the Table above, majority of the respondents (60%) agreed that virtual learning improves accessibility of education while 15.5% disagreed. It was evident that there was a challenge of accessing alternative materials with the traditional mode of education delivery which necessitated the need to implement virtual learning. In addition, adequacy of learning materials is an important factor in promoting improved performance of students using the virtual learning

platforms. The results show that 73.4% of the respondents agreed that virtual teaching platforms provide adequate learning materials while 11.1% disagreed.

Moreover, the implementation of virtual learning platforms requires knowledge and skills in computer usage. Consequently, students and teachers can effectively achieve success in the virtual teaching platforms by training on ICT skills. The results show that 89.5% of the respondents agreed that virtual learning platforms have increased the need to train on ICT skills to improve the level of understanding content while only 10.5% were undecided. On the other hand, the level of motivation of students to learn is important in ensuring an improved level of performance. The respondents were asked whether the virtual learning and teaching platforms have an important influence in motivating students to learn. The results show that 53.4% of the respondents agreed that virtual learning platforms enhance motivation of students to learn while 20% disagreed.

Besides, flexibility in learning is an important factor in promoting performance of students using a virtual learning platform. The results indicate that 62.2% of the respondents agreed that virtual learning platforms enhance flexibility in learning while 15.6% disagreed. Another 22.2% of the respondents were undecided on how virtual platforms provide flexibility of learning process. Also, efficiency in the learning process particularly management of classroom time is required for improving academic performance. The results of the study have shown that 57.8% of the respondents agreed that virtual learning and teaching promotes efficiency in the use of classroom time while 20% of the respondents disagreed.

4.4 Inferential analysis

4.4.1 Factor Analysis

Before conducting diagnostic tests and thereafter correlation and regression analysis, factor analysis was done to identify factors which may not be instrumental to the study and get composite variables to be used for inferential analysis. Factor analysis acts as a gauge of the substantive importance of a given variable to the factor and it was used to identify and remove hidden constructs or variable items that do not meet the objectives of the study and which may not be apparent from direct analysis (Ben-David, *et al.,* 2010). Communalities and eigen values were used to show the substantive importance of variable factors. In this study eigen values for each

variable were extracted using principal component analysis. The components with eigen values of 1 and above were used for further analysis. These were combined to come up with a composite variable to be used in regression analysis.

To conduct hypothesis testing, the study used factor analysis for dimension reduction and principal component analysis (PCA) to extract factors scores that were used for regression. The study found either PCA or computing composite score based on all indicators measuring similar constructs yielded similar results and therefore opted PCA. Where more than one principal component was generated, the researcher combined the scores by addition to get resultant scores with higher cumulative variation. The composite variables generated by PCA were found to meet all classical linear regression assumption of no multicollinearity, non-autocorrelation, and homoscedasticity. Similarly, composite scores also met these assumptions as shown below.

4.4.2   Diagnostic tests

Before carrying out regression analysis, it was important to test for all the assumptions of multiple linear regression analysis. These tests included normality test, autocorrelation, multicollinearity, heteroscedasticity, and linearity.

Normality

Normality test is central to statistics especially when parametric tests such as correlation and regression analysis are to be used. Therefore, in this study normality tests were carried out used to determine if the data is well modelled and normally distributed. The study applied Kolmogorov-Smirnov normality test whereby in Kolmogorov- Smirnov test, if the tests of normality will yield a figure of less than 0.05 it will mean that the data is not normally distributed. The Kolmogorov and Shapiro-Wilk test helps us conclude whether our data is normally distributed or not.

H_0: *The data is normally distributed*

H_1: *Data is not normally distributed or not from a normal distribution*

From the results, the response variable (conduct disorder) showed normality using both Kolmogorov- Smirnov and Shapiro-Wilk tests (p-value >0.05).

Table 4.8: Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Performance	.371	44	.078	.984	44	.087

a. Lilliefors Significance Correction

Autocorrelation

Durbin-Watson test for autocorrelation was conducted to establish whether or not the residuals are serially correlated. The Durbin Watson test reports a test statistic, with a value from 0 to 4, where: 2 denotes no autocorrelation; 0 to 2<2 denotes a positive autocorrelation, while >2 denotes a negative autocorrelation. The decision rule is that test statistic values in the range of 1.5 to 2.5 are relatively normal. Values outside this range could be cause for concern (Field, 2009). The results from the Durbin-Watson test for autocorrelation value of 1.728 shows that the variables were not auto-correlated.

Table 4.9: Autocorrelation test

Model	Durbin-Watson
1	1.728[a]

a. Predictors: (Constant), Effect of use, Extent of use, Method of use

b. Dependent Variable: Performance

Multi-collinearity test

Multi-collinearity refers to the presence of correlations between the predictor variables (William et al., 2013). Any situation where there is a high degree of association between independent variables, it is said to be a problem of multi-collinearity and it results in large standard errors of the coefficients associated with the affected variables. Multi-collinearity inflates the standard errors and confidence intervals leading to unstable estimates of the coefficients for individual predictors (Belsley*et al.*, 1980). In this study multi-collinearity was tested using Variance Inflation Factor (VIF). This was calculated using SPSS whereby the rule of the thumb is that a VIF for all the independent and dependent less than 3 (VIF 3) indicate no multi-collinearity while a VIF of

more than 10 (VIF 10) indicates a problem of multi-collinearity. The summary is indicated in Table 4.10.

Table 4.10: Test for multi-collinearity

		Coefficients[a]	
		Collinearity Statistics	
Model		Tolerance	VIF
1	Extent of use	.459	2.178
	Method of use	.360	2.776
	Effect of use	.256	3.913

a. Dependent Variable: Performance

The results indicated that there was no multi-collinearity between the independent variables and the dependent variable since the resulting V.I.F statistics between all the independent variables and dependent variable was between 1 and 5 therefore there was no multi-collinearity.

Heteroscedasticity

The classical linear regression model (CLRM) expect that the error term is homoscedastic, that is, it has constant variance. On the off chance that the error variance isn't steady, at that point there is heteroscedasticity in the data. To test for heteroscedasticity, the Breusch-Pagan/Koenker test will be utilized. The null hypothesis of the study was that the error variance is homoscedastic. On the off chance that the null hypothesis is rejected and a conclusion made that heteroscedasticity is available in the panel data, at that point this would be accounted for by running a Feasible generalized least squares (FGLS) model which estimates the coefficients of a multiple linear regression model and their covariance matrix in the presence of non-spherical innovations with an unknown covariance matrix.

Table 4.11: Breusch-Pagan and Koenker test for heteroscedasticity

	LM	Sig
BP	2.674	.614
Koenker	2.639	.620

Null hypothesis: heteroskedasticity not present (homoskedasticity).

If sig-value less than 0.05, reject the null hypothesis.

Note: Breusch-Pagan test is a large sample test and assumes the residuals to be normally distributed.

Linearity test

This was tested using a normal P-P plot.
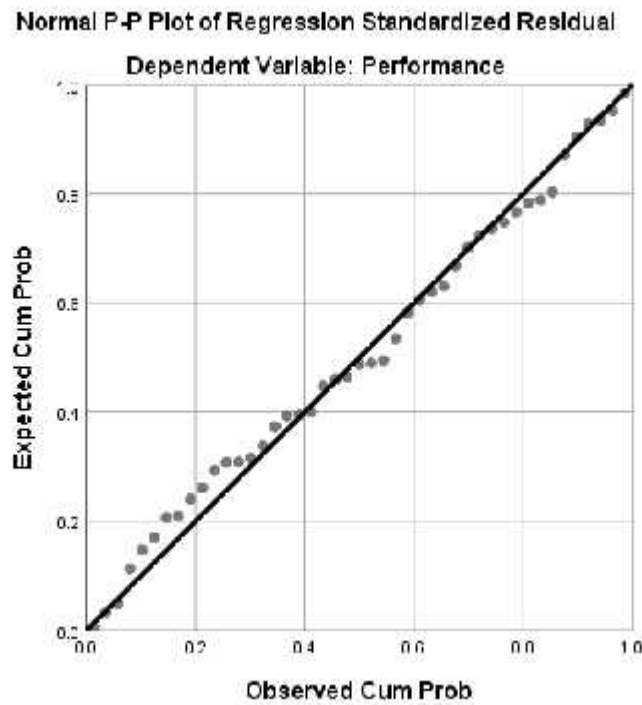
Figure 4.6: Test for linearity

4.4.3   Correlation analysis

Pearson's correlation analysis was conducted to establish the relationships between the study variables. The results were as illustrated in Table 4.12 below.

Table 4.12: Correlation analysis results

Correlations		

		Performance	Extent of use	Method of use	Effect of use	Enablers
Performance	Pearson Correlation	1	.722**	.617**	.800**	.673**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	45	45	45	45	45
Extent of use	Pearson Correlation	.722**	1	.594**	.735**	.546**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	45	45	45	45	45
Method of use	Pearson Correlation	.617**	.594**	1	.800**	.503**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	45	45	45	45	45
Effect of use	Pearson Correlation	.800**	.735**	.800**	1	.619**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	45	45	45	45	45
Enablers	Pearson Correlation	.673**	.546**	.503**	.619**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	45	45	45	45	45

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

As evidenced by the results in Table 4.9 above, there was a strong positive and significant relationship between extent of using virtual platforms and the academic performance of students (r= 0.722, n=45; p < 0.001). This implies that an increase in the extent of use of virtual learning platforms would increase student performance and vice versa. The results further revealed that there was a strong, positive and a significant association between method of using the virtual learning platforms and student performance (r = 0.617, n=45, p < 0.001).

In addition, the results depicted a positive yet strong association between effect of use of the virtual learning platforms and the academic performance of students (r = 0.800, n=45, p<0.001) which was statistically significant at 95% confident interval. Moreover, there was evidence of a strong, positive correlation between external factors (enablers of virtual learning) and the academic performance of student (r = 0.673, n=45, p < 0.001). This association was statistically significant at p<0.05. The positive correlations imply that the variables change in the same direction where an increase in the independent would lead to an increase in the dependent and vice versa.

4.4.4 Multiple linear regression

Regression analysis was conducted to measure the ability of the independent variable(s) to predict an outcome in the dependent variable where there is a linear relationship between them. Regression analysis can also be used determine the strength of the relationship between the independent and dependent variables and to determine the combined effect of all the independent variables on the dependent variable (Cooper & Schindler, 2010). The coefficient of determination (R-square) was used to measure the change in dependent variable explained by the change in independent variable(s) while F –test was carried out to evaluate the significance of the overall model and to define the relationship between the dependent variable and independent variables.

Goodness of fit

Goodness of fit of the model refers to how well the model explains the variations in the dependent variable (Gujarati, 2012). It evaluates whether the model is good, reliable, and valid to be used for prediction. In this study, the R squared, Standard error of estimate (S.E.) and the F-test statistic were used respectively to evaluate the goodness, reliability, and validity of the various models. In this study F-test was used further to determine the validity of the model while R squared was used as a measure of the model goodness of fit. The regression coefficient summary was then used to explain the nature of the relationship between the dependent and independent variables.

Table 4.13: Goodness of fit of the model

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.825[a]	.680	.657	.58555909

a. Predictors: (Constant), Effect of use, Extent of use, Method of use
b. Dependent Variable: Performance

Coefficient of determination explains the extent to which the change in the dependent variable can be explained by the change in the independent variables or the percentage of variation in the dependent variable that is explained by all the independent variables. The coefficient usually lies between 0 and 1 whereby 0 indicates a complete lack of fit while 1 indicates a perfect fit. Therefore, the closer it is to 1 the better the fit.

An R-square value of 0.680 was established and adjusted to 0.657. This means that the independent variables (effect of use, extent of use and method of using virtual platforms) could explain 65.7% of the conduct disorder while only 34.3% of student performance can be explained by factors not included in this model. The standard error of estimate is the standard estimate of the deviation of the dependent variable about the regression line (Gujarati, 2012; Brooks, 2014). The smaller the estimate the better the fit to the actual data.

Table 4.14: The ANOVA table

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	29.942	3	9.981	29.108	.000[b]
	Residual	14.058	41	.343		
	Total	44.000	44			

a. Dependent Variable: Performance
b. Predictors: (Constant), Effect of use, Extent of use, Method of use

Analysis of Variance (ANOVA) was used to test the overall significance of the regression model. The null hypothesis for this test is that the predictor variables do not have explanatory power ($\beta_1 = \beta_2 = \beta_3 = 0$). The p-Value of 0.001 means that the R squared is significantly greater than zero thereby our predictors can account for a significant amount of variance in conduct disorder. With a significant p-value, we reject the null hypothesis and adopt the alternative hypothesis and conclude that the predictors have explanatory power ($\beta_1 \neq \beta_2 \neq \beta_3 \neq 0$). Therefore, the regression model is significant ($F_{(3, 44)} = 29.108$, $p<0.001$; $R^2 = 0.680$).

Table 4.15: Regression coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	1.330E-16	.087		.000	1.000	-.176	.176

	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
Extent of use	.292	.130	.292	2.244	.030	.029	.555
Method of use	-.067	.147	-.067	-.458	.649	-.364	.230
Effect of use	.639	.175	.639	3.658	.001	.286	.991

a. Dependent Variable: Performance

Results of the regression analysis indicated that the extent of using the virtual platforms as well as their effect significantly influenced the academic performance of students. For instance, an increase in the use of the virtual platforms led to increase in student performance by 0.292 points when other factors are held constant. Similarly, a unit increase in the effect of using the virtual platforms would lead to increase in student performance by 0.639 points when holding other factors constant. These relationships were statistically significant ($p < 0.05$).

Table 4.16: Moderation analysis results

		Coefficients[a]						
		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	.008	.086		.088	.931	-.167	.182
	Extent of use	.240	.127	.240	1.885	.067	-.018	.497
	Method of use	-.072	.141	-.072	-.513	.611	-.358	.213
	Effect of use	.512	.177	.512	2.889	.006	.153	.871
	Enablers	.248	.110	.248	2.241	.031	.024	.471
	Moderator	-.004	.011	-.036	-.379	.706	-.027	.018

a. Dependent Variable: Performance

Based on the results above, there were no moderation effects of policy and regulations, infrastructure, and attitudes towards use of virtual learning platforms on the academic performance of students (the p-value of the moderator > 0.05).

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4.5. Qualitative Analysis

This part presents the results of the school management concerning the extent of use, impact of virtual and online teaching platforms and the challenges experienced by the school management in using the system for teaching international curriculum. The school head teacher, deputy head teacher, and teacher in-charge of ICT department were interviewed about the according to the study questionnaire to understand the extent of use and the challenges affecting the virtual platforms and the results arranged according to the objectives of the study.

4.5.1 The extent of use of virtual learning and online teaching platforms

The first objective sought to establish the extent to which virtual learning/teaching platforms have been used in Shah LljiNangpar international school. The question was posed to the school management particularly the head teacher and teachers. All the teachers reported to have used the virtual platforms in teaching the international curriculum at the school. The head teacher stated that;

> *"We have fully integrated online teaching and learning to ensure our students are not adversely affected by the prolonged absence in school especially following the pandemic. Even before Covid-19, we were also using the virtual for teacher training (Professional courses) by Cambridge.*

This assertion was echoed by the head of ICT at the school who informed the study that the school had used the virtual teaching/learning platforms for a while. When asked about the extent of virtual learning and teaching platforms at the school the head of ICT at the school stated that;

> *"We have used virtual platforms in teaching international curriculum at the school as well as in administering Continuous Assessment Tests (CATs) and end of term exams. We ensured that it was more of a physical classroom whereby the students had to put on their cameras, start at the right time and submit on time. The teacher invigilates like a he or she would do in a physical class.*

When the teachers were asked, the senior teacher responded that virtual platforms are integrated in delivering content, but at times they found problems while using it because it was not properly integrated to deliver content. Regarding preparation and planning of materials, the teachers

interviewed stated that the virtual platform was used to prepare and plan materials for international curriculum. One of the teachers argued that;

> *"We have over time used the virtual platforms to prepare and plan online materials for teaching and learning. We also compare with our colleagues (those teaching international curriculum) the content of the teaching materials."*

In addition, the deputy head teacher during an interview stated that the virtual platforms were used to support learning as a primary mechanism for distance learning especially during the COVID-19 period when schools were closed.

4.5.2 How virtual learning and teaching platforms are used

The second objective of the study sought to examine how the virtual teaching and online learning platforms were used at the learning institution. The follow-up questions to this section included determining how the virtual platforms support distance learning, whether virtual platforms can use IT to support online learning that is not provided by conventional education mechanisms. It was revealed that the virtual platforms have so far achieved great success because of supporting video, audio and written communication that make it easy for learning and teaching. On their part, the head of ICT stated,

> *"Virtual platforms can use IT to support online learning."*

The school management was asked about the suitability of virtual platforms in supporting international curriculum. One of the teachers argued that virtual platform makes use of diverse features that enable the learning experience. This was due to the exchange programs the school has with their colleagues offering international curriculum. It was also said that they compare the teaching syllabus and content. This shows that teachers concurred that virtual platforms indeed made use of diverse features like forums, chats, and private messaging to improve the overall learning experience.

The other part in this section was to find out how the use of virtual platform has enhanced the level of student engagement. The head teacher reported that the virtual teaching and learning platforms have indeed enhanced the level of student engagement during the learning process. It was further

reported that the virtual teaching/learning platforms have promoted the level of group interactions between the students and teachers. This was because the students have been using the virtual platforms in doing their group assignments among other interactive activities. Moreover, the head of ICT at the school was tasked to give a response on the technical relationship of virtual platforms and eLearning and FAQs. The head of ICT responded that;

> *"Virtual platforms have been incorporated into the student learning process through availability of eLearning and FAQs sections"*

4.5.3 Effectiveness of virtual learning and teaching platforms on the academic performance of students

The third objective of this study was to determine the effectiveness of the virtual learning platforms on the academic performance of students. Under this objective, the school management further confirmed that the virtual platforms had increased benefits in the teaching process because of offering visibility of the virtual teaching status. It was argued that the teachers could monitor and track attendance of students in lessons and would engage students in questions and answer sessions to ensure that they follow the lessons. Moreover, much as it was the opinion of most of the management staff that the use of virtual platforms had been very instrumental in improving the academic performance of students taking international curriculum, some held a contrary opinion. For instance, one of the teachers noted that

> *"I am not sure whether virtual platforms have played a role in improving the performance of students taking international curriculum."*

When prompted further on how the virtual platforms had improved the students' performance, one of the grades 12 class teachers stated that,

> *"Since the introduction of the virtual learning/teaching, the school has registered improved performance. This has been seen in the Mocks, mid and end of term exams. The students, who were shy to ask questions physically, could now seek clarification on issues they did not understand, and this enhanced their performance."*

The second aspect, the management concurred that the virtual platforms offered increased visibility by the students, and this was instrumental in improving the teaching process. The

teachers agreed that virtual platforms increase benefits on the teaching process because of providing visibility. In conventional teaching, students and teachers are expected to recall the teaching tools so that they can improve understanding. The school management was asked whether virtual teaching platforms have increased benefits on teachers' teaching process by recognition of the virtual teaching tools and their functionalities. The ICT teacher stated that

> *"The virtual platforms improved the recognition of virtual teaching tools and their functionalities because the teachers had a better understanding of the virtual tools."*

Besides, the school management was asked to whether using virtual teaching platforms have increased the benefits of teachers learning process by facilitating the ease of understanding and navigating through the virtual teaching system. The ICT teacher was asked about the ease of navigating through the system, and he stated that

> *"Virtual platforms improve the ease of understanding content by making navigation possible."*

The other issue was to determine suitability of virtual teaching tools to improve memo ability of content so that students can have a better understanding of content. Teachers interviewed stated that the virtual teaching tools indeed improved the level of memo ability of content. On this note, the ICT teacher indicated that,

> *"Students had a better memory of the content taught through the virtual platforms. They had a proper mastery of the functionalities and tools of virtual platforms which enabled them to boost the level of memorability of content used in the virtual platforms."*

4.5.4 Challenges faced in using virtual learning and online teaching platforms

The fourth objective of the study sought to determine the challenges faced by the school management in executing virtual learning. During discussions with the school management, it was reported that using technology in teaching was faced with several challenges that need to be addressed to improve the level of understanding. Among the challenges reported include inability of the instructors to respond properly to transitioning and support offered for enhancing transition of course content from a face-to-face environment to an online setting. Another challenge was difficult in the mastery of using the virtual platforms especially in ensuring effectiveness in delivery of international curriculum content. The ICT teacher stated that

"Incompetence of using the virtual platforms was a major challenge. This includes ability to troubleshoot problems during the delivery of the curriculum brought about by the resistance to new technology by teachers especially those who were used to the traditional teaching methodologies because they resisted virtual teaching platforms."

On the other hand, the head teacher claimed that,

"I do not find resistance as a challenge to executing online teaching in our school. However, a few teachers still do not have adequate knowledge and skills to effectively use the virtual platforms despite the school's effort to build capacities of teachers to execute the curriculum"

The school management was asked about the challenges students faced while using the virtual platform while learning. The head teacher reported that students' over-reliance on virtual learning platforms has been a major challenge at the school. The ICT teacher further indicated that interaction between instructors and students especially while using the virtual learning platforms was enhanced and this improved the performance of students. Besides, the head teacher argued that,

"Despite students having difficulties in accessing devises that are connected to the internet which would aid the virtual learning, the use of virtual teaching platforms in learning international curriculum has not been an issue to students."

4.5.5 External factors that influence success of Virtual teaching and learning platforms

The study further sought to determine the influence of factors such as policy and regulations, supporting school infrastructure and student' attitudes on virtual learning. The school management informed that policy and regulations relating to virtual learning/teaching also influenced the success of the learning process. The head teacher claimed that,

"ICT policies and virtual learning regulations were sufficient to support learning and teaching at the school."

Moreover, regarding the influence of the ICT infrastructure laid by the school, it was reported that the infrastructure was sufficient in supporting virtual learning. The ICT teacher stated that,

"The school has a proper ICT infrastructure to support virtual learning."

4.5.6   Student Performance

During key informant interviews with the school management, it was noted that the virtual learning platforms came to the rescue of the students because they ensured continuity in learning activities which in turn played a better part in improving students' performance. The school management through the head teacher claimed that,

> *"The virtual learning improves accessibility of education. It also enhanced access to alternative materials with the traditional mode of education delivery has necessitated the need to implement virtual learning at the school. Access to alternative materials has led to student performance".*

One of the teachers further stated that

> *"The availability of adequate learning materials is an important factor in promoting improved performance of students while using virtual learning platforms."*

4.6   Chapter Summary

The study found that on average 60% of students agreed that virtual learning improves accessibility of education while 15.5% disagreed. It was evident that there was a challenge of accessing alternative materials with the traditional mode of education delivery which necessitated the need to implement virtual learning. In addition, adequacy of learning materials is an important factor in promoting improved performance of students using the virtual learning platforms. The results show that 73.4% of the respondents agreed that virtual teaching platforms provide adequate learning materials while 11.1% disagreed. The respondents were asked whether the virtual learning and teaching platforms have an important influence in motivating students to learn. The results show that 53.4% of the respondents agreed that virtual learning platforms enhance motivation of students to learn while 20% disagreed. Descriptive statistics further indicate 22.2% of the respondents were undecided on how virtual platforms provide flexibility of learning process. Also, efficiency in the learning process particularly management of classroom time is required for improving academic performance.

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This section presents discussion of the findings provided in the results so that it can form the basis of making conclusions and recommendations. Later, the chapter makes conclusions and recommendations about the specific findings in the study. The section has been organized according to the four specific objectives set out in the introduction.

5.2 Discussion of findings

This section compares the findings of this study with results of other studies. The section is organized based on the study objectives.

5.2.1. The extent of use of virtual learning platforms

Virtual learning and teaching platforms have created new opportunities and new challenges for education to go online. For educational services to be delivered to students at home and in their workplace, overcoming the time and travel constraints of conventional place-based face-to-face educational methods. However, the main challenge influences the extent of use of virtual learning and teaching platforms is internet access and education qualifications. The results show that teachers at Shah LaljiNangpar Academy have requisite qualifications that can enable them to effectively teach the students using the virtual learning approach and teaching. This is consistent with an earlier finding by Yigit (2020) who argued that virtual multimedia education (OLME) is developing into a major mechanism for the provision of off-campus education. As such, the study has confirmed that majority of the students use virtual platforms for learning international curriculum.

The findings of the study have shown that the school has fully embraced the virtual platforms as a means of instruction for international curriculum at the school. This supports an earlier assertion by Agustina and Cahyono (2017) who reported a positive perception of EFL teachers and students' in using Quipper School as an online platform for extended EFL learning. Teachers and students in their study thought that Quipper School was good not only for coping with the limited time for

learning at school, but the platform also contributed to the improvement of the students' EFL learning (Phas, 2018).

On the issue of duration in using the virtual teaching and learning platforms, the results have indicated that most students and teachers at the school have used the virtual platform for at most two years. According to Nakitu and Neema-Abooki (2011), the duration of using the virtual platform plays a critical role in enhancing the performance of students and teachers taking the online curriculum. The study shows that teachers and students at the school use virtual platform extensively to perform certain activities that boost performance (Barreyro et al., 2019).

Contemporary technologies provide room for the expansion on the power of visuals to include experiential learning using virtual reality (VR) applications to promote understanding and to scaffold prior knowledge. Conversely, incorporating technologies in teaching enhances the ways teachers promote understanding of new concepts (Michael & Jodi, 2018). The results indicate that virtual platforms are used at the school to assessments in administration of exams. However, it is imperative that students and teachers have a proper understanding of the technologies to ensure that it can achieve its objectives.

The study results indicate that some of the teachers and students do not understand ICT, which makes it difficult to understand the role of ICT in virtual platforms. The results in this section have shown that teachers and students at the school use virtual platforms for delivering learning content, assessments of exams, administering continuous assessment tests, integrating ICT tools, and preparing and planning online materials for international curriculum. This is consistent with an earlier finding by Shohel and Shrestha (2010) who argued that ICT has been used to increase access to authentic teaching and learning materials, which could be used at a time convenient to teachers, such as while preparing lesson plans or travelling to schools. This makes it easier for teachers and students to communicate, access online content and deliver their work for assessment.

5.2.2. How virtual platforms were used for learning and teaching

Currently, educational institutions rely on the internet as the primary mechanism for providing their distance learning offerings, using an array of asynchronous learning management systems. According to Hrastinski (2008), asynchronous mode of learning/teaching has been the most

prevalent form of online teaching so far because of its flexible modus operandi. This is consistent with the findings of the study that have shown that Virtual learning and teaching platforms support distance learning. Another study by Parsad and Lewis (2008) have stated that asynchronous e-learning is the most adopted method for online education because learners are not time bound and can respond at their leisure. The opportunity of delayed response allows them to use their higher order learning skills as they can keep thinking about a problem for an extended period and may develop divergent thinking.

Virtual teaching and learning space leads to a self-paced, independent, student-centered learning (Murphy et al., 2011). The results show that virtual platforms have effectively achieved success because it enables video, audio, and written communication to be possible, which makes the process of learning and teaching easier. This implies that virtual teaching and learning platforms can scaffold students' previous knowledge with new concepts (Lin et al., 2012). The study has shown that virtual platforms incorporate online tools that make it easy for online learning and improve performance. This supports the conclusion by Huang and Hsiao (2012) that less reliance on memory and notes and more opportunity of discussions with peer groups help build critical thinking and deep learning.

In traditional teaching environment, students can be shy to respondent to the classroom activities or question. However, in a virtual teaching and learning environment, this is reduced due to the distance mode, which alleviates the fear of the teacher. Also, there is less pressure than a real time encounter, the affective filter remains low, and learners can respond more innovatively and creatively. This study shows that a virtual learning environment provide students with readily available material in the form of audio/video lectures, handouts, articles, and power point presentations. The results show that better performance of students using the virtual platforms is based on its ability to support use of diverse features like forums, chats and messaging that give a better learning experience.

5.2.3. The level of effectiveness of virtual learning platforms on the academic performance of the students

Victoria et al. (2018) argue that Virtual learning module was useful and easy to use, stating that they understood information, and navigated and accessed documents effortlessly. A similar study based on the TAM model and developed at the University of Jordan (Imarabeh, 2014), has shown that perceived usefulness and ease of use directly influence the attitude that students have towards using Virtual learning. This is consistent with the findings of the study that show virtual platforms are used to promote student engagement that plays a critical role in promoting academic results. Virtual learning and teaching platform over the advantages of its usefulness, effectiveness, and positive influence on student's performance. The findings have shown that most students and teachers are able to interact as groups while using the virtual platform and this plays a critical role in sharing information and boost performance. This is consistent with the findings of Burac*et al.* (2019), who asserted that teachers believe Virtual learning enhances the educational process by improving collaboration and communication with students, it offers flexibility and helps students to better understand the lectures. This justifies the findings in the study that virtual platforms play a major role in promoting the learning process of students, which is crucial in enhancing academic performance (Odit-Dookhan, 2018).

Lochner*et al.* (2016) have indicated that when virtual learning and teaching platforms are when as additional method to traditional classes, it improves students' learning experience and increased their engagement with the lectures. The results showed that from teacher's perspective, virtual platforms increase the visibility of learning (using teaching aids such as visuals), which improved understanding of content and better academic performance. This supports an earlier finding by Alsaaty *et al.* (2016) who found out that a high percentage of the students have assimilated more information in face-to-face classes than virtual, but they positively perceived their overall online experience, even though they have encountered difficulties while using virtual learning platforms. It implies that virtual platforms enable teachers and students to recognize rather than recall the virtual teaching tools and functionalities which make understanding of content easier (Vangie, 2020).

Virtual learning and teaching platforms allow teachers to create an online classroom, invite students to the class then create and distribute assignments. This provides a classroom environment where students and teachers can have conversations about the assignments and teachers can track the student's progress (Vangie, 2020). The study has shown that virtual platforms enable students to navigate through the learning content and this makes it easier for understanding of content and better academic performance at the end. The findings of the study are consistent with previous studies that virtual platforms facilitate the interaction of a professor or teacher with a student or students in the virtual world (Liu & Chuang, 2016). Results from this study have indicated that teachers are able to navigate through the virtual teaching platforms and boost the level of understanding for students.

Virtual learning platforms can be accessed through computer devices connected to the internet. According to the results of the study, virtual learning platforms have increased accessibility of education, and this plays a critical role in improving performance. Lochner et al. (2016) have pointed out that, when used as an additional method to traditional classes, virtual learning enhanced students' learning experience and increased their engagement with the lectures. This is consistent with the findings of the study that showed that virtual learning and teaching platforms are critical in ensuring that adequate materials are provided for both students and teachers. Availability of adequate learning materials promotes academic performance because it allows students to access enough materials to support understanding of a concept.

Virtual teaching platforms offers teachers and opportunity can create an online classroom, invite students to the class then create and distribute assignments. This can be achieved where the teachers have sufficient training in ICT skills and knowledge as well. The results of the study indicated that virtual learning and teaching platforms increase the need to train and acquire ICT skills to enable a better understanding of learning content. Virtual teaching and teach platform offer students and teachers an opportunity to have conversations about the assignments and teachers can track the student's progress (Vangie, 2020). This is critical because it motivates students to learn while using the virtual learning platforms. This is supported by an earlier finding in literature review that showed virtual teaching and learning platforms facilitate the interaction of a professor or teacher with a student or students in the virtual world (Liu & Chuang, 2016).

In virtual teaching platforms, teachers freely hand out a scientific assessment and provide an independent assessment for students (Wijaya, 2016). This is supported by the results of the study which showed that virtual learning and teaching platforms allows children a high level of flexibility that gives them an opportunity to improve their overall performance. Teachers can provide materials on the subject being taught or post some teaching materials, assign tasks for students, and upload the students' grades so that they can immediately see the scores obtained in the course. This supports the fact that virtual learning platforms have an important role in supporting achievement of better performance through enhancing efficiency of classroom time (Inoue & Pengnate, 2018).

5.2.4. The challenges of using virtual learning and teaching platforms

The effectiveness of virtual learning and teaching platforms is a major challenge that has been identified by studies in literature review (Hakim, 2016). Other challenges identified include optimization of using Google Classroom as a learning media, as an alternative way to enhance learning quality and as a media for improving attainment of graduate attributes (Soni, 2018; Sewang, 2017; Madhavi et al., 2018). According to the results of the study, majority face challenges of transiting from a traditional face-to-face environment to an online setting with the same learning content. The results show that most teachers have challenges using the virtual teaching platform. These findings are consistent with earlier findings in literature review by Kashorda (2016) who found out those students virtual learning platforms have obstacles that hinder academic excellence.

Students face challenges in adapting to study online, which, although is not easy for them, they have worked hard to get used to. The findings show that teachers resist use of virtual teaching platforms, but a good number of teachers at the school have effectively accepted the new technology of teaching. Skills and knowledge on the usage of virtual teaching platforms is required to enable a seamless function of the platform. According to Frimpon (2018), students have been reported to complain of limited time making it hard for them to complete assignments. This supports the findings of the study that students over rely on virtual learning platforms which can be a challenge to their academic performance.

Wojciechowski and Palmer (2016) have reported that educators have a higher course dropout and failure rates among virtual learners than among learners in traditional campus-based programs. Applying the cohort model and support systems provided by partners in Africa, as well as the reflective learning experience in the summer, enabled students to refocus and air out some of the challenges they encountered so that they could be amicably resolved in a timely fashion. Our results have shown lack of interaction between students and teachers is a major challenge student using virtual learning platforms to learning international curriculum. This is because some of the students' resist use of virtual teaching platforms to learn international curriculum and this can be a contributor to low academic performance.

Literature has shown that for students to persist in virtual learning, communication with instructors who address students' needs in a timely manner is essential. In this study, it was revealed that students face challenges of accessing computer devices connected to the internet because they are not enough at the school. According to Packard (2016) avers that failure of instructors to communicate with students in a timely manner could negatively impact those students' learning and their ability to complete the course. This is supported by the finding in the study that majority of students believe that the content shared through the virtual learning platforms is appropriate (Eke, 2015).

Communication and technology have supported increased adoption of virtual teaching and learning platforms instead of traditional education. The implementation has been slow because of challenges in the development of virtual platforms. This study has shown that there is a need for proper design of the virtual platforms to the extent that they are easy to use. This is imperative because it will promote easier usability of the platform and facilitate understanding of content shared through the platform.

5.3 Conclusion

5.3.1. Extent of Use of Virtual Learning and Teaching Platforms

Contemporary technologies provide room for the expansion on the power of visuals to include experiential learning using virtual reality (VR) applications to promote understanding and to

scaffold prior knowledge. Teachers' course materials can be accessed by students through the use of Google Drive at any time, any place with multiple devices like smart phones, computers, or tablets. Teachers can get a drive that stores their course materials and choose to share with specific student email addresses generating from the student email list, creating by the university or directly with the students that he had been added on his Google classroom. ICT has been used to increase access to authentic teaching and learning materials, which could be used at a time convenient to teachers, such as while preparing lesson plans or travelling to schools. Use of ICT may be a bridge to provide access to education and quality professional preparation. Virtual learning classes need to be supported by a prior establishment of an orientation on the use of technical skills to navigate technology. At Shah LaljiNangpar virtual teaching and learning platforms are used to the extent of offering an interaction of students and teachers from varying cultures and that also facilitate the delivery of lectures and interaction between students, their colleagues, and teachers.

5.3.2. How Virtual Learning and Teaching Platforms Are Used

The internet has become the primary mechanism for providing their distance learning by providing asynchronous learning management systems. Virtual learning and teaching platforms have been adopted because learners are not time bound and can respond at their leisure. This gives student the advantage of learning at self-paced, independent, and student-centered teaching. Less reliance on memory and notes and offer more opportunity for discussions with peer groups help build critical thinking and deep learning.

Virtual learning can be challenging because it needs a set of strategies can keep students engaged and interested in this sort of learning environment to facilitate motivation, confidence, participation, problem solving, analytical and higher order thinking skills. similarly, a self-paced system in which the students must be self-disciplined to keep themselves active as well as interactive to keep track of e-tivities. In a virtual teaching platform, instructors teach with predefined content. In these courses, most of the instructors face the issue of lack of empowerment. Here, instructors need to create, shape, and integrate their own experiences into the content of the courses has been downplayed. Teachers should actively participate in designing the content and adopting an autonomous and active role through constantly criticizing their assumptions toward

online teaching. Therefore, they are responsible for preparing and planning materials for online courses.

The findings of the study have concluded that virtual teaching and learning platforms are used as forums that allow student-teacher communication and collaboration in an asynchronous way, web conferences that allow video, audio and written communication, and chat, where users can send messages and receive responses in real-time. As such, the results of the study conclude that virtual teaching and learning platforms at Shah LaljiNangpar are designed to offer students, teachers, and administrators a system that can help them create an enhanced and customized learning environment. Teachers at Shah LaljiNangpar use these platforms to upload and supply students with information and resources to which they would not have had access during face-to-face classes. Students at Shah LaljiNangpar use the virtual learning platform to share information, state their difficulties and receive feedback. Therefore, this study can conclude that virtual teaching and learning platforms have diverse features such as forums; chats, private messaging, and higher education institutions can use it as an additional method to traditional education, or for exclusively online learning.

5.3.3. Level of Effectiveness of Virtual Learning and Teaching Platforms on the Academic Performance of Students

The effectiveness virtual teaching and learning platforms was analyzed from the aspects of message receiver, content, communication media, format, source, and appropriateness or timing. According to the Technology Acceptance Model (TAM), all students believe that the Virtual learning module is useful and easy to use. This is because it provides an easy way to understand information, navigate and access materials and documents effortlessly. This study has shown that use of virtual learning in higher education results in increased usefulness, effectiveness, and positive influence on student's performance. The study has concluded that teachers support Virtual teaching platforms alongside traditional teaching as a strategy to enhance the educational process to improve collaboration and communication with students. In addition, the study has concluded that virtual learning platforms offers flexibility and helps students to better understand the learning content. The study has shown that students' attitude towards Virtual learning was positive and that it improves when they perceive that virtual learning systems are easy to access.

Virtual learning and teaching platforms are effective because it allows teachers to create an online classroom, invite students to the class then create and distribute assignments. The platform allows teachers to have conversations about the assignments and teachers can track the student's progress and administer continuous assessment tests. The results have concluded that virtual learning and teaching platforms are used to facilitate the interaction of a teacher with students in an online environment. Teachers can provide materials on the subject being taught, post teaching materials, assign tasks to students, and upload the students' grades after administering an exam. Therefore, this study has concluded that virtual teaching and learning are effective for its usability, response-time, interactivity, web & course design, accessibility, reliability, cost-effectiveness, functionality, security, stability, trust, accuracy, flexibility, interoperability, and continuity.

5.3.4. Challenges Faced in Using Virtual Learning and Teaching Platforms

A myriad of challenges has been faced by Shah LaljiNangpar in relation to virtual learning and teaching platforms, but obstacles encountered are not viewed as a hindrance to academic pursuits. Power outages and sometimes Internet connectivity have acted as a major challenge at Shah LaljiNangpar Academy. The study has shown that students have complained of limited time making it hard for them to complete assignments. Persistence of students in virtual learning, communication with instructors who address students' needs in a timely manner is essential. Failure by teachers to communicate with students in a timely manner could negatively impact those students' learning and their ability to complete the course.

The study concludes that inadequate prior knowledge of the use of computers and wireless modems nor the requirement of a higher academic language have posed a challenge to the effective performance of virtual learning and teaching platforms. The main challenge facing Shah LaljiNangpar Academy is the organizational component. This encompasses a set of processes and procedures that supports the school management. Implementation of policies and procedures to support virtual learning platforms is a major factor that supports its success, which Shah LaljiNangpar must observe. The study concludes that students and teachers need ICT skills and knowledge to support their activities through the virtual learning and teaching platforms. These ICT skills can make learning more efficient and lead to an improved academic performance

because minimizes possibility of resistance thereby creating a positive attitude towards the learning process and the use of virtual platforms.

5.4 Recommendations

ICT has been used to increase access to authentic teaching and learning materials, which could be used at a time convenient to teachers. This enables the process of preparing for lessons and time management achieved easily. Access to internet, inadequate computer skills and knowledge, and resistance to change are main challenge affects effective implementation of virtual learning platforms. Therefore, this study recommends

a) Incorporating ICT training in virtual teaching and learning to bridge the challenge of inadequate skills and knowledge among teachers and students. It is important for proper strategies are developed to support implementation of virtual teaching and learning platforms so that it can improve academic performance of students.

b) Learning institutions should work hand in hand with the government to incorporate virtual learning policies in Kenya and also ensure adherence to all policies and regulations to reduce government interference in recognition of the international curriculum

c) Thirdly, there is need for orientation of both teachers and students on the use of technical skills to navigate technology, so that they can access online library resources and gain global perspectives via interaction through various virtual learning platforms.

5.5 Suggestions for future research

The current study focuses on assessing the impact of virtual learning and teaching platforms on academic performance of high school students taking international curriculum. As such, we suggest a similar study can be conducted for other schools offering international curriculum and are using virtual teaching and learning platforms. As a suggestion for future research, a similar study can be carried out for several schools outside Nakuru County and offering international curriculum. This is important because it provides an opportunity to understand whether the challenges are similar in different location and propose strategies for improving virtual learning platforms for improved students' performance. Also, this study relied on data from 19 teachers

and 26 students and teachers and a future study can increase this number to provide information that can be generalized about the population.

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APPENDICES

APPENDIX I: INTRODUCTION LETTER

WANYONYI YVONNE FATUMA

P.O. BOX

NAIROBI

DECEMBER 2021

Dear Sir/Madam,

<u>RE: REQUEST TO CARRY OUT RESEARCH</u>

I do request to be allowed to carry out the above research within your school. My research titled *"**ASSESSING THE IMPACT OF VIRTUAL LEARNING AND TEACHING PLATFORMS ON ACADEMIC PERFORMANCE OF SENIOR SCHOOL STUDENTS TAKING INTERNATIONAL CURRICULUM: A CASE STUDY OF SHAH LALJI NANGPAR ACADEMY NAKURU".* This research is meant purely for academic purposes; however, evaluation results may be made public after the completion of the study for future researchers and other relevant stakeholders to guide them in their work.

Every care will be taken in the data collection procedure to ensure that it is within ethical limits.

Thank you in advance for your cooperation.

Yours sincerely

Wanyonyi Yvonne Fatuma

APPENDIX II: QUESTIONNAIRES FOR TEACHERS

QUESTIONNAIRE FOR TEACHERS

SECTION A: GENERAL INFORMATION

In this section, please fill or tick where applicable

  a. Name **……………………………………………………………………………….**

  b. Are you using virtual platforms in teaching international curriculum? Yes [ ] No [ ]

  c. For how long have you been in the teaching profession?   1 year [ ] 1- 2 years [ ] 3 - 5 years [ ] 6 - 10 years [ ]   10 years [ ]

  d. Gender   Male [ ]   Female [ ]

  e. Level of Education stud: Certificate [ ] Diploma [ ] Degree [ ] Masters [ ] PHD [ ]

B. EXTENT OF USE

  i.   To what extent do you agree with the following statements on the extent of use of virtual learning and teaching platforms at Shah LaljiNangpar Academy?

Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
Virtual learning and teaching platforms have been used extensively in the school					
Virtual learning and teaching have been integrated in delivery of learning content					
Virtual learning and teaching is used in assessments (administer exams)					

	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
Virtual learning and teaching platforms are used in administrations of Continuous Assessment Tests (CATs)					
Virtual learning and teaching platforms have integrated ICT in the international curriculum					
Virtual learning platforms have given room for instructors to prepare and plan materials for online courses					

C. METHODS OF USE

Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
Virtual teaching platforms have offered a primary mechanism for providing distance learning					
Virtual teaching has been successful as it allows video, audio and written communication					
Virtual teaching can use IT as an additional method to traditional education, or for exclusively online teaching					
Virtual teaching makes use of diverse features such as forums, chats and private messaging which enhance the teaching experience					

Virtual teaching platforms have enhanced student engagement on virtual teaching resources					
Virtual teaching platforms have enhanced group interactions in virtual teaching resources					
Virtual teaching platforms have been incorporated in students' learning process by availability of eLearning "Live" Frequently Asked Questions (FAQ) on technical areas					

D. LEVEL OF EFFECTIVENESS

To what extent do you agree with the following statements on the level of effectiveness of virtual learning and teaching platforms on the academic performance of students at Shah LaljiNangpar Academy?

Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
Virtual teaching platforms have been very instrumental in improving the performance of students					
The school has registered improved performance since it started using virtual teaching fully					
Virtual Teaching platforms have increased benefits on Teachers' teaching process by providing					

visibility of virtual teaching system status					
Virtual Teaching platforms have increased benefits on Teachers' teaching process by recognition rather than recall of virtual Teaching tools and functionalities					
Virtual Teaching platforms have increased benefits on Teachers' learning process are enhanced by the ease to understand and navigate through virtual teaching system					
Virtual Teaching platforms have increased benefits on Teachers' learning process are enhanced by memorability - how easy is it to remember and use virtual teaching system					

E. **CHALLENGES OF USE**

Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
Some instructors are not responding properly to the training and support that has been provided to them concerning transitioning course					

Statements					
content from face-to-face to online settings					
There are teachers who are not competent enough with the use of virtual learning platforms					
The use of virtual learning and teaching platforms has experienced the problem of resistance from a number of teachers					
Inadequate teachers' knowledge and skills on use of virtual teaching platforms					

F. MODERATING VARIABLES

Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
Policies and regulations are sufficient to support virtual learning and teaching at the school					
The school ICT supporting infrastructure is sufficient for virtual teaching and learning at the school					
Teachers have a positive perception to virtual teaching and learning at the school					

G. STUDENT PERFORMANCE

Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
Virtual learning and teaching has improved accessibility of education and learning leading to improved performance					
Virtual learning and teaching has improved adequacy of learning materials leading to improved performance					
Virtual learning and teaching has necessitated training on basic ICT skills leading to better understanding of content and performance					
Virtual learning and teaching is motivating students to learn leading to better performance					
Virtual learning and teaching enhances flexibility in learning leading to better performance					
Virtual learning and teaching has enhanced efficiency of classroom time learning leading to better performance					

APPENDIX III: QUESTIONNAIRES FOR STUDENTS

QUESTIONNAIRE FOR STUDENTS

<h3 style="text-align:center">SECTION A: GENERAL INFORMATION</h3>

In this section, please fill or tick where applicable

a. Name **………………………………………………………………………….**

b. Are you using virtual platforms in learning international curriculum?Yes [ ]
No [   ]

c. For how long have you been using virtual teaching platforms?   1 year [   ] 1 - 2 years
[   ] 3 - 5 years [   ] 6 - 10 years [   ]   10 years [   ]

d. Gender   Male [   ]   Female [   ]

EXTENT OF USE

i.   To what extent do you agree with the following statements on the extent of use of virtual
learning and teaching platforms at Shah LaljiNangpar Academy?

Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
Virtual learning and teaching platforms have been used extensively in the school					
Virtual learning and teaching has been integrated in delivery of learning content					
Virtual learning and teaching is used in assessments (administer exams)					
Virtual learning and teaching platforms are used in administrations of Continuous Assessment Tests (CATs)					

	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
Virtual learning and teaching platforms have integrated ICT in the international curriculum					
Virtual learning platforms have given room for instructors to prepare and plan materials for online courses					

B. METHODS OF USE

Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
Virtual learning platforms have offered a primary mechanism for providing distance learning					
Virtual teaching and learning has been successful as it allows video, audio and written communication					
Virtual learning and teaching can use IT as an additional method to traditional education, or for exclusively online learning					
Virtual learning and teaching makes use of diverse features such as forums, chats and private messaging which enhance the learning experience					
Virtual learning and teaching platforms have enhanced student					

	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
engagement on virtual learning resources					
Virtual learning and teaching platforms have enhanced group interactions in virtual learning resources					
Virtual learning and teaching platforms have been incorporated in students' learning process by availability of eLearning "Live" Frequently Asked Questions (FAQ) on technical areas					

C. LEVEL OF EFFECTIVENESS

To what extent do you agree with the following statements on the level of effectiveness of virtual learning and teaching platforms on the academic performance of students at Shah LaljiNangpar Academy?

Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
Virtual learning platforms have been very instrumental in improving the performance of students					
The school has registered improved performance since it started using virtual learning fully					

Virtual learning platforms have increased benefits on students' learning process by providing visibility of virtual Learning system status				
Virtual learning platforms have increased benefits on students' learning process by recognition rather than recall of virtual Learning tools and functionalities				
Virtual learning platforms have increased benefits on students' learning process are enhanced by the ease to understand and navigate through virtual Learning system				
Virtual learning platforms have increased benefits on students' learning process are enhanced by memorability - how easy is it to remember and use virtual Learning system				

D. CHALLENGES OF USE

Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree

	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
Students over rely on virtual learning platforms settings					
virtual learning platforms provide lack of interaction between classmates and instructors					
The use of virtual learning and teaching platforms has experienced the problem of resistance from a number of students					
Inadequate computers/devices with internet connections restrict use of virtual learning					
Inappropriate content					
Poor design of virtual learning platforms leads to poor usability					

E. MODERATING VARIABLES

To what extent do you agree with the following statements regarding enablers of virtual learning?

Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
Policies and regulations are sufficient to support virtual learning and teaching at the school					

Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
The school ICT supporting infrastructure is sufficient for virtual teaching and learning at the school					
Students have a positive perception to virtual teaching and learning at the school					

F. STUDENT PERFORMANCE

Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
Virtual learning and teaching have improved accessibility to international curriculum and learning leading to improved performance					
Virtual learning and teaching have improved adequacy of learning materials leading to improved performance					
Virtual learning and teaching have necessitated training on basic ICT skills leading to better understanding of content and performance					
Virtual learning and teaching are motivating students to learn leading to better performance					

Virtual learning and teaching enhance flexibility in learning leading to better performance				
Virtual learning and teaching have enhanced efficiency of classroom time learning leading to better performance				

END

APPENDIX IV: INTERVIEW FOR SCHOOL MANAGEMENT STAFF

Extent of Use

What is the extent of use of virtual learning platforms at Shah LaljiNangpar Academy?

_____

_____

_____

How can you rate your extent of use to that of other schools?

_____

_____

Does the school have plans of expanding its coverage with respect to use of virtual learning?

_____

_____

Best ways of use

How best canvirtual learning and teaching platforms be used at Shah LaljiNangpar Academy?

_____

_____

_____

Based on the answers given above, do you have the right structures for actualization?

_____

_____

Level of effectiveness

What is the level of effectiveness of virtual learning platforms?

_____

_____

_____

How has effectiveness of the platforms impacted on the academic performance of the students?

_____

_____

Can you say that use of virtual learning platforms has compromised the performance of students at the school?

_____

_____

Challenges

Which challenges have been encountered in using virtual learning and teaching platforms at Shah LaljiNangpar Academy?

_____

_____

_____

How do you think these challenges can be addressed effectively?

_____

_____

Has the school done anything aimed at countering the effects of these challenges?

_____

_____

APPENDIX V: CONTENT ANALYSIS CODING SHEET

Measures of performance	Before introduction of virtual learning	After introduction of virtual learning
Scores in final examinations (%)		
Scores in continuous assessments (%)		
Number of students passing		
Overall student's class participation (Good / Poor)		
Level of engagement of students (Good / Poor)		
Class attendance (Good / Poor)		
Completion of assignments (Good / Poor)		
Classroom effectiveness (Good / Poor)		
Group work (Good / Poor)		
Student discipline (Good / Poor)		
Teacher satisfaction (Good / Poor)		
Teacher feedback on students (Good / Poor)		