

**ROLE OF MOBILE TELECOMMUNICATION SERVICES IN THE ADOPTION OF
VIRTUAL LEARNING IN KENYAN UNIVERSITIES: CASE STUDY GRE TSA
UNIVERSITY, THIKA**

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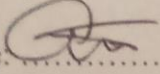
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**A RESEARCH PROJECT SUBMITTED TO THE SCHOOL OF COMPUTING AND
INFORMATICS IN PARTIAL FULFILLMENT FOR THE AWARD OF DEGREE IN
BACHELOR OF SCIENCE IN COMPUTER SCIENCE OF GRE TSA UNIVERSITY.**

NOVEMBER 2021

DECLARATION

I thereby declare that this Research project is my own and original work and that it has not been presented by anyone for award of a degree or for any other similar purpose in any other institution.

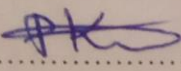
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DEDICATION

I would like to dedicate my research to my dear parents Mr. Amos Atulo and Miss. Atulo and to my elder and younger siblings.

TABLE OF CONTENTS

DECLARATION	Error! Bookmark not defined.
ACKNOWLEDGEMENT	iii
DEDICATION	iv
ABSTRACT	ix
CHAPTER ONE: INTRODUCTION	1
1.0: Background of the Study	1
1.1.1 Mobile telecommunication	1
1.1.2 Mobile telecommunication devices	1
1.1.3 The process of virtual class creation	2
1.2: Statement of Research Problem.....	2
1.3: Purpose of the Study	3
1.4: Conceptual Framework.....	3
1.5: Research Questions.....	3
1.6: Objectives of the Study.....	4
1.6.1: General Objective	4
1.6.2: Specific Objectives	4
1.7: Hypothesis of the Study.....	4
1.8: Significance of the Study	4
1.9: Scope of the Study	5
1.10: Limitations of the Study	5
CHAPTER TWO: LITERATURE REVIEW	6
2.1: Introduction.....	6
2.2: How type of device affects connectivity.....	6
2.4: Area network coverage as a factor to virtual learning implementation	6
2.5 Benefits of telecommunication to virtual learning.....	7
2. Tele-sharing	7
2.7: Research gap	7
CHAPTER THREE: RESEARCH METHODOLOGY	8
3.0 Preview	8
3.1: Research Design	8
3.2: Target Population.....	8
3.3: Sampling Techniques.....	8
3.3.1: Sample procedure	8

3.3.2: Sample size	9
3.4 Measurement of variables	9
3.5 Research instruments	9
3.6 Validity and reliability	9
3.7 Data analysis	10
3.8: Ethical Considerations	10
CHAPTER FOUR: FINDINGS AND DISCUSSION	11
4.1 Introduction.....	11
4.2 Overview of Findings	11
4.3 Discussion of the Findings.....	11
CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	17
5.0 Introduction.....	17
5.1 Summary	17
5.2 Conclusion	17
5.3 Recommendations.....	18
5.4 Suggestions for Further studies.....	18
REFERENCES	19
APPENDIX	21
Appendix I: Questionnaire.....	21
SECTION A: Socio-Demographic Data.....	21
SECTION B: Knowledge About Virtual Learning.....	22
SECTION C: Knowledge About Telecommunication Services.....	22
SECTION D: Virtual Learning Acceptance	24
Appendix II: BUDGET.....	25
Appendix III: WORK PLAN	26

List of Tables

Table 1: Target population.....	8
Table 2: Internet Service Provider	13
Table 3: Type of Telecommunication Device	14
Table 4: Area Network coverage	15
Table 5: Virtual learning acceptance	16
Table 6: Budget.....	25
Table 7: Work plan	26

List of Figures

Figure 1: Theoretical Framework	3
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Figure 2: Respondents chart..... 11
Figure 3: Age chart 12
Figure 4: Gender chart 13
Figure 5: ISP chart 13
Figure 6: Telecommunication device chart..... 14
Figure 7: Network coverage chart..... 15

ABSTRACT

Mobile telecommunications on its own is the process of sending, transmitting and receiving information over a distance with the purpose of communicating. This form of signal transmission takes place with assistance of some sort of mobile device, such as a cellular phone, computer, or other wired or wireless device. The main benefit of mobile telecommunications is the ability to perform point-to-point or point-to-multipoint transmissions using either a digital or digitized analog signal. Basic transmission uses a series of protocols to send blocks or packets of information. The study will aim at finding out how mobile telecommunications impacts on the adoption and implementation of virtual learning at Grets University. This study will assess both the positive and negative impacts of mobile telecommunications on implementation of online/ virtual learning. The study will also help determine mobile telecommunications factors limiting the success of implementation of virtual learning and how the factors can be cubed

CHAPTER ONE: INTRODUCTION

1.0: Background of the Study

With the evolving technology virtual learning continues to be effective in its implementation as it is favored by the daily improving technology. Telecommunication has its own aspects that makes it a better communication platform. With the current impact of COVID 19 on the universe, virtual learning becomes the best option of teaching and learning and therefore for it to be effective it really depends on mobile telecommunication services.

1.1.1 Mobile telecommunication

Mobile telecommunication is the process of sending, transmitting and receiving information over a distance with the purpose of communicating. This form of signal transmission takes place with assistance of some sort of mobile device, such as a cellular phone, computer, or other wired or wireless device. The main benefit of mobile telecommunications is the ability to perform point-to-point or point-to-multipoint transmissions using either a digital or digitized analog signal. Basic transmission uses a series of protocols to send blocks or packets of information.

1.1.2 Mobile telecommunication devices

In this research I will focus on two mobile telecommunication devices which are mobile phones and PCs (personal computers). For the above-named devices to be considered as telecommunication devices they have to be driven by protocols and instructions.

Virtual learning is where one gets classes online and virtually and usually in real time. For one to access the class platform, he/she has to be connected to a search engine such as Google chrome, opera mini, Microsoft edge and phoenix browser. Therefore, before you gain access to the internet you have to be linked with an internet service provider. Some of the internet service providers in Kenya are: Safaricom, Airtel and Telkom.

1.1.3 The process of virtual class creation

The host of the class has to create a class session earlier before the actual commencement of the session and invite all the desired audience via a link he generates in the process of session creation. In case the scheduled period of the class expires then the session itself will have expired and no one will have access to it. The audience has to be punctual and join the session on time before the period scheduled expires.

Previous study has shown that in the modern world there is need to fully implement virtual learning and drop face to face learning. Virtual learning has its own benefits that makes it become more and more popular:

- Saves on transportation cost to get to campus to catch up with face-to-face learning.
- Saves on time that would have been used to get from place of residence to the campus and hence allocate that time for other important business
- The learner is able to access more resources online.

Therefore, with the above-named benefits it is therefore of benefit to fully adopt to virtual learning in Kenyan universities.

1.2: Statement of Research Problem

With the daily evolving world and continuous change in technology, virtual learning has to be considered as to becoming the main source of education rather than face to face by the lecturers in Kenyan universities. This has to be taken with a lot of keenness considering that all the resources required for online/virtual learning to take place have been considered and are in place to enable smooth running of the process. And telecommunication being a major aspect of virtual learning aspect it has to be put as a priority to check for readiness of an institution and its students in implementing virtual learning fully.

1.3: Purpose of the Study

The main purpose of this study is to determine the role played by mobile telecommunication services in ensuring that virtual learning runs smoothly and how mobile telecommunication impacts on the whole process of virtual learning.

1.4: Conceptual Framework

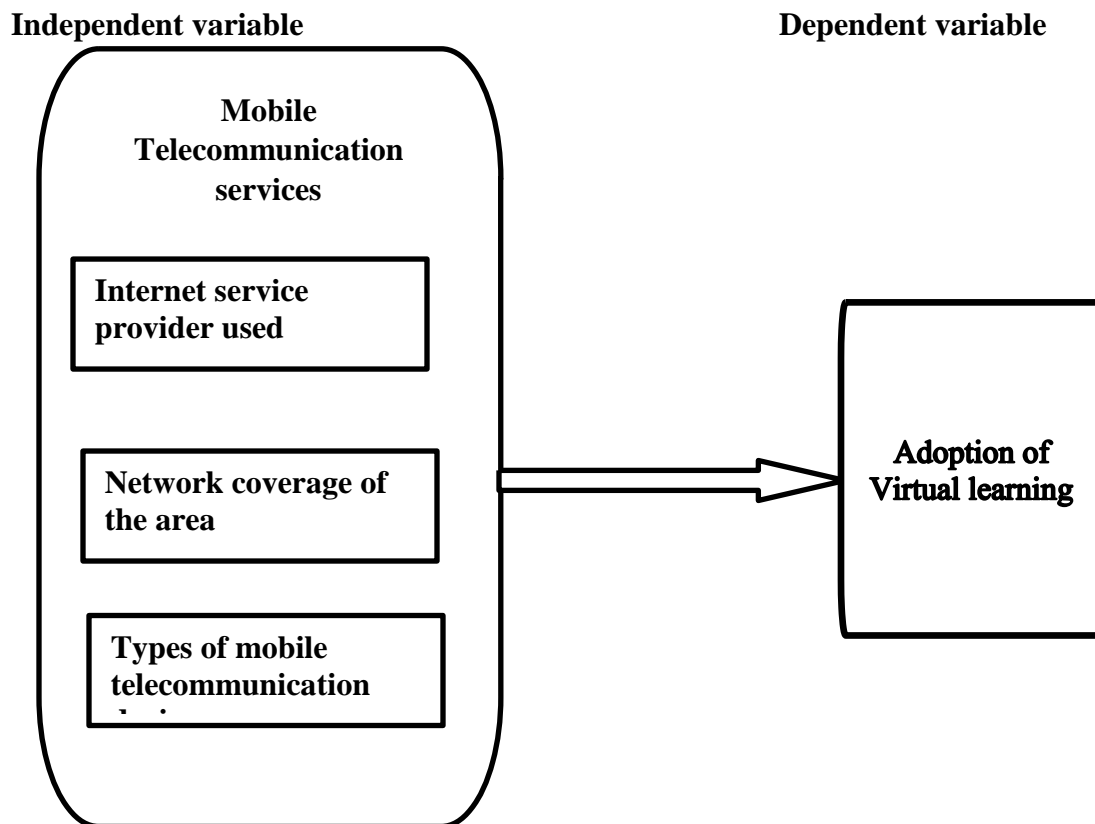


Figure 1: Theoretical Framework

1.5: Research Questions

- i. Does the type of internet service providers impact on the adoption of virtual learning at Gretsas University?
- ii. Does area network coverage impact the adoption of virtual learning at Gretsas University?
- iii. Does the type of telecommunication device impact on the adoption of virtual learning at Gretsas University?

1.6: Objectives of the Study

1.6.1: General Objective

The main objective of this study is to determine how mobile telecommunication services impacts on adoption of virtual learning in Gretsas University.

1.6.2: Specific Objectives

- a. To assess how the type of ISP impacts to the virtual learning adoption at Gretsas University.
- b. To determine how the type of mobile telecommunication devices available hinders the virtual learning adoption at Gretsas University.
- c. To determine how the area network coverage impact on the virtual learning adoption at Gretsas University.

1.7: Hypothesis of the Study

H₀: Mobile telecommunication services impact on virtual learning adoption at Gretsas University.

H₁: Mobile telecommunication services does not impact on virtual learning adoption at Gretsas University.

1.8: Significance of the Study

This study mainly aims to determine how mobile telecommunication services impacts on the effectiveness of virtual learning and how can mobile telecommunication be made to favor the process of virtual learning in Gretsas University. It will enable identification of mobile telecommunication aspects that are hindering the effectiveness of running virtual learning at Gretsas University.

The study will help eliminate the limiting factors of mobile telecommunication that hinder effective virtual learning.

1.9: Scope of the Study

This study will target Kenyan universities in specific Gretsia University.

Data will be collected from the university students, the lecturers and the communication/ IT office or department from Gretsia University.

1.10: Limitations of the Study

- ✓ Limited sample size.
- ✓ Lack of co-operation from the respondents about their personal information.

CHAPTER TWO: LITERATURE REVIEW

2.1: Introduction

This chapter tries to explore the other various works done by other scholars in their efforts to try and understand this topic. It brings about their areas of interest and their findings.

It is made up of two broad sections: theoretical review and empirical review.

2.2: How type of device affects connectivity

For one to establish an internet connectivity he/she has to have some specific devices with a capability to access the internet because virtual classes are online based. (O. S. Galilina, May 2018) explains that not all telecommunication devices have the capability to have access the internet and therefore there are some specific devices to attain internet connection. Smartphones, laptops and PCs are some of the available devices installed with internet connection functionality that helps one access online classes. Students who don't own or cannot access any of the above devices are not able to access the learning sessions. For it to be easy to fully implement the virtual learning, type of devices owned by individual students has to be considered because you will end up implementing it and only some small percentage of students will access.

2.4: Area network coverage as a factor to virtual learning implementation

The type bandwidth distributed to a particular area by ISPs can also be a limiting factor to the effectiveness of virtual/online learning. Not all areas have the same bandwidth distribution. Mostly, the urban areas have more bandwidth than the rural areas hence the browsing speed and network strength is greater. With a lower internet speed, one is unable to access the virtual classes since for one to get connected he/she has to have a stable internet connection.

So, the students from local rural areas are disadvantaged with the online classes. Those in urban areas have a great advantage because they have a stable internet connection and therefore assuming that implementation of virtual classes fully will be of help to the education sector without considering the great percentage of students in rural areas who don't access the internet easily is zero work.

2.5 Benefits of telecommunication to virtual learning

The following are some of the benefits of implementing virtual learning.

2. Tele-sharing

In their reality, the numerous functionalities of the internet and telecommunication as a whole enable students to share all forms of information in a variety of ways. Tele-sharing often begins with simple e-mail chats between two parties interested in sharing of learning resources. It advances to a global communication, and then ends up into the sharing of resources, ideas, experiences, knowledge data and findings and even projects.

This transition from simple communications to more advanced learning offers added advantage and the analytical challenge of studies at large. Further, it calls upon students to engage in more social interactions in search of knowledge. Such learning implies an equality among participants rather than the traditional structured education kind of system.

Presently, the most promising tele-sharing project is Global Learning and Understanding to Benefit the Environment (GLOBE), which was initiated and introduced by Vice President Al Gore. The program forges a partnership between students worldwide and leading scientists to monitor key environmental parameters.

2.7: Research gap

Previous studies of the same research never focused on the aspect of mobile telecommunications services and its main aspects i.e. devices, aspect of internet service providers and network coverage and how these aspects impact on the adoption of virtual learning in Kenyan universities.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Preview

This section comprises of research design, study area, target population, sampling techniques, sample size, measurement of variables, instruments of research, validity and reliability, analysis of data and finally the logistic and ethical considerations for the study.

3.1: Research Design

A descriptive research design will be used to provide information on the role of Mobile Telecommunication services in the process fully adopting virtual learning/online learning in Kenyan Universities.

3.2: Target Population

The target population in this study will be students and lecturers at Greta University. It will also interview students and lecturers at the university to assess their views on virtual learning.

The target population is 2000 in which out of the total population 100 are lecturers and 1900 are students.

Personnel	Target number	Sample size
Lecturers	100	17
Students	1900	316
Total	2000	333

Table 1: Target population

3.3: Sampling Techniques

3.3.1: Sample procedure

Selection of some portion of a whole based on which a criterion or inference about the totality is made (Kothari, 2005). It is obtaining a record of responses to act as information from a population by evaluating a part of it.

Purposive and referral sampling will be employed in the study. The target audience will be chosen with bias so as to find respondents to fit into intended purpose of the study. Identified respondents will be asked to recommend other personnel who also meet the description of the sample required.

3.3.2: Sample size

First of all, you should find a manageable population and if the population size is known, then use Yamane formula to determining the sample size is given below:

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

Where

n= corrected sample size, N = population size, and e = Margin of error (MoE), e = 0.05 based on the research condition.

Let's assume that the population is 10,000. At 5% MoE., the sample size would be: $2,000 / (1 + 2,000 (0.05^2)) = 2,000 / 6 = 333.3333 \sim 333$

3.4 Measurement of variables

The variables of study in this case will be all measured using a Likert scale, with values ranging from 1 to 5, to better understand the relationship between the variables.

The Likert scale is appropriate as it enables correlation analysis.

3.5 Research instruments

(Patton, 2002) states that it is so crucial for a researcher to develop a way of collecting data. Questionnaires were used in this case as the preferred tool for this study, because they can be easily administered, analysed, they are economical.

3.6 Validity and reliability

Validity refers to how meaningful and accurate the measures are and how this can be measured to the final results of the study. while reliability is the degree at which research instrument brings about results that are constant on a number of attempts and study being carried out (R Heale · 2015).

Valid constructs from the numerous previous research work and studies have been used in this study.

3.7 Data analysis

After data has been successfully collected, it was analysed through a computerised system, as it enables checking, coding, editing and doing analysis and computation. Charts and pie charts were used to present data for an easier interpretation. Both descriptive and inferential statistics were used in the computational analysis to come up with conclusive results.

3.8: Ethical Considerations

The ethical issues to be considered in the study will include privacy, informed consent and confidentiality and honest. The consent letter will be issued by the Head of school of Computing Greta University.

CHAPTER FOUR: FINDINGS AND DISCUSSION

4.1 Introduction

In this chapter, I present the results and findings of my research that I have researched on the findings of the study are outlined according to my specific objectives as I outlined them in chapter one of this study. I classified my findings in to two where the first one represents the demographic data and the second section represent the individual specific objectives.

4.2 Overview of Findings

The researcher found out that the implementation of virtual classes fully in Kenyan universities a case study Gretsia University is being hindered by a number of factors. Telecommunication services being one of them became the dwelling point of the study. Out of the whole percentage of the respondents I found out that 55% were male and the remaining 45% were female respondents. The responses provided were fair to provide an answer for what conclusion to be made.

4.3 Discussion of the Findings

4.3.1 Demographic information

The responses for this section were good and a total of 65% of the expected target population accepted to share their information while the remaining 35% did not because of some privacy issues. 65 % is a good percentage to be used to get conclusions.

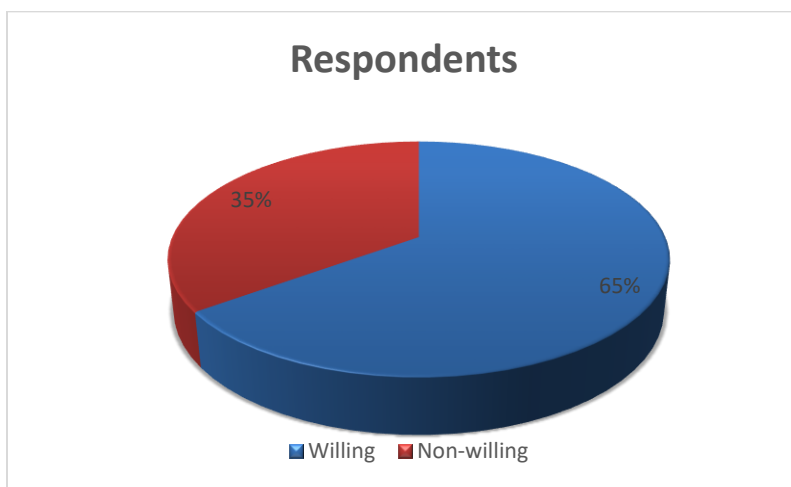


Figure 2: Respondents chart

Age

The study show that the respondents age was distributed well across the age brackets. The chart below shows how each age bracket responded to the questionnaire. The age groups represented were as follows 18-25 (60%) 26-35 (20%) 36-45 (15%) 46-55 (7%) 56-65 (3%).

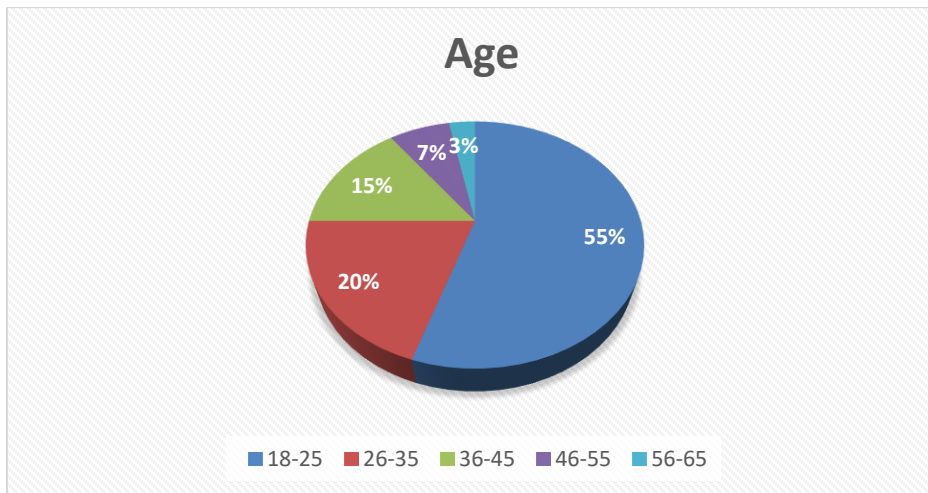


Figure 3: Age chart

Gender

From the data collected I found out that the number of males that took part in the process of responding to the questionnaire was higher than that of the female respondents. 55% of the respondents were male whereas the remaining 45% were females.

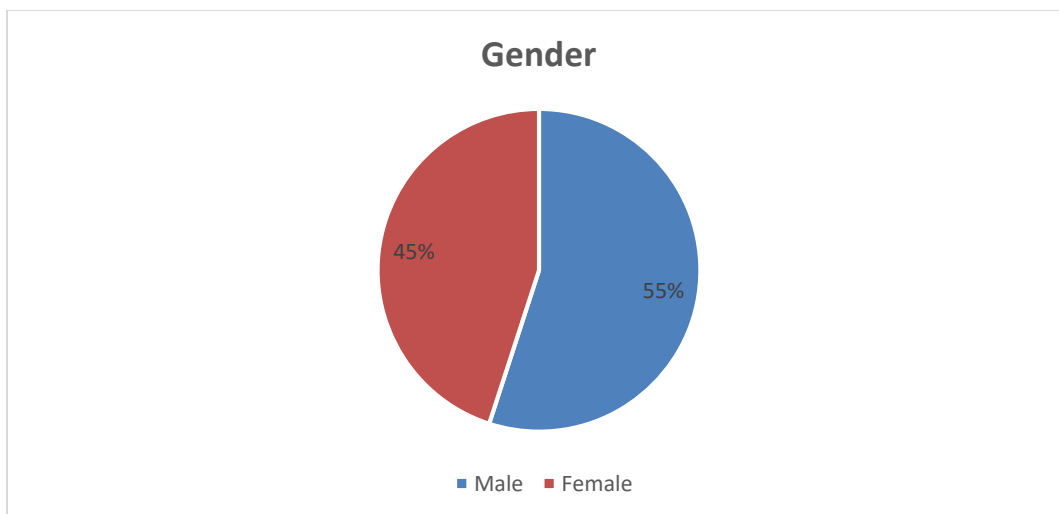


Figure 4: Gender chart

4.3.2 SECTION B: Knowledge About Virtual Learning and Mobile Telecommunication Services

Service provider used

Through the study it was determined that out of the total respondents that took part in the process 50% use Safaricom 25% use Airtel 20% use Telcom and the remaining 5% use Faiba.

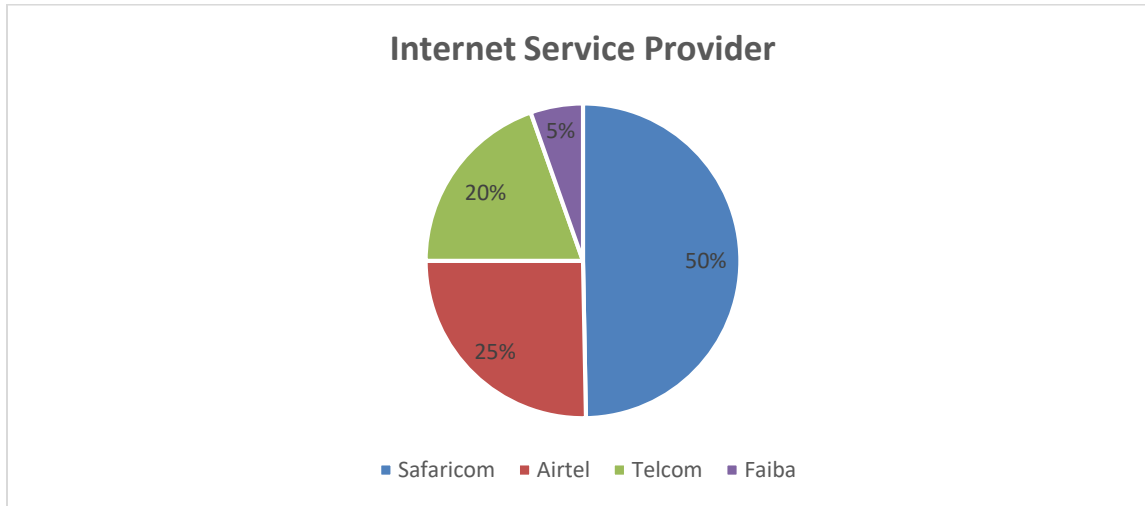


Figure 5: ISP chart

Type of internet Service Provider

	Agree	Strongly agree	Disagree	Strongly disagree
Safaricom is the best ISP	40%	27%	23%	10%
Telcom is the best ISP	10%	5%	43%	42%
Airtel is the best ISP	20%	18%	30%	32%
ISPs affect connectivity to the internet	40%	34%	16%	10%
ISPs do not affect connectivity to internet	10%	16%	34%	40%
ISPs connectivity to the internet varies from one ISP to the other	35%	30%	20%	15%

Table 2: Internet Service Provider

Telecommunication Devices owned

The devices owned by the respondents was another study area in this research. It was aiming at understanding why devices matter when it comes to the implementation of virtual learning in Kenyan universities. Out of the total no of respondents 15.5% own laptops while 60% own smartphones and 25.5% own none of the two devices.

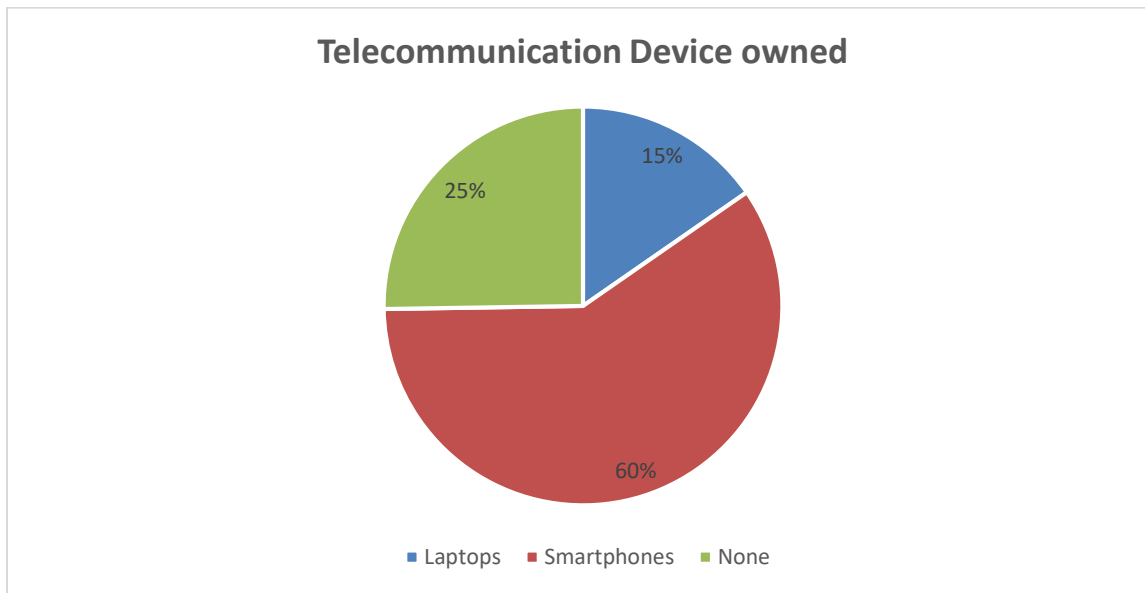


Figure 6: Telecommunication device chart

Type of Mobile Telecommunication devices

	Agree	Strongly agree	Disagree	Strongly disagree
Smart phones are better compared to laptops	24%	21%	28%	27%
Type of device affects connectivity to internet	37%	30%	20%	13%
Device configuration affect internet connectivity	28%	30%	25%	17%
Type of device does not affect internet connectivity	13%	20%	30%	37%
All mobile devices can connect to the internet	20%	18%	30%	32%

Table 3: Type of Telecommunication Device

Network coverage of the area

The researcher found out from the data provided from the network coverage areas of different regions that only 31.5% of the respondents use 4G network while 49.5% use 3G network and the remaining 29% use 2G network.

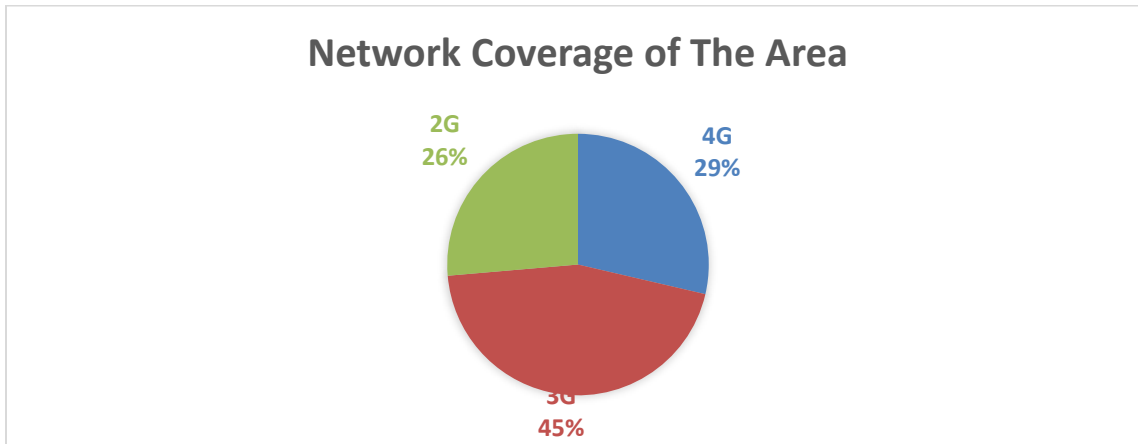


Figure 7: Network coverage chart

Area network coverage

	Agree	Strongly agree	Disagree	Strongly disagree
Different areas have different signal strength	40%	37%	13%	10%
Network coverage of an area affect connectivity	39%	35%	15%	11%
Network coverage does not affect connectivity	11%	15%	35%	39%
Urban areas have a better network coverage	30%	34%	20%	16%
Rural areas have a poor network coverage	30%	34%	20%	16%
Urban and rural areas have same net coverage	18%	20%	30%	32%

Table 4: Area Network coverage

SECTION D: Virtual Learning Acceptance

In this section the respondents were required to provide answers based on the scale of strongly disagree, disagree, agree and strongly agree. The resulting data collected is as represented below in the table below.

Question	Disagree	Strongly Disagree	Agree	Strongly Agree	Total
Virtual learning is highly recommended over in person learning	29.7%	22.3%	30.2%	18.8%	216
Virtual learning should be fully adopted	30.1%	24.9%	29.5%	17.5%	216
Virtual classes are easy to access	27.6%	27.5%	27.5%	18.4%	216
Virtual learning favors all kinds of students	39%	20%	21.5%	19.5%	216
Virtual learning should be abandoned.	30%	27%	23%	20%	216
Virtual learning favors students from urban areas only.	17%	27%	26%	30%	216

Table 5: Virtual learning acceptance

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

In this chapter I drive conclusions from the results of my study and also come up with possible recommendations regarding the conclusions drove from the study. The results of the findings are enough to come up with efficient conclusions and recommendations.

5.1 Summary

From the results of my findings, I found out that all the three elements I factored out to be the key limiting factors towards implementation of virtual learning at Gretsas university namely: type of telecommunication devices available, the type of internet service provider available and finally the kind of area network coverage. The results showed that the type of device owned by the students at Gretsas university was a major factor limiting the full implementation of virtual learning as most of them didn't own either a laptop nor a smartphone.

5.2 Conclusion

Watching the results of my findings I can drive conclusions that both the network area coverage, type of telecommunication device owned and the type of internet service provider used by the students at Gretsas university all hinder the implementation of virtual learning. However, the type of device and area network coverage stood out as the main factors that hinder students to access online virtual classes as most of the students are from interior rural areas with a poor internet access as the network coverage of the areas is not strong as compared to that of the urban areas. To add on that most of the students do not even own gadgets that can connect to the internet meaning that if the virtual classes are fully implemented most of them will not be able to access.

Therefore, before you consider implementing fully virtual learning at Gretsas one must have to consider the three factors namely: the type of telecommunication devices owned by students, the type of internet service provider used and the area network coverage of their places of locality. In addition, for that more has to be done to make sure these factors are considered and improvements are made before making a step towards full implementation of virtual learning at Gretsas University.

5.3 Recommendations

The study recommends that the institution in this case Greta university has to ensure that the students have access to devices with internet access as this is the first step because virtual learning is covered online via the internet.

Then the second recommendation is that each student from his/her area of locality is able to access a strong internet access to make it easier to access the online classes without having issues with the connectivity.

5.4 Suggestions for Further studies

A lot of studies can be done on the same to identify the other key factors that I may have not singled out in the study. There are numerous factors concerning mobile telecommunication services and how it affects the implementation of virtual learning that have not been covered in this study.

More studies can be carried out also in the other universities concerning mobile telecommunication services and their impact to implementation of virtual learning in the universities as there are so many universities in Kenya.

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APPENDIX

Appendix I: Questionnaire

Questionnaire to assess the knowledge on role played by mobile telecommunication and its impact on virtual learning.

Dear respondent,

I am conducting a research study on the above topic. The research study is purely for academic purpose and therefore your response will be held with highest confidentiality required. Thank you for giving detailed and accurate answers to the question in advance. Please sign to allow me use your responses in my research.

Name of respondent: Signature of respondent:

Instruction: Tick [] as appropriate or fill in the answer where required.

SECTION A: Socio-Demographic Data

Lecturers

1. Gender: Male [] Female []

2. Age 18-25 [] 26-35 [] 36-45 [] 46-55 [] 56-65 []

Students

1. Gender: Male [] Female []

2. Age 18-25 [] 26-35 [] 36-45 [] 46-55 [] 56-65 []

SECTION B: Knowledge About Virtual Learning

Do you know what virtual learning is? if yes, have you been part of a virtual class?

How did you rate the session? **Good** [] **Fair** [] **Awful** []

Was the network in your area favoring the process? **Yes** [] **No** []

What gadget do you own? **Smart phone** [] **Laptop** [] **PC** []

What service provider do you use?

Safaricom [] **Telkom** [] **Faiba** [] **Airtel** []

What is the network coverage in your area?

4G [] **3G** [] **2G** []

Do you experience network interference in your area of internet access?

SECTION C: Knowledge About Telecommunication Services

In this section you are required to select from the following choices: strongly agree, agree, disagree and strongly disagree by placing a tick in your preferred choice.

1. Internet service provider

Question	Agree	Strongly agree	Disagree	Strongly disagree
Safaricom is the best ISP				
Telcom is the best ISP				
Airtel is the best ISP				
ISPs affect connectivity to the internet				
ISPs do not affect connectivity to internet				
ISPs connectivity to the internet varies from one ISP to the other				

2. Area network coverage

Question	Agree	Strongly agree	Disagree	Strongly disagree
Different areas have different signal strength				
Network coverage of an area affect connectivity				
Network coverage does not affect connectivity				
Urban areas have a better network coverage				
Rural areas have a poor network coverage				
Urban and rural areas have same net coverage				

3. Type of Mobile Telecommunication devices

Question	Agree	Strongly agree	Disagree	Strongly disagree
Smart phones are better compared to laptops				
Type of device affects connectivity to internet				
Device configuration affect internet connectivity				
Type of device does not affect internet connectivity				
All mobile devices can connect to the internet				

SECTION D: Virtual Learning Acceptance

In this section please tick the box with the response you prefer.

Question	Disagree	Strongly Disagree	Agree	Strongly Agree
Virtual learning is better than in person learning				
Virtual learning should be fully adopted				
Virtual classes are easy to access				
Virtual learning favors all kinds of students				
Virtual learning should be abandoned.				
Virtual learning favors students from urban areas only.				

Appendix II: BUDGET

Activity	Items	Unit Cost	Totals
Stationary	-	-	-
	5 pens	@20 each	Ksh. 100
	3 pencils	@20 each	Ksh. 60
	1 rubber	@20 each	Ksh. 20
	1 ruler	@30 each	Ksh. 30
	Foolscaps	@2 each	Ksh. 100
Proposal Typing services	@30 per page		Ksh. 1,200
Printing	@10 per page		Ksh. 1,000
Internet research			Ksh. 1,000
Miscellaneous			Ksh. 2,000
TOTAL			Ksh. 5,510

Table 6: Budget

Appendix III: WORK PLAN

Activity	MARCH	APRIL	MAY	JUNE	JULY
Proposal presentation	■				
Data collection		■			
Data Analysis			■		
Data Representation				■	
Defense Presentation, Final Compilation and hand over					■

Table 7: Work plan