
**UNIVERSITY OF NAIROBI**

**SCHOOL OF COMPUTING AND INFORMATICS**

# FACTORS DETERMINING THE SUCCESS OF SYNCHRONOUS LEARNING IN KENYAN UNIVERSITIES DURING COVID-19 PERIOD

BY

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# DECLARATION

This research, as presented in this report, is entirely my original work, and it hasn't been submitted for an award at any other university.

Signature:__  __ Date: 24TH AUGUST 2021

Bruce Malimo Shabaya

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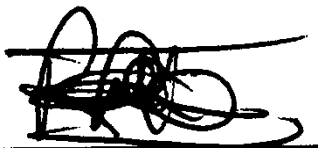
With my consent as the University supervisor, the project report has been presented in partial fulfilment of the University of Nairobi's Master of Science in Information Technology Management degree.

Signature: _____  _____ Date: 24/11/2021

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# ABSTRACT

Due to infrastructure, expertise, and other issues, a number of Kenyan institutions have been unable to properly implement online learning resulting in a sluggish uptake. They had to transition to online learning relatively immediately to ensure that learning could resume. Despite the fact that Kenyan universities launched online learning more than a decade ago, learners and teachers alike disliked it because of its poor implementation. Despite the availability of course materials via web portals, face-to-face meetings were still required for introductory lectures and assessments. With Covid-19 outbreak, the need for online courses became obvious, and universities soon resorted to online meeting platforms to supplement their learning management systems. Covid-19 is still present and expected to create further disruptions, thus the emergence of synchronous learning via video conferencing as a solution. As a result, the study intended to establish how Kenyan universities have benefited from the rapid adoption of synchronous learning, as well as the factors that have influenced those benefits. A conceptual framework was developed using the DeLone and McLean IS success model. A positivist approach and quantitative data were used to determine the success factors. With a sample size of 385, a survey was performed with a response rate of 89%. The study discovered that ease of learning, cost, relevance, and system use all played a role in synchronous learning's success in Kenyan universities. The study suggests that security and data policies be developed, that proper investments be made in online teaching and learning platforms, that the requisite technological skills to operate in a synchronous learning setting be acquired, and information compliance with learning requirements be adhered to as a roadmap for the implementation and uptake of synchronous learning in all Kenyan universities.



**Keywords:**

Synchronous learning, video conferencing, Covid-19, IS success model of DeLone and McLean

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| | |
|---|---|
| HLIs: | Higher Learning Institutions |
| ICT: | Information and Communication Technology |
| UoN: | University of Nairobi |
| UNESCO: | United Nations Educational, Scientific and Cultural Organization |
| MOOCs: | Massive Online Open Courses |
| IP: | Internet Protocol |
| URL: | Uniform Resource Locator |
| IT: | Information Technology |
| IS: | Information Systems |
| ERP: | Enterprise Resource Planning |
| SMEs: | Small and Medium-Sized Enterprises |
| EIS: | Executive Information System |
| FAQs: | Frequently Asked Questions |
| ISP: | Internet Service Provider |
| ODEL: | Open and Distance eLearning |
| ANOVA: | Analysis of Variance |

# CHAPTER ONE: INTRODUCTION

## 1.1 Background

The World Health Organization (WHO) on 11th March 2020 declared the outbreak of Corona Virus disease (Covid-19) a global pandemic (World Health Organization, 2020). The outbreak hit hard the worlds' education systems and by 29th April 2020, it was estimated that at least 1.6 billion learners were affected by approximately 190 countrywide closures of schools (UNESCO, 2020a). This was an unprecedented global health crisis that led to the disruption of education among other severe ramifications (Education Cannot Wait, 2020). To alleviate this disruption, a number of universities around the world resorted to online learning. This was evidenced by the unprecedented move from conventional face-to-face education to online education (Bao, 2020).

In Kenya, things took a different turn when the Government ordered all schools including Higher Learning Institutions (HLIs) to cease face-to-face learning on 15th March 2020 with the first Covid-19 case having been recorded earlier on 12th March 2020 by the Ministry of Health (2020). Approximately 17 million learners were affected out of which 562,521 were in Higher Learning Institutions (HLIs) (UNICEF 2020a). This put a strain on the education system and left learning institutions isolated and forced to come up with contingency measures. To ensure continuity of learning, schools and Higher Learning Institutions (HLIs) were required to switch almost overnight to online learning (Daniel, 2020).

This presented a new challenge as research conducted by Manduku, Kosgei and Sang (2012) had indicated that in the recent past, a vast majority of schools had not properly implemented ICT to aid teaching and learning in Kenya. Inadequate online learning abilities and infrastructure, according to Tarus, Gichoya, and Muumbo (2015), pushed institutions to embrace blended learning since online learning platforms were not being properly utilized. The pandemic provided a paradigm shift that now required a complete switch from face-to-face learning to online learning.

From a survey conducted by Tarus, Gichoya and Muumbo (2015) a number of Kenyan Public Universities implemented online learning more than ten years ago. Wedusoft was implemented at the University of Nairobi (UoN) in 2004, and MOODLE was used at Kenyatta University (KU) and Jomo Kenya University of Agriculture and Technology (JKUAT) having launched online teaching in 2005 and 2006 respectively, as has Moi University implementing MUSOMI in 2007. This has been replicated in recent times by a number of Kenyan private universities

with the likes of Mount Kenya University (MKU), Daystar University and United States International University – Africa (USIU) offering open and distance eLearning programmes.

Nyerere (2020) alludes that these online learning platforms in existence in some universities provide capabilities for interactive sessions, chats, content exchange and evaluations but that these might be supplemented with live audio and video tools to complete the online classroom experience. With the pandemic still here with us, physical school meetings and classes are slowly being a thing of the past with schools and Higher Learning Institutions (HLIs) turning to open-source digital meeting solutions to conduct online classes. Google Meet, Microsoft Teams and Zoom are some notable instances.

Video Conferencing is a platform that has been in existence since 1964 when an American Telecommunications Company by the name AT&T launched its first public Videophone called the Picturephone at a World's fair (Senft, 2019). Subsequently, the likes of Google Meet, Skype, Zoom, and other similar solutions have emerged. Technology has gotten to a point that just about any institution and learner has access to Video Conferencing. Rouse (2016) affirms that video conferencing can enable learners and classes to connect to other learners, teachers and even industry experts worldwide through an internet connection with suitable bandwidth and video conferencing software.

## 1.2 Problem Statement

Despite the initiatives taken by Kenyan Universities to implement online learning to their education offering way before the Covid-19 pandemic, respective studies conducted by Nyerere (2020) and Nyerere, Gravenir and Mse (2012) showed that students had a positive affinity for face-to-face and blended learning as opposed to online learning. This was attributed to the fact that there were no programs available that did not involve in person sessions for preliminary lectures or tests despite the fact that course materials were available for access on the institutions' web portals. This was attributed to the fact that institutions were having challenges stemming from infrastructure, capacity, funding among other impediments that resulted to sluggish uptake of online learning in Higher Learning Institutions (HLIs) in Kenya (Nyerere, 2016).

With the outbreak of Covid-19 and Government directives on contactless learning, schools and Higher Learning Institutions (HLIs) quickly turned to online meeting platforms as the need to provide courses online became clear. Despite the fact that this academic calendar is now in its preliminary phase, there are likely to be further Covid-19 propelled developments. One

significant platform has now become the go-to pandemic solution in education, along with other critical sectors and our everyday lives: synchronous learning through video conferencing (Bentley, 2020). In light of these developments, this study seeks to assess how Kenyan universities have benefited from the rapid adoption of synchronous learning and the factors which have determined those benefits.

## 1.3 Research Objectives

The overall objective was to examine the factors determining the success of synchronous learning to Kenyan universities during Covid-19 period and develop a revised model.

The specific objectives include:

1. To assess the effect of system quality on the use of synchronous learning successfully in Kenyan universities.
2. To assess the effect of service quality on the use of synchronous learning successfully in Kenyan universities.
3. To assess the effect of information quality on the use of synchronous learning successfully in Kenyan universities.
4. To assess the effect of system use on the success of synchronous learning in Kenyan universities.
5. To determine the benefits that accrue from using synchronous learning in Kenyan universities.

## 1.4 Research Questions

1. What role does system quality play in the effective use of synchronous learning in Kenyan universities?
2. What role does service quality play in the effective use of synchronous learning in Kenyan universities?
3. What role does information quality play in the effective use of synchronous learning in Kenyan universities?
4. How does the usage of a system affect the success of synchronous learning in Kenyan universities?
5. What are the benefits that can accrue from using synchronous learning in Kenyan universities?

## 1.5 Justification and Significance

The motive behind this research was to examine the factors determining the success of synchronous learning in Kenyan universities during Covid-19 period. The results of this study could have widespread implications for best practices of synchronous learning.

The research is expected to produce fresh information and insights of synchronous learning used to facilitate real-time interaction, collaboration and content sharing in an online environment. The success of synchronous learning will be determined, and adequate plans will be implemented to guarantee that it is used to its full potential. The research will aid in the development of online learning policies and guidelines for teaching and learning with synchronous learning technology.

DeLone and McLean's model has been used to assess the success of information systems in the workplace. As a result, applying the model to assess information system technology in an online learning environment would contribute to the existing body of knowledge of Higher Learning Institutions (HLIs) and might potentially be adopted for use in academic libraries, as there has been little research in this field. ICT and Education is also a topic of interest to many stakeholders as evidenced by many survey reports published on an African report on ICT and Education (Farrell and Shafika, 2007).

# CHAPTER TWO: LITERATURE REVIEW

## 2.1 Background

Keegan (2002) defines Distance Education as a scholastic experience where learners and teachers are separated in space and time. Gunawardena, McIsaac and Jonassen (2008) add to this definition by stating that Distance Education can occur away from an institution of learning with the resultant being a diploma or a degree. Distance education has grown in popularity over the years as it has been shown to improve access to learning opportunities.

The following types of Distance Education or Online Learning exist: Synchronous, Asynchronous, Hybrid/Blended, Massive Online Open Courses (MOOCs), and Open Schedule Online Courses. According to Watts (2016), Synchronous learning involves an online live video and audio interactive session between learners and teachers for a predetermined period of time. Asynchronous learning on the other hand involves learners being able to access educational content over the internet at their own free will (Watts, 2016). Garrison and Kanuka (2004) define hybrid/blended learning as a fusion of in person instruction and online instruction. Tseng and Walsh Jr. (2016) add to this definition by stating that learners with a variety of learning needs, interests, and styles can benefit from a variety of teaching methodologies and instructional tools.

According to Cormier, Mcauley, Siemens and Stewart (2010), Massive Online Open Courses (MOOCs) involve making open online courses publicly available to a wide number of people through the internet. Finally, Open Schedule Online Courses involve learners working asynchronously with course content provided digitally with emphasis on learners being allowed to work at their own pace as long as they stick to a schedule (Campus Explorer, 2019). Despite the fact that there are vast types of Distance Education, the study concentrates on synchronous learning.

## 2.2 Distance Education through Synchronous Learning

Synchronous learning occurs when a group of learners engage in the same activity simultaneously (Watts, 2016). Before instructional technologies supported synchronous learning environments, majority of online learning used asynchronous learning approaches. Many individuals are turning to synchronous learning tools that may be utilized for education since they have become available in the recent past (Oztok et al., 2013). Students and teachers can connect and learn in real-time. This can be achieved through live chats, webinars, and audio/video conferencing.

Video conferencing is not a modern concept; it was initially used for business conferencing before being used for online teaching and learning. Rouse (2016) defines Video Conferencing as a technological tool that enables learners and classes to connect to other learners, teachers and or industry experts worldwide through an internet connection with suitable bandwidth and video conferencing software.

According to Anastasiades (2009), the capacity of video conferencing to offer collaboration and interaction amongst institutions notwithstanding their physical location outlines its usefulness. Studies by Jung (2013) and Rassasi (2017) state that collaborating through video conferencing is to the same extent effective as face-to-face collaboration whilst studies by Carvile and Mitchell (2000) and Howard (2013) touch on the impediments to overcome in video conferencing that are non-existent in face-to-face collaboration.

While studies have revealed video conferencing to be an effective instructional tool, other studies have also revealed its effectiveness to be purely dependent on its usage. It is essential to examine how digital tools are implemented in institutions to guarantee their usage matches actual needs of the present knowledge society (Dooly and Davitova, 2018). Video conferencing could be essential in preparing learners for the 21st century if utilized correctly in addition to bringing individuals across different sectors to foster work and collaboration in ways formerly not feasible.

## 2.3 History of Synchronous Learning

Long before computers were used in synchronous learning, synchronous communication was used in distance education. Following the initial years of online education, learners and instructors interacted through email asynchronously. Later, broadcast radio and television evolved into synchronous forms of online education (Bernard et al., 2004). However, it was until the 1980s that video streaming and web conferencing became a reality, bringing a host of features such as real-time interaction and collaboration.

The first ever form of video conferencing came into existence in 1964 when an American telecommunications company by the name AT&T launched the Picturephone at a world's fair (Senft, 2019). Some years later in 1970, the Picturephone became available in the market with projected sales in the thousands in a few years as it was said to have the capability to replace once thought tedious business travel (Laskow, 2014). Laskow explains that unfortunately, the technology was too expensive for general adoption and within a couple of years, the Picturephone was entirely closed down. Part of the reason contributing to its failure was that

video conferencing was piloted over telephone networks with the quality being below par (Roberts, 2009).

In the 1990s, Roberts (2009) explains that video conferencing saw improvements in quality with gains in video compression, bandwidth and internet protocol (IP) technology. This led to an uptake in adoption by businesses as video conferencing was deemed to be cost friendly and saved time from avoiding travel (Tang and Isaacs, 1995). A study by Creighton and Adams (1998) revealed that use of video conferencing proved to be effective than traditional meetings once participants became used to it. Factors that led to the widespread uptake of video conferencing by various sectors in the early 2000s were; increased bandwidth availability, cost-friendly equipment and network interoperability (Roberts, 2009). Lawson (2010) explains that it is this success in the various sectors that led to video conferencing being implemented in Higher Learning Institutions (HLIs).

Initially, video conferencing was used to expand the audience of a traditional classroom by allowing more learners listen to academic experts (Storck and Sproull, 1995). Bates (2005) explains that it was also used to provide remotely connected learners with educational experiences otherwise considered difficult to deliver. According to research conducted by Carville and Mitchell (2000), using video conferencing to widen traditional classrooms was underutilizing the capabilities that video conferencing could offer in terms of interaction. This was a wake-up call as Higher Learning Institutions (HLIs) began implementing video conferencing for various applications.

Haselton (2017) explains that in 2012, the introduction of Facetime on iPhone 5 had a tremendous effect on higher learning. A study by Lopez, Ortiz and Allen (2015) revealed that teachers found it easier to use their personal phones to record their classes, upload and engage in conversations about their experiences through video conferencing rather than any other traditional mode. Not only have smartphones had a tremendous effect on higher levels of education but also opened doors to institutions that now have access to video conferencing.

## 2.4 Current Applications of Synchronous Learning

Institutions are spoilt for choice in terms of video conferencing applications that are readily available for use. A study by Henshall (2017) revealed that there are three video conferencing applications with increased functionality which include; Zoom, Skype, and Google Meet (initially Hangouts), all with the capacity to easily share a participant's screen and chat concurrently whilst being active on the video call as they try to duplicate the experience of a

traditional classroom. Another study by Stem Ecosystem (2020) revealed that Zoom, Microsoft Teams, Google Meet and Cisco Webex are the top free video conferencing platforms for educational purposes. Familiarity with any of the video conferencing applications coupled with sufficient internet bandwidth renders any of the applications usable.

Zoom automatically shares the entire screen. Zoom allows up to 100 students for free but meetings are limited to 40 minutes. Increased capabilities can be enjoyed on Zoom with paid versions using breakout rooms for group interaction and discussion. Henshall (2017) explains that the application enables group chats. Meeting setups are easy with Zoom requiring creation of a URL acting as the meeting room that can be shared with participants to give access to the meeting. All things considered, Zoom possesses better audio and video quality but the dissimilarity is minimal. Zoom also boasts of using fewer computing resources undoubtedly being a perfect fit over Skype and Google Meet to video conferencing users (Henshall, 2017).

Cisco Webex is another platform being implemented by institutions. It allows sharing of a participant's screen. Cisco Webex allows up to 100 students for free but meetings are limited to 50 minutes. The platform boasts of an interactive whiteboard with in-meeting polls and hand raising as available features. Cisco Webex also has improved security with end-to-end encryption and meeting hosts have the option to lock meeting rooms (Stem Ecosystem, 2020).

Google Meet (initially Hangouts) is another platform being implemented by institutions with University of Nairobi as a notable example. It allows sharing a specific part of a participant's screen. Henshall (2017) explains that the application enables group chats. Google Meet allows up to 100 students for free but meetings are limited to 1 hour. Meeting setups are easy with Google Meet requiring creation of a URL acting as the meeting room that can be shared with participants to give access to the meeting. Google Meet also has improved security and two-factor authentication, as well as integration with Google Classroom (Stem Ecosystem, 2020).

Microsoft Teams is another platform being implemented by institutions. It goes beyond video calls by offering features for collaboration such as file sharing, storage, chat, and so on. It allows sharing of a participant's screen. Microsoft Teams allows up to 100 students for free but meetings are limited to 1 hour. It also boasts of virtual breakout rooms for group interaction and discussion. Other capabilities to be enjoyed include digital whiteboards and participant's background blur. Microsoft Teams also has improved security, as well as integration with other Microsoft Office applications (Stem Ecosystem, 2020).

Skype is another platform being implemented by institutions. It automatically shares the entire screen. Henshall (2017) explains that the application enables group chats. Skype allows up to 100 students per chat for free but meetings are limited to 40 minutes. Meetings are enhanced with live captioning, subtitles and translation services. Increased capabilities can be enjoyed on Skype with paid versions.

Another video conferencing solution available for institutions is Gumzo, Kenya's first video conferencing solution which was initiated in 2020. It has since been revolutionized to Gumzo for Schools to further suit the school setting offering an online learning platform that allows institutions create digital classes. Gumzo for Schools offers increased capabilities and is offered at a monthly cost allowing an unlimited number of students and instructors. There are also no time limits on meetings (Usiku Entertainment Limited, 2021).

## 2.5 Notable Benefits of Synchronous Learning

### 2.5.1 Interactions with instructors

Students can communicate with their instructors in real time with instructors presenting course materials and engaging in real time discussions with their students. If students have a query, it will be promptly answered (ELM Learning, 2020 and Towson University Continuing & Professional Studies, 2020).

### 2.5.2 Feedback from instructors

Students are able to ask instructors to expound or clarify things in real time when they have online classes, which they can't do when they study asynchronously. Instructors can assess whether students are grasping the content and make necessary revisions (ELM Learning, 2020).

### 2.5.3 Meeting times are set in advance

Real time online classes are scheduled at regular intervals throughout the week, much like traditional classes. This enables students to incorporate ongoing education into their daily routine. With the disruption caused by the pandemic, synchronous learning makes it easier for students to be accountable with learning sessions set in advance (Towson University Continuing & Professional Studies, 2020).

### 2.5.4 Students working together

Virtual classrooms can not only mimic the real-world classroom experience, but they can also enhance it by providing a set of collaborative tools that foster active learning. Breakout Rooms stimulate practice and conversation, digital whiteboards provide engagement, and screen sharing

allows others to teach others, all of which help to bring the classroom experience to life (Towson University Continuing & Professional Studies, 2020).

## 2.6 Theoretical Literature Review

### 2.6.1 Task Technology Fit

According to the task-technology fit (TTF), individuals are likely to embrace technology if the technology's capabilities match their task requirements (Goodhue and Thompson, 1995). Quality, accessibility, authorisation, compatibility, ease of use/training, production timeliness, system reliability, and user interaction were all factors in the development of TTF. Each aspect is assessed through a series of two to ten questions, and responses are on a 7-point scale that ranges from strongly disagree to strongly agree.

While the Goodhue and Thompson's (1995) approach is focused on a personal level of analysis, Zigurs and Buckland's (1998) approach is based on a group level of analysis. TTF has also been used in a number of information system contexts. Other frameworks relating to IS, and in particular technology adoption model, have also been enriched by TTF. The TTF measure proposed by Goodhue and Thompson (1995) has been modified multiple times to meet the needs of the research.

The Task-Technology Fit construct is the core construct of the TTF Model, and it involves matching of the technology's capabilities to the task's support. Task Characteristics and Technology Characteristics are two of the four constructs in the TTF models, and they have an effect on the third construct Task-Technology Fit, which in turn has an effect on the outcome, which is either Performance or Utilization. This model takes a logical view, believing that consumers, regardless of their attitude toward IT, want to use IT that offers advantages, such as enhanced job efficiency (Goodhue 1995) but does not take into account the time and effort needed to use technology together with the social ramifications of using technology.

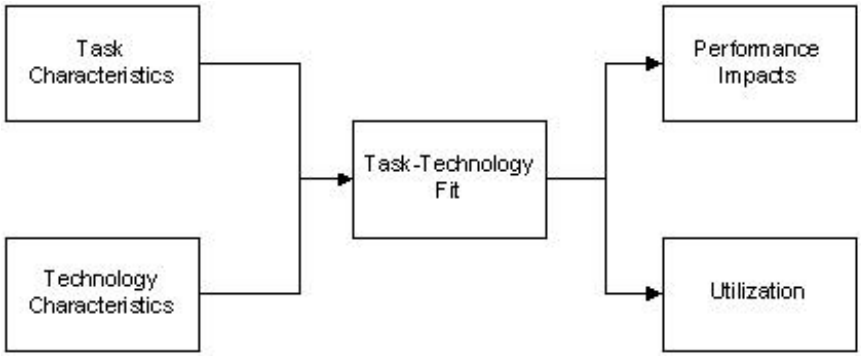



Figure 1: TTF from Goodhue and Thompson (1995)

### 2.6.2 Unified Theory of Acceptance and Use of Technology

Vekantesh et al. (2003) introduced the UTAUT, which is a technology acceptance theory. According to this theory, four main principles have an effect on people who use technology. As shown on Fig. 2, these variables have an effect on the direct causes of usage behavior and intention.

A notable number of theories were used to develop this theory making it the most complete acceptance model but it needs to take into account more external influences in various technological areas with the likes of diffusion of innovation theory, technology acceptance model and PC utilization model but a few to mention.

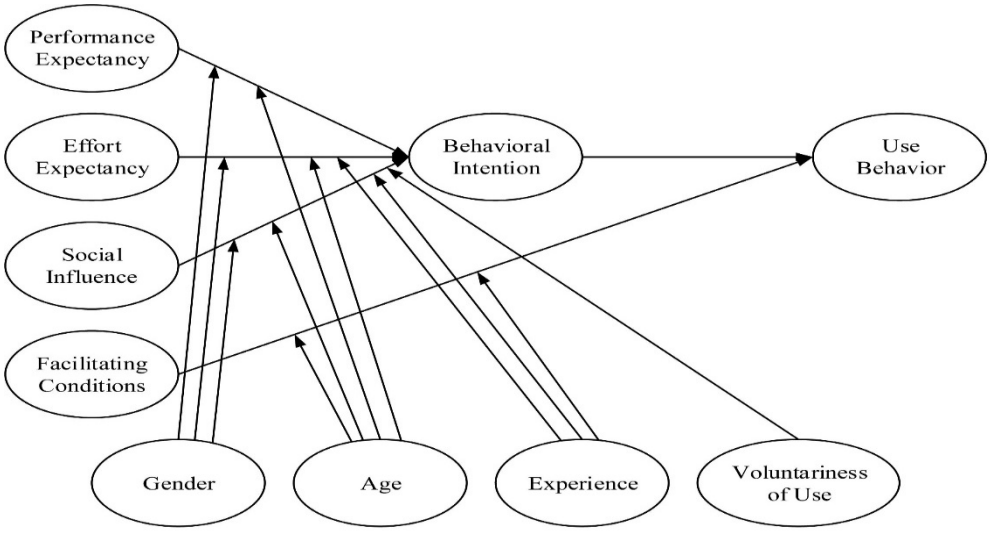



Figure 2: UTAUT from Venkatesh et al. (2003)

### 2.6.3 DeLone & McLean's Information Systems Success Model

DeLone and McLean's theory on information systems success is that it appears to provide an extensive comprehensive comprehension of IS achievement. The theory accomplishes this by recognizing, depicting, and clarifying the relationship between the most basic components of success that are generally reviewed when evaluating information systems (DeLone and McLean 2003).

#### *2.6.3.1 DeLone & McLean Information Systems Success Model of 1992*

A series of previous research on information system success led to the creation of the first model, which was published in 1992. The model's application has benefits in that it is utilised in assessing the overall performance of an information system or just a specific subsystem. The parameters of the classic model are listed below: System quality is a metric that assesses the efficiency of an information system, Information quality is a statistic that evaluates an

information system's output, Use is a metric for determining how a consumer interacts with an information system, User satisfaction is a metric that assesses how effectively an information system is used, Individual impact is a metric for deciding how an information system affects a person's behavior and the impact of information systems on organizational performance is measured by organizational impact. (DeLone and McLean 1992).

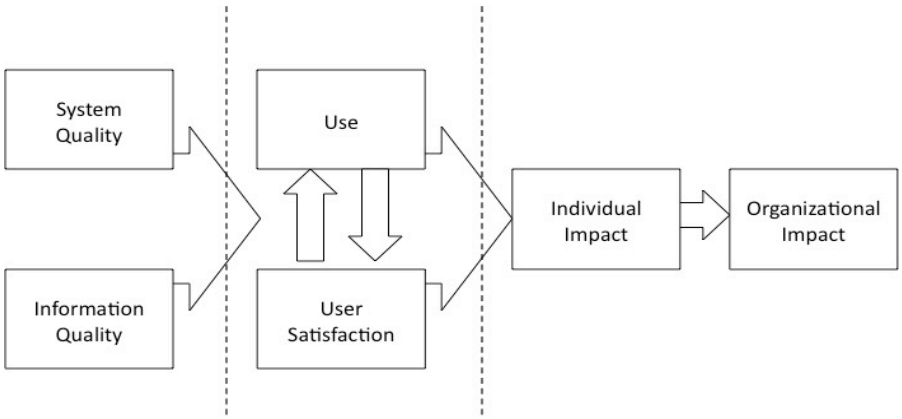



Figure 3: ISSM from DeLone and Mclean (1992)

### *2.6.3.2 DeLone & McLean's Information Systems Success Model of 2003*

The relationship between the six dimensions was defined in the updated model published in 2003. Because information system problems affect a wide range of industries and organizations, the DeLone and McLean model was utilized in this study to evaluate the performance of information systems in an Online Learning setting. To investigate the determinants and their influences on the dimensions of IS performance, the relationships between the various variables will be checked (DeLone and McLean, 2003).

The 6 interrelated aspects of IS success in the updated model are system quality, service quality, information quality, intention to/use, user satisfaction, and net benefits. The arrows indicate potential links between the constructs. The model's summary is as follows: System, service, and information quality can all be evaluated in terms of how they affect subsequent use or intent to use, along with user satisfaction. As a result of the system's use, certain benefits would accrue. The net benefits would have an impact on user satisfaction and sustained usage of the information system (both positively and negatively) (DeLone and McLean, 2003).

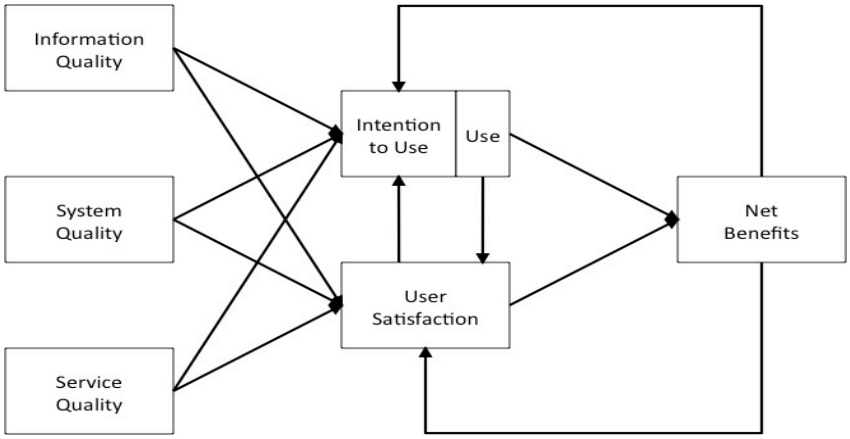



Figure 4: Updated ISSM from DeLone and McLean (2003)

## 2.7 Empirical Literature Review

### 2.7.1 System Quality

System quality can be termed as acceptable characteristics that users anticipate from the system. System quality can be measured in terms of ease of learning, system reliability and flexibility, and ease of use (DeLone and McLean, 1992 and Petter et al., 2013).

#### *2.7.1.1 Relationship between System quality and use*

Several studies evaluate system quality as perceived ease of use at the individual level of study and find favorable associations with different conceptualizations of usage in a number of systems. The perceived ease of use is connected to system dependence, behavioural intent to use the system, the extent of use, and self-reported use (Venkatesh and Davis, 2000 and Hsieh and Wang, 2007). Other researchers have found that perceived ease of use is only marginally related to actual use (Straub et al., 1995) and has no bearing on intent to use, self-reported use, or system dependence (Goodhue and Thompson, 1995, McGill et al., 2003 and Klein, 2007). Researchers discovered varied results when looking at the association between system quality and use at the institutional level. According to one study, self-reported use of a resource planning system was unaffected by perceived ease of use (Gefen, 2000).

#### *2.7.1.2 Relationship between System quality and net benefits*

The literature supports a moderate relationship between system quality and net benefits. Although there has been some disagreement over the relationship between perceived ease of use and usefulness as a metric of system quality, there is a positive effect on individual performance in general. System dependability and perceived ease of use had no effect on productivity or effectiveness (Goodhue and Thompson, 1995). There is no link between system quality and individual influence, as assessed by decision-making performance and productivity, according to

McGill and Klobas (2005). Kositanurit et al. (2007) discovered a substantial association between reported ease of use and performance for individual ERP system users. In an e-commerce setting, Bharati and Chaudhury (2006) established a link between decision-making satisfaction and system quality, as assessed by reliability, flexibility, ease of use, and ease of access. At the organizational level, the link between system quality and net benefits is widely accepted. A data warehouse's system quality was related to reduced decision-making time and effort (Wixom and Watson, 2001). Perceived software correctness and ease of use were likewise associated to perceived usefulness, according to Gefen (2000).

### 2.7.2 Service Quality

Service quality refers to the level of service or support provided by an IS organization and its IT support staff to system users in general, or for a particular IS. Service quality can be measured in terms of responsiveness, correctness, dependability, technical expertise, and understanding of the personal staff (Petter et al., 2013).

#### *2.7.2.1 Relationship between Service quality and use*

Little study has been done on the link between service quality and use at the individual and organization level. The documentation of an ERP system was not shown to be a determinant of use in a survey of ERP users (Kositanurit et al., 2006). According to a review of knowledge-management systems by Halawi et al. (2007), service quality had no association with intention to use. In a study of the London Ambulance System by Fitzgerald and Russo (2005), the effective role of technical personnel was significantly linked to a system's eventual utilization at the organizational level. In a review of expert systems, the retention of service personnel to sustain an expert system was a crucial element in determining the system's durability. Caldeira and Ward (2002) discovered that the expertise of workers, vendor support, and training provision all influenced the use and acceptance of IS in Portuguese SMEs.

#### *2.7.2.2 Relationship between Service quality and net benefits*

The association between service quality and net benefits finds moderate support in the individual context. External computing assistance was connected to perceived system use, whereas internal computing assistance was not, according to Igbaria et al. (1997). The developers' technical output was positively linked to increasing productivity (Leonard-Barton and Sinha, 1993). ERP system documentation has little influence on an individual's perception of performance (Kositanurit et al., 2006). More study is clearly needed at the organizational unit of review. According to Thong et al. (1994, 1996), greater levels of technical support and

efficiency were linked to reduced operational expenses. According to Gefen (2000), the perceived effectiveness of a system increases with the belief that the provider is cooperative.

### 2.7.3 Information Quality

Petter et al. (2008) defines information quality as a system's output that meets the needs and desires of its users. Information quality can be measured in terms of relevance, comprehensibility, correctness, completeness, and timeliness.

#### *2.7.3.1 Relationship between Information quality and use*

Few researches have explored the correlation between information quality and usage both at the individual and organizational levels. The explanation for this is that, rather than being assessed as a separate construct, information quality is often measured as a component of user satisfaction. The majority of research on the correlation between information quality and use has concentrated on overall IS success models. As use is assessed by system dependence, Rai et al. (2002) discovered that information quality has a strong association to use. The quality of information was found to be strongly linked to the intention to use in a review of knowledge management systems. Nonetheless, according to two studies by McGill et al. (2003) and Iivari (2005), the quality of information has no bearing on the desire to use it. While the quality, locatability, authorization, and timeliness of information were not strongly linked to use as evaluated by system reliance, Goodhue and Thompson (1995) discovered that information compatibility was. In their study of the London Emergency Dispatch System, Fitzgerald and Russo (2005) discovered a favorable association between information quality and system use at the organizational level.

#### *2.7.3.2 Relationship between Information quality and net benefits*

Gatian (1994) discovered a connection between information quality and decision-making performance. Quality of information has also been linked to job quality, savings in time and satisfaction in decision-making. The perceived usefulness (net benefit) of information was also related to its perceived efficiency. The association between information quality and benefits at the organizational level has shown conflicting findings depending on how net benefits are evaluated. Teo and Wong (1998) discovered that information quality is linked to better perceptions of the workplace setting such as job satisfaction, and exciting tasks, as well as organisational effectiveness, profits, and reputation (Farhoomand and Drury, 1996).

### 2.7.4 System Use

System use refers to how often and how much employees and consumers use the resources of an information system. For instance, the amount, frequency, nature, appropriateness, extent, and purpose of use are all factors to consider (Petter et al., 2008).

#### *2.7.4.1 Relationship between Use and net benefits*

Empirical research supports the link between system use and net benefits in a moderate way. Using an information system has been linked to better decision-making in many studies. Burton-Jones and Straub (2006) discovered a close link between use and net benefits. Halawi et al. (2007) discovered a correlation between intent to use and net benefits, as evaluated by improved job performance. Some reports, on the other hand, indicate the opposite. According to one report by McGill et al. (2003), individual impact is unrelated to intended use. Other researches by Iivari (2005) and Wu and Wang (2006) have found no connection between usage and net benefits. There is minimal support for the link between system use and organizational gains. In both developed and developing countries, Zhu and Kraemer (2005) discovered that using online IS for eBusiness had an important effect on value. Gelderman (1998) also discovered that usage, calculated in time, was not substantially related to increased revenue.

### 2.7.5 Net Benefits

The degree to which information systems contribute to the success of individuals, organisations and sectors is known as net benefits. Enhanced decision-making and productivity, higher revenue, lower costs, higher profit margins, efficient markets, customer wellbeing, employment generation are examples of benefits according to Petter et al. (2013).

#### *2.7.5.1 Relationship between Net benefits and use*

At the individual level of study, the association between net benefits and use has garnered modest support. When assessing real benefits using perceived usefulness as the indicator, studies have established a connection between consumer attitude and system use (Klein, 2007). Other studies have found strong links between perceived usefulness and self-reported use, degree of use, or reliance on a system (Kulkarni et al., 2006). In both voluntary and mandatory environments, Venkatesh et al. (2003) discovered a substantial link connecting performance expectations and system use intentions. When evaluated one, three, and six months after the system's introduction, these findings remained constant. At the organizational level, studies have shown compelling evidence of an association between system use and net benefits. Self-reported use is substantially linked to perceived usefulness (Gefen, 2000). In reviewing executive information systems (EIS) at a single entity, Belcher and Watson (1993) employed interviews to

evaluate results and questionnaires to evaluate system utilization. EIS benefits enhanced worker efficiency, improved decision-making, improved knowledge transfer and communication among personnel, and promoted continuous use, according to the report.

## 2.8 Conceptual Framework and Hypothesis

The conceptual framework utilized by the research was the Information Systems Success Model by Delone and McLean (2003). This model was chosen since it is focused more on how to evaluate the success of a system, with major emphasis mostly on delivered IS and end-user experience which ideally aligned with this research. Such models describe a range of success constructs such as system quality, service quality, information quality, system use, and net benefits.

The model was a great fit compared to other models discussed under theoretical review as it covers all objectives of the research and some of its attributes are in line with this research. Moreover, this model has been referred to in more than 300 publications worldwide as per Heo and Han (2003). This demonstrates that their model is dependable and efficient.

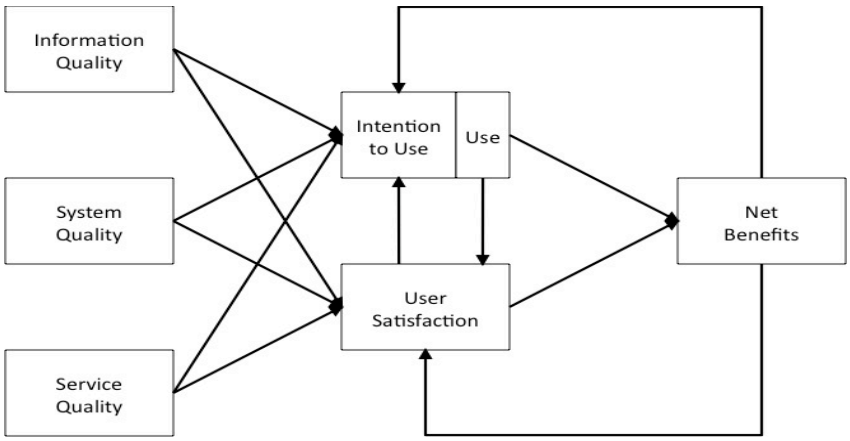



Figure 5: Updated ISSM from DeLone and McLean (2003)

The research aims to uncover some of the factors that determine the success of synchronous learning. As a result, we seek to:

Study ease of learning and security as factors of system quality in regards to success of synchronous learning through system use. According to Lewis (2020), with the increased usage of video conferencing technologies, the security of these communications has become a priority. Security issues can stem from unauthorized access, inappropriate sharing and privacy of user information (Nairn, 2020). Security or a sense of it would have a favourable outcome on their

utilization of video conferencing as learners/instructors will be pleased with the system's handling of important meeting sessions and information shared through it, resulting in a positive impact on system use.

The ease of learning of video conferencing technologies is the most critical factor for any implementation (Frost & Sullivan, 2020). The ability to access a video conferencing platform and its functionality without consulting lengthy training manuals or FAQs is a major factor in convincing students and instructors to use the service. The ability to launch, locate, and use features inside video conferencing technologies at the click of a button would go a long way to reassuring students and instructors that the system has the necessary level of quality to meet their needs. This will then influence system use.

Therefore, this study proposes:

**H1:** Security as a factor in system quality has a positive relationship with system use.

**H2:** Ease of learning as a factor in system quality has a positive relationship with system use.

Study cost and instructional expertise as factors of service quality in regards to success of synchronous learning through system use. Video conferencing has the potential to increase efficiency, reduce costs, shorten processing times, speed decision-making, and eventually affect the bottom line (Frost & Sullivan, 2020). Universities could collaborate and create practically cost-free webinar training sessions instead of sending instructors to training sessions abroad and wasting a lot on travel expenses. Smaller institutions could join together and use video conferencing to expand their course offerings by allowing one instructor to serve several classrooms at the same time. Students could positively be impacted by saving on travel expenses to attend physical classes but the cost accrued from internet usage could vary depending on ISP and time taken on video conferencing platform. Cost will play a major role in influencing system use.

Engaging guest lecturers and industry experts as classroom speakers is a major factor in convincing students to use video conferencing as it enhances the classroom experience. Video conferencing provides a platform for interaction and collaboration between students and industry experts who are brought in to give presentations on specific subjects which is much easier for them to do for an hour or so from the comfort of their home or work than it is to physically visit institutions. For students, these mentoring interactions are motivating and carry

their learning to a whole new level thus, feeding directly into system use (Bentley, 2020 and Vizual Symphony, 2020).

Therefore, this study proposes:

**H3:** Cost as a factor in service quality has a positive relationship with system use.

**H4:** Instructional expertise as a factor in service quality has a positive relationship with system use.

Study relevance as a factor of information quality in regards to success of synchronous learning through system use. Relevance of information shared through video conferencing is a major factor in convincing students and instructors to use the service. Students and instructors need to be reassured that the information gathered or exchanged through video conferencing platforms is of sufficient quality to meet their needs, as this will have a positive impact on system use.

Therefore, this study proposes:

**H5:** Relevance as a factor in information quality has a positive relationship with system use.

Study system use and its relationship with success of synchronous learning. At the organizational level, there is considerable evidence showing a link between net benefits and use, according to research. Self-reported use has been linked to perceived usefulness in a substantial way (Gefen, 2000). Using an information system has been linked to better decision-making, enhanced efficiency, and improved information, according to a report by Belcher and Watson (1993). Burton-Jones and Straub (2006) also discovered a close link between system use and task success.

Therefore, this study proposes:

**H6:** System Use has a positive relationship with success of synchronous learning.

The following are the research's main variables:

Table 1: Variables

| **Dependent Variables** | **Independent Variables** |
|---|---|
| • Success of synchronous learning | • Security<br>• Ease of learning<br>• Cost<br>• Instructional expertise<br>• Relevance |

The following is the research's recommended conceptual framework:

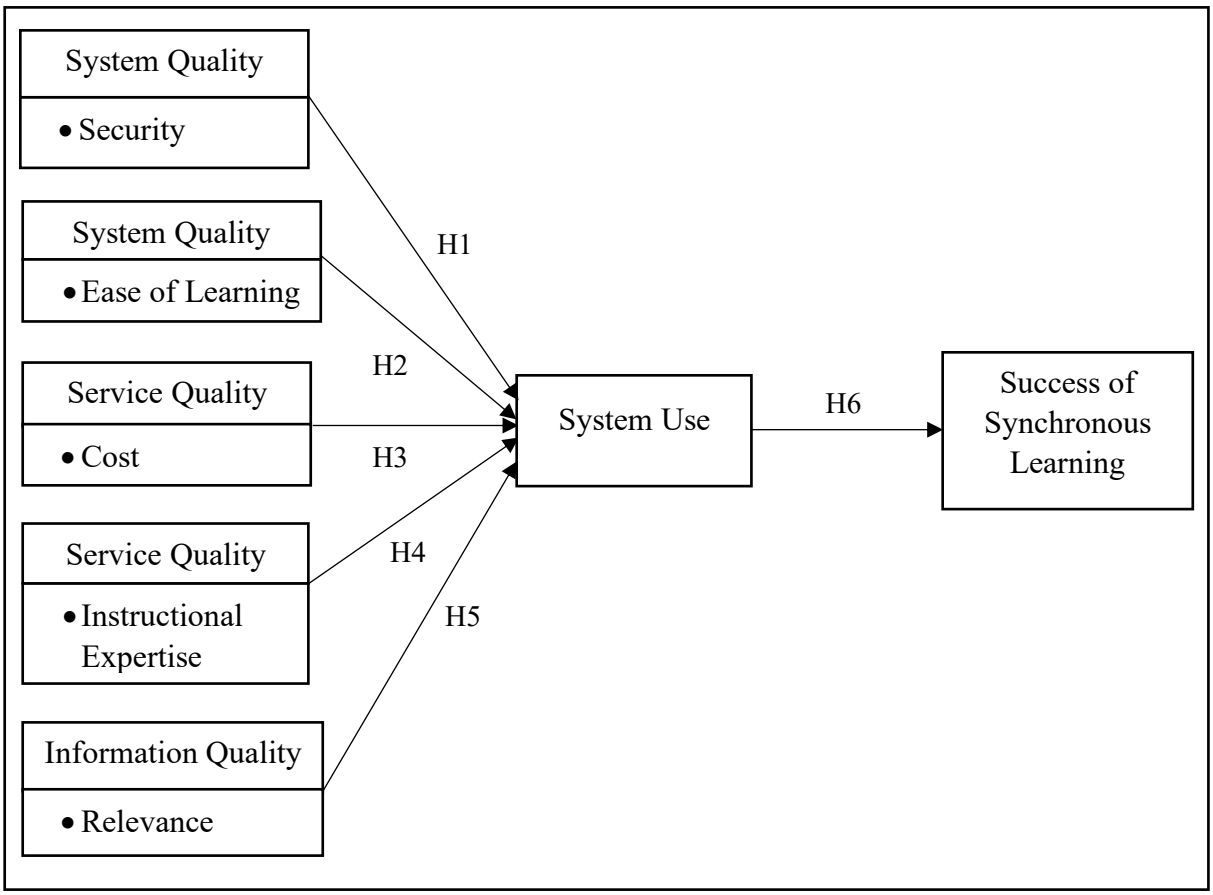



Figure 6: Conceptual Framework

Factors: Security, Ease of learning, Cost, Instructional Expertise, Relevance

## 2.9 Operationalizing the Variables

Table 2: Operationalizing the Variables

| Construct | Variable | Supporting reference from literature | Measurable Item | Metric |
|---|---|---|---|---|
| System Quality | Security | Nairn (2020) | Presence of a public policy to handle personal information | Likert Scale |
| | | | Presence of personal information safety | Likert Scale |
| | | | A synchronous learning platform's level of security | Likert Scale |
| | | | Level of confidence in system's quality | Likert Scale |
| | Ease of Learning | DeLone & McLean (2003); Sedera et al. (2004) and Gable et al. (2008) | Degree to which a synchronous learning platform makes it easy to learn | Likert Scale |
| | | | The ease with which a synchronous learning platform can be navigated | Likert Scale |
| | | | The ease with which a synchronous learning platform may be launched | Likert Scale |
| | | | In terms of technology command, the degree of utilization | Likert Scale |
| Service Quality | Cost | Nyerere (2020) | Computers, tablets, and smartphones range in price | Likert Scale |
| | | | Cost of internet connectivity | Likert |

| | | | | |
|---|---|---|---|---|
| | | | on a scale of one to five | Scale |
| | | | Level of investment in a synchronous learning platform | Likert Scale |
| | | | Time and money savings as a result of using a synchronous learning platform | Likert Scale |
| | Instructional Expertise | Bentley (2020) | A synchronous learning platform's level of instructional expertise | Likert Scale |
| | | | Professionals on standby to deal with certain subject areas | Likert Scale |
| | | | Degree of teaching experience in relation to the utilization of a synchronous learning platform | Likert Scale |
| Information Quality | Relevance | Petter et al. (2008) and DeLone & McLean (1992) | The degree to which information provided over a synchronous learning environment is relevant | Likert Scale |
| | | | Degree to which the information gathered or exchanged through a synchronous learning platform is of high quality | Likert Scale |
| System Use | Use | Petter et al. (2013) and DeLone & McLean (1992) | Degree to which a synchronous learning platform is accessible | Likert Scale |
| | | | Extent to which a synchronous learning | Likert |

| | | | | |
|---|---|---|---|---|
| | | | platform is used | Scale |
| | | | Suitability of a synchronous learning platform for learning | Likert Scale |
| | | | Ability of students to learn | Likert Scale |
| Net Benefits | Success of Synchronous Learning | DeLone & McLean (2003); Sedera et al. (2004) and Petter et al. (2008) | Level of productivity of a synchronous learning platform | Likert Scale |
| | | | Time spent on teaching students | Likert Scale |
| | | | Effectiveness of student education | Likert Scale |
| | | | Overall degree of success with a synchronous learning platform | Likert Scale |

# CHAPTER THREE: RESEARCH METHODOLOGY

## 3.1 Introduction

The research methodology describes how the study's survey was conducted (Kombo and Tromp, 2009). This chapter focuses the research design to be utilized, the study's population and techniques used in sampling, the tools employed for data collection, how validity and reliability will then be achieved as well as how data will also be analysed and presented.

## 3.2 Research Philosophy

The researcher's research philosophy demonstrates how he or she understands the connection between knowledge and its creation process.

The study employed positivist research as it intended to use a quantitative approach to gather data that could be statistically interpreted to draw conclusions. This philosophy draws relationships between variables using scientific methods.

## 3.3 Research Methodology

There are two primary approaches for this: qualitative and quantitative. The quantitative method was used in this study to measure the problem and generate numerical data that would be used in the research. The quantitative approach was chosen as the primary research method because it uses measurable data to discover trends and patterns, as it is with our research on factors determining the success of synchronous learning in Kenyan universities.

## 3.4 Research Design

The research used a descriptive design to address the research questions. Descriptive research is used to explain the current state of affairs. In this analysis, a descriptive study determines and explains the characteristics of interest variables in a situation, which will aid in understanding the factors determining the success of synchronous learning in Kenyan universities.

## 3.5 Target Population

A population is a research area that contains all things of interest. Undergraduate, postgraduate students, and instructors from two leading Kenyan universities (one public and the other private) directly involved in synchronous mode of learning during covid-19 period were the study's target population. The size of the population targeted from the two universities was 9,000 from the University of Nairobi and 1,000 from Mount Kenya University totalling to a population of 10,000 with the numbers representing an accurate estimate obtained from ICT Centre and ODEL sections of the two universities respectively.

## 3.6 Sample Size and Sampling Technique

### 3.6.1 Sample Size

A sample is a subset of the available population. Each sample member or case is referred to as the foundation, respondent, or interviewee, and this subpopulation is carefully selected to be representative of the entire population with the respective features. The representative sample size was determined using Taro Yamane's (1967) formula with an expected 95% confidence level and population proportion of 0.5. The formula is given by

$$n = N / (1 + N (d)^2)$$

The population size is N, and the margin of error is d. The formula was utilized with a precision of 5% for the population N = 10,000. The sample size was calculated using a 95 percent confidence level and p = 0.5.

$$n = 10{,}000 / (1 + 10{,}000 (0.05)^2)$$

$$n = 385$$

The proper sample size of 385 respondents was then determined.

### 3.6.2 Sampling Technique

Since the population was homogeneous, the respondents were split into three groups: undergraduate, postgraduate students, and instructors. The three-level responses are less variable and were easily applied to the entire population. To obtain values for each group, the study employed Cochran's (1977) stratified sampling technique. Values identified were 173 undergraduate students, 135 postgraduate students and 77 instructors.

Purposive sampling was used to select two universities due to the research's timing constraints. The two universities were chosen because they have a long history of using online learning to provide students with a flexible and dynamic learning experience by combining the usage of e-learning with strong traditional learning and teaching practices. With this in mind, the two universities provided a more reliable source of data for this research. Out of these universities, one is public and the other private and they're based in Nairobi as well.

To generate a representative sample, students and instructors were chosen at random in both of the two institutions by employing stratified random sampling. The goal of stratified random sampling would be to ensure that different subgroups in the population are adequately represented (Kothari, 2004).

## 3.7 Data Collection

The study used a questionnaire as the primary source of data, along with informal interviews directed by the questionnaires.

### 3.7.1 Questionnaires

Questionnaires were chosen because they are easily relatable to respondents, are simple to administer and interpret data because they are in a standardized format, and are perfect when the respondent may not want their identity revealed. The questionnaire was divided into 6 sections: Section A would collect background information, whereas Sections B to F would focus on questions related to independent and dependent variables, such as security, ease of learning, cost, instructional expertise, relevance, system use, and success. The questionnaire featured closed ended questions to provide more uniform replies easier to process than open-ended questions (Babbie, 2010).

The questionnaire was created and link distributed to 385 people using an online survey tool (Google Forms). Because the sample size was substantial and the data was equivalent to that gathered through face-to-face interviews, Google Forms were an excellent choice for this study (Leedy and Ormrod, 2010). To evaluate the various variables under research, a five-point Likert scale was employed, with 1 indicating strong disagreement, 2 indicating dissatisfaction, 3 indicating neutrality, 4 indicating agreement, and 5 indicating strong agreement. The scale was chosen because it is easy to administer, relatable to respondents, and is readily quantifiable and subjective to mathematical analysis computation.

Although questionnaires are widely used in quantitative studies, they typically elicit poor returns thus having a disadvantage. A moderate response rate of 216 responses was received in the initial data collection phase. The length of the questionnaire and the fact that the researcher is a student at one of the institutions where data was collected may have resulted in a moderate return rate, despite the questionnaire having a confidentiality clause. A reminder to complete the questionnaire was issued to responders as a mitigating step, which resulted in an increase of 128 responses. Respondents had the flexibility to save an incomplete session and progress on it later due to its length and any personal identifying fields were omitted for the sake of confidentiality.

## 3.8 Validity and Reliability Tests

A reliability test determines the extent to which an instrument can be relied upon to provide consistent data should the process be repeated. The reliability of research instruments is

calculated through the piloting process, which is used to test the extent to which the instrument is successful in getting the required data.

A pre-test with undergraduate and postgraduate students was performed to test the questionnaire's ability to collect the necessary data in order to ensure its validity. Because of cost, time, and practicality of the pre-test, one percent of the sample was considered in this analysis despite the fact that they were not part of the actual research.

Cronbach's alpha method was applied to Likert scale artifacts to assess the study tools internal consistency. This approach was chosen because of its specific ability to assess the internal accuracy and reliability of the study instrument. Cronbach's alpha reliability coefficient varies from 0 to 1, with values near one suggesting that Likert scale items have a high degree of internal quality.

## 3.9 Data Analysis and Presentation

Data analysis refers to the use of logic to interpret the information gathered in order to identify coherent patterns and summarize the relevant details revealed in the investigation. The research goals and the assessment of the information collected would be the drivers of data analysis in order to decide the trends discovered in the information collection of the factors (Zikmund, Babin, Carr, and Mitch, 2013).

For the creation of relationships in tabular, graphical, inferential, and descriptive statistics, the quantitative data gathered from respondents was structured, compiled, and input in Statistical Package for Social Sciences (SPSS) software version 28 The variables were subjected to correlation and regression analysis to determine their relationship. Using descriptive statistics, factors determining the success of synchronous learning in Kenyan universities were determined.

# CHAPTER FOUR: RESULTS AND DISCUSSION

## 4.1 Introduction

This chapter examines the information gathered and explains results from the observations obtained from respondents sampled. This goal of the research was to look into the factors determining the success of synchronous learning in Kenyan universities.

## 4.2 Response Rate

385 questionnaires were delivered to the respondents identified in the two universities, with 173 of them going to undergraduate, 135 to postgraduate students and 77 going to instructors. 344 questionnaires were correctly filled out by 157 undergraduates, 120 postgraduates and 67 instructors which represented an overall acceptable response rate of 89.4%. Return rates of 50% are adequate for analysis, whereas 60% are good, and more than 70% are excellent as stated by Babbie (2004). Given that the majority of the questionnaires were distributed online due to the covid-19 pandemic, the overall response rate was good. The following is the response rate:

Table 3: Response Rate

| | **Target Sample Size** | **Response Rate** | **% of Response Rate** |
|---|---|---|---|
| Undergraduate Students | 173 | 157 | 90.8% |
| Postgraduate Students | 135 | 120 | 88.9% |
| Instructors | 77 | 67 | 87.0% |
| **Total** | **385** | **344** | **89.4%** |

## 4.3 Reliability Analysis

The internal consistency and reliability of any survey instrument employed in research is assessed using Cronbach's Alpha test. The test was used to measure the reliability of this study. Alpha values must be greater than 0.6 for the study to be effective. This study's Cronbach's Alpha was 0.840, indicating that it is highly effective. The findings are shown in the table below:

Table 4: Reliability Analysis

**Reliability Statistics**

| Cronbach's Alpha | N of Items |
|---|---|
| .840 | 7 |

Table 5: Item-total Statistics

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| Security | 24.1500 | 9.021 | .380 | .847 |
| Ease of Learning | 23.8970 | 8.794 | .422 | .842 |
| Cost | 24.2880 | 7.912 | .654 | .809 |
| Instructional Expertise | 24.0632 | 8.232 | .667 | .810 |
| Relevance | 23.8767 | 8.143 | .738 | .803 |
| System Use | 24.3832 | 7.313 | .706 | .800 |
| Success of Synchronous Learning | 24.2154 | 6.728 | .675 | .811 |

## 4.4 Background Information

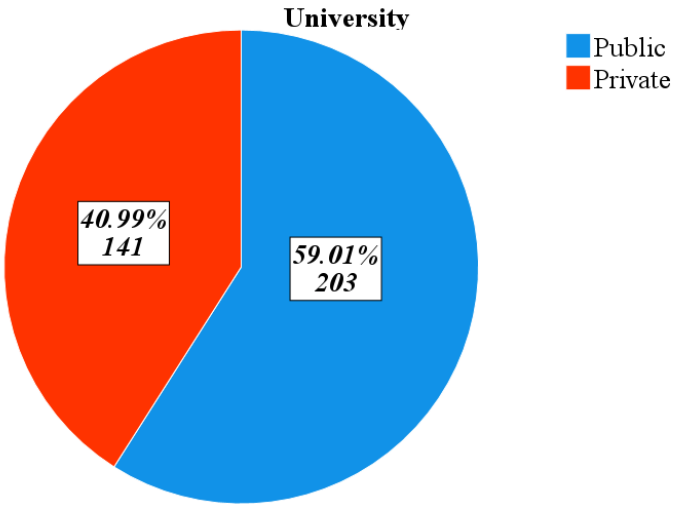
### 4.4.1 Respondents by University

Table 6: Respondents by University

**University**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Public | 203 | 59.0 | 59.0 | 59.0 |
| | Private | 141 | 41.0 | 41.0 | 100.0 |
| | Total | 344 | 100.0 | 100.0 | |

According to the data above, the majority of those who participated in this research came from a public university, accounting for 59.0% of the total. Those from a private university accounted for the remaining 41.0%. The information in the table above is represented in more detail in the chart below:



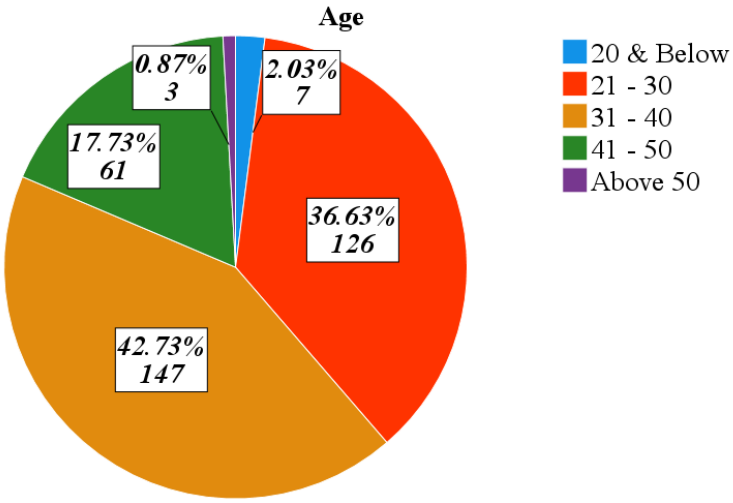

### 4.4.2 Respondents by Age

Table 7: Respondents by Age

**Age**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 20 & Below | 7 | 2.0 | 2.0 | 2.0 |
| | 21 - 30 | 126 | 36.6 | 36.6 | 38.7 |
| | 31 - 40 | 147 | 42.7 | 42.7 | 81.4 |
| | 41 - 50 | 61 | 17.7 | 17.7 | 99.1 |
| | Above 50 | 3 | .9 | .9 | 100.0 |
| | Total | 344 | 100.0 | 100.0 | |

According to the data above, the majority of those who participated in this research were between the ages of 31 and 40, accounting for 42.7% of the total. Those between the ages of 21 and 30 accounted for 36.6%, 41 and 50 accounted for 17.7%, 20 & below accounted for 2.0% and the remaining 0.9% were above 50. The information in the table above is represented in more detail in the chart below:



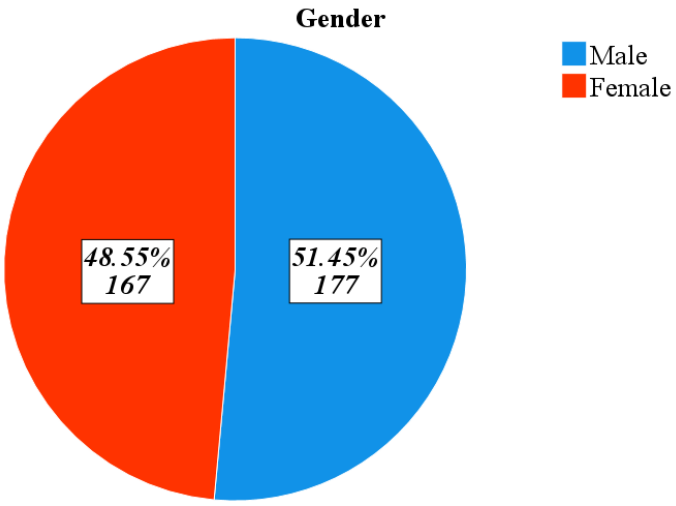

### 4.4.3 Respondents by Gender

Table 8: Respondents by Gender

**Gender**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Male | 177 | 51.5 | 51.5 | 51.5 |
| | Female | 167 | 48.5 | 48.5 | 100.0 |
| | Total | 344 | 100.0 | 100.0 | |

According to the data above, the majority of those who participated in this research were male, accounting for 51.5% of the total. Those who were female accounted for the remaining 48.5%. The information in the table above is represented in more detail in the chart below:



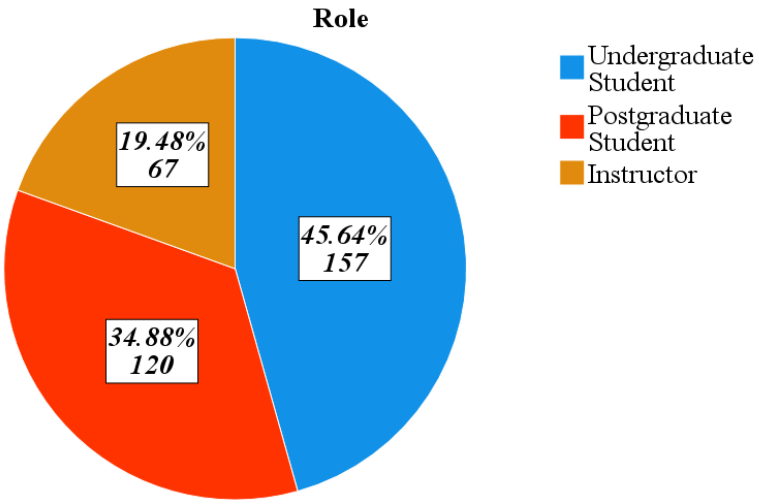
### 4.4.4 Respondents by Role

Table 9: Respondents by Role

**Role**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Undergraduate Student | 157 | 45.6 | 45.6 | 45.6 |
| | Postgraduate Student | 120 | 34.9 | 34.9 | 80.5 |
| | Instructor | 67 | 19.5 | 19.5 | 100.0 |
| | Total | 344 | 100.0 | 100.0 | |

According to the data above, the majority of those who participated in this research were undergraduate students, accounting for 45.6% of the total. Those who were postgraduate students accounted for 34.9% and instructors accounted for the remaining 19.5%. The information in the table above is represented in more detail in the chart below:




## 4.5 Descriptive Analysis of Variables

Respondents scored various aspects on a 5-point Likert scale with (1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, and 5 = Strongly Agree). During analysis, the first two were joined to form Disagree, whereas the latter two were joined to form Agree. As a result, three metrics were developed (Agree, Undecided and Disagree).

### 4.5.1 Security

The study was looking into the effect of security on system use. On a five-point likert scale, participants were asked to score their responses. The results are listed in the table below:

Table 10: Descriptive Statistics - Security

**Descriptive Statistics**

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| I'd like to see a public policy governing how the system handles my personal information. | 344 | 1 | 5 | 3.63 | 1.126 |
| I would not use a synchronous learning platform if I was concerned about the security of my personal information. | 344 | 1 | 5 | 4.05 | .694 |
| The security of a synchronous learning platform and the services it offers is crucial in my opinion. | 344 | 1 | 5 | 4.19 | .533 |
| I require reassurance that my data will be safe, and I will only use the system if I am confident with the security features. | 344 | 2 | 5 | 4.12 | .653 |
| Valid N (listwise) | 344 | | | | |
| Average Mean | 344 | | | 4.00 | |

The respondents generally thought that security was an important factor in the success of synchronous learning (average mean of 4.00). A considerable number of respondents agreed that a public policy is required to handle their personal information. They also were in agreement that their personal information safety would be a factor in determining if they would use a synchronous learning system. Security of a synchronous learning system and the services it provides was found to be of importance by a majority of the respondents and if their data was protected, they'd most likely use it. The results are as follows: 1 (Mean: 3.63, Std Dev =1.126), 2 (Mean: 4.05, Std Dev =.694), 3 (Mean: 4.19, Std Dev =.533), 4 (Mean: 4.12, Std Dev =.653).

As revealed by the study, security provides the necessary reliability feature which is important when dealing with online learning. A secure system also encourages trust and builds confidence with its users. Security provides credibility, accountability and is key to ensuring confidentiality of personal data. Data integrity ensures personal information is as is hence, students will be contented to give correct details. These findings are in line with Nairn (2020) who asserts that security is crucial for synchronous learning to thrive as it details user data protection methods and security features available on the platform.

### 4.5.2 Ease of Learning

The study was looking into the effect of ease of learning on system use. On a five-point likert scale, participants were asked to score their responses. The results are listed in the table below:

Table 11: Descriptive Statistics - Ease of Learning

**Descriptive Statistics**

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| To me, a synchronous learning platform's ease of learning is crucial. | 344 | 1 | 5 | 4.28 | .722 |
| Without consulting lengthy training manuals or FAQs, I can effortlessly explore a synchronous learning platform and its capabilities. | 344 | 2 | 5 | 4.01 | .842 |
| It's simple to set up a synchronous learning system, as well as to find and use features within the platform. | 344 | 2 | 5 | 4.44 | .680 |
| If a synchronous learning system is built to make me feel in control of the technology, I am more likely to use it. | 344 | 2 | 5 | 4.27 | .711 |
| Valid N (listwise) | 344 | | | | |
| Average Mean | 344 | | | 4.25 | |

The respondents generally thought that ease of learning was an important factor in the success of synchronous learning (average mean of 4.25). A considerable number of respondents agreed that the ease of learning of a synchronous learning system is of importance and they can easily navigate it without consulting training manuals. They also agreed that they could easily launch, find and use features of a synchronous learning system except for a minority few who were not decided. A considerable number of respondents also agreed that they would use a synchronous learning system more if they felt in command of the technology. The results are as follows: 1 (Mean: 4.28, Std Dev =.722), 2 (Mean: 4.01, Std Dev =.842), 3 (Mean: 4.44, Std Dev =.680), 4 (Mean: 4.27, Std Dev =.711).

As revealed by the study, ease of learning promotes discussions and building communities among students hence promoting divergent views and rich learning. A system that is easy to navigate especially for users who aren't tech-savvy gives them confidence to use the system without the lingering doubt of making errors. Easier access and usability motivate students to join a class since they don't have to go through an entire process. Ease of learning promotes user friendliness thus students will meet their deliverables without strain since all learning features will have been exploited effectively and efficiently. These findings are in line with Bentley (2020) who asserts that ease of learning is also important for synchronous learning to work because it describes how easy it is to navigate the platform and how much learning there is.

### 4.5.3 Cost

The study was looking into the effect of cost on system use. On a five-point likert scale, participants were asked to score their responses. The results are listed in the table below:

Table 12: Descriptive Statistics - Cost

**Descriptive Statistics**

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| In recent years, computers, tablets, and smartphones have all become more affordable. | 344 | 1 | 5 | 3.90 | .837 |
| Internet connectivity is reasonably priced. | 344 | 1 | 5 | 3.21 | 1.011 |

| | | | | | |
|---|---|---|---|---|---|
| Before going digital, institutions must invest in synchronous learning platforms, digital libraries, and internet access. | 344 | 3 | 5 | 4.29 | .792 |
| Time and money savings would surely influence my decision to employ a synchronous learning system if the level of quality is maintained. | 344 | 1 | 5 | 4.03 | .740 |
| Valid N (listwise) | 344 | | | | |
| Average Mean | 344 | | | 3.86 | |

The respondents generally thought that cost was an important factor in the success of synchronous learning (average mean of 3.86). A considerable number of respondents agreed that computers, tablets and smartphones have become less expensive recently with a small percentage not decided while the remaining minority disagreeing. Respondents were tightly split on the assertion that cost of internet access is reasonable with just a couple agreeing while the rest either disagreed or were not decided. A majority of respondents also agreed that investments in synchronous learning systems, digital libraries, internet etc. were compulsory for institutions to go digital while savings in time and money would have a direct impact in their decision to use synchronous learning systems. The results are as follows: 1 (Mean: 3.90, Std Dev =.837), 2 (Mean: 3.21, Std Dev =1.011), 3 (Mean: 4.29, Std Dev =.792), 4 (Mean: 4.03, Std Dev =.740).

As revealed by the study, cost is critical especially if it has to be met by students from marginalised areas who have to prioritise basic needs over internet access. Cost of computers, tablets and smartphones has been considerably high in the recent past and stable internet connectivity is highly priced. Cost affects the quality of setting up and running of online learning platforms. Better quality of the latter translates to more resources and processes required to make it a success. Cost is a big driver of learning in Kenyan universities. Online learning has reduced the cost associated with learning and affordable cost of technology has also made it possible for universities to conduct online classes. These findings are in line with Nyerere (2020) who asserts that before going digital, institutions must invest in synchronous

learning platforms, digital libraries, and internet access. To benefit from online learning, students must have access to computers or tablets as well as internet access.

### 4.5.4 Instructional Expertise

The study was looking into the effect of instructional expertise on system use. On a five-point likert scale, participants were asked to score their responses. The results are listed in the table below:

Table 13: Descriptive Statistics - Instructional Expertise

**Descriptive Statistics**

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| When it comes to synchronous learning, instructional expertise is crucial. | 344 | 2 | 5 | 3.94 | .738 |
| I'd want to see more specialists brought in remotely to speak on specific issues. | 344 | 3 | 5 | 4.13 | .646 |
| If the level of quality is maintained, virtual field trips to enhance the educational experience will undoubtedly affect my decision to use synchronous learning services. | 344 | 1 | 5 | 4.18 | .742 |
| Valid N (listwise) | 344 | | | | |
| Average Mean | 344 | | | 4.08 | |

The respondents generally thought that instructional expertise was an important factor in the success of synchronous learning (average mean of 4.08). A considerable number of respondents agreed that instructional expertise is a factor in synchronous learning delivery and that they prefer to see more experts brought in remotely to present on certain topics. Results also showed that virtual trips would enrich learning experience together with influencing respondents'

decision to use a synchronous learning system. The results are as follows: 1 (Mean: 3.94, Std Dev =.738), 2 (Mean: 4.13, Std Dev =.646), 3 (Mean: 4.18, Std Dev =.742).

As revealed by the study, instruction in the realm of synchronous learning is somewhat different from how traditional instruction is conducted. Instructors have to evolve as far as their approaches to instruction are concerned. It is by doing this that they will come close to achieving their instructional goals. Level of instructional expertise determines how well instructions are packaged for students; hence, good instructions will allow students to successfully learn. By giving students a virtual tour, industry experts offer students quality training thus instructional expertise boosts quality, confidence, understanding and success. These findings are in line with Bentley (2020) who asserts that instructional expertise is important in contributing to the success of synchronous learning due to the fact that it provides professionals to handle specific thematic areas as well as virtual field trips to enhance the learning experience.

### 4.5.5 Relevance

The study was looking into the effect of relevance on system use. On a five-point likert scale, participants were asked to score their responses. The results are listed in the table below:

Table 14: Descriptive Statistics - Relevance

**Descriptive Statistics**

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| A crucial component in persuading students and teachers to use a synchronous learning platform is the relevance of the information shared. | 344 | 2 | 5 | 4.17 | .699 |

| | | | | | |
|---|---|---|---|---|---|
| It is necessary to have assurance that information obtained or transferred through a synchronous learning platform is of sufficient quality, and I would only use the system if I am confident that the information quality satisfies my requirements. | 344 | 3 | 5 | 4.36 | .642 |
| Valid N (listwise) | 344 | | | | |
| Average Mean | 344 | | | 4.27 | |

The respondents generally thought that relevance was an important factor in the success of synchronous learning (average mean of 4.27). A considerable number of respondents agreed that relevance of information shared through a synchronous learning system is a major factor in convincing them to use it. Respondents also unanimously agreed that quality of information gathered or exchanged through a synchronous learning system would impact their decision to use it. The results are as follows: 1 (Mean: 4.17, Std Dev =.699), 2 (Mean: 4.36, Std Dev =.642).

As revealed by the study, the degree to which the information provided during online learning is relevant is heavily influenced by the effectiveness of a platform as an educational. If the platform provides irrelevant information, it is unfit for educational purposes. A majority of students would consider taking a course online if its contents are relevant to their needs. The more relevant a course and its materials are to students and instructors, the greater success it will have. All educational content should be relevant to the subject matter, especially in an online setting where students and instructors have access to a wealth of information. These findings are in line with Nyerere (2020) who asserts that the information exchanged through a synchronous learning platform must be relevant in order for synchronous learning to be successful.

### 4.5.6 System Use

The study was looking into the effect of system use on success of synchronous learning. On a five-point likert scale, participants were asked to score their responses. The results are listed in the table below:

Table 15: Descriptive Statistics - System Use

**Descriptive Statistics**

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| It is simple to access a synchronous learning platform. | 344 | 1 | 5 | 3.90 | .942 |
| I consider the use of a synchronous learning platform as essential. | 344 | 1 | 5 | 3.67 | 1.307 |
| A synchronous learning platform's resources are appropriate for learning. | 344 | 1 | 5 | 3.77 | 1.096 |
| Students' ability to learn will improve when they use a synchronous learning platform. | 344 | 1 | 5 | 3.71 | 1.057 |
| Valid N (listwise) | 344 | | | | |
| Average Mean | 344 | | | 3.76 | |

The respondents generally thought that system use was an important factor in the success of synchronous learning (average mean of 3.76). A considerable number of respondents agreed that a synchronous learning system is easily accessible and its use is essential to them with a small percentage not decided and a minority few disagreeing. A considerable number also agreed that the resources used in a synchronous learning system are suitable for learning while a small percentage was not decided. A number of respondents also agreed that student's ability to learn would increase by using a synchronous learning system with a small percentage not decided and the remaining minority disagreeing. The results are as follows: 1 (Mean: 3.90, Std Dev =.942), 2 (Mean: 3.67, Std Dev =1.307), 3 (Mean: 3.77, Std Dev =1.096), 4 (Mean: 3.71, Std Dev =1.057).

As revealed by the study, simplicity in access of a synchronous learning platform only occurs when there is an underlying ICT infrastructure, computer devices and stable internet connectivity. The more students interact with a synchronous learning platform, the more they

become familiar with it therefore making it easy to learn from. These findings are in line with Nyerere (2020) who asserts that because of their suitability for learning, the resources used in a synchronous learning platform also contribute significantly to the success of synchronous learning.

### 4.5.7 Success

The study was looking into the benefits that can accrue from using synchronous learning. On a five-point likert scale, participants were asked to score their responses. The results are listed in the table below:

Table 16: Descriptive Statistics - Success

**Descriptive Statistics**

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Students and instructors would be more productive if they used a synchronous learning platform. | 344 | 1 | 5 | 3.97 | 1.063 |
| By using a synchronous learning platform, less time will be spent instructing students. | 344 | 1 | 5 | 3.81 | 1.171 |
| Using a synchronous learning platform would increase effectiveness of student education. | 344 | 1 | 5 | 3.87 | 1.095 |
| Using a synchronous learning platform would lead to overall success in offering education online. | 344 | 2 | 5 | 4.08 | .993 |
| Valid N (listwise) | 344 | | | | |
| Average Mean | 344 | | | 3.93 | |

The respondents generally agreed that using synchronous learning can be beneficial (average mean of 3.93). A majority agreed that student and instructor productivity would increase, less

time would be spent in teaching students and student education effectiveness would increase while quite a number was not decided with the remaining minority disagreeing. A good number also agreed that using a synchronous learning system would lead to overall success in offering education online with a small percentage not decided and the remaining minority disagreeing. The results are as follows: 1 (Mean: 3.97, Std Dev =1.063), 2 (Mean: 3.81, Std Dev =1.171), 3 (Mean: 3.87, Std Dev =1.095), 4 (Mean: 4.08, Std Dev =.993).

As revealed by the study, many if not all students can access the same quality of education from wherever they are hence bringing the sense of inclusivity and level ground in learning. This allows students to learn and compete on the same level from across the country. Synchronous learning is a safe way to conduct learning particularly during this covid-19 period. Course delivery is easier, with broader material for use by students, instant feedback from instructors, archival of material for use later and visual demonstrations which make learning more practical. The existence of study timetables also leads to well-timed instruction sessions.

### 4.6 Correlation Analysis

In order to understand the link between Security, Ease of Learning, Cost, Instructional Expertise, Relevance, System Use, and Success of Synchronous Learning in Kenyan universities, correlation analysis is essential. The data in the table below suggests that the variables are sufficiently correlated. Because the p-value was less than 0.05, the results were found to be significant for all variables.

Table 17: Correlation Analysis among variables

**Correlations**

| | | SEC | EOL | CO | IE | REL | SYSUS | SUCC |
|---|---|---|---|---|---|---|---|---|
| Security | Pearson Correlation | 1 | .165** | .275** | .518** | .373** | .213** | .265** |
| | Sig. (2-tailed) | | .002 | <.001 | <.001 | <.001 | <.001 | <.001 |
| | N | 344 | 344 | 344 | 344 | 344 | 344 | 344 |
| Ease of Learning | Pearson Correlation | .165** | 1 | .492** | .391** | .232** | .436** | .216** |
| | Sig. (2-tailed) | .002 | | <.001 | <.001 | <.001 | <.001 | <.001 |
| | N | 344 | 344 | 344 | 344 | 344 | 344 | 344 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Cost | Pearson Correlation | .275** | .492** | 1 | .428** | .535** | .561** | .525** |
| | Sig. (2-tailed) | <.001 | <.001 | | <.001 | <.001 | <.001 | <.001 |
| | N | 344 | 344 | 344 | 344 | 344 | 344 | 344 |
| Instructional Expertise | Pearson Correlation | .518** | .391** | .428** | 1 | .625** | .498** | .479** |
| | Sig. (2-tailed) | <.001 | <.001 | <.001 | | <.001 | <.001 | <.001 |
| | N | 344 | 344 | 344 | 344 | 344 | 344 | 344 |
| Relevance | Pearson Correlation | .373** | .232** | .535** | .625** | 1 | .578** | .735** |
| | Sig. (2-tailed) | <.001 | <.001 | <.001 | <.001 | | <.001 | <.001 |
| | N | 344 | 344 | 344 | 344 | 344 | 344 | 344 |
| System Use | Pearson Correlation | .213** | .436** | .561** | .498** | .578** | 1 | .673** |
| | Sig. (2-tailed) | <.001 | <.001 | <.001 | <.001 | <.001 | | <.001 |
| | N | 344 | 344 | 344 | 344 | 344 | 344 | 344 |
| Success of Synchronous Learning | Pearson Correlation | .265** | .216** | .525** | .479** | .735** | .673** | 1 |
| | Sig. (2-tailed) | <.001 | <.001 | <.001 | <.001 | <.001 | <.001 | |
| | N | 344 | 344 | 344 | 344 | 344 | 344 | 344 |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | | | | | | |

### 4.7 Multicollinearity Test

When two or more predictors are correlated into the model and offer identical response information, multicollinearity exists. Inflation Variance and resistance factors (IFVs) were used to determine multicollinearity. There is a problem with multicollinearity if the VIF value reaches 4.0 or the tolerance value falls below 0.2 (Hair, Black, Babin & Anerson, 2010). No item has a tolerance value of less than 0.2, and VIF values do not exceed 4.0, as shown in the table below. This indicates that there is no collinearity, meaning that no items contain redundant information. This serves as further evidence that each item represents distinct aspects of our conceptual model.

Table 18: Tolerance and VIF values for independent variables

| Model Variables | | Collinearity Statistics | |
|---|---|---|---|
| | | Tolerance | VIF |
| 1 | (Constant) | | |
| | Security | .714 | 1.400 |
| | Ease of Learning | .655 | 1.526 |
| | Cost | .534 | 1.872 |
| | Instructional Expertise | .454 | 2.203 |
| | Relevance | .451 | 2.218 |
| | System Use | .526 | 1.903 |

## 4.8 Regression Analysis

The relationship between security, ease of learning, cost, instructional expertise, relevance, system use, and success of synchronous learning can be better understood using this approach. According to the data in the table below, the independent variables accurately predict the success of Synchronous Learning by 64.5%. Security, Ease of Learning, Cost, Instructional Expertise, Relevance, and System Use are all factors that contribute to Synchronous Learning's success, according to the R Square. The minimal value for R Square should be greater than 30%, therefore this is a good model that can be studied further and used by other researchers.

Table 19: Regression Analysis – Model in its entirety

| **Model Summary** | | | | |
|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .803[a] | .645 | .639 | .53469 |
| a. Predictors: (Constant), System Use, Security, Instructional Expertise, Cost, Relevance, Ease of Learning | | | | |

## 4.9 Analysis of Variance (ANOVA)

With the help of Security, Ease of Learning, Cost, Instructional Expertise, Relevance, and System Use, the table below explains the variance as a result of Synchronous Learning Success. The independent variables account for 175.105 of the total of 271.451, whereas variables outside

the study account for the remaining 96.346. This implies that the model's independent variables have a great influence on the success of Synchronous Learning.

Table 20: ANOVA Table

| ANOVA[a] | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 175.105 | 6 | 29.184 | 102.080 | <.001[b] |
| | Residual | 96.346 | 337 | .286 | | |
| | Total | 271.451 | 343 | | | |
| a. Dependent Variable: Success of Synchronous Learning | | | | | | |
| b. Predictors: (Constant), System Use, Security, Instructional Expertise, Cost, Relevance, Ease of Learning | | | | | | |

## 4.10 Regression Analysis – Coefficients

When ease of learning (p=0.006), cost (p=0.014), relevance (p=0.001) and system use (p=0.001) were regressed with synchronous learning success, the study found that there was a strong association between the four. Because they are below 0.05, ease of learning, cost, relevance and system use are likely to influence the success of Synchronous Learning in an organization. The findings suggest that the four factors mentioned above, ease of learning, cost, relevance and system use, are likely to influence on the success of Synchronous Learning in Kenyan universities.

Table 21: Coefficients Table

| Coefficients[a] | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | -1.130 | .308 | | -3.674 | <.001 |
| | Security | .000 | .060 | .000 | -.008 | .993 |
| | Ease of Learning | -.167 | .060 | -.111 | -2.779 | .006 |
| | Cost | .154 | .063 | .109 | 2.459 | .014 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Instructional Expertise | -.042 | .078 | -.026 | -.541 | .589 |
| | Relevance | .837 | .082 | .495 | 10.244 | <.001 |
| | System Use | .472 | .055 | .387 | 8.647 | <.001 |
| a. Dependent Variable: Success of Synchronous Learning | | | | | | |

### 4.11 Proposed Model

The proposed model was created by carefully conducting the regression analysis from the full model excluding independent variables that had a p-value greater than 0.05. Multiple iterations were used to see how each independent variable affected the dependent variable. The model with the highest adjusted R squared and the lowest residual value in the sum of squares would be selected.

Because security had the highest p-value when compared to instructional expertise, the first regression was done without it. The independent variable instructional expertise was removed from the second regression. Because both security and instructional expertise had a p-value greater than 0.05, the third regression was performed without them.

Table 22: Model Summary without Security and Instructional Expertise

| **Model Summary** | | | | |
|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .803[a] | .645 | .641 | .53339 |
| a. Predictors: (Constant), System Use, Cost, Relevance, Ease of Learning | | | | |

Table 23: ANOVA Table without Security and Instructional Expertise

| **ANOVA[a]** | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 175.004 | 4 | 43.751 | 153.781 | <.001[b] |
| | Residual | 96.446 | 339 | .285 | | |
| | Total | 271.451 | 343 | | | |
| a. Dependent Variable: Success of Synchronous Learning | | | | | | |

| b. Predictors: (Constant), System Use, Cost, Relevance, Ease of Learning |
|---|

The adjusted R squared value of the regression models created without security and instructional expertise differed by just 0.001 and 0.002 respectively from the entire model. The model's residual sum of squares values rose by 0.1 when compared to the whole model.

Despite the fact that security and instructional expertise have no significant relationship with synchronous learning success, the study chose to use the full model because it was more representative of why synchronous learning succeeds in Kenyan universities due to the insignificant difference in the resulting adjusted R squared values and increased residual values on the sum of squares.

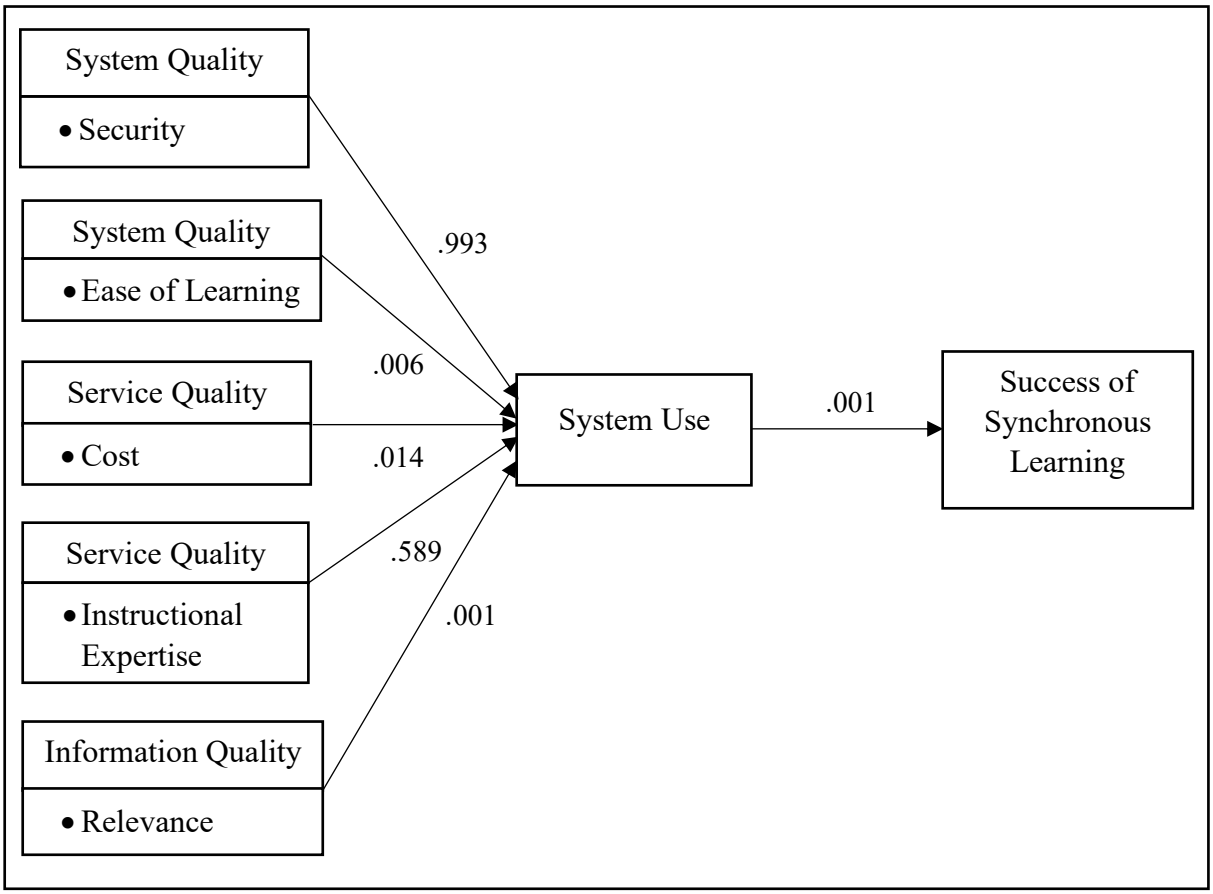



Figure 7: Proposed model with significance-based values

# CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

## 5.1 Introduction

The key findings of the research are summarized in this chapter, as well as pertinent comments, conclusions, and recommendations. The goal of this study was to figure out what factors contribute to Synchronous Learning's success in Kenyan universities.

## 5.2 Summary of Findings

### 5.2.1 System Quality

The first objective was to assess the effect of system quality on the use of synchronous learning successfully in Kenyan universities. According to descriptive statistics gathered, system quality issues, particularly ease of learning, contribute to the success of synchronous learning in Kenyan universities. The study also indicated that the average mean for security and ease of learning was 4.00 and 4.25, respectively, where a mean of 4 indicated that the measured items were largely agreed upon. The data also revealed that some measured items under security had a mean of less than 4, indicating that they were less important in promoting synchronous learning in Kenyan universities. The data also revealed that the majority of measured items under ease of learning had a mean of 4 or greater, indicating that they were more important in facilitating the success of synchronous learning in Kenyan universities.

### 5.2.2 Service Quality

The second objective was to assess the effect of service quality on the use of synchronous learning successfully in Kenyan universities. According to descriptive statistics gathered, service quality issues, particularly instructional expertise, contribute to the success of synchronous learning in Kenyan universities. The study also indicated that the average mean for cost and instructional expertise was 3.86 and 4.08, respectively, where a mean of 3 indicated that respondents were undecided and a mean of 4 indicated that the measured items were largely agreed upon. The data also revealed that some measured items under cost had a mean of less than 4, indicating that they were less important in promoting synchronous learning in Kenyan universities. The data also revealed that the majority of measured items under instructional expertise had a mean of 4 or greater, indicating that they were more important in facilitating the success of synchronous learning in Kenyan universities.

### 5.2.3 Information Quality

The third objective was to assess the effect of information quality on the use of synchronous learning successfully in Kenyan universities. According to descriptive statistics gathered, information quality issues, particularly relevance, contribute to the success of synchronous learning in Kenyan universities. The study also indicated that the average mean for relevance was 4.27, where a mean of 4 indicated that the measured items were largely agreed upon. The data also revealed that the majority of measured items under relevance had a mean of 4 or greater, indicating that they were more important in facilitating the success of synchronous learning in Kenyan universities.

### 5.2.4 System Use

The fourth objective was to assess the effect of system use on the success of synchronous learning in Kenyan universities. According to descriptive statistics gathered, system use adds to the success of synchronous learning in Kenyan universities to some extent. The study also indicated that the average mean for system use was 3.76, where a mean of 3 indicated that respondents were undecided with the measured items. The data also revealed that some measured items under system use had a mean of less than 4, indicating that they were less important in promoting synchronous learning in Kenyan universities.

### 5.2.5 Success

The fifth objective was to determine the benefits that accrue from using synchronous learning in Kenyan universities. According to descriptive statistics gathered, there are certain advantages to employing synchronous learning in Kenyan universities. The study also indicated that the average mean for success was 3.93, where a mean of 3 indicated that respondents were undecided and a mean of 4 indicated that the measured items were largely agreed upon. The data also revealed that some measured items under success had a mean of less than 4, indicating that they were less important in promoting synchronous learning while some measured items had a mean of 4 or greater, indicating that they were more important in facilitating the success of synchronous learning in Kenyan universities.

## 5.3 Conclusion

### 5.3.1 System Quality

According to the findings, the study concludes that security and ease of learning contribute to the success of synchronous learning in Kenyan universities. This is based on statistical analysis, which revealed that the average mean of the measured items under security was 4.00, while the

average mean of the measurable items under ease of learning was 4.25. Furthermore, the majority of the measured items in the two variables had a mean greater than 4, indicating that the majority of respondents believed that the two variables led to synchronous learning success. Security is crucial for synchronous learning to thrive as it details user data protection methods and security features available on the platform. Ease of learning is also important for synchronous learning to work because it describes how easy it is to navigate the platform and how much learning there is.

### 5.3.2 Service Quality

According to the findings, the study concludes that service quality, particularly instructional expertise contributes to the success of synchronous learning in Kenyan universities. This is based on statistical analysis, which revealed that the average mean of the measured items under instructional expertise was 4.08, whereas the average mean of the measured items under cost was 3.86. This means that instructional expertise, rather than cost, is more important in contributing to the success of synchronous learning. This is due to the fact that instructional expertise provides professionals to handle specific thematic areas as well as virtual field trips to enhance the learning experience.

### 5.3.3 Information Quality

According to the findings, the study concludes that information quality, particularly relevance contributes to the success of synchronous learning in Kenyan universities. This is based on statistical analysis, which revealed that the average mean of the measured items under relevance was 4.27. Furthermore, the majority of the measured items in the variable had a mean greater than 4, indicating that the majority of respondents believed that the variable led to synchronous learning success. This means that the information exchanged through a synchronous learning platform must be relevant in order for synchronous learning to be successful.

### 5.3.4 System Use

According to the findings, the study concludes that system use contributes to the success of synchronous learning in Kenyan universities. This is based on statistical analysis, which revealed that all four measured items under system use had a mean of less than 4. This means that having an easily available synchronous learning platform is crucial. Because of their suitability for learning, the resources used in a synchronous learning platform also contribute significantly to the success of synchronous learning.

### 5.3.5 Success

According to the findings, the study concludes that there are benefits that accrue from using synchronous learning in Kenyan universities. This is based on statistical analysis, which revealed that only one of the four measured items under success had a mean of 4 or above. This means that using a synchronous learning platform is vital if student and instructor productivity is to be maximized. The existence of study timetables, which leads to well-timed instruction sessions, also adds to success when using a synchronous learning platform.

## 5.4 Recommendations

### 5.4.1 System Quality

The goal of the research was to determine the effect of system quality on synchronous learning success in Kenyan universities. The report suggests that universities be held responsible for safeguarding student details, as well as advocating for the implementation of synchronous learning solutions that address this issue. Universities should also develop security and data privacy policies to guide the use of synchronous learning while taking security issues and precautionary measures into account to prevent putting their institutions at risk (Nairn, 2020). To meet university requirements, synchronous learning systems must be scalable, allowing students to use and learn from them without the need for technical help. The success of synchronous learning will be determined by these factors (Bentley, 2020).

### 5.4.2 Service Quality

The goal of the research was to determine the effect of service quality on synchronous learning success in Kenyan universities. The study suggests that universities should invest more in online teaching and learning platforms, as well as physical and human eLearning resources. Despite the widespread availability of computers, tablets, and smartphones, the cost of internet connection remains a barrier for students. As a result, the study suggests that funds be allocated to provide students with data bundles through partnerships with mobile service providers. Institutions may also subsidize access to digital libraries resources relevant for synchronous learning (Nyerere, 2020). The study also suggests that institutions have the requisite technological skills to operate in an online learning environment, as well as the essential competence through online delivery training. To enhance the learning experience, institutions could use synchronous learning to invite experts from all over the world to speak on certain thematic areas as well as organize virtual field trips (Bentley, 2020).

### 5.4.3 Information Quality

The goal of the research was to determine the effect of information quality on synchronous learning success in Kenyan universities. The study suggests that universities should make at least all of the course materials available through their online teaching and learning platforms (Nyerere, 2020). Universities must also guarantee that content given, shared, or exchanged through an online teaching and learning platform complies with the requirements and is appropriate for learning.

### 5.4.4 System Use

The goal of the research was to determine the effect of system use on synchronous learning success in Kenyan universities. The study suggests that institutions make online teaching and learning mandatory, rather than using it as a stopgap approach to learn when physical learning is not possible due to pandemic-related restrictions. In the future, universities should consider synchronous learning as a fundamental component of teaching and learning (Nyerere, 2020).

### 5.4.5 Success

The goal of the research was to determine the benefits that accrue from using synchronous learning in Kenyan universities. The study suggests that institutions leverage on the benefits realized through all the factors determined from the research that contribute to the success of synchronous learning in Kenyan universities.

## 5.5 Suggestion for further research

The use of only two universities limits the extent of the research. The study suggests that future research include a variety of institutions in various sections of Kenya to account for the many conditions that exist throughout the country, thus broadening the demographic context. Furthermore, because the independent variables employed in this study were unable to properly predict the dependent variable, more research is needed to uncover additional variables/factors that contribute to the success of synchronous learning in Kenyan universities.

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# APPENDIX I: QUESTIONNAIRE

**Instructions**

- Kindly complete this questionnaire by answering the questions about your institution.
- Mark your preference with a checkmark [ √ ] or where necessary, provide a brief explanation.
- You are not required to write your name.

**Section A: Demographic/Background Information**

1. University
    - Public [ ]
    - Private [ ]
2. Age
    - 20 & Below [ ]
    - 21 – 30 [ ]
    - 31 – 40 [ ]
    - 41 – 50 [ ]
    - Above 50 [ ]
3. Gender
    - Male [ ]
    - Female [ ]
4. Role
    - Undergraduate Student [ ]
    - Postgraduate Student [ ]
    - Instructor [ ]

**Section B: System Quality Aspects**

**Security as an aspect of System Quality**

5. In terms of the success of synchronous learning, how much do you agree with the following assertions about security as an aspect of system quality? Use a scale of 1. Strongly Disagree 2. Disagree 3. Not Decided 4. Agree 5. Strongly Agree

| | **Statement** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| | I'd like to see a public policy governing how the system handles my personal information. | | | | | |
| | I would not use a synchronous learning platform if I was concerned about the security of my personal information. | | | | | |
| | The security of a synchronous learning platform and the services it offers is crucial in my opinion. | | | | | |
| | I require reassurance that my data will be safe, and I will only use the system if I am confident with the security features. | | | | | |

In your opinion, in what ways do you think security as an aspect of system quality contributes to the success of synchronous learning in Kenyan universities?

**Ease of learning as an aspect of System Quality**

6. In terms of the success of synchronous learning, how much do you agree with the following assertions about ease of learning as an aspect of system quality? Use a scale of 1. Strongly Disagree 2. Disagree 3. Not Decided 4. Agree 5. Strongly Agree

| | **Statement** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| | To me, a synchronous learning platform's ease of learning is crucial. | | | | | |
| | Without consulting lengthy training manuals or FAQs, I can effortlessly explore a synchronous learning platform and its capabilities. | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | It's simple to set up a synchronous learning system, as well as to find and use features within the platform. | | | | | |
| | If a synchronous learning system is built to make me feel in control of the technology, I am more likely to use it. | | | | | |

In your opinion, in what ways do you think ease of learning as an aspect of system quality contributes to the success of synchronous learning in Kenyan universities?

**Section C: Service Quality Aspects**

**Cost as an aspect of Service Quality**

5. In terms of the success of synchronous learning, how much do you agree with the following assertions about cost as an aspect of service quality? Use a scale of 1. Strongly Disagree 2. Disagree 3. Not Decided 4. Agree 5. Strongly Agree

| | **Statement** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| | In recent years, computers, tablets, and smartphones have all become more affordable. | | | | | |
| | Internet connectivity is reasonably priced. | | | | | |
| | Before going digital, institutions must invest in synchronous learning platforms, digital libraries, and internet access. | | | | | |
| | Time and money savings would surely influence my decision to employ a synchronous learning system if the level of quality is maintained. | | | | | |

In your opinion, in what ways do you think cost as an aspect of service quality contributes to the success of synchronous learning in Kenyan universities?

**Instructional Expertise as an aspect of Service Quality**

6. In terms of the success of synchronous learning, how much do you agree with the following assertions about instructional expertise as an aspect of service quality? Use a scale of 1. Strongly Disagree 2. Disagree 3. Not Decided 4. Agree 5. Strongly Agree

| | **Statement** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| | When it comes to synchronous learning, instructional expertise is crucial. | | | | | |
| | I'd want to see more specialists brought in remotely to speak on specific issues. | | | | | |
| | If the level of quality is maintained, virtual field trips to enhance the educational experience will undoubtedly affect my decision to use synchronous learning services. | | | | | |

In your opinion, in what ways do you think instructional expertise as an aspect of service quality contributes to the success of synchronous learning in Kenyan universities?

**Section D: Information Quality Aspects**

**Relevance as an aspect of Information Quality**

5. In terms of the success of synchronous learning, how much do you agree with the following assertions about relevance as an aspect of information quality? Use a scale of 1. Strongly Disagree 2. Disagree 3. Not Decided 4. Agree 5. Strongly Agree

| | **Statement** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| | A crucial component in persuading students and teachers to use a synchronous learning platform is the relevance of the information shared. | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | It is necessary to have assurance that information obtained or transferred through a synchronous learning platform is of sufficient quality, and I would only use the system if I am confident that the information quality satisfies my requirements. | | | | | |

In your opinion, in what ways do you think relevance as an aspect of information quality contributes to the success of synchronous learning in Kenyan universities?

**Section E: System Use**

**System use in regards to success of using Synchronous Learning**

5. In terms of the success of synchronous learning, how much do you agree with the following assertions about system use? Use a scale of 1. Strongly Disagree 2. Disagree 3. Not Decided 4. Agree 5. Strongly Agree

| | **Statement** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| | It is simple to access a synchronous learning platform. | | | | | |
| | I consider the use of a synchronous learning platform as essential. | | | | | |
| | A synchronous learning platform's resources are appropriate for learning. | | | | | |
| | Students' ability to learn will improve when they use a synchronous learning platform. | | | | | |

In your opinion, in what ways do you think system use contributes to the success of synchronous learning in Kenyan universities?

**Section F: Success**

**Success of synchronous learning**

6. How much do you agree with the following assertions about success of synchronous learning? Use a scale of 1. Strongly Disagree 2. Disagree 3. Not Decided 4. Agree 5. Strongly Agree

| | **Statement** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| | Students and instructors would be more productive if they used a synchronous learning platform. | | | | | |
| | By using a synchronous learning platform, less time will be spent instructing students. | | | | | |
| | Using a synchronous learning platform would increase effectiveness of student education. | | | | | |
| | Using a synchronous learning platform would lead to overall success in offering education online. | | | | | |

In your opinion, what are the benefits that can accrue from using synchronous learning in Kenyan universities?

Thank you for your feedback!