A PROPOSED FRAMEWORK FOR ADOPTION OF OPEN EDUCATIONAL RESOURCES FOR TEACHING AND RESEARCH BY FACULTY MEMBERS IN SELECTED UNIVERSITIES IN KENYA

By

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DECLARATION AND RECOMMENDATION

I hereby declare that this thesis is my original work and has not been submitted anywhere for any award. Where other sources of information are used, they have been duly acknowledged.

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DEDICATION

This thesis is dedicated to my late father Gideon Muthanga who did not live to witness this success and to my late mother who worked very hard over the years to give me quality education.

To our children Keziah, Agatha and Joan, I pray that you will have the desire to pursue academic excellence.

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ABSTRACT

Adoption of Open Educational Resources is critical, it offers chances for access to library resources, quality education and such technology revolution is being used in Kenya to transmute teaching and learning. Despite the significance of OERs, UNESCO 2020 noted that engagement and adoption of OERs in teaching, learning and research was still not a mainstream activity in many institutions and libraries especially in developing countries. The study sought to provide an empirically developed framework for adoption of OERs by members of faculty for teaching and research within universities in Kenya. Objectives were to assess the level of awareness of OERs among members of faculty, to examine the status of OERs uptake by members of faculty, to determine how OERs support teaching at universities, to determine how OERs are used to support research activities and to develop a framework for adopting OERs in teaching and research by members of faculty. The study was informed by the Wilson's Model of Information Seeking Behaviour and the Concerns Based Adoption model. The study used Pragmatic paradigm. It utilized the mixed method approach and Survey research design. Data was collected using questionnaires and interview schedules. The study population consisted of members of faculty and librarians from Kisii University, Kabianga University, Kenya Methodist University as well as Africa Nazarene University. The descriptive and inferential statistics were used aided by SPSS for quantitative data. Thematic analysis was applied on qualitative data. The findings demonstrated that faculty had adopted OERs though not widespread but there were noticeable initiatives in the targeted universities. Findings on adoption of OERs indicated that members of faculty had adopted OERs for teaching and research though to a small extent. Both university and e-resources librarian were making efforts to enhance adoption through providing access to OERs. Findings on assessing level of awareness among faculty members indicated there was awareness hence faculty were expected to be gainfully utilizing OERs, there were assertions on the criticality of raising awareness of OERs by librarians for their full adoption and exploitation. Significance uptake of OERs was also demonstrated on supporting teaching activities indicating their value in knowledge discovery, sharing and acquisition. On how OERs support teaching, OERs were presented as a vital commodity that facilitate knowledge exchange. OER repositories were found to support research activities by allowing access to vast amounts of research resources. On developing a framework for adopting OERs findings focused on aspects like regular training, forming partnerships, institutional support and creating awareness being critical. The study recommends OER awareness programs to demystify OERs, on uptake librarians should assist members of faculty in having access to OERs, strong collaborations and holding sensitization meetings and campaigns to promote OERs. Libraries should liaise with ICT department to provide adequate infrastructure. Faculty should update the curriculum to include OERs as part of e resources. Therefore, the study recommends that the university libraries and university management in Kenya fully implement the proposed framework in adopting Open Educational Resources in supporting teaching and research.

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LIST OF ABBREVIATIONS ACRONYM

ANIE	African Network for Internalization of Education
ANU	Africa Nazarene University
AVU	African Virtual University
CBAM	Concerns Based Adoption Model
CC	Creative Commons
CCK	Creative Commons Kenya
CFT	Competency Framework for Teachers
COL	Commonwealth of Learning
CORE	China Open Resources for Education
CUEA	Catholic University of Eastern Africa
EIFL	Electronic Information for Libraries
HE	Higher Education
ICT	Information Communication Technology
KeMU	Kenya Methodist University
KENET	Kenya Education Network Trust
KLISC	Kenya Library and Information Services consortium
KODI	Kenya Open Data Initiative
KU	Kenyatta University
MERLOT	Multimedia Education Resource for Learning and Online Teaching
MIT	Massachusetts Institute of Technology
MM	Motivational Model
MPCU	Model of PC Utilization
OA	Open Access
OC	Open Content
OCW	Open Course Ware
ODI	Open Data Initiative
OECD	Organization for Economic Co-Operation and Development
OER	Open Educational Resources
OL	Open Learn
SADC	South African Development Community
TESSA	Teacher Education for Sub-Saharan Community
UK	United Kingdom
UN	United Nations
UNESCO	United Nations Educational Scientific and Cultural Organization
UNISA	University of South Africa
UoK	University of Kabianga
UoN	University of Nairobi
USIU	United States International University

CHAPTER ONE

INTRODUCTION

This chapter presents a background of the study, statement of the problem, purpose of the study, objectives of the study and research questions. It also presents the significance of the study, scope of the study, limitations of the study, assumptions of the study and conceptual framework.

1.1 Background to the Study

Successful lifelong learning and access to information resources in higher learning institutions is dependent on many factors, important among them in the current era being use of technology (UNESCO, 2020). Open Educational Resources have been identified as a vital technological tool with capacity to lead to information access by making both teaching and library resources visible, accessible and can facilitate harnessing and sharing of academic wisdom and building community of practice (SAIDE, 2014; OER Africa, 2020). OERs refers to educational materials that are found on public domain or materials covered by an Intellectual Property License that consents others to openly repurpose, share, use or adopt (Hodgkinson-Williams 2010).

OERs are characterized by their copyright range being limited to application of a license that is open. As indicated by Ngugi and Butcher (2011, p. 5) OERs use Creative Commons (CC) licenses which provide various options as elaborated in the literature review. Fitzgerald (2007, p. 13) gives similar views and notes that Creative Commons license offer a basis on sharing and reuse of OERs. The application of the CC approach grants user-friendly digital materials licenses thus avoiding the copyright restrictions applied.

Therefore, the traditional copyright model of all rights reserved is substituted by some rights reserved. Creative common (CC) license which according to Trev (2012), is part of the numerous licenses that permit dissemination of works that are copyrighted have numerous combinations that terms of distribution are conditioned to. The licenses were first applied in 2002 by Creative Commons which is a United States of America non-profit corporation founded in 2001. It is the most common tool for enhancing sharing of knowledge and provides simple alternatives that are standardized compared to the traditional paradigm of all rights reserved system which required permission in order to access the work (Liu et al. 2014).

Through a Creative Commons license, the author will always be endorsed and he or she owns the copyright. With allowance of CC license, materials can be copied, distributed and also utilized commercially following what the resource producer applied by applying the CC's symbols. The CC licenses are discussed in detail in chapter two.

Globally, when the World Wide Web was launched in 1992, OERs increasingly started becoming available freely, though widely varying in quality. Since then, great progress has been made to realize the OER dream internationally. MIT a groundbreaking initiative in the United States in 2002 helped to pave way for the advance of OERs through the Open Courseware (OCW) enterprise where members of faculty began posting on the web teaching materials acquired from 32 of its courses which included notes from lectures, curricula, library information resources, lessons and questions. In 2005 MIT in collaboration with other higher learning institutions constituted the Open Courseware association which recently consists of over 200 academic institutions whose one of the

objectives is to encourage adoption and adaption of OERs around the world. Librarians, teaching staff and students from MIT utilize OERs, they also believe they have improved access to their library information resources and dissemination teaching and research, material, enhanced prestige internationally and professional reputations (Salem 2016:2). Based in Houston Texas, Connexions at Rice university provides a scholarly environment for developing, sharing, publishing and identifying OERs by creating new information materials and tools for use by their libraries, members of faculty and students (Ngimwa & Tina, 2012). In contrast to MIT, OCW which began access of OERs through provision of traditional course resources through web access, Connexions efforts to produce fresh information resources geared to transform interaction between members of faculty and students. Another important OER milestone is the Open University of Great Britain which attends over 200,000 students in their 70 institutions which have their courses and library resources freely available online through Open Learn platform. The institution offers free courses to the public which include information resources articles, educational packages and a wide range of videos in various subjects.

The general acceptance and use of OERs by members of faculty and librarians is increasing globally (Salem, 2016:2). Bell (2015, p. 3) attributed this acceptance to availability of high quality information resources, minimal concern on ability of OERs meeting information needs, more media coverage, increase on higher learning institutions focus on access and affordability. Acceptance is also due technological advances since OERs now include interactive multimedia and modular learning as compared to simple text books with open licensing (Salem, 2016, p. 2). This includes high quality resources like California State University collections, Multimedia Educational Resource for Learning and Online

Teaching and OER Commons that maintain metadata for OERs housed elsewhere thus making them more discoverable.

The 2012 World OERs Congress undertaken at UNESCO Paris was a landmark event for OERs. It was a global call for all governments to openly license publicly funded education resources like curriculums, library e resources, program materials, texts, videos, applications in multimedia, podcasts and many more to learners for use (UNESCO 2012). OER movement is developing in academic institutions in the 21st century as a result of the millennium goals for all, which are currently expanding to more countries. This is a part of a larger societal movement towards "opening up" that which was previously "closed" to everyone except for a small group of individuals who could afford to pay for access (Ngimwa & Tina, 2012; Johnstone, 2005; Hylen, 2007). They give the institution an opportunity to present their courses to potential students, enhance the status and visibility of the university among its competitors and the public. The institution is also perceived to be availing value for any public funding it receives by enabling knowledge to be more accessible, and by promoting more flexible pattern of learning for registered students (Suber 2004). Many supporters of OERs such as UNESCO (2011) attribute more benefits to OERs to having open content that is shared freely, and without asking permission. Additionally, OERs enhance quality improvement, accessibility as well as efficiency of learning.

The Open Educational Resources crusade is driving significant shifts internationally which are characterized by various initiatives like OER Africa and the South Africa Institute of distance education. In forthcoming years, growing numbers of OERs projects in countries

such as United States and India have been introduced that basically puts emphasis on OERs broadly and intensely (Ngimwa & Tina, 2012). For example, the National Knowledge Commission of India advocated for a countrywide curriculum and library's electronic resource initiative to encourage the creation, adaptation and utilization of OERs by their educational bodies. Additionally, the Indian Commission for grants in universities, policy and advocacy making organization of Software and Services Companies are backing up the initiatives, bridging skills and knowledge gaps (Das 2011). OERs were introduced in developed countries such as America, Europe and Middle East and popularized amongst scholars, practitioners and educationalists (Tlili et al., 2020). Beside numerous OER projects, developed countries have been aggressively devoting creation of abundant national high quality open education courses which are intended to satisfying the needs of masses (Xu, Zhang, and Zheng, 2014) and availing their intellectual property to support members of faculty, librarians and learners in order to build a better and more resilient system of education.

In spite of the delayed entrant, Africa has witnessed great initiatives like Teacher Education in Sub Saharan Africa (TESSA), ACEMaths enterprise whose objective is to pilot adaptation of OERs for programs by teaching staff in South Africa; Free courseware project, which supports the publication and use of OERs at Western Cape University; African Virtual University (AVU); Africa Health OER Network which is an association of institutes pursuing to promote a scalable and sustainable model for the efficient rollout of OERs as important information resources to support health education in Africa and MERLOT African Network (MAN) (OER Africa, 2020). OER Africa also launched a pledge encouraging individuals and institutions to support OERs. The pledge is grounded

on the idea that nations rely on information resources to improve livelihoods, broaden economic participation and in supporting civic and long-life education (UNESCO, 2020).

In Africa OERs access is mainly through online library repositories which are online databases that capture, organize and categorize information resources (Hodgkinson-Williams & Arinto, 2017). A good example is Kwame Nkrumah University of Science and Technology which promotes OERs facilitating their members of faculty to access information resources that are openly licensed. University of South Africa (UNISA) which has over 400,000 students owns a big collection of information and curriculum supporting materials from libraries that have open licenses, and it envisions a future where OERs will be the core of the university subject design. South African Institute for Distance Education (SAIDE) harnesses expertise for creating OERs that benefit members of faculty in different subject areas. Africa Virtual University (AVU) has an OER repository which holds English, French and Portuguese information materials and has contributions through combined efforts by twelve Universities in Africa from 146 peer reviewers and authors (Tlili et al. 2020).

Despite few initiatives in Kenya, there are pointers of developing OERs, for example libraries in Kenya have institutional repositories, Kenya also is the host of AVU, an intergovernmental initiative that promotes e learning and distance education. The country also participated in the inauguration of School of Open Africa which was held at Nairobi in 2014, Egerton University participated in founding of TESSA, which looks at information needs of teachers and development of OERs by teachers (TESSA, 2007). Africa Nazarene University has signed an MoU with South African Institute of Distance Education (SAIDE)

whose objective is to explore OERs adoption at ANU (SAIDE, 2014). In terms of policies, Kenya partook in the Inauguration for Paris OER declaration implementation forum whose aim was to support Member Countries to implement the teachers' ICT competency framework by UNESCO and development of OER policies at a national level for adopting OERs (UNESCO, 2013).

As noted by Bell (2015) how and whether adoption takes place at any institution is determined by various factors which include infrastructural access, availability of OER materials, individual and institution volition and prevailing cultural and social conditions. In Kenya during the lock down due to Covid-19 learning institutions adopted the e learning and blended modes of learning. OERs and Open Access library resources become critical in keeping learners in touch with education and members of faculty were encouraged to create links to OERs in the e learning systems like Moodle, Canvas and the Blackboard. As noted by (Ochieng and Gyasi 2022:DN 2) globally there has been disruptions to learning where over 1.6 billion learners at different levels have been affected and as the author noted, OERs will act as a remedy to education beyond Covid-19 by linking up academics and libraries in various geographical spaces undertaking related projects or fields.

Although many higher education institutions in Kenya are not conversant with OERs (Kivunja & Kayuni, 2017) as supported by literature review, librarians in these institutions have experienced a catalytic digital situation which has provided an impetus for change and technological advancement to promote access to digital information resources like OERs to transform information resources provision, teaching and research. As such, an

investigation of best practices for advancing members of faculty adoption of OERs can provide valuable information to higher learning institutions in Kenya.

Kenya recognizes the significance of OERs in enhancing quality of teaching and learning materials and providing more openings for the acknowledgement of worldwide access to education. In a speech given by Ministry of information and technology Principle Secretary at the inauguration of the School of Open Africa on October 2014 (Tiampati, 2014), the Kenyan government communicated support to education in line with millennium goals through ICT training and access to high quality education. Tiampati (2014) noted that "by using OERs, schools of open are opening up to countless students who would have otherwise missed the opportunity of accessing education, especially in the marginalized regions which could not sufficiently access quality education".

The Kenyan government agrees with the Federal government in supporting Open Educational Resources as attested in the United Nations declaration of Human Rights article 26, where the government of Kenya is supportive of the use of OERs to provide equitable access to educational and library resources. The act articulates that everyone's right to education and that through education there shall be improvement of human personality and reinforcement to human rights and freedom (Tiampati, 2014).

1.1.1 Teaching and Research at Universities in Kenya

In Kenya, many universities have experienced a challenging moment of swelling enrollments in a situation of decreasing quality in education (Mwangi and Udoto, 2011; Mutula, 2002). This fast increase in enrolments in developing countries viewed as the significant reason to the weakening in education quality due to limited finances in

universities leading to the disregard of vital inputs in teaching and research like library information resources and support for members of faculty (The World Bank, 2020). According to the World Bank, due to lack of better education it will be difficult for developing countries to tap benefits from international knowledge-based economies. The report recognized that there are many challenges hindering the provision of quality education, chief of which is shortage of resources. It made an urgent plea to higher learning institutions to utilize the new information technologies to link developing countries to the international intellectual mainstream.

According to Bunyi (2013), Kenya's institutions of higher education have been experiencing multiple difficulties of relevance, access to library resources and quality of education and research. Consequently, there are calls for university administrators in Kenya to deliver improvements in higher education in the era of decreasing government funding and increased demand. In a research carried out on five Higher learning institutions in Kenya by Mwangi and Udoto (2011), the need for enhancement of the quality of teaching and research especially on the library resources to cater for the requirements of students and members of faculty in Kenyan universities stood out distinctively. This underscores access to library resources in fostering quality education which in return escalate the benefits down to the society, the same ideas were echoed by Bunyi (2013) and UNESCO (2020) who noted quality education as a major contributor to social-economic development in countries hence the need to improve university facilities and library resources.

In May 2016, OER Africa convening was held in Nairobi, Kenya and the main aim was to find out the current state of OER usage in Kenya as well as in Africa. The convening explored how higher learning institutions are utilizing OERs. According to a report given by Africa Nazarene University, it was noted that there was increasing interest in open licensing on OERs and establishing supportive policy backgrounds, but there is still limited understanding of the concept of OERs beyond its 'champions'(OER Africa, 2016). According to the participants in the OER convening, it was demonstrated how the concept of open licensing can be harnessed as a way of increasing and improving resources for learning, especially in higher learning institutions.

In reaction to the immense distraction in education because of the Covid-19 pandemic which affected over 1.6 billion learners in 191 countries, where institutions offered online classes and e resources in libraries UNESCO (2020) headed an appeal to sharing of knowledge and supporting learning through OERs. As noted by UNESCO, it is therefore more than ever critical that the global community comes together to foster universal access to information and knowledge through OERs. OER Africa has noted in various contexts a growing number of learners in higher learning institutions in Kenya alongside insufficient human resources, library resources and infrastructure which has resulted to consistent scarcity of individual's capacity to teach in various areas at universities. Members of faculty as noted by Ngugi and Juma, (2016, p. 7) are already overstretched thus lacking the time to adopt OERs. At the same time the finances existing to run courses are insufficient to cater for the educational requirements of registered students and to cater for costs of members of faculty as well as the time to develop quality teaching resources. Limited

infrastructure in ICT, knowledge and best practices experience with regard to adoption and use of OERs has been noted as another challenge. Due to this, teaching, learning and research which are the crucial components of higher learning institutions suffer as members of faculty struggle to use and adopt OERs (CENGAGE 2016, p. 4).

1.2 Statement of the Problem

Information resources are fundamental in enhancing teaching and research in academic institutions. In Kenya, Commission for University Education (CUE) standards stipulate that each academic program offered in the University must be availed with adequate, relevant, authoritative and up to date core texts and additional reading materials, comprising of both print and digital resources to facilitate teaching, learning, research (Commission for University Education, 2014). Among such resources are OERs which are information resources that allow free access, permit shareability and redistribution with permission from the holder of copyright (Bahrawy, 2019, p. 65). Despite the significance of OERs, the World Congress in 2012 and UNESCO in 2020, noted that engagement and adoption of OERs in teaching, learning and research was still not a mainstream activity in many institutions and libraries especially in developing countries (UNESCO, 2020).

If OERs are not embraced, then there will be diminished opportunities for collaborations, delayed pedagogical transformation, efforts duplication in provision of information materials, development of learning materials, lack of consistency across courses, inadequacy of high quality library resources (Tlili et al., 2020). Library budgets have been affected by global economic crisis, thus information resources sharing has become inevitable (Mays, 2017). There are very few studies on OERs in Kenya, as noted by OER Africa (2020) which shows potential of OERs in Kenya. Even though OERs are highly

valued and have the support of numerous stakeholders, their adoption has not yet reached a critical mass (OER Africa, 2021). This situation regarding OERs constitutes a research gap that requires a scholarly investigation; hence the need for the current study which aimed to develop a framework on how members of faculty and librarians can be supported in adoption of OERs. The study also sought to identify key stakeholders, policies, technologies and processes that can support the framework for OER adoption and also establish how they interact in contribution towards adoption or OERs at universities in Kenya

1.3 Purpose of the Study

The general objective of the study was on the adoption of OERs by members of faculty with an ultimate to propose a framework for adopting OERs in teaching and research at selected Universities in Kenya.

1.4 Specific Objectives

i. To assess the level of awareness of OERs among faculty members in selected universities in Kenya

ii. To examine the status of OERs uptake by faculty members in selected universities in Kenya.

iii. To determine how OERs support teaching in selected universities in Kenya.

iv. To establish how OERs are used to support research activities among faculty members in selected universities in Kenya.

v. To develop a framework for adopting OERs in teaching and research by faculty members in selected universities in Kenya.

1.5 Research Questions of the Study

i. What is the level of awareness of OERs among faculty members in selected universities in Kenya?

ii. What is the status of OERs uptake by faculty members in selected universities in Kenya?

iii. How do OERs support teaching in selected universities in Kenya?

iv. How do OERs support research activities among faculty members in selected universities in Kenya?

v. What should constitute a framework for adoption of OERs in teaching and research by faculty members in selected universities in Kenya?

1.6 Significance of the Study

The main reason for sharing teaching and library resources for local communities is individuals' desire to transform the lives of those less fortunate and the need to share knowledge with the whole of humanity. Furthermore, in traditional campus settings, few faculty members see their colleagues' curricula, much less their teaching materials. Thanks to the OpenCourseWare (OCW) initiative, which now enables faculty members from different institutions to realize the overlap and deficiencies in the topics and courses they offer.

By just reviewing the Open Educational Resources from their desktops, members of faculty can perceive how someone in a different discipline approaches the same course or resources consulted. This capacity makes a richer experience for learners and members of faculty in generating new and cross-departmental partnerships. The study hopes to help

faculty members to extend the benefit to others by opening course materials and availing them as OERs.

Understanding OERs raises the general awareness of the institutions academic offerings and standing around the world. It was anticipated that the study would go a long way in convincing higher learning institutions to contemplate using OERs as a way to ease library expenses, bring excellence in curriculum development, show case their institutional knowledgeable capability to a worldwide audience and make research more reachable to the overall academic fraternity. With the use of OERs there is a move from examination compelled methods to assessment designs due to direct engagement with students and backing up more incorporation practice and theory within academic programs.

The study also appeals to education stakeholders to view the evolving OER landscape as playing an important role in knowledge diffusion. In many developing countries contexts like Kenya, where ICT is limited, the potential for OERs to diffuse knowledge shall depend on sharing library resources as it is expected that for the coming years' learners will have reliable access to internet and computers. The technology shall also provide expertise in content development and sharing best practices. By understanding OERs learners' engagement shall be boosted through learning better approaches on what is considered difficult stuff/topic. For example, audio/video OER teaching resources are appropriate in order to maximize understanding of concepts. OERs also hold promise in saving time in curriculum development. Consequently, members of faculty who are open to diversifying course content shall benefit from OER initiatives around the world instead of relying exclusively on traditional publisher textbooks.

More light will be shed through the findings on the importance of utilizing modern technologies in advancing quality of education, teaching and creating an international requirement for effective access, usage and distribution of OERs. With current digital technologies making it easier to share and access digital resources, teaching, learning and research has been improved. It is envisioned that the study will assist higher learning institutions and members of faculty to exploit OERs as they tackle definite historical challenges regarding equitable access to education.

With the rising cost of educational materials in institutions, members of faculty and students, the adoption of OERs would help relieve the problems. Cost for teaching, learning and research information materials like traditional textbooks and course materials have continued to increase and access to them equitably by members of faculty, libraries and students is becoming a barrier to educational success. Libraries that are utilizing OERs will benefit from affordable courses and information materials that are easy to use and access.

Knowledge gained would enable exploring access behaviors by faculty on OERs especially in academic institutions in Kenya. The research also planned to shed some light on some obstacles to widespread use of OERs especially on unknown permissions, the problem of discovering resources, verifying their quality, linking to interrelated resources and sharing. The study acknowledged that finding and adapting OERs can be complicated and members of faculty may be in short of awareness or ease in expending expertise necessary to make looked-for or desired adaptations. Furthermore, the lack of such skills and knowledge for editing such materials can deter full utilization of OERs. The study suggested solutions

by examining best practices from developed countries. The study also acts as a driver for research by contributing to the body of knowledge from a concrete point of review as well as fulfillment of an academic requirement. It is hoped that the study will fill the gap in knowledge in information science and technology and that the findings would offer key facts to information seekers who stands to benefit from the in-depth knowledge on OER's use by faculty in academic institutions.

The study would also benefit policy makers in Kenya who are currently facing extreme challenges due to skills discrepancy between graduates from institutions of higher education and the needs of the market. OERs provide learners and faculty credible support through the provision of relevant materials and appropriate pedagogies especially on practical subjects. When the policy makers get knowledge about OERs they shall be able to boost their use in higher learning institutions, involve members of faculty in content design process by supporting and motivating them to adopt OERs. They shall also inspire members of faculty to be content designers, grow communities of practice that is based on resources grounded learning, motivate sharing of OERs and foster open educational practices in higher learning institutions.

1.7 Assumptions of the Study

An assumption is an issue out of the researcher's control, though if not available the study will become inappropriate (Simon, 2011). Assumptions serve as the basis of any research (Leedy and Ormrod, 2020), and set up what the researcher takes for granted. It was an assumption that all the selected respondents will participate in the study and respond honestly and objectively, and that the participants are volunteers who may pull out from the research at any period with no ramifications. It also assumed that faculty members have

initial knowledge on the adoption of OERs in teaching, learning and research, and that universities have requisite infrastructure that supports OERs. There is also the assumption that faculty members will have basic information literacy skills on accessing and discovering OERs and that they will regard OERs as a key resource in teaching and research.

1.8 Scope of the Study

It refers to the parameters under which the research will be operational which implies the problem to be solved will fit within certain parameters. This research investigated the adoption of OERs in research and teaching by faculty members at Africa Nazarene University, University of Kabianga, Kenya Methodist University and Kisii University in Kenya. It did not examine the role played by learners and other educational institutions in the adoption of OERs. It also aimed at finding out whether members of faculty in higher learning institutions are able to find, create, use and share Open Educational Resources for teaching and research and if they are aware of CC licenses. It did not examine the actual process of creating OERs and application of CC licenses.

Since Kenya is a big nation with many universities, the research was narrowed to four universities and since the four are just a representative for such a large nation, generalization of the research findings was applied, nevertheless the four cases are hoped to provide variety of information and contextual similarities hence enriching the research findings.

1.9 Limitations of the Study

Kamau, Githii and Njau (2015) view a limitation is a feature of study that the investigator is aware it may negatively affect the results or generalization of the findings, but which

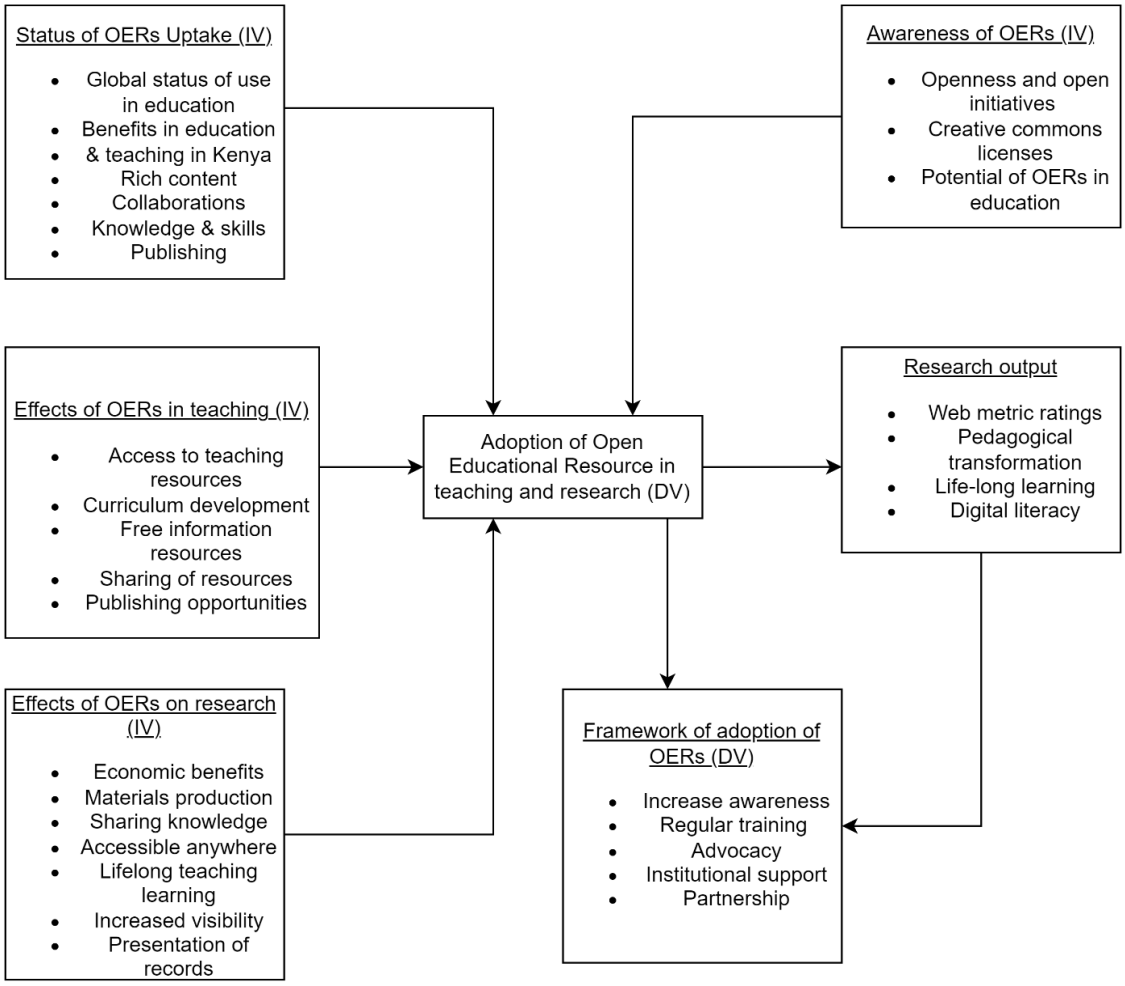
one has no power to control. Limitations are effects that the researcher cannot control. They are shortcomings, circumstances or effects that the researcher cannot control that place restrictions on methodology and conclusions(Simon & Goes, 2013). No matter how well a study is conducted and constructed, limitations are inevitable. The results of this study were interpreted and understood within the confines of the following limitations. The study predominantly concentrated on adoption of OERs in academic higher learning institutions . Another limitation was the issue of biasness especially on responses. The methodology used gave participants' freedom to select any choice in any format and provided opinions that were subjective. The study made use of research assistants as much as possible who were trained appropriately to overcome data collection errors. The researcher also recorded all responses as accurately as they were given without adding or altering anything and keeping own opinions out of the responses. There was a limitation since the questionnaires used were standardized and predetermined so that respondents could easily understand therefore extraneous variables beyond the researcher's control like personal feelings, honesty, and biases were discarded. The study was also cross-sectional due to time and cost constraints therefore limiting the study from being carried out over a long period.

1.10 Conceptual Framework

A conceptual framework represents ways of conceptualizing phenomena within the context of a particular viewpoint which stipulates relevant variables (Mmuya, 2007). It gives an overview of the area under investigation and clearly explains the various concepts and variables to be used in the study and their presumed interrelationships. It offers some insight into understanding the phenomenon of investigation. A good conceptual framework is important for guiding the determination of the relevance or meaningfulness of the findings (Munyoki & Mulwa, 2012, p. 36). As Babbie (2007, p. 125) describes,

conceptualization yields a particular agreed on meaning for a concept for the commitments of research. This process of specifying exact meanings involves describing the indicators to be used in measuring an impression and the different aspects of the notion called dimensions.

Figure 1. 1 Conceptual Framework



Key:

IV-Independent variable

DV-Dependent variable

After pinpointing research problems and arriving at a topic, it is important to define variables. They are qualities or merits of the cases that are recorded or measured. (Kombo & Tromp, 2006, p. 21). In this research, variables are divided into dependent and independent variables. Amongst the important variables is the independent variable (IV) which is also known as a predictor variable, repressor, controlled, manipulated, explanatory, exposure an input variable, (Obwatho, 2014, p. 25). The researcher contemplates that these are factors that explain variation in the dependent variable or the causes of an outcome. According to Figure 1.1, independent variables include status of OERs uptake, effect of OERs on teaching, effect of OERs on research and awareness of OERs. The independent variables will influence adoption and usage of OERs in higher learning institutions. The adoption and usage of OERs in higher learning institutions shall be measured by the extent of uptake of OERs, influence on content/ learning resources in terms of availability, effect on quality of learning, effect on cost incurred in accessing resources, how awareness shall enhance research and learning. Figure 1.1 above provides a clear picture.

1.11 Operational Definition of Terms

Adoption- it is the integration of and Open Educational Resource into a unit or course without making significance revisions. It can also mean integrating a new information resource like a book into an existing unit.

Behavioral intention- this is the member of faculty's intention to continuous and regular use of OERS in future to access needed information.

Effort expectancy- it is the degree of usability feeling by a member of faculty while using OERs.

Facilitating conditions- this is the degree of belief by a member of faculty that there's an organizational or technological basis to support the use of OERs.

Faculty member-this is an individual working a university within an academic department and is involved in teaching graduate and undergraduate students within a specific discipline

Performance expectancy- this is the degree of belief by a member of faculty to get help in improving access to information by using Open Educational Resources

Social influence – it is the perception degree of a member of faculty that an important person near him or her believes one should use OERs to access needed information.

Uptake- this is utilization of available information resources and learning opportunities.

Use behavior- it is the member of faculty's actual frequency of OERs use to access needed information.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter details a review of literature on adoption of OERs for research and teaching by faculty members in higher learning institutions. It reviews past scholarly work related to the usage of OERs. It specifically points out an evaluation of studies that have acknowledged factors that relate to adoption of OERs by members of faculty in academic institutions. The literature discussion is guided by the objectives of the study. It starts by discussing the level of awareness of OERs among faculty members in universities, it then addresses the status of OERs uptake by members of faculty, effects of OERs on quality of teaching in universities, and explores how OERs affect research activities among members of faculty. The chapter concludes by describing how to develop a framework for adoption of OERs for research and teaching by members of faculty in universities in Kenya.

According to Kamau, Githii, and Njau (2014, p.60), literature review entails getting to know the status of knowledge in a research topic. One needs to be informed about the existing knowledge in a research topic to avoid rediscovering the wheel and be in a position to advance knowledge. Obwatho (2014, p.45) describes literature review as formally examining and assessing literature that is relevant to the research topic to establish what has already been said on the topic, knowing key writers in the field and establishing main theories and hypotheses in the field of study (Bell et al., 2019).

2.2 Theoretical Framework

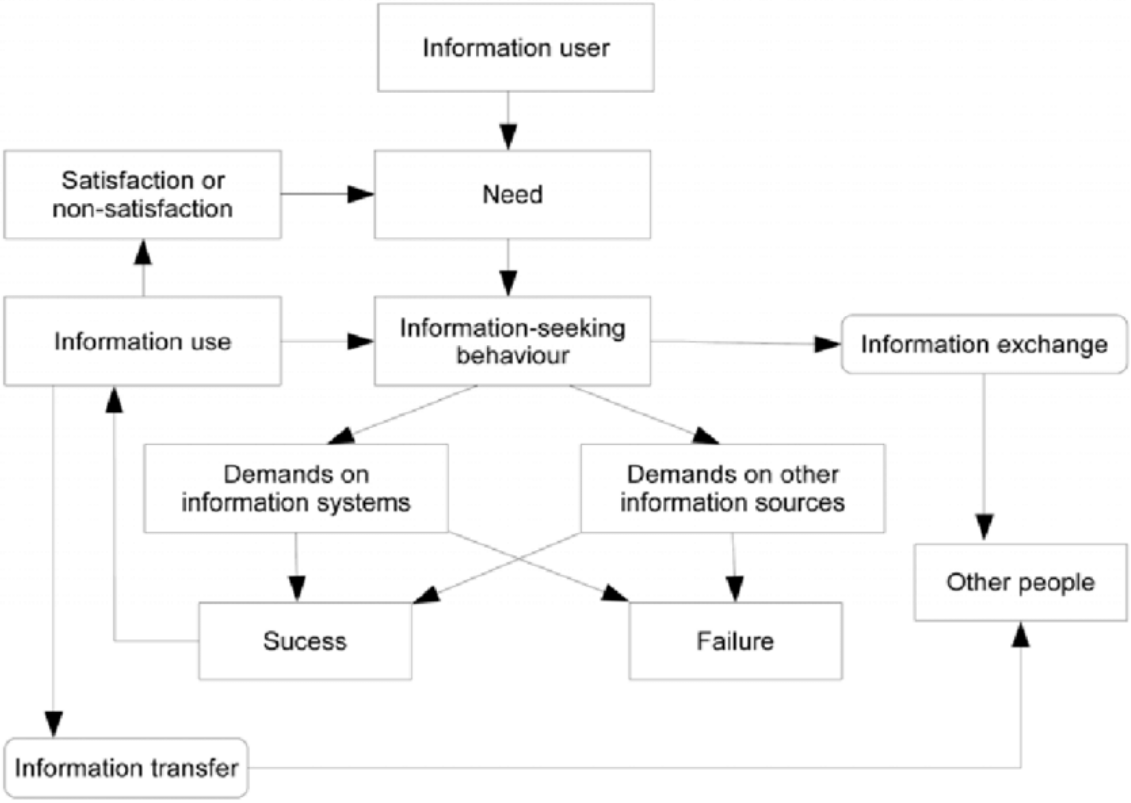
Kombo and Tromp (2006) describes theoretical framework as a combination of related concepts founded on theories. It is a well-structured set of propositions which result from and reinforced by data and evidence. It tries to clarify the reason why things happen the way they do (Mmuya, 2007). The purpose of the theory is to explain an account for phenomena in terms of some other phenomena. In research, theories provide answers to the problem to be researched. Rotfeld (2014), while explaining about the importance of a theory asserted that it has three fundamental requirements whereby the theory clarifies existing data and based on that explanation it makes predictions of coming events by virtue of the predictions.

Most of the models on information seeking behavior effort to describe an information seeking activity causes and consequences or try to demonstrate connections among stages in information seeking (Kundu, 2017, p. 394). This study was guided by Wilson's information seeking behavior model and the Concerns Based Adoption model.

2.2.1 Wilson's Information Seeking Behavior Model

Wilson's model of information seeking of 1999 was adopted in order to guide on adoption of OERs by members of faculty. Information seeking is essential to acquire data. In order to satisfy an information need, the user makes searches from formal to informal sources and services which may result in failure or success. The model acknowledges that other people may be involved as part of information seeking through information exchange and sharing of information perceived useful (Wilson, 2016). The individual's behavior towards getting information resources and discovering new knowledge indicates the information seeking behavior as indicated on the Figure 2.1 below.

Figure 2. 1 ***Wilson's model of information seeking behaviour (Wilson 1999)***



2.2.2 Relevance of the Wilson's Information Seeking Behaviour Model to this Study

The Wilson model (1999) was considered appropriate for the study since it is extensively used in libraries and information science to elaborate the process through which information users satisfy their information needs. In the current era of information explosion, members of faculty have limited ability to scrutinize all information resources and all they require is accurate and appropriate information resources tailored towards satisfying their information need. To satisfy information needs, the member of faculty makes searches upon formal or informal information sources or services which will lead to either success or failure to find the significant information resource (Kundu, 2016:5).

To a faculty member, information seeking is purposeful searching for information to accomplish a teaching and learning goal. While seeking, a member of faculty may interact with manual information systems for example, books in the library or digital based systems such as OERs. The information seeking may be successful or a failure, if successful the member of faculty utilizes the found information for teaching and learning. (Al-Suqri, 2017). The model is appropriate as it helps to understand members of faculty information needs and how to satisfy them as well as guiding libraries to build strong resources and services to satisfy information needs of the users. It also reveals the importance of selective dissemination of information resources to meet the specific needs of information resources in higher learning institutions.

2.2.3 The Concerns-Based Adoption model

The model was developed as a conceptual change context by Susan Loucks and Gene Hall in 1979 for institutions desiring to adopt an innovation. The above researchers investigated what happens when individuals are requested to adopt an innovation or to change a practice. They had the belief that change begins with individuals and the researchers observed what happens when teaching staff are subjected to change. The Concerns Based Adoption Model is based on six assumptions (Hord et al., 1987) as indicated below.

The model views change as a process and not an event, it indicates that change occurs over a long period, often spanning years. It also notes that change is accomplished by individuals and that the change process is a personal experience which needs all individuals involved in a change to be recognized. It also sights change as a personal experience, and individuals behave and react differently at different paces during the change process.

Paying attention to these individual differences will heighten the change implementation process.

The model encompasses developmental growth and that individuals regard change based on their skills and the feelings they bring the change process. Their feelings are set to change over time as they continue interacting in the implementation of the projected change. The model also states that change is best understood in operational terms which means individuals most of the times view anticipated change in practical terms and their main desire is to know how the change will impact them personally and what will be required from them to address issues and this may result in less resistance during the change process. The emphasis of facilitation should be on individuals, context and innovations. The element of humans in the change process is a critical aspect which cannot be underrated because when innovation is being implemented individuals need to change their behaviors for change to be successful.

According to Agripah (2015), for OERs to be successfully adopted by members of faculty, some significant effort will be required through commitment. The model also looks at the overall institutional commitment for adoption to take place through developing policies, incentives and measures for adoption. The Concerns Based Adoption model was used in this study to predict, describe and explain faculty members behavior when asked or are required to adopt OERs. According to CBA for an innovation to take place the concerns of faculty members is paramount and must be addressed. If OERs are to be successfully adopted in Kenya by higher learning institutions some significant commitment and effort

by faculty members and librarians will be required, coupled with commitment by the institutions in developing incentives and policies to promote adoption of OERs.

For higher learning institutions that plan to adopt OERs careful consideration should be given to the above two models, however reviewed literature on members of faculty OERs adoption did not cite projects of change process as indicated by the above model however several examples of institutional level changes were viewed in the literature.

2.3 Information Resources for Teaching and Research

Members of faculty are the primary owners of the curriculum and they are overwhelmed with teaching, research and service obligations where research in many higher learning institutions features more prominently than teaching (Mtebe & Roisamo, 2014). A research by Porter (2013) in British Columbia noted that emergence of OERs has opened up avenues for members of faculty to adapt and select research and teaching resources that are able to meet their unique needs.

The world Bank Development Report (2018) indicated the need for systems to be aligned to the goal of learning and research. As noted by ministry of education (2019) sessional paper, despite the progress made in improving access and equity, some challenges exist in the higher education sector some of which include inadequate learning resources to cater for university education and research (Ministry of Education, 2019, p. 81). As noted by Salem (2016) cost for traditional course materials such as textbooks have increasingly gone up and lack of equitable access has become a hindrance to members of faculty and students' success.

A survey in a Norway university by Bahrawy (2019) noted that OERs can be a key resource for teaching as it reduces costs and provides free educational resources for higher learning institutions . While the study did not form broad conclusions on adoption of OERs, it recommends an approach that is systematic with clear structure and policies for OERs sustainability and to enable adoption, production and use for the future to come. The research has also endorsed communication between the involved parties in developing, using and commissioning OERs and other educational technologies which if not done OERs will remain marginalized despite evidence given above on its positive impact in transforming pedagogy and availing library resources in higher learning institutions.

A project by Mays (2017), on the use of OERs to support pedagogical transformation in African universities applied a participatory research approach to investigate the nature of engagement with OERs in distance learning. The study noted that understanding of OERs and how best to be adopted remains under-theorized as much available literature consists of descriptive studies rather than theoretical analysis. While the study did not form broad conclusions about adoption of OERs, it nevertheless noted willingness by members of faculty to engage with OERs in teaching and their production. It further acknowledged that for OERs to change from individual to institutional focus, the engagement must be aligned with the vision, mission and business model of the institution. The study recommended that since providing suitable teaching and research resources is among key pillars in higher learning institutions, it is important to make adoption of OERs center of business model.

Babson Survey Research Group (2014) in the U.S. noted that 75% of members of faculty had awareness about OERs and they believed OERs have value in academic institutions, and they were willing to utilize them. This is a great opportunity for librarians in academic

institutions to take leadership roles in creating awareness among members of faculty to advance alternatives to textbook initiatives. A good example as noted by Salem (2016) is having OER librarians to educate members of faculty and students about benefits of creating and using OERs and offer support to members of faculty in integrating them in their courses and how to locate them. By utilizing OERs libraries will benefit from affordable information materials to support the curriculum, and this will lead to an increase in access to its resources. As Babson laments, if an academic library is not exploring OERs and working with `members of faculty to create a textbook revolution which is a great opportunity to save learners money then they are missing a fantastic opportunity.

2.4 Awareness of OERs in Higher learning institutions

Awareness of OERs is determined by members of faculty mainstreaming and integrating them into their teaching materials (Allen &Seaman, 2014). Critical success factors of OER awareness and adoption will be institutionally based while others will be generic based on knowledge of how OERs enhances pedagogical transformation in teaching ensuring that this OER knowledge is extensively used, there is sharing and incorporation into policy and advocacy in higher learning institutions (OER Africa, 2016).

Cox and Trotter (2017) studied factors shaping members of faculty adoption of OERs by carrying out workshops in three universities in South Africa. This involved in depth interviews of members of faculty. There was a positive response as the majority of faculty members were deliberate in asking about OER awareness and use. This affirmed a study by Robinson (2015) on impact OERs and processes academic institutions success which

found that members of faculty and students are unaware of OERs and claimed they would use OERs in future.

Brasley (2018) study on advancing faculty adoption of OERs also cited lack of awareness of OER among members of faculty but noted that they were ready to embrace them for their teaching and learning activities. Allen and Seaman (2016) survey on faculty use of digital resources tested members of faculty about their awareness and production of OERs and found that members of faculty surveyed did not create OERs and they had not entered the mainstream nor integrated them into their teaching and research materials. Nevertheless, the survey report found that lack of awareness by members of faculty on OERs did not arrest actual use of OERs for teaching and research activities. Though the above studies noted that the awareness of OERs by members of faculty have limitations since they are based on global north evaluation, this study aspires to understand effects of awareness on higher learning institutions in Kenya rather than the global effect.

Butcher and Moore (2015); OER Africa (2016) and Commonwealth of Learning and UNESCO (2011) considered awareness of OERs as having knowledge about their existence. The studies advised that higher learning institutions need to have OERs advocacy strategies, analyze needs and provide capacity. They also need to plan various activities and actions that meet the needs that have been recognized. It is also necessary to train on Creative Commons licensing, monitor progress and keep refining goals. These studies depended on theory over empirical grounded assessment of results which leads to lack defensible generalization from one study to other cases.

In Africa, higher learning institutions are facing challenges in producing competent graduates coupled with development needs which have become more pressing. As noted by OER Africa (2020) this two drives have increased the need for adoption and use of OERs. In terms of OER adoption and impact, case studies that were carried out in 15 African countries which are within 5 UNESCO regions by (Butcher & Hoosen, 2019), data collected reviewed that there is little proof of awareness and wide acceptance of OERs within the assessed countries. Findings of the survey pointed to lack of awareness around reuse and adoption but noted the need for greater efforts to focus on development of OER policies by governments involved accompanied by financial support to creation and adoption of OERs.

Research by Pete et al., (2017) collected data from four universities in Kenya namely: Jomo Kenyatta University of Agriculture and Technology, Tangaza University College, Great Lakes University and Maseno University reviewed that Kenya is on the move in embracing world-wide developments mostly on online and blended learning as well as opening education through OERs. On overall awareness and recognition of open licensing was perceived to be low therefore posing as a major hindrance to adoption and reuse of OERs. The study recommended further increase in members of faculty, institutional as well as national awareness of OERs and the issue of open licensing.

2.4.1 Concept of Openness and the Open Initiatives

The idea that knowledge should be freely shared online for the good of society is the foundation of the concept of openness. The key components of openness are availability and the least number of constraints on the usage of information resources. OER programs

seek to provide open access to high-quality educational resources across the globe. Currently there are various initiatives round the world geared towards promoting OERs, among them is the African Virtual University (AVU) Teacher Education OER Initiative, a Pan-African intergovernmental organization created by charter and tasked with significantly enhancing access to high-quality education in higher institutions and training through the creative application of communication technologies and information resources.

Adala (2016, p. 26) claims that AVU has space for an OER repository with over 219 modules. These courses were developed as part of the AVU Phase 1 Multinational Support Project (2005–2011), which was implemented in twelve universities in Africa through ten Lusophone Anglophone and Francophone countries. In Kenya, the project was implemented at University of Nairobi. Other institutions included the University of Hargeisa, East Africa University in Somalia, Open University of Tanzania, University of Zimbabwe, Kyambogo University in Uganda, and University of Zambia. Universidade Pedagogical in Mozambique, Universite Cheikh Anta Diop (UCAD) in Senegal, Amoud Universit, Jimma University in Ethiopia, Universite d'Antananarivo in Madagascar, and University of Hargeisa. In all these countries, OERs were conveyed and produced in different designs to ensure accessibility. They were produced as DVDs, printed booklets, short introductory videos as well as uploaded onto an open-source learning management system.

Adala (2016, p. 30), noted that AVU has of late established an Open Access journal, phase 2 is being implemented in Kenya in collaboration with Egerton University and Kenyatta University. Another project is the TESSA, a network of teacher educators and educators

who work with the Open University in the UK to improve classroom access to resources for teaching, learning, and research in teacher education in sub-Saharan Africa (Ngimwa & Wilson, 2012). To assist higher education institutions, it provides a wealth of Open Educational Resources. It is a global partnership made up of companies like COL, BBC World Service, and SAIDE, but it concentrates on the needs of teacher education in nine countries.

Another initiative, OER Africa, was started by the South African Institute of Distance Education (SAIDE) and has its main office in Nairobi, Kenya. Its main goal is to encourage the creation and application of Open Educational Resources across all African educational sectors. OER Africa (2016) states that OERs play a role by having the ability to speed up the availability of learning materials that are needed-targeted and promote more effective students and educators. OERs help lower the cost of access to educational resources by removing copyright limitations and promote educator involvement in pertinent course design by adapting or creating materials for learning programs that are relevant to African contexts. OERs also inspire members of faculty to participate in appropriate course design and attainment of skills to move away from lecture-based teaching.

The School of Open initiative is another effort that was mentioned in an empirical study conducted in Kenya by Ngimwa (2012) and Adala (2016). It was defined as a community of volunteers from educational institutions and areas throughout the world that was run under Creative Commons. It was established based on three fundamental principles, including the availability of content, the school of Africa community's openness to ensure that everyone can participate, the community's inclusion of control of the initiative based

on a community model, which volunteers all aspects of the project, and pear learning, where everyone is a learner and a teacher at the same time.

This study has introduced examples of OER initiatives in Kenya and around the world with a focus of promoting OERs potential as information resources and pointing out that OERs are fundamentally about working together towards a common ground whether as members of faculty, a single member or a cross global network. Though there are many studies on the concept of openness and open initiatives from the developed world which take the western approach, very few link to the actual local context, the study will focus on the Kenyan context. The study shall fill the gap in raising awareness on knowledge of sharing resources and encourage adoption of OERs as solution to the pressing problems faced by higher learning institutions due to scarcity of information resources.

2.4.2 Creative Commons (CC) License Options

Online information materials by default are copyrighted to their author, creator or the holder of the copyright. However, OERs are available at no cost for access but include an open license on permissions on how to use the resource. The CC is the most widely used open license. An American nonprofit organization called Creative Commons makes it easier to share, use, and access knowledge by providing free legal tools. The organization offers licenses to content creators so they can share their works with others and aims to expand the amount of creativity (material that is cultural, educational, and scientific) present in the "commons," or the body of work that is freely accessible to the public. For the advantage of creators and receivers, the licenses allow creators to specify which rights they waive and which ones they reserve (McKinnon & Helge, 2014).

According to Creative Commons (2013, p. 1), CC licenses provide free, simple-to-use legal tools that give everyone, from individual "user generated content" creators to businesses and higher education institutions, a straightforward, standardized way to pre-clear usage rights to creative research work that they own the copyright to. OER creation and sharing should be improved by making research work available under a creative commons license, CC enables individuals to use, share, and expand upon it (Bissell, 2011, p. 6).

The primary licenses available when publishing work under a Creative Commons license are each described in the sections that follow. They are listed starting with the most accommodating licensing category one may select and ending with the most restrictive license type one can select. Creators select the parameters they want to use for their work.

The following are creative commons licenses that helps to enhance awareness of OERs across the globe (Kleinman, 2008)

Table 2. 1 ***Creative Commons Licenses Options***

Type of CC License	**License options**
BY: Attribution 	Others are permitted to perform, copy, display, and distribute copyrighted works and their derivatives under the terms of the license, provided they properly credit the author.
SA: Share Alike 	The license essentially allows others to publish derivative works under a license that is the same as the one that applies to your work.
NC: Noncommercial 	

	The license permits others to reproduce, transmit, display, and perform your work, as well as any derivative works based on it, but only for noncommercial uses.
ND: No derivatives	It only permits exact copies of your work to be copied, distributed, shown, and performed by others; it forbids the creation of derivative works.
 Attribution	This is one of the most accommodative licenses available, in relation to what others can do with your works licensed under Attribution, and permits others to share, remix, tweak, and build upon your work, even commercially, as long as they credit you for the original production.
 Attribution Share Alike	The license permits people to modify, remix, and build upon your work even for commercial purposes as long as they attribute you and license their original works similarly. Open-source software licenses may be connected to the license. The same license will apply to any new work based on yours, allowing commercial use of any derivatives.
 Attribution No Derivatives	Redistribution is permitted under the terms of the license, both for commercial and non-commercial purposes, provided that the original work is acknowledged and distributed unchanged.
 Attribution Non-Commercial	The license permits non-commercial alterations, remixes, and additions to your work by others. While it is required that these modifications and additions be non-commercial and recognize you, it is not required

	that their derivative works be licensed under the same condition.
 Attribution Non-Commercial Share Alike	The license permits non-commercial modifications, remixes, and additions to your work by others as long as they attribute you and grant the same license to their own original works. Similar to the BY-NC-ND license, other people are allowed to download and share your work. They are also allowed to translate, create remixes, and gather new stories based on it. All new works based on yours will have a similar license, thus any derivative works must also be of a non-commercial in nature
 Attribution Non – Commercial No Derivatives	Of the six main licenses it's the most restrictive, allowing redistribution. Because it allows others to download your work and share it with others as long as they credit you and link back to you, this license is frequently referred to as the "free advertising" license. However, it prohibits any changing of the work or its use commercially.

Knowledge of CC licenses enable users to adopt the license that best suits, for example in Africa initiatives like the ACEMaths project which utilizes OERs for teacher education, the African Health OER Network which is a partnership institutions supporting heath education has their resources under CC licenses (OER Africa, 2020).

In Kenya, though there aren't many OER initiatives, the establishment of Open access policy by the University of Nairobi, the Teacher Education in Sub-Saharan Africa (TESSA) and ANU entering into an Memorandum of Understanding with SAIDE are examples of institutions that have some of their resources under the CC Licenses (Mays, 2017). Due to its openness, Creative Commons (BY) has been chosen as the

default license at ANU. It only entails the user to attribute the original authorship of the information resource or adapting them, but it leaves them free to adapt as they consider essential and use the resources in whatever way they wish.

2.5 The uptake of OERs by Members of Faculty in Teaching and Research

The Macmillan dictionary looks at the word uptake as wanting to do something such as use a service or study a particular subject. Uptake of OERs for members of faculty is the ability to engage with the Five 'Rs' activities; reuse, remix, revise, redistribute and retain (Wiley, 2016, p. 174). Studies by Inamorato dos Santos, Punie, and Castaño-Muñoz (2016) have revealed that the profits of OERs have led numerous governments especially European ones towards developing and implementing policies for supporting their use and creation. Due to radical changes in education and training all over the world, there has been an increase in demand for educational resources. Since year 2001, higher learning institutions particularly in the USA have been at the forefront of development.

Guidelines for integrating Open Educational Resources (OERs) into higher education institutions have been established by UNESCO and the Commonwealth of Learning (COL) to facilitate the development and implementation of OERs and to encourage their logical creation, adaption, and usage. Due to the realization that effective higher education systems significantly contribute to a country's economic competitiveness in the increasingly knowledge-driven global economy, focus on the value of higher education has increased in the majority of countries (UNESCO, 2011).

As noted by Inamorato dos Santos et al., (2016), and the Organization for Economic Cooperation and Development (2016), OERs have much to offer in higher learning institutions in creating, sharing library e resources and adapting learning materials. Due to effective adoption and use of OERs, unnecessary duplication of effort by members of faculty in building on what already exists elsewhere is eliminated, faculty members can make use of a variety of complementary library resources to meet their legal requirements regarding accessibility and to avoid paying for copyright negotiation and clearance costs.

Studies by Inamorato dos Santos et al., (2016); Mays (2017) Ngimwa and Wilson (2012) looked at OERs development in higher learning institutions and described them as a means of enabling carrying out educational functions often using digital technologies and also viewed them as one of the driving force behind improving education in higher institutions. They also increase access to up-to-date educational materials, increased access to learning materials at an affordable cost (Bialobrzeska and Louw, 2014, p. 11). They further noted that when there are wider choices, students can make better informed decisions about materials and programs. By removing obstacles to information resources and making learning resources available, plentiful, and adaptable for everyone, the goal is to increase access and involvement for everyone. Additionally, it integrates formal and informal education and offers a range of access points to both. Okonkwo (2012) notes that for members of faculty to succeed in instructional delivery and to address the changing nature of education, there is need to adopt OERs.

The research by COL (2011) in Canada indicated that given the challenges facing higher institutions of learning due to lack of resources, uptake of OERs by members of faculty becomes more important in that OERs offer a great deal of promise to improve education's

effectiveness, quality, and accessibility while also reviving one of the fundamental purposes of education—the sharing of knowledge. In some nations, sharing and producing are done in a collaborative manner. The wikiwijs project in the Netherlands is an excellent example; it was motivated by the idea of wikis and focuses on collaborative content generation. It provides faculty members with an open platform where they can locate, download, and exchange information resources. Okonkwo (2012) further noted that OERs are increasingly becoming acceptable as information resources that members of faculty and students ought to use to bring change in higher learning institutions.

A review of literature by Balasubramanian et al. (2009, p. 7) indicated that higher institutions of learning are facing enormous challenges worldwide to meet increasing demand for enrolments. Later studies such as Inamorato dos Santos et al., (2016); Kwan (2011); Mays (2014) and Ngimwa and Wilson (2012); Bialobrzeska and Louw (2014, p. 11); World Bank (2019) investigated development of OERs in higher learning institutions as the major driving force behind improving higher education. The studies looked at ways of eliminating barriers to information resources and making OERs accessible, abundant, and customized for all. The above studies gave benefits of using OERs like providing access to up to date resources, affordable and promoting curriculum diversion, however they did not expound on adoption of OERs for research and teaching by faculty members.

Empirical study by Adala (2016) and a survey study by Pete, Mulder and Neto (2017) interrogated OERs status in terms of creation, use, access and management. The study by Adala further looked at various initiatives such OER Africa, TESSA, AVU and collaborations with UNESCO and COL as a means of promoting OERs which gives a

promise of bridging the gap between the urban and the rural, literate and the illiterate and haves and have-nots (digital divide). The above studies looked at digital and OER differentiation in Sub-Saharan Africa. The above authors have emphasized the need to embrace OERs in education and teaching. Nevertheless, they did not provide actions and framework that can lead to effective adoption and usage of OERs, issues that this study is set out to address. It will also identify ways of enhancing the level of instruction and teaching materials in higher learning institutions by leveraging OER integration. If members of faculty adopt and uptake OERs they will be able to develop their own customized content, freely revise and update content as necessary to meet curriculum requirements, thus increasing the quality of teaching and the institutions involved.

2.5.1 Global Status of the Use of OERs in Education

When viewed globally, technological advances and increased availability of internet connections have enabled the rapid development of Open Educational Resources (Angell and Hartwell, 2011, p. 2). The concept of Open Educational Resources in education is constantly evolving advocating for transparency, dropping or eliminating barriers at all levels within higher learning institutions including the procedure entailed in research, instruction and learning (Peter Bradshaw et al., 2013b).

The study by Subade, Munoz, Punie, Hoo, and Vuorikari (2014, p. 1) in Europe made note of the fact that global trends in education and training are changing, as well as the rising demand for education in developing economies—as opposed to the predominant use of financial incentives in most institutions around the world. The competition for finance and skills among international education sources is growing at the same time. OERs seem to

be holding significant solutions to the situation. This is due to the recent development of OERs and the open movement, which in many ways challenged the outdated educational methods. The internet's accessibility and the capacity to copy and disseminate works using it serve as facilitator.

The studies by Inamorato dos Santos et al., (2016) and Angell & Hartwell (2011, p. 4) suggested that great work on OER around the world in institutions of higher education has happened in the United States of America (USA) but there is speedy increase in practices in the international arena. The work done by Butcher (2016, p. 65) pointed that one of the main approach that is endorsing OER globally is OpenCourseWare (OCW) consortium which is a partnership of more than 200 higher education institutions and related organizations across the globe. Their primary focus is on creating and disseminating openly accessible library resources, standalone online courses and educational resources. The scope also covers course syllabi, reading lists, assignments, simulations, examinations, and study materials. The body has members across the world. Saudi Arabia, Spain, China, France, India, Taiwan, Mexico, Portugal, and Japan are a few examples of member nations. Additionally, the OCW website states that more than 200 universities are offering over 2500 open courses.

The Multimedia Educational Resource for Learning and Online Teaching (MERLOT), which offers open and free educational resources created especially for faculty members and students in higher education institutions, is another project similar to OCW. It enables users to look for library resources, get peer-reviewed online courses, and exchange expertise and information about education with professionals in particular professions. According to Blake and Morse (2016), MERLOT has about 22500 resources.

Butcher (2016) also noticed a growing interest in the advancement of OER efforts in other regions of the world, such as in China, where 176 members of higher education institutions that are a part of the China Open Resources for Education (CORE) consortium have access to 451 courses. Members of the Japanese OCW Consortium receive access to 1500 courses across Japan. There are other higher education OER efforts centered in the United Kingdom (UK), such as the Jorum, a free online repository service for teaching and support personnel in the UK (Butcher & Moore, 2015). The primary focus of Jorum is to support the development of a community for the unrestricted exchange, reuse, and adaptation of teaching and learning resources. The Massachusetts Institute of Technology (MIT) is a global leader in OER efforts (Blake &Morse, 2016, 360).

OER Africa, a project of the South African Institute for Distance Education (SAIDE), supports the use of Open Educational Resources and encourages people and organizations to create OERs (OER Africa, 2016). By bringing together faculty, librarians and researchers, its goal is to establish vibrant networks of African OER practitioners who will create, share, and modify OER to meet the continent's educational needs. OER Africa is actively involved in a number of initiatives that support the adoption of OER in higher learning institutions throughout Africa. A great example is the ACEMaths project, which assessed a collaborative method for the selection, adaptation, and use of openly available resources in mathematics teaching and learning for teacher education. Due to a lack of adequate teaching and learning information resources in higher education institutions, the initiative is having a tangible impact on the quality of education in Africa. Another initiative in Africa that brings together teachers and teacher educators from all over the continent is Teacher Education in Sub-Saharan Africa (TESSA). It has produced a variety

of OERs in four languages to support blended mode of teacher education and training. It is also in charge of providing guidance on course design for educators. In the areas of literacy, numeracy, science, social studies, the arts, and life skills, the educational materials produced emphasize classroom practice. In addition, TESSA participants are motivated to research, present, and modify their own work (Inamorato dos Santos, Punie, and Castao-Muoz, 2016, p. 281).The research by Neil and Moore (2015), UNESCO (2012) and Commonwealth of Learning (2011) have agreed on the following timeline in the growth of OERs globally.

Table 2. 2 ***Growth of OERs Globally***

January 1999	The first instance is regarded as occurring at the University of Tubingen in Germany, which posted lecture video series online.
2001	The New York Times published information about MIT Open Courseware.
July 2002	The term "Open Educational Resources" was for the first time used by UNESCO in a forum on the effects of "open courseware" on higher education in developing nations
September 2002	The Massachusetts Institute of Technology (MIT) released 32 of its courses through its Open Courseware platform.
November 2003	China Open Resources for Education (CORE) and MIT established a partnership with the goal of providing educational materials to Chinese universities.
January 2005	The OECD released a report on the development of Open Educational Resources which outlined 20-month study of the usages of OER.
September 2006	There was launching online of the Khan Academy which offered free video curriculum materials for secondary schools.
September 2007	The University of Michigan Medical School's IT department and others realized that there was a way to provide preclinical curricula as OER.
January 2008	The Cape Town Open Education Declaration requested that all governments and publishers make educational materials available for free online.

February 2009	OER Africa, the University of Michigan, and four African universities received funding from the Hewlett Foundation to support free health education.
August 2009	The passing of California's Free Digital Textbook Initiative was done by Governor of California, Arnold Schwarzenegger.
September 2010	Offering of free massive open online course (MOOC) by Stanford University that draws enrolment of over 160,000.
April 2011	Bangladesh releasing a complete set of digital textbooks for grades 1 to 12.
May 2011	The Commonwealth of Learning gave a broad set of guidelines to support and inform the creation and application of OER.
July 2012	Release of the Paris OER Declaration, which called all governments to publicly license educational resources for use by all.

Source: Neil and Moore (2015).

Since 1999, when the first university video lecture series was made freely available online, the adoption and usage of OERs have grown and gained momentum. According to UNESCO (2012), it is crucial to utilize OERs to improve the quality, accessibility, and efficacy of education while also reviving the fundamental purpose of education—that is, the sharing of knowledge—considering the challenges that higher learning institutions are currently facing.

In March 2020 UNESCO launched the multi- stakeholder dynamic coalition for the OERs recommendation which aims to consolidate and expand commitments to strategies and actions and also reinforce global cooperation among all stakeholders in building capacity to access, re-use, create, redistribute and adapt OERs, develop supportive policy, encourage equitable and inclusive quality and nurturing the creation of sustainability models for OERs (UNESCO, 2020).

2.5.2 Rationale for Adopting OERs by Libraries

The hitches of growing enrolments and inadequate library resources explain why higher learning institutions are making deliberate effort to develop and improve resources to meet the greater needs of diversified learners and quality teaching and learning. During the OER Africa Convening in Kenya in 2016, various aspects facing higher education were discussed, for example, its poor funding, inadequate library resources to support the curriculum, its articulation with the needs of society, issues of access, its research capacity and its affordability (OER Africa, 2016). Due to these challenges facing institutions of higher education in Kenya, the further significant the reason for engaging OER as openly licensed educational materials capable of filling the gap. The gaps entail: improving the quality, accessibility of library and teaching resources, sharing and enhancing effectiveness in teaching and learning.

OER is not just about sharing content for learning but full potential of OERs in developing countries context is to enhance the value of education through growth in sharing of information materials (Butcher, 2016, p. 2). In his article Butcher noted due to prohibitive prices associated with text books 65 % of U.S. students were unable to buy despite being concerned about grades, he also pointed out that higher learning institutions that succeed will be guided by appreciating that their potential or educational importance depends on their capacity to provide students with effective support, especially during practical sessions, assessment by members of faculty, individual counseling sessions or online. This study is somehow limited in its scope since it does not highlight the type of institution, or the method used to collect data from the students. Also noting low rates in textbook use

there may be theoretical reasons to reduce the projected overall role that textbooks play in higher learning institutions.

Efforts by universities like MIT and Open University which have released their content as OERs reveals an acceptance of the move. In this case, their reputation has grown by making content available through competence in providing support, accreditation, publicizing, and assessment. Institutions and academics who attempt to safeguard and conceal their educational content are more likely to impose restrictions on their academic careers. They also miss great opportunities to progress their teaching practices and knowledge.

An important function of OERs is to provide a route for members of faculty to change from the traditional teaching methods and embrace new technologies. This study shall act as a reflection of how adopting technologies like OERs by librarians and members of faculty are changing the environment for teaching and learning in higher learning institutions and it shall act as a catalyst in filling the gap for institutional transformation in Kenya in terms of availability and accessibility of learning resources.

2.5.3 Skills for Effective Use of OERs

An article by Commonwealth of Learning and UNESCO (2011, p. 18) provided guidelines on skills and expertise that members of faculty need to have in order to fully harness the potential of OERs. The skills required include skills in managing curriculum development processes, conducting educational needs assessment, and using technologies and media to support learning outcomes. Other skills required include those for sourcing OER based on knowledge of the benefits and characteristics of the primary repositories and those for adapting or integrating OER clearly into curriculum and contextualized programs. Leng,

Ali and Hoo (2016, p. 36) also concurred those skills on sharing of knowledge and information resources especially by the use of communications technology has a major impact in education. Moreover, Bradshaw, Younie, and Jones (2013, p. 189), highlighted the skills that are essential for members of faculty to effectively use and utilize OERs for teaching and learning. They include introduction to digital literacy on how to access library e resources and digital technologies, pedagogical approaches which will enable and support e-learning. These skills involve engagement with professional networks, searching and identifying, selecting, sharing, modifying, using and applying OERs.

Commonwealth of Learning (2015, p. 27); Leng et al. (2016, p. 36) also supports the need of knowledge, competence and skills for members of faculty. Among them include knowledge in advocacy and campaigning of OER as a tool for improving teaching and learning. This includes understanding practical issues, conceptual and policy implications. There is also the need for understanding the advantages and disadvantages of various open licensing arrangements, knowledge of OER repositories in various libraries as well as clarity about the economic benefits of OERs when it comes to marketing institutions and programs. The Commonwealth has also raised the issue of legal expertise to advise OER users on how copyright works, the type of copyright and diverse approaches to the licensing of educational materials. To achieve full potential of resource-based learning various factors need to be taken into consideration for example through carrying out educational needs assessment, managing curriculum development processes, recognizing target audience, picking suitable combinations of teaching, learning strategies to accomplish identified learning outcomes, adopting and integrating OERs in to contextualized curricula.

Members of faculty according to OER Africa (2016), further need the communication and research expertise in order to share OERs in the form of research reports, newsletters Web updates, case studies and brochures. It also includes skills required for best practices in researching and documenting and fundamental concepts to graphic design and arrangement.

The entire world has now been reduced to a form of global village due to technological advancements like adoption and use of OERs. Third world countries like Kenya cannot afford to sit on the fence about this great innovation. Despite the challenges facing provision of educational resources all Kenyan citizens have legal rights to access education and information materials. This study therefore takes a critical view of the general problems related to adoption and usage of OERs in Kenya especially in higher learning institutions. It takes cognize of inadequate knowledge and skills required by faculty in order to realize the full potential of OERs.

2.5.4 Status of OER Uptake in Kenya

One of the key priorities is to reduce expenses while enhancing the level of the instructional materials, student involvement, and graduation rates for almost all higher learning institutions. OERs hold promise as a powerful means in higher learning institutions that seek to offer accessible library resources and new tools for teaching and learning (CENGAGE, 2016).

Research by Ngimwa and Wilson (2012) ascertains that Kenya has become an active participant in Open Educational Resources, joining the rest of the world and is in agreement with the 2002 UNESCO forum on developing a universal educational resource available

for all institutions of higher education. They noted that few higher institutions of learning are being involved in OER projects amid social, economic, cultural, institutional, and national issues. OER growth is unevenly distributed, and many developing nations, like Kenya, continue to place strategic priority on enrollment expansion that is occurring more quickly. The irony is that this expansion does not come with an equal increase in staff or funds for learning resources to handle the increased teaching load that such growth generates.

According to the study by Adala (2016, p. 6), the OER movement in Kenya is gradually gaining momentum, and the country's technology revolution is being used to improve learning and teaching. Access to and creation of learning information materials is one important component of this transformation. OERs, according to Adala, have the potential to embrace the local voice by supplying library resources to enhance learning without the establishment of new materials in each learning situation and by enabling access to high-quality materials by faculty members and students working in under-resourced environments. Learning materials are scarce at all levels of the educational system, as noted by Wolfenden, Buckler, and Keraro (2012, p. 2), there is a significant possibility for OERs to contribute to the education and training of faculty members. In particular for difficult environments like rural Kenya, Onguko, Jepchumba, and Gaceri (2013, p. 16) see OERs as a crucial driver for access to contextually suitable content if the UNESCO dream for education for all is to be achieved as Onguko et al., (2013, p. 18) argued, then, the quality of teaching will be a chief feature to contemplate. To help understand how quality of education can be improved and availed to all, the study shall address how OERs should be implemented to improve quality of teaching in higher learning institutions in Kenya.

In studies carried out by Ngugi (2009, p. 6); Brown Onguko et al., (2013); Ngimwa (2012); OER Africa (2016); Mutula (2002), show that OERs can make potential contributions to education. Research by Adala (2016) revealed that several studies have been carried out to establish OER projects in Kenya and that various tertiary institutions are to some extent participating in innovative initiatives that aim to benefit from ICT advancements. The African Network for Internationalization of Education (ANIE), a non-governmental African network with a base in Eldoret, Kenya, is one of them. ANIE is dedicated to advancing high-level research, developing capacity, and supporting higher education in Kenya. Its main goal is to give the higher education sector a way to adapt to the demanding changes, effects, and possibilities in the educational field. The platform was created using OERs to share knowledge, insights, and other resources regarding the internalization of higher education (Ngugi and Juma, 2016, p. 11).

Another project on OERs according to Ngugi and Juma (2016) is the Creative Commons Kenya (CCK). The booming cultural diversity in Kenya necessitates access to resources that can be shared that enable remixing. CCK hence supports democratic freedoms by permitting widespread access to information and knowledge.

As noted earlier, another project with its headquarters in Nairobi, Kenya is the OER Africa an initiative of SAIDE, the South African Institute of Distance Education. It was established to motivate development and use of OERs in Kenya and Africa in general. The initiative aims to address the difficulties higher education teachers in Kenya experience by collaborating with them to create and adopt Open Educational Resources (OER) approaches that would correct inefficiencies in teaching and learning.

According to Ngugi and Juma (2016), OER Africa organized and facilitated OER awareness forums in Kenya at higher education institutions like Kenyatta University (KU), University of Nairobi (UoN), Africa Nazarene University (ANU), Catholic University of Eastern Africa (CUEA), United States International University (USIU), and Kenya Methodist University (KeMU). Ngimwa and Wilson (2012) noted that the Teacher Education in Sub-Saharan Africa (TESSA) initiative, a project centered on collaborative development of higher education teaching and learning materials and open licensing, has also played a significant role in Africa and globally over the past few years. It has been able to develop training modules in language, the arts, arithmetic, and social studies for Kenya. They can be found at www.tessaafrica.net, the TESSA website. Although OER Africa has been trying to create awareness as evident from the above institutions, its adoption and the extent of usage OERs by universities has been minimal. There is also the need to have some investigation into the extent of OER practices and pedagogy in higher learning institutions. This study envisaged investigating how universities have embraced OERs and the extent of utilization, and its implication on teaching practices and learning experiences.

Ngugi and Juma (2016, p. 13), further discusses another home-grown project namely the Kenya Open Data Initiative (KODI) which was launched by honorable Mwai Kibaki, the former president of Kenya. The initiative helps in creation of crucial government information freely available to the public through an online portal. The project was established by the Kenyan government in collaboration with the Kenya ICT Board as an open access platform for accessing government resources.

Accessing information held by the government is an important element to democracy because it permits the public to be conscious of governmental resolutions that can impact the environment and individuals. Also access to information allows the public to participate in critiquing and hence improving decision making. KODI though a good initiative faces challenges such as resistance by ministries to avail information and the fact that public lacks awareness of the portal's existence. While the site provides data on agriculture, education, energy and the environment among others, the studies pointed out the need to sensitize higher learning institutions on availability of such information (Kwamboka, 2016, p. 15 C.1)

Kenya Education Network Trust (KENET) is a national research and educational network that promotes the use of ICTs in teaching, learning, and research in higher education institutions. It aims to connect all universities by creating a cost-effective and sustainable network with excellent access to the global internet. KENET also shares learning and teaching resources by working with the research and development of educational content (Kashorda, 2014, p. 14). According to Kashorda's research, Kenya is prepared to employ ICT for management, learning, and research. It is evident that higher education institutions are not investing in infrastructure that will make it easy for students and members of faculty to access learning materials and other important services related to learning, scholarship and research (Ngimwa, 2012, p. 61). The internet has greatly increased access to educational information resources, which are available in a variety of formats, including OERs.

The foregoing discussion shows significant initiatives through ICT infrastructural development support for higher learning institutions in Kenya. The studies have not provided information on the extent of adoption of OERs in learning, scholarship and research at higher institutions of learning in Kenya. Due to the abundance of educational resources available online, there is a requirement for investigation on the extent of adoption and usage of OERs which this study sought to address.

The need to share information has been immense due to limited resources and inadequate support by parent institutions. Kenya Library and Information Services Consortium (KLISC), is an initiative that was established in 2003 and currently has a membership of 94 institutions (Oyieke & Dick, 2017, p. 6). Additionally, it promotes OERs by distributing available information resources, promoting Kenyan libraries and information centers' capacity building. It also emphasizes sharing the expenses associated with the acquisition of information resources, supporting the use of ICTs in information management, encouraging the creation and promotion of local content, and improving information distribution for research and national development (Kasalu and Ojiambo, 2015, p. 2).

Through the collaboration and cooperative subscription of library e-resources, members benefit both institutionally and personally through access to high quality library resources. As noted by Kasalu and Ojiambo, (2015), efforts to share information in the past have not been successful in many universities in Kenya. Resources have been minimal and only available mostly to inter-library loans (ILL). As Oyieke and Dick (2017, p. 7) indicate, there is need for institutions to change their traditional way of providing resources. Efforts from KLISC are commendable but their focus is currently biased to e-resources through

subscription hence member institutions that are unable to raise the required fees fail to enjoy the services thereof. This pointed out serious gaps in institutional support of embracement of OERs as learning and teaching resources in Kenya. This study explored appropriate initiatives for informing and sensitizing members of faculty and their institutions the importance of sharing information through OERs and mechanisms of embracing them in teaching and learning.

From a national perspective, Kenya is committed to OER initiatives and development. The ICT Competency Framework for Teachers (CFT) toolkit, which was created by UNESCO, COL, Microsoft, and the UN in 2013, served as the guide for a nationwide implementation plan workshop on Open Educational Resources. The workshop's main objective was to explore how ICT and CFT could help Kenya's teaching workforce become a technologically savvy and creative workforce in line with vision 2030 (Adala, 2016, p. 19). Also in 2014, when OERs were introduced in Kenya, the then-principal secretary of the ministry of information, communications, and technology emphasized the value of OERs in raising teaching and learning standards and expanding opportunities for the realization of universal access to education. Adala's research aimed at showcasing the benefits of adapting OERs in Kenya and demonstrating their potential in fulfilling vision 2030 on availing education to all.

In a speech at a forum on Open Educational Resources hosted by Creative Commons, the principal secretary of the Ministry of Information, Communications, and Technology mentioned that one of the proposed goals for sustainable development is to ensure inclusive, equitable quality education and promote opportunities for lifelong learning for

everyone (Tiampati, 2014). UNESCO's Paris Declaration of 2012 on Open Educational Resources with Creative Commons Open Licenses is also acknowledged, with Kenya being a signatory. Tiampati advocated on Open Educational Resources and stressed that "School of Open" is opening to many students and teachers who would have previously lost the opportunity to acquire education, particularly in the marginalized communities which could not sufficiently access excellent education. The usage of free educational resources in Kenya, according to Onguko et al. (2013, p. 63), will close the gap in teaching and learning quality by improving student comprehension and by expanding opportunities for the realization of universal access to education.

In 2016, OER Africa convening was held in Nairobi, Kenya. The main aim of the convening was to ascertain who is using OER and how. One of the key speakers underscored the importance of learner support (OER Africa, 2016), that the foregoing discussion exposed a gap in the use of the OERs content for learning, teaching and research, and in the use of openly licensed OER materials like assessment items, mappings and lists of learning outcomes to evaluate education outcomes at the higher learning institutions in Kenya.

Studies by CENGAGE (2016); Ngimwa and Wilson (2012) focused on challenges facing higher learning institutions , as mentioned earlier in this research most of which are institutional, cultural, economic and national matters. Adala (2016, p. 6); Wolfenden, Buckler and Keraro (2012, p. 2) further noted that there are limited learning and research materials at all levels of education in Kenya mostly due to low funds and Gaceri (2013, p. 16) in her study viewed OERs as one of the major catalyst for access to contextually suitable information resources for challenging contexts such as rural Kenya.

Other studies by Ngugi (2009); Brown Onguko et al., (2013); Ngimwa (2012); OER Africa (2016); Mutula (2002) conducted a deeper interrogation on potential of OERs to Education in Kenya while a study by Adala (2016); Ngugi and Juma (2016, p. 12); Ngimwa and Wilson (2012) tried to review some of the OER projects in Kenya such as TESSA and African Network for Internationalization of Education (ANIE) which is a non-governmental African network located in Eldoret, Kenya further showing the potential of OERs in Kenya in enhancing high quality.

An in-depth analysis of the above studies revealed that there is a gap in adoption of OERs by members of faculty in Kenya coupled with the ever growing demand for education in higher learning institutions which trickles down to more demand for information resources that cannot be met by traditional physical resources therefore this study will measure the acceptability and legitimacy of OERs not only for teaching and learning but also in evaluating the outcomes at the higher learning institutions in Kenya.

Kenya which has over 70 universities, 38 public, 35 private, 13 with letters of interim and with over 500,000 students who by 2021 has witnessed massive learning disruptions as a result of Covid-19 pandemic. Some higher education institutions have embraced blended learning and e-learning. which faces challenges especially for courses that require practicals. As noted by Awandu (2021) and Kathula (2021, p. 106) fresh approach is needed for the current models of teaching and learning by higher learning institutions providing efficient and effective digital platforms that support active learning and in this case OERs come in handy.

2.5.5 Factors Inhibiting Adoption of OERs in Research and Teaching by Faculty Members in Selected Universities in Kenya

Although there are numerous benefits associated with OERs, its adoption and utilization at higher learning institutions may be hindered by various factors which may range from inadequate infrastructure, low awareness to the lack of skills to retrieve and utilize them, low priority assigned to research, learning and teaching by national government and international donors. In some cases, members of faculty are also under-qualified, are unmotivated, they are poorly remunerated which results in learners being poorly taught and most curriculums are underdeveloped. In higher learning institutions in developing countries, faculty members pay is commonly very low in relation to that given by other professional employments thus they spend a lot of time moonlighting rather than advance in research and teaching activities like developing OERs. Research, teaching and learning are also affected and face difficulties when members of faculty take political positions and abandon their roles in learning institutions. Various problems associated with higher learning institutions are due to lack of information resources. Also noted, higher education institutions in Africa and Asia spend up to 80% of their expenditures on maintaining their staff and students, leaving little money for infrastructure, maintenance, and libraries. which are key ingredients in maintaining research and learning. Also, many higher learning institutions in unindustrialized countries lack the power to make key academic, financial and employees' decisions. Other frustrations include sourcing appropriate OERs, understanding open licenses and traditional mindsets (World Bank, 2000, p. 26); (Commonwealth of Learning and UNESCO, 2011) and (OER Africa 2016).

A theoretical paper by Welch (2008, p. 2) raises important issues on engagement of OERs in terms of access. Welch's research points out that if people do not have convenient access to technology necessary for the use of OERs, access shall be impossible. Significantly, Leng, Ali, and Hoo (2016) research project based on a Japanese open source model viewed access to OERs from five Asian repositories. The study results pointed out issues that inhibit engagement with OERs like lack of technical support and knowledge on OERs. They also noted that the lack of marketing was a major deterrent. According to Leng, Ali, and Hoo marketing of OERs can be achieved through organized workshops, training programs, seminars, and symposiums. Content recruitment and sustainability which involves identifying suitable materials, digitizing, and applying the relevant Creative Commons license in accordance with institutions policy also has issues. There is also lack of allowance for academic libraries to manage OER content as they have the knowledge in management undertakings strongly associated with information systems. For instance, systems analysis, adherence to metadata standards, indexing, classification, dissemination, and retrieval of information resources such as OERs. The above articles provide important insights on issues of engagement with OERs however key findings by Leng et al. (2016) demonstrated that OERs need to be promoted, and academic libraries in particular are urged to act as OER advocates in higher learning institutions . However, none of the studies provided opinions on the adoption and usage of OERs by faculty members in higher education institutions.

A nationwide plan for Greece's school system's modernization by Megalou, Gkamas, Papadimitriou, Paraskevas, and Kaklamanis (2016) explored practices that lead to effectiveness of OERS in institutions of learning and have given practices that support

the use and reuse of OERs. This is like creating OERs repositories platforms and populating them with open access resources. Also, collaborations with numerous communities outside and within educational institutions will help to build OERs. The framework which looked at 7500 small reusable OERs that were developed by 120 qualified teachers who were divided into ten groups recommended raising more awareness on OERs and proved the importance of enhancing synergies among national strategies.

A white paper by CENGAGE (2016, p. 4) noted that the biggest challenge in OERs development is not technology itself but sharing information resources between members of faculty, higher learning institutions and network community of practice. Vázquez-Cano (2016, p. 95) study revealed significant challenges to the broad adoption of OERs. Vázquez-Cano predominantly related the low engagement to difficulties in discovering resources, concerns about unauthorized access, and quality, and difficulties in integrating the resources. The work further noted perception of members of faculty as the greatest impediment to OERs being adopted and used more widely. The lack of a comprehensive catalog of OERs was also cited as a barrier. Further challenges occur due to the lack of knowledge on the extent of using and repurposing OER. The first step in open educational practices is usually finding and using an OER. The process of incorporating an OER information resource into teaching and learning activities is known as repurposing, and it typically entails undoing the original resource to extract the useful information and eliminating the unhelpful material.

In a research by CENGAGE Learning (2016), knowledge capabilities were noted as a serious challenge that was affecting users given the numerous OER options available from various sources. OER users lack the ability, knowledge, and skills to use cutting-edge

learning technology platforms and content in order to take full advantage of OERs (CENGAGE (2016) and Adala (2016, p. 65) also noted lack of awareness among members of faculty and institution's administration.

Gakindi (2010); Ngimwa and Wilson (2012) alleged in their research that policies and strategies on the use of OERs are not fully developed at institutional levels and national levels. The procedure by which educational information resources are made available under a free licensing structure must be described if an institution wants to move toward open educational practices. Following this, the resources will be made accessible for others to adopt, utilize, or repurpose both within and internationally. It is possible to advance open educational performance using a widely used organizational method for open educational materials. A toolkit developed by Mays (2012, p. 4) advocate for the development of policies to enhance adoption and usage of OERs in higher learning institutions . The study recommended that it is crucial to consider the main benefits of developing copyright laws that automatically apply open licenses to content as part of the policy-making process unless convincing explanations are given for all rights reserved copyright to be retained towards the materials. Establishing policies and strategies encourage the use of OERs within an institution. They also communicate rules and regulations for how to implement OERs in the institution.

A comparative research by Mwamlangala (2015, p. 10);Vázquez-Cano (2016, p. 95) noted that the degree of sharing of OER also possess challenges. They noted that the major aim and greatest successful use of Open Educational Resources is sharing. Openness is therefore a crucial component of the success of Open Educational Resources. According

to the above discussions, members of faculty upload teaching and learning resources but they can only be accessed by registered users through use of passwords and usernames. Functionally, this negates the entrenched value of OERs.

The engagement of OERs in teaching may also be hindered by the lack of clear policy. A toolkit for OER developed by Mays (2012, p.4) and supported by Butcher (2016) looked at organizational policy for OER in academic institutions as an important component in adoption and use of OERs. They noted that a policy would comprise reference to the production, sharing and/ reuse of OERs. According to Mays, the vision should purpose availing learning opportunities in open learning architectures whose objective of learning and learning methodologies are usually established in consultation with learners and members of faculty. The policy should be communicated and shared to all members of faculty and learners within the institution.

Intellectual property rights (IPR) and copyright regulations are major points of focus of OER which are based on sharing as well as adapting resources. According to Prabhala and Commonwealth of Learning (2016, p. 5), one characteristic of Open Educational Resources is that their copyright scope is constrained by an open content license. They noted that ownership, intellectual property rights, copyrights, and authorization to adopt are the four primary legal difficulties associated with producing and publishing OERs. Due to copyright issues, a lot of information resources could only be applicable in a certain context, making local context adaptation a challenge. As noted by Gakindi (2010, p. 89); Adala (2016, p. 62), writers have fears to publish as OERs since other educational institutions might reproduce and use the work for profitmaking purposes. Ngimwa and

Wilson (2012), also observe that the delight that is associated with owning Intellectual Property Rights makes members of faculty and other academicians to be reluctant to share their work, and others are wary about having their study considered as OER for concern that it won't withstand national and international scrutiny.

Various interventions exist that can help to scale down the effects of the above factors and facilitate the engagement of OERs. Adala (2016, p. 66) looks at the development of the Creative Commons license as a key breakthrough in enabling sharing resources openly and freely. The research also advocates for digital literacy which is specifically significant for the employment of OER as it deals with practices and digital resources. According to Commonwealth of Learning and UNESCO (2015), knowledge on OERs which includes learning on open pedagogies, open educational practices, open assessment and open credentials shall help fill the gap in overcoming challenges that are being experienced in accessing OERs.

2.6 How OERs Support Teaching in Universities

Integration of OERs in higher learning institutions is a growing phenomenon for developing countries and developed ones as well. Developments in learning indicate that OERs do not only address challenges in limited library resources but they also save cost, improve quality in teaching and learning practices as well as enhancing performance of faculty members and students (Atkins, Brown & Hammond, 2007, p. 2).

Research by Butcher (2016) in giving an analysis of quality learning, looked at OERs in terms eradicating avoidable hindrances to information resources and also targeting to provide students with chances that are practical for success in higher learning institutions.

The research points key principles of quality learning, for example, it states that quality learning should be lifelong and should embrace both training and education a notion supported by Commonwealth of Learning and UNESCO (2011, p. 13).

Another survey study by Paskevicius (2019) about access to OERs by learners in Commonwealth nations, utilized questionnaires to undertake learners' survey through a qualitative and quantitative approach in selected higher learning institutions. It highlighted that learners were utilizing print and digital library resources but failed to recognize OERs and they were confusing them with Online information Resources. The research advised on need for librarians to educate learners on OERs, about accessing and finding them and how they can be used and members of faculty are expected to select the most relevant learning materials commonly used in higher learning institutions including OERs.

Participatory action research by Mays (2017) based at four Universities in Africa gave an indication in the literature of use and reflection about the adoption of OERs in the institutions but minimal information on evidence about the association between practice and theory. Precisely Mays recognized OERs for pedagogical transformation at African higher learning institutions. Reality check dealt with documents review, observation, interviews and focus group discussions. In the data the researcher recommended theoretical analysis based on extent of OERs engagement rather than descriptive case studies.

In Kenya members of faculty are anticipated to produce research as well as teach but rarely are they given information resources to support them by the parent institutions. Whereas faculty have skills for teaching a number of subjects, there is limited time for revisiting and modifying the curriculum often as it is required (Ngugi, 2013, p. 7). However, the truth

is that many faculty members are teaching abroad including the greatest intellects therefore adoption of OERs needs support in order to utilize and tap information resources that exist globally.

According to the studies mentioned above, while there are many studies on the adoption and accessibility of OERs from the developed nations, few relate to the actual setting in third-world countries. For this reason, this study focuses on the Kenyan scenario and provides guidelines for OER adoption.

2.6.1 Access to Teaching Resources

Open Educational Resources focus is transmission of world's knowledge as a public good and exploiting technology to provide an extra ordinary chance for everyone to utilize, share, and repurpose OERs (Marshall, 2008, p. 4). Salem (2016, p. 1) focused on course content and success of students. The study was vital for achieving the objectives of the study as Salem identifies access to instructional materials from libraries as one of the major issues facing higher education institutions. He viewed access to information resources as the ability, right or permission to use a resource. As indicated by Salem access to teaching materials has emerged as members of faculty and student success issue due to lack of library resources to navigate courses on offer. Increased use of OERs and less priced solutions is one method that many institutions are putting into practice, with libraries taking the lead or cooperating to do so, according to the report. The study by Salem makes the claim that access to OERs as teaching information resources is associated with high-quality instruction at higher learning institutions.

Another contribution was by Komba and Mays (2014, p. 8) on incorporating OERs in faculty development programs. The case study pointed out that in Africa, higher learning

institutions are experiencing the challenges of dealing with changing environments of library resources access. The need to regularly increase enrolments often in the face of decreasing funds was noted while still struggling to ensure that learning and teaching remain the key function of the discipline. The study noted that one way to address the issue is to make great use of OERs because engagement with OER provides opportunities for access to learning resources. Findings from case study specified that faculty members preferred to utilize OERs as an important factor in achieving reputable information resources and for curriculum review process. The authors concluded by developing an implementation plan for e learning information resources that integrates OERs.

Additionally, in providing importance for OERs, research by Komba and Mays (2014) and Bissell (2011) highlighted need for understanding open licenses as it facilitate access to an increased choice of resources and exposes students and faculty to various range of resources, approaches and voices. It also leads to increased student and members of faculty interaction with learning materials while also simplifying difficult concepts into more practicable approaches. Access to OERs also leads to standardization of curricula as use of OERs leads to greater sharing of ideas and comparing approaches since more courses are made available for public scrutiny. Access to OERs has also been cited in the research by Komba and Mays (2014, p. 10) as reducing workload on development of teaching materials.

A case study by Gakindi (2010), aimed at obtaining experiences of teaching staff and learners in accessing digital library resources. The study noted the need for better access to digital resources and highly specialized resources. According to Gakindi (2010, p. 19),

education is the foundation of social and economic growth thus being able to access library materials is an chief factor for consideration for achievement of an education system. As Butcher (2016, p. 25), indicated many difficulties are due to high cost, inappropriateness, limitations on funding and laws governing intellectual property.

Openness idea is the most recent development in the educational sector. Open movements are changing the environment of information resources access and sharing. The notion of openness has to do with freely availing library resources over the Internet with a few restrictions to using them, which basically is the main intention of OERs (OER Africa, 2016).

Since Open Educational Resources (OERs) provide chances to systematically transform teaching through readily available content, for members of faculty to benefit they have to be knowledgeable enough about OERs in order to use them effectively. The promise and aim of availing OERs in Kenya are to increase access to extra teaching materials while at the same time opening availing alternatives faculty members. The study aims to showcase OERs as library and learning resources in higher learning institutions as tools for supporting teaching and learning. A study on adoption of OERs by members of faculty in Kenya is incomplete without scrutinizing effects of OERs on the quality of teaching to effectuate their adoption and use.

2.7 Uses of OERs in Supporting Research among Faculty Members

Research according to Kabir (2016, p. 2) is an investigation of key evidences of knowledge. It's systematic as looked by Kabir and an effort for gaining new facts.

Significant work on OERs in higher education is being experienced in the advanced countries, but adoption has increased expeditiously internationally. Focus of OERs is on developing and sharing accessible teaching materials as well as stand-alone e-courses which generally comprises of items such as reading lists, teaching notes, syllabi, assignments, tests, study library materials and simulations (Butcher, 2016, p. 65).

Sandarayake's (2019) action research in Sri Lanka evaluated students' opinions on blended learning based on OER as a gauge of learning quality. The study utilized a questionnaire-based evaluation on 106 commerce studies learners and suggested incorporation of OER in undergraduate studies by backing up OERs for their free copyright teaching and learning library resources and for being a solace for learners who cannot afford textbooks and have limited classroom access. This study is supported by Brasley (2018) and UNESCO (2014) in the view of providing free educational resources for teaching and learning that availed from reliable sources. The above research has a contribution to this study however, the limitation is that Sandarayake (2019) simply concentrated on a group of commerce learners, therefore broader studies should be undertaken on other learners as well as on members of faculty which is the aim of this study.

A project by South (2017) in the US on reimaging the role of technology in education pointed on preparing members of faculty to be leaders technological wise before arriving in the lecture hall. The project also noted the increase and adoption of Open Educational Resources as the major piece required to reach the best transformations to education in higher learning institutions. The study suggested that using OERs can eliminate

inefficiencies of library resources, reach beyond the walls of traditional classrooms and support everywhere all the time learning. While this project contributed to this study it failed the reality check since its theoretical rather than empirical, therefore this study utilizes questionnaires and interview schedules for the reality check of adoption of OERs in higher learning institutions.

A report by UNESCO (2020) celebrated OERs in contributing a significant progress in attaining the aim of quality and accessible teaching resources for everyone. The research recommended OERs in creating knowledge and open societies that are inclusive and also in achieving the aim of the fourth goal on education by United Nations Sustainable Development Goals. UNESCO (2020) and Butcher & Hoosen (2019) pointed out that OERs adoption, development, dissemination and use progress since 2012 has been characterized mainly by rhetoric instead of action. The major challenge as noted by Butcher and Hoosen is mainly on OERs awareness. As endorsed by multiple case studies by Ossiannilsson et al., (2020) it is the prime time for the global community to come together to foster access to information and knowledge through OERs. The articles review the recent status of Open Educational Resources but fail to showcase the official national perspectives therefore meaning they don't offer a broad review of the growth of OERs internationally. The case studies show gaps in struggles of transforming from awareness to adoption and implementation, which if the objective of this research.

An action research by Karunanayaka et al., (2013) in Sri Lanka on developing a virtual teaching system on OERs for Scientific education highlighted OERs concept as a chief

discovery in education and higher learning institutions in terms of sharing, adaptation contextualization of course content and in learning and research. Butcher (2016) and UNESCO (2011) are in agreement with Karunanayaka et al., (2013) which noted a great significance of OERs on ability for remixing, redistributing and adopting teaching resources guided by how flexible the licenses applicable are. Karunanayaka et al. (2013) supported the sentiments by adding the self-satisfaction through engaging OERs as motivation for members of faculty and students through the engagement with the resources for learning and research. The indicated studies contribute to this study but limitations occur for example Karunanayaka et al. (2013) focused on a single department in an university. Higher education institutions landscape is comprised of different departments with varying environments. Focusing on members of faculty from all departments would enhance better understanding of OERs adoption.

Despite the financial gains of OERs as the research earlier noted, usage of OERs by higher learning institutions is still a challenge. Major reason being that faculty lack skills and knowledge to adopt OERs (Hori et al., 2015, p. 2). This study envisioned bridging the gap by presenting OERs as sharable and reliable resources for learning in Kenya. The research also intends to inform institutions which have little operating finances to invest sufficiently in campus networks and in building the capacity of faculty to link with the global knowledge movements like the OER to enhance their learning and research prospective as endosed by Prabhala and Commonwealth of Learning (2016, p. 23). This study aimed to validate Karunanayaka, Fernando, and Silva's (2013) assertion that faculty members' capacity building and awareness-raising efforts are crucial for maximizing the use of Open Educational Resources in learning and research.

Ngimwa (2012) also identified that adoption of Open Educational Resources and free content in higher learning institutions is very low. To maximize on OER usage as noted by Wolfenden et al. (2012, p. 5); Gakindi (2010, p. 44), users should consider, adapting technically concerning to being compatible with local environments, adapting linguistically through learning to local language and reading ranks for members of faculty, adapting culturally which involves meeting cultural expectations of the subject community, adapting pedagogically which concerns structures to be used in teaching and learning, explanation of the resource being used and giving the source code access related to the capability to edit an original work so as to enable sustainability and reuse.

OER Africa (2016) reported that research conducted in Africa is not much but there are numerous works that point to the potential that OER holds for Africa. Higher education institutions have contributed to the adaption and creation of OERs through initiatives like the African Virtual University and Teacher Education in Sub-Saharan Africa. According to Gakindi (2010, p. 37), African higher education institutions should get involved as they can better determine how to approach regional concerns related to epistemology, pedagogy, culture, ideology, social issues, and technology.

Research work on OER related to Africa identifies problems being experienced by higher learning institutions and the potential OERs hold in improving the conditions. Institutions experience almost similar problems and the degree of their challenges are also close, mostly due to inadequate learning and research resources (Adala, 2016).

Universities in Kenya will get knowledge from this research about how faculty members have dealt with OERs elsewhere and will be able to better grasp their potential. The study serves as an addition to research on the potential of OERs to increase Kenyan students'

access to teaching resources. It will also confirm that Open Educational Resources (OERs) help to achieve high-quality research, possibly by making information accessible that might not have been otherwise.

Members of faculty are being motivated to improve their productivity and research output to be at the fore front in meeting the demands of the 21st century. The governments presume academic institutions to be additionally efficient in the area of research. Mays (2014) noted low levels in research on OERs and participation in research activities within institutions of higher education. With this poor situation in publishing this study hope to minimize the prevailing gap on inadequate research and learning resources.

A crucial advantage of OER adoption relates to costs reduction in research through posting research materials on the Internet. This allows higher learning institutions that cannot economically afford a particular resource to access through the provision of Open Educational Resources. A cross regional overview by Adala (2016) in Kenya on best practices for OERs noted that many OER initiatives are open for members of faculty to use and this brings the movement nearer to achieving the provision of learning resources to all mankind a reality. The study recommended establishment of policies to guide on OERs integration in higher learning institutions, training teachers and learners on basis ICT skills and creating a motivational framework. Another significant study was by Ngugi (2013), on OERs profile noted that African universities are dealing with significant pressure to increase access to higher education programs and research articles, they have to increase enrolments despite structural under-funding, to discharge their core functions effectively, thus most programs even at post graduate level rely heavily on lecturing as a main method

of transmission of content. The two authors are in agreement on advising higher learning institutions to invest in ICT for teaching and research and allocate operational budgets to ICT and also create appropriate networks within the higher learning institutions .

OERs use through openly sharing learning objects, modules, courses, programs and OER educational resources for research, will enable higher learning institutions to realize economies of scale, encourage joint development of curriculum and courseware, provide members of faculty and students with high quality education content and encourage student-centered learning (Ngugi and Juma, 2016).

According to OER Africa's (2016) research, higher education institutions around the world have been using the Internet and other digital technologies to generate and disseminate research, teaching, and learning for years. Open Educational Resources (OER) has drawn increased attention due to its potential to break down racial, ethnic, and geographic barriers to education and to promote individualized, lifelong learning.

Kirui and Ndalo (2016, p. 6), confirm that OERs help improve education and research across the globe. Where access to classrooms may be restricted and where teacher preparation programs are scarce, sharing allows many students and teachers to obtain textbooks. Whether one is a student or a member of faculty, OERs are invaluable for research and learning. This study aimed to establish that access to free knowledge is a fundamental human right and that Open Educational Resources (OERs) enable people of all ages and backgrounds to learn more about the world and have access to the resources they need to improve their lives.

2.7.1 OER Policies in Academic Institutions

The OER policy was described by Nicol (2016, p. 3) as a document outlining the organization's perspective on Open Educational Resources and offering guidelines for using them in lessons and instruction. The OER policy seeks to provide direction for the creation and review of OER materials prior to their sharing globally. Once more, it outlines the regulations for using important structures like the library and technology and resolves questions relating to publication rights and licensing. (Mays, 2012, p. 4). It is crucial that it also specifies specific individuals and other resources to support faculty members in creating OER for training and instruction. Intentions to ease access are also defined by policies, which also aid in defining collaborations both inside and outside the institution (Bissell, 2011, p. 3).

For the successful adoption and usage of OERs appropriate OER policies at national, institutions and project level are identified as major factor (Commonwealth of Learning and UNESCO,2015). Promotion of OERs is paramount for them to be adopted in higher learning institutions, and a key aspect is development of policies to promote them. For example, Bialobrzeska and Louw (2014); Mays (2014); Silva, Rogerson, Pektas, Ogunleye and Demir (2012), emphasized on implementing policies that encourages research work generated at higher learning institutions to be deposited as copies of OERs and encourage publishing research articles from in Open Access journals. This shall enable adoption of OERs not only in Africa but globally. The above study pointed out that over the last 10 years South Africa put various ICT and e-learning policies in place which helped in creating a facilitating condition for OERs access and sharing by higher learning institutions.

Clear policies would simply guide on required institutional rights and its faculty members, staff as well as students in regard to Intellectual Property Rights (Mays, 2014, p. 4; Ngugi, 2009, p. 13). The authors stressed the need for academic institutions to consider to what degree policies motivate members of faculty to set aside time in continuing design the curriculum and establishment of operational learning and teaching materials.

A comprehensive research by Commonwealth of Learning and UNESCO (2015, p. 128) has identified key policy issues for consideration if higher learning institutions are to adopt OERs effectively. A key consideration being a policy on development of materials to foster promotion of intellectual property. UNESCO held that the policy needs to comprise of open licenses like Creative Commons, copyright issues and plagiarism amidst the need to share information.

Work carried out by Marte and Coolidge (2016), indicate that every work released on the African Virtual University (AVU) is covered under the Creative Commons Attribution-ShareAlike 3.0 license. The AVU policy cautions that it's the responsibility faculty members and students to ensure crucial rights for publishing are acquired and that academic resources published conform to relevant policies, for instance the copyright rules, intellectual property rights and accessibility.

Another example of an OER adopted policy as noted by Nicol (2016, p. 3) is for the university of Edinburgh in South Africa which states that, members of faculty after incorporating OERs shall assume the responsibility of maintaining integrity and librarians shall serve as central support. As noted from the above works, policies on OERs are crucial

to back up the adoption and usage of OERs in higher learning institutions. The above works support this study, and authors have suggested the importance of stakeholders having OER policy to guide the implementation process.

2.8 Frameworks for Adopting OERs in Teaching and Research

The frameworks for adoption of OERs help in differentiating and contrasting the elements shaping members of faculty OERs adoption in teaching and research. These untapped educational resources are far and wide advocated including increase to access of library resources in institutions of higher education, decreasing their costs, increase to educational opportunities and improving the quality of teaching and research resources. An OER can be as broad as an entire course, as detailed as an entire book, or as specific as a single learning item (Cox & Trotter, 2017). OERs are becoming more and more significant, yet navigating around their widespread practices is still a challenge. A framework for adoption and use is provided by knowledge of OERs and the 5Rs (openness, retain, reuse, remix, revise, and redistribute).

Reuse is the most basic level of openness where one is permitted to utilize all or part of the item for individual purposes, for instance downloading an educational journal article to use in teaching. Redistribute is where one can share the work with others, for example lecturer emailing an OER article to students. When a work is revised, one can adapt, change, translate, or change its format. For instance, one might turn an English-language book into a French audiobook. Remixing is the process of taking two or more OER materials that already exist and combining them together to produce a new resource. For instance, taking audio lectures from one unit and combining them with slides from another unit, to produce

a new derivative work. Also basic knowledge of licensing and copyright permissions such as Creative Commons is essential in order to work with OERs. (Cox & Trotter, 2017, p. 5)

2.8.1 Sources of OERs for Teaching and Research

Reliable OER sources include, but are not limited to:

OER Africa: a thriving network of African OER practitioners that brings together like-minded academics, instructors, and trainers and empowers them to create, adapt, and share OERs to meet the needs of African educational institutions. (http://www.oerafrica.org/)

The UNESCO Open Training platform (http://www.opentrainingplatform.org/)

The Open CourseWare Consortium (http://www.ocwconsortium.org/)

The UNESCO Open Educational Resource platform (http://www.oerplatform.org/)

OpenLearn (http://openlearn.open.ac.uk/)

LORO (Language Open Resources Online) (http://www.open.ac.uk/education-and-languages/loro/)

Wikiversity: Wikiversity is a Wikimedia Foundation project that collects teaching and learning materials, learning projects, and research for use at all educational levels, types, and styles, from pre-school to higher learning institutions, including professional training and informal learning (http://en.wikiversity.org/).

Despite the resource and technological infrastructure abilities of various institutions of higher education in Kenya, adoption of OERs has yet to become a routine practice by all members of faculty whereas numerous of the alleged benefits from OERs would bring a

great impact in educational institutions worldwide. The goal of this study was to serve as an alert to those who create Open Educational Resources (OERs) to make sure that users have access to editing tools and that the tools that don't need an unreasonably high level of expertise while still allowing them to be meaningfully editable and self-sourced.

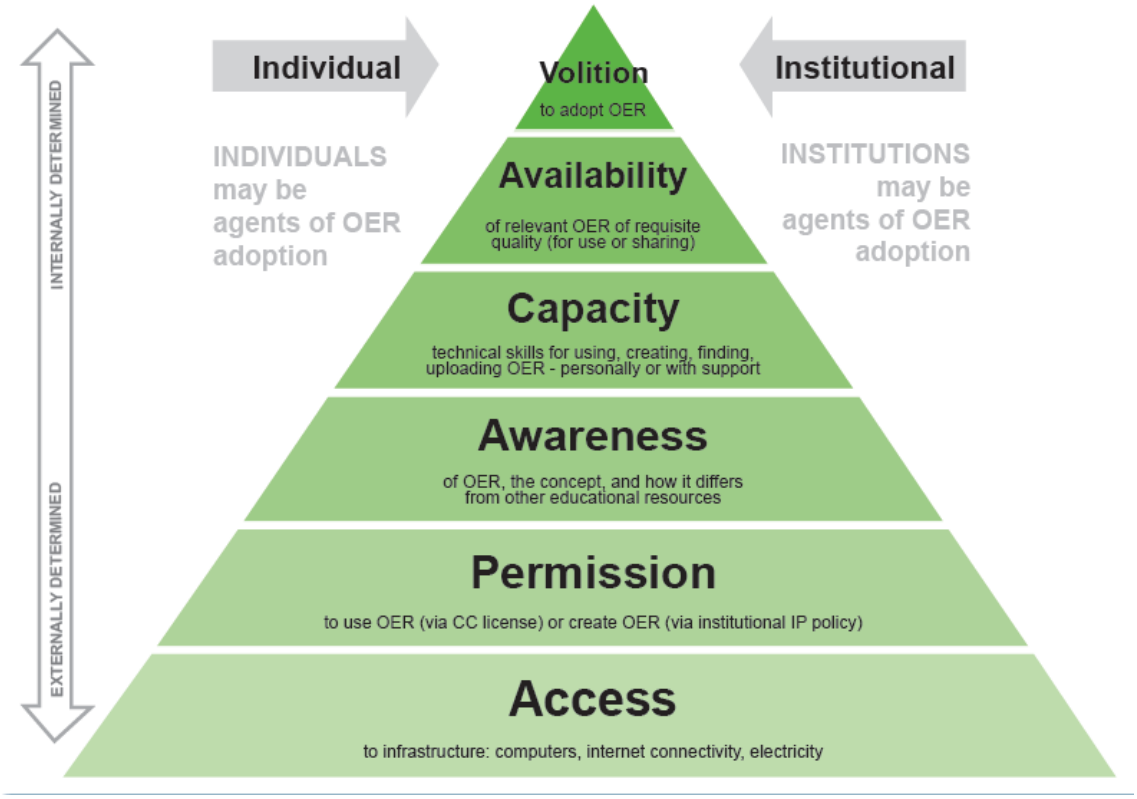
2.8.2 Review of Frameworks for OERs in Teaching and Research

Research by Kansa and Ashley (2005) pointed to statistics that only 27% of written research papers are published and only 5% are shared. This increases ten times the value for OERs. As indicated by Cox & Trotter (2017, p. 154) in the framework below, whether teaching staff adopt OERs or do not adopt depends on many factors. This includes awareness, availability, capacity, policies that allow teaching materials to be openly shared, infrastructure to access and institutional support.

2.8.2.1 The OER Adoption Pyramid Framework

The Maslow hierarchy of needs (Maslow, 1943) served as an inspiration for Cox & Trotter (2016) as they created an analytical framework that outlined the OER adoption pyramid. The figure below shows the OER adoption pyramid framework.

Figure 2. 2 ***The OER adoption pyramid framework***



The framework described above is based on various levels of OER adoption, from factors that are externally determined (at the national or institutional level) to those that are internally determined (at the individual level), each of which is necessary to support the level above. The first level deals with infrastructure access, the second with authorization to use or produce OERs, and the third level is about understanding OERs, what they entail, and how they vary from other educational materials. The fourth level deals with capacity, or the ability to locate, use, produce, and/or upload Open Educational Resources; the fifth level deals with the availability of high-quality, relevant OERs; Lastly, there are three levels of adoption volition: social, individual, and institutional volition.

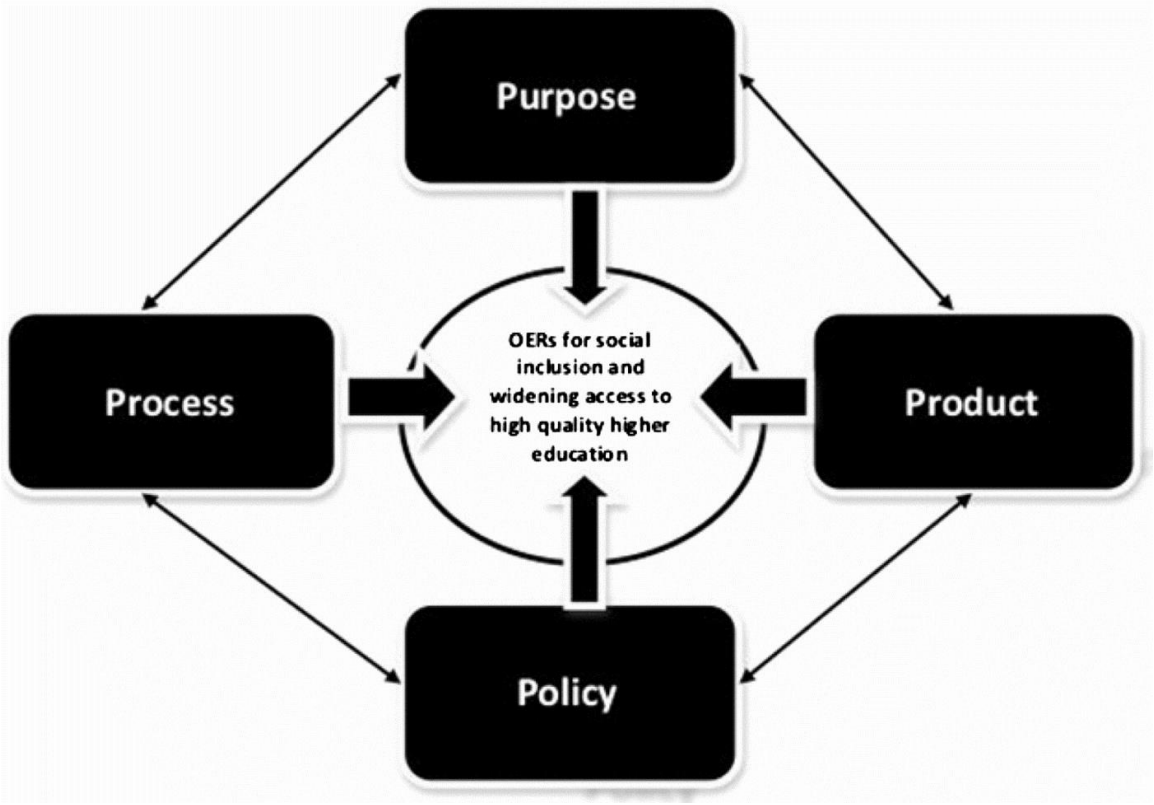
According to the setting of the study by Baas et al. (2019), availability should be thought of as a prerequisite for instructors to explore their capacity and volition and, therefore, be lower in the pyramid. In assessing the OER adoption pyramid framework, factors already identified on the developed framework for this study in the four universities like awareness, capacity or institutional support and access were found useful thus further helping to shape the OER adoption framework.

Despite its interesting insights into OER adoption, this framework neither specifically addresses its complexity nor the broader scope of research required for adoption. As noted by Abeywardena (2017), a decision like adoption of OERs in an institution should be supported by senior management but the entire process of implementation depends on execution which is done by members of faculty and academic staff with support from library and Information Technology staff.

2.8.2.2 The OER Mix Framework

The OER mix framework was proposed and developed by Nikoi & Armellini (2012). Its main focus is on adopter's purpose which focuses on what members of faculty want to achieve by adopting OERs for example the TESSA program aims at availing and sharing information resources to meet teachers curriculum needs in Africa (Mutisya, 2020). Therefore, there is a clear intention for raising awareness on OERs availability to widen their access as proposed in the study's framework.

Figure 2. 3 The Open Educational Resources Mix Framework.



From the framework in Figure 2.3 members of faculty may need to consider how OERs will help them (purpose), also the mechanisms needed to sustain OERs (process), licensing options and the target users (product) and the governing of OER initiatives (policy). The framework involves creation and sharing of OERs in higher learning institutions. The four Ps of the OER mix framework—purpose, process, product, and policy—offer institutions guidance on how to reflect on OER projects and their implications, consider and embed open practices, optimize the advantages of OER, and facilitate more access to high-quality resources for higher education.

To enhance the process of OER adoption, the framework suggests that institutions need to implement and avail diverse OERs for members of faculty and learners to benefit and promote the institutions visibility. To achieve this, the framework suggests stakeholder engagement and partnerships to support creation, re-use, ease of access, sustainability and reusability of OERs which agrees with the proposed framework for the study.

Nikoi and Armellini (2012) framework also raises concerns about the legality of OERs in re-use and re-purposing. The authors indicate the role of CC licensing application as the central legal dimension of OERs. To widen access and adoption of OERs the institution's management needs to support in Intellectual Property Licensing enforcement to avoid copyright infringement by OER creators and users. In this case clear OER policies need to be developed to enable uptake and re-use of OERs. The framework agrees with the study's suggested framework indicating that to maximize adoption, usability, visibility and access, OERs need to be hosted in more servers pointing to many locations and websites policies and products. However, the suggested framework agrees with views by McGreal et al. (2013, p. 235) in the sustainable collaborative framework discussed below on disconnect between the institution management and the implementers of OERs adoption.

2.8.2.3 Sustainable Collaborative Framework

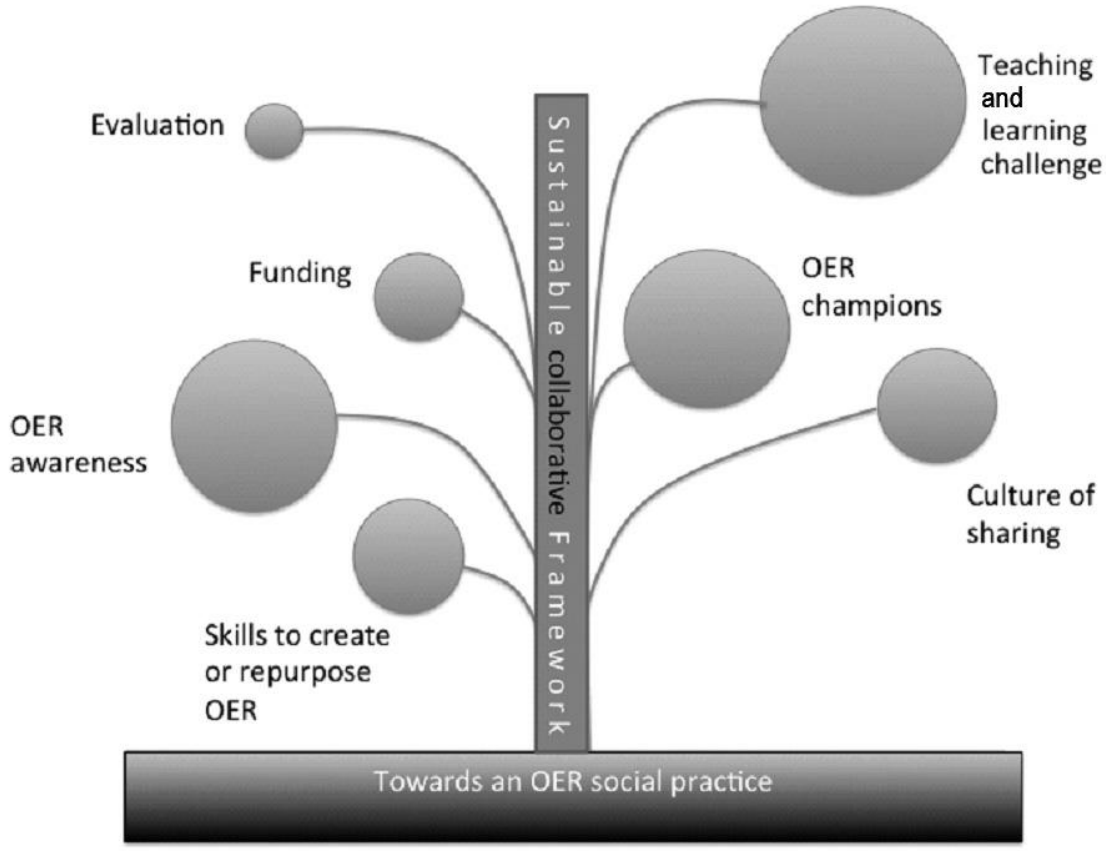


Figure 2. 4 ***Sustainable Collaborative framework***

The sustainable collaborative framework gives some insight to the creation and repurposing of OERs and gives a hint of key indicators towards success in OERs adoption. All the factors dipping into the cylinder are critical in OER adoption. For example, challenges in teaching and learning in terms of technological constraint, pedagogical designs and social cultural issues lead to the question on how OERs will lead to enhancing,

optimizing, improving and pedagogical transformation. As indicated in the framework shown in Figure 2.5, higher learning institutions need to develop OER policies, provide guidelines for creation and repurposing of OERs, provide funding, prioritize on OER awareness campaigns through OER champions like faculty members and librarians, encourage a culture of sharing and help in evaluating available OERs. This will lead to development of a sustainable OER environment in higher learning institutions as supported by (Ngugi, 2009). As the sustainable collaborative framework clearly indicates, sustainability of OERS adoption requires a collaboration between institutions stakeholders for OERs to transition from an individual or social behavior to an institutionalized social practice as supported by the inter-institutional collaborative framework discussed below.

2.8.2.4 Inter-Institutional Collaborative Framework

According to Ngugi (2011) the inter-institutional collaborative framework describes an interplay between adoption of OERs by teaching staff and students and the learning and teaching practice.

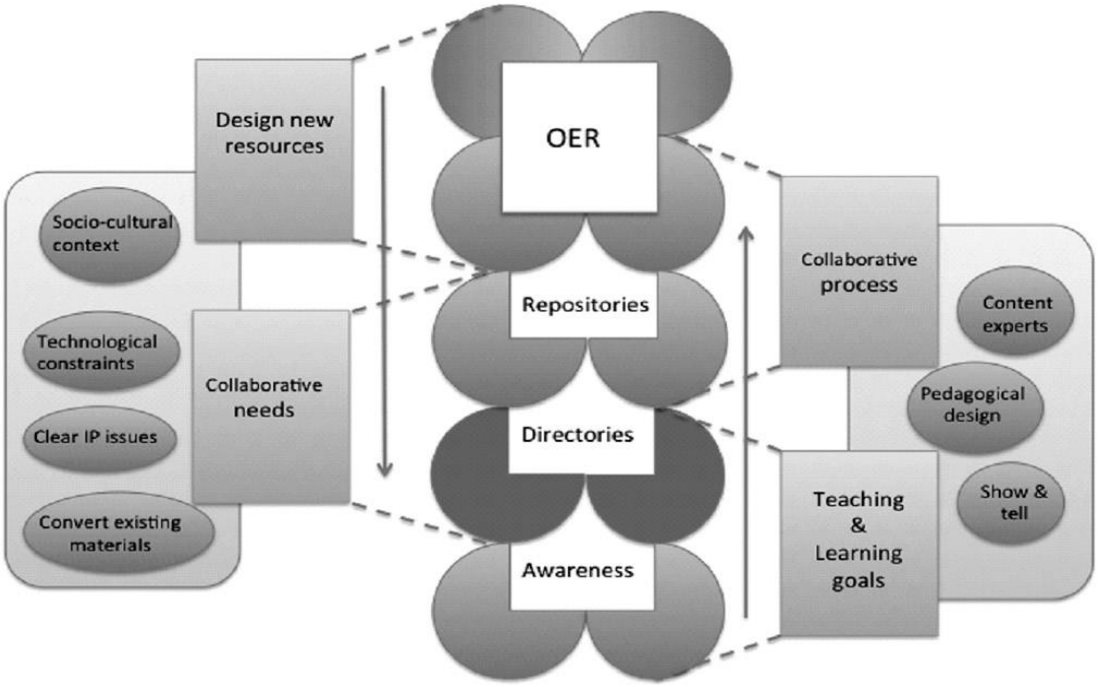


Figure 2. 5 ***Inter-Institutional Collaborative framework***

The framework shown in Figure 2.6 indicates learning and teaching goals as an important starting point. The learning and teaching are guided by the curriculum and pedagogical intentions. This is followed by the awareness process which can be achieved through show and tell by OER champions. The show and tell leads to identifying collaborations which finally lead to successful adoption of OERs. The collaborations end up in developing guidelines for sharing OERs and finally the framework shows ways of achieving OERs social practice as well as supporting OERs social behavior. The developed framework leverages a process in which teaching staff develop teaching resources and later release them as OERs which can be shared with other institutions. The framework supports the developed framework for the study in achieving adoption and use of OERs by higher learning institutions.

This collaboration strategy will boost ownership of the OER adoption process, resulting in more success and sustainability. de Langen & Bitter-Rijkema (2012) article in Netherlands on positioning the OER business framework for open education, the author looked at OERs sustainability and offered a system of non-cash trade in which members would use each other's services in return, including hosting, quality control, distribution, and cataloging and production. The authors argued that the government should provide some financial support which will be required. This framework, however, has drawn criticism because no real-world applications of the model were provided, raising doubts about its viability.

Studies by Butcher and Hoosen (2019) noted that widespread use and adoption of OERs has been slow even after a decade of development. They noted that the biggest hindrance for adoption of OERs by members of faculty is time needed to find and evaluate the resources. The author advised higher learning institutions to reallocate funds to encourage members of faculty to integrate OERs in teaching and research which will bring cost saving and create a market competitive advantage. Savings made through replacing purchasing books and curriculum development with OERs to the institution would limit future tuition fees increases, therefore higher learning institutions in Kenya have a strong motivation for adoption and use of OERs especially with big enrolments and since higher learning institutions are obliged to avail research and learning materials for members of faculty and learners.

There is immense potential of adopting OERs in higher learning institutions in encouraging pedagogical transformation and access to high quality information resources as well as in advocating for equity in provision of education. The OERs are seen as playing a critical

role in fulfilling the SDG4 and the 2030 Agenda for sustainable development, which is supported by UNESCO (UNESCO, 2020). As noted from literature review authors have given recommendations on adoption of OERs however they fail to identify a framework for adoption of OERs in higher learning institutions a potential solution that this study aims to provide by formulating an empirical framework for adoption of OERs.

The above reviewed frameworks identify several key aspects to be adopted by major stakeholders for successful adoption of OERs which are on training which basically is on gaining technical skills to create and repurpose, using, finding and uploading. The frameworks also highlight on importance of advocacy especially by OER champions and creating a sharing culture, institutional support by management in providing infrastructure electricity and internet connectivity, awareness of OER sites and repositories and partnerships between management, faculty members, librarians and students. The key aspects identified by the above frameworks highly contributed to the proposed framework for this study.

2.9 Research Gap

The literature revealed that the adoption of OERs in universities in Kenya is an important initiative in supporting quality teaching, learning and research. It was however apparent that gaps in knowledge exist since OERs content has not been embraced in Kenya and most institutions concentrate in increasing the number of enrolments disregarding the resources for teaching, learning and research as well as library resources to support the curriculum. Additionally, policies have been identified as important contributors to usage and adoption of OERs. From the research undertaken, it is clear that policies lack especially for accessing openly licensed resources.

The literature also highlighted studies on factors that inhibit engagement with OERs. It was noted that OER users must adopt tools for finding, sharing and repurposing resources and a knowledge gap was noted in the lack of skills to fully use and exploit OERs by students and members of faculty. The knowledge of various Creative Commons licenses also seemed to be lacking, which is an important factor if users shall fully use OERs. Unawareness of OERs in higher learning institutions is also an important area that literature review has underscored. Various initiatives to enhance awareness have been pointed out by various authors. However, a gap in knowledge existed since users seem not to appreciate the full benefits that are associated with OERs. Literature on the effects of OERs on the teaching was also reviewed. It was noted that modern technological advances for teaching and learning are lacking hence OERs are hoped to fill this gap. OERs offer opportunities that will change teaching through accessible e resources in the library and sharing of teaching content. The aim of this research was to promote OERs in institutions of higher education in Kenya as teaching and research tools by members of faculty.

Another important area that literature reviewed is on contributions of OERs on research activities among members of faculty. This research shed more light to institutions of higher education in Kenya and shared experiences of members of faculty dealing with OERs, it has also added articles on the potential of OERs, introduced OERs as a reliable and shareable resource. It has also acted as an eye opener to higher learning institutions which have small operating budgets, to invest effectively in campus systems and enhance capacity of faculty members to be part of global knowledge markets like the OER movement as a lift to their learning and research potential. It also aimed to assist faculty members in realizing that access to free information is a fundamental human right and that Open

Educational Resources (OERs) enable learners of all ages and backgrounds to further their education and research.

Literature on factors that inhibit adoption of OERs in teaching and research was considered as an important function for it provides a route for members of faculty to change from the traditional teaching methods and embrace new technologies. This research aimed to reflect how new technologies like OERs are changing the teaching and research environment in terms of accessibility of course materials and availability of library resources. Lastly literature reviewed on framework for adoption of OERs in teaching and research, the research aspired to alert OER creators to ensure that their products are made in a way that users can use editing tools and that such tools don't need prohibitively high levels of expertise. while at the same time enabling them to be meaningfully editable and self-sourced. Through the literature reviewed, it was noted by various authors that sharing of resources is valuable and it will enable all to have access to learning resources. However, this research presented a gap in knowledge since many stakeholders lack awareness on benefits of OERs which could largely explain the rampant non-sharing practices reported in several previous studies.

While reviewed literature provided useful insights on adoption and usage of OERs, it did not provide relevant strategies to support OERs adoption and usage by members of faculty in Kenya, therefore there was need for investigation in higher institutions of learning in Kenya to know the position on the ground with a view of recommending a framework for adoption. The following chapter on methodology enabled thorough investigation on position of OERs in Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

According to Obwatho (2014), research methodology is a presentation of the various methodical stages that are followed by a researcher in studying a research problem. This chapter gives a logical and comprehensive overview of the techniques employed in this thesis to successfully address research questions that focus on faculty members' adoption of Open Educational Resources (OERs) in selected universities in Kenya, status of OERs uptake by members of faculty, effects of OERs on quality of teaching, effects of OERs on research activities among members of faculty, development of a framework for faculty adoption of OERs in teaching and research at selected Kenyan universities.

3.2 Research Paradigm

According to Schwandt (2017), the word paradigm is derived from a Greek word that means pattern. According to Kivunja & Kayuni (2017), a research paradigm is a method of looking at the world that organizes a study topic and shapes the researcher's perspective on the topic. They still maintain that every study is influenced by a paradigm, or particular way of looking at the world and understanding it. Every researcher has a distinct conception of what constitutes knowledge and truth, and this conception informs their worldviews. Creswell (2018) acknowledges that there are several worldviews or paradigms that organize or structure modern research work for example participatory action frameworks or pragmatism, post positivism and constructivism.

Essentially, research paradigms are philosophical in nature and consist of shared fundamentals like axiology, which are beliefs about the significance of morals and values in research, ontology, which deals with presumptions about the nature of reality, epistemology, which deals with presumptions about how we learn and how we know the world, methodology, which is a shared understanding of the best ways to learn about the world, and rhetoric, which is a shared understanding of the best ways to communicate ideas.

3.2.1 Pragmatism

Pragmatism is an American philosophical movement which started in the 19th century in the United States of America. It is founded on the premise that researchers should employ the methodological or philosophical strategy that is most effective for the research challenge they are trying to solve. Pragmatism is typically connected with numerous techniques or mixed methods, where the emphasis is mostly on the research questions or outcomes rather than the methodology (Kivunja & Kayuni, 2017).

As ascertained by (Creswell, 2018) researchers draw mostly from qualitative and quantitative assumptions when engaging in research and the researcher has the liberty to choose methods, techniques and procedures that satisfy their purposes and needs. To a pragmatist, the world is not seen as an absolute unity and researchers in mixed methods utilize various approaches for collecting and analyzing data. For pragmatists, truth is what works at the time. It is not based in a duality between reality independent of the mind or within the mind, therefore, for mixed methods researchers use both qualitative and quantitative data in order to provide the best understanding of the research problem.

Pragmatists approve of the fact that research takes place in social, political, historical, and other settings. As a result, research may incorporate the postmodern turn, a theoretical lens that is reflective of political goals and social justice. They (pragmatists) advocated for refraining from posing queries concerning reality's laws and the existence of an external world apart from the mind as well as one residing there. Pragmatism was thus used for this mixed-methodologies research since it allowed for the inclusion of many points of view, multiple methods, and different assumptions, as well as various approaches to data collection.

3.3 Research Design

Obwatho (2014) describes research design as a general method adopted for a study. It is the strategy, plan and structure for research intended to achieve defined objectives and find research-related answers while minimizing variations.

According to Creswell (2012, p. 81), a research design is the overall strategy for addressing research questions and identifies the sources from which data will be gathered, considering constraints likely to be met as well as discuss ethical issues. Research design also acts as the outline for the collection, measurement and analysis of data. The research design also helps the researcher allocate insufficient resources by providing important methodology choices, including the overall structure of the research, and including a plan of what the researcher will do from developing hypotheses and considering their operational implications to conducting the final data analysis. The design outlines the structure of the research problem, including its organization, framework, plan of investigation used to gather empirical data on those relationships, and configuration of the

relationships among variables in a study. By posing important decisions, it helps the researcher allocate the scarce research resources.

3.3.1 Survey Design

Surveys are characterized by asking questions with the purpose of describing the current situation. The survey strategy is generally connected with deductive approach. It is mostly used to answer who, what, where, how much and how many questions. According to Saunders et al. (2009, p. 144), data is obtained using a questionnaire that is administered to a sample of people and is standardized to allow for simple comparison. With the help of the survey's design, the researcher is able to gather quantitative information that can be analyzed quantitatively using both descriptive and inferential statistics. Bryman and Bell (2011, p. 54). Bryman and Bell (2011, p. 55); Cooper and Schindler (2011b, p. 243); Saunders et al. (2009, p. 144) indicate that surveys, offer inexpensive, quick, accurate and efficient means of evaluating information about the population, they are also fairly flexible when appropriately conducted. When standardized, they are relatively free from various types of errors, collect a broad range of data, for example, attitudes, opinions, beliefs, values, behavior and factual. To examine survey data and establish its validity, reliability, and statistical significance, they can also make use of sophisticated statistical procedures, including the ability of analyzing many variables, since numerous questions can be asked about a subject it gives extensive flexibility in data analysis, by use of surveys the researcher is able to gather.

This study employed the survey design method since it is the representative of the sample. Also, since data collection utilized questionnaires and interview techniques for recording the behavior of respondents the survey method was the most appropriate tool. Survey

methods as noted by Ghauri and Gronhaug (2010, p. 118) was suitable for gathering views, attitudes, and descriptions as well as for determining the cause and effective relationships. Surveys can get good reliable answers to the same set of questions by all respondents in a population.

Drawing a good sample will help in building confidence since the group to be asked questions looks like the entire population and the answers gotten can confidently be attributed to the larger population. Since the survey method is reliable, it was the best fit for the study because the researcher used the same `questions, phrased in the same way and posed to members of faculty to the selected institutions, hence, the potential of producing reliable results. The survey method was adopted because of its cost effectiveness since the researcher collected data from large samples at a relatively low price, sample helped in building confidence since the group asked questions represented the entire population and the answers gotten can confidently be attributed to the larger population.

3.4 Research Approach

A mixed method was adopted for this study. According to Creswell (2014, p. 43), mixed method includes incorporating data from both qualitative and quantitative research into the study. Creswell (2014, p. 264) argues that blending of data or mixed methods offers a better understanding of the problem than using either by itself. In order to address research questions or hypotheses, mixed methods entail the collection of both qualitative (open-ended) and quantitative (close-ended) data.

Since data collection for the study was conducted through questionnaires and interviews, qualitative as well as quantitative approaches were appropriate. The use of quantitative

data predominated in this study, whereas the qualitative approach only applied to explanatory data. Quantitative data was used more because it could be used to address issues with OER adoption and usage in the context of higher education institutions. For the researcher to answer the research questions, it is important to understand members of faculty's contexts and experiences relating to their teaching and learning practices hence the need for an interrogative approach. Also, since qualitative research is presented in narrative form rather than in statistical form, the narrative tries to capture the underlying explanation to phenomena in the study. Therefore, this study was able to gain deeper and richer insights into how faculty members adopt OERs by utilizing both qualitative and quantitative data.

As indicated by (Leavy, 2017, p. 164), mixed methods encompasses collecting and integrating quantitative and qualitative data in a particular research which results in a more widespread understanding of the phenomena under investigation. The mixed methods approach is mostly applicable when the purpose of the research is to describe, explain or evaluate. They are especially useful when researching complex problems or issues. The emphasis placed on numerical (numbers) versus non-numeric (words) data, according to Saunders et al. (2009, p. 151), is one factor that distinguishes the two approaches. The term "quantitative" refers to any method of data collecting (such as a questionnaire) or method of data analysis (such as graphing or statistics) that produces or makes use of numerical data. Contrarily, the term "qualitative" is typically used as a synonym for a data gathering method (like an interview) or data analysis procedure (like classifying data) that produces or employs non-numerical data.

According to Walliman (2018, p. 169), the mixed method can help identify and address validity threats brought on by the use of qualitative or quantitative research by incorporating techniques from a different methodological tradition. This can help ensure worthy scientific practice by boosting the validity of research methods and findings. Additionally, the use of mixed methods can help in acquiring a better picture and greater understanding of the issue being studied by relating findings that are complementary to one another and from different methodological traditions of qualitative and quantitative research. Work by Saunders et al. (2009, p. 153); Bryman and Bell (2011) appreciates the importance of utilizing both qualitative and quantitative methods and notes that in various circumstances, a researcher has several objectives of the study. Quantitative methods are better at measuring certain of these objectives than qualitative methods are for other purposes. The fact that the researcher can revisit the qualitative information at any time and reread quotes in the context of the larger article is a significant benefit of the mixed approach for this study design. Using the two methods can be disadvantageous as noted by Saunders et al. (2009, p. 153), combining both methods can be expensive. Also, the researcher may not have adequate knowledge in both methods to be able to use them efficiently.

3.5 Study Area

Four universities in Kenya were selected for the survey. One is Africa Nazarene University which is in Kajiado County in Kenya. The university main campus is located 21.1 Kilometers South of the Nairobi Central Business District (CBD), the other is Kenya Methodist University which is a private university in Nairobi town. Kisii University is the other university located in Kisii County, Kenya. The main campus is located 306.3

kilometers in Southwestern Kenya and 2.5 Kilometers from Kisii town. Lastly data was also collected from Kabianga University which situated in Kericho in the Southwestern end of the Rift Valley Province of Kenya, about 380 kilometers from Nairobi town.

The four universities were selected because they are a representative of public and private universities in Kenya therefore the findings can be applied in similar environments, they are also known to have established library systems that can support OERs. They are also among the key advocates of e resources and open access resources use as established from the Kenya Library Information Services Consortium (KLISC). They also have established learning management systems, well established ICT infrastructure for supporting OERs, they have also adopted the blended learning mode and open/virtual/distance learning which highly utilize e resources OERs being among them, they have established a directorate or division of research and innovation and they employ excellent technological practices in supporting teaching, learning and research and have large populations and by having this advances the universities are well based to adopt and use OERs.

Africa Nazarene University (ANU) is an international university and participated in the OER Africa convening conference held in Nairobi Kenya in 2016 and has developed a policy on OERs thus being more appropriate for the research. ANU has a student population of over 4000 with five schools, it has an Institute of Open and Distance Learning (IODL) which was established in 2011 with over 1500 online students which endeavors to keep abreast of progresses in the rest of the world by placing more emphasis on the use of technology to support teaching and research. The IODL also leads the development of institutional strategies and policies for stimulating innovative use of technologies for

teaching and research within the university. ANU has also embarked on putting up computer labs and does a lot of training to students and members of faculty on applying recent technologies for teaching and research. The university also introduced e-learning using e-Naz Moodle platform. Through the platform students are able to access high quality information resources, interact with members of faculty and collaborate with fellow students on different learning tasks within the comfort of their homes, cybercafés, and workplaces or even while on business trips. Accessibility of ICT infrastructure is the first step towards adoption and use of OERs.

Kisii University has 8 schools and 8 departments ICT being one of the departments which provides technical support to members of faculty and students. It also develops, maintains and implements necessary technological systems and policies that enhance teaching and research within the university, and provides user-centered ICT services. Kisii University has accorded distinctive attention to ICT to accelerate teaching and research procedures and the university is currently reviewing the curricula and modes of instruction to cope with demand for ICT technologies for betterment of academic excellence.

Kabianga University provides excellent academic services through training, research and innovation. The university has over 8000 student population, 8 academic programmes and 8 schools/directorates. The aim of Kabianga University is to develop, preserve, and transfer knowledge and technology via excellent and entrepreneurial education, research, extension, and collaboration with the public sector, private sector, and non-state actors. Kenya Methodist University has over 7000 students, with 4 schools. The university has established open and distance learning with accessible and flexible online education and has virtual learning resources.

All the four universities were selected because they support information access and sharing having established Institutional Repositories. The institutions also provided a good background since they comprise both public and private institutions, therefore offering an ideal setting for gathering information.

3.6 Target Population of the Study

Obwatho (2014, p. 60) refers to population as the entire group that a researcher is interested in. The population of the study is the collection of features from which the actual sample is drawn, according to Babbie (2014, p. 135). The population of this study consisted of members of faculty from Africa Nazarene University and Kenya Methodist University which are private universities, Kisii and University of Kabianga which are public universities, e- resources and university librarians from the four universities. Due to time and financial constrains four universities were selected because they are fully chartered, they have established a directorate or school/Institute of open/virtual/distance learning, the universities also have learning management systems, well established ICT infrastructure for supporting open/virtual/distance learning, they have also adopted the blended learning mode, established a directorate or division of research and innovation and they employ excellent technological practices in supporting teaching, learning and research and have large populations and by having this advances the universities are well based to adopt and use OERs .

Data was collected from full time members of faculty, university librarians and e resources librarians. The main reason for choosing full-time faculty was because they participate in committees, guaranteeing that the members of faculty voice is heard in the institutions

decision-making. While the management have concerns about the "bottom line", it is the members of faculty who strive to protect the quality of the teaching and learning environment. Members of faculty also play a key role in teaching and therefore, they are better placed in advising on the reference information materials suitable for each academic program which they teach. Full-time members of faculty hold regular office hours, have offices and are generally available to students. They also have knowledge of their specific discipline and are the pillars of institutions of higher education, they are responsible for creating the environment essential to attract and retain students. They are also responsible for developing courses and programs. It is the full-time members of faculty who warrant that curriculum is up to date and that they are revised with the development of courses and programs to fulfil educational requirements of their institutions. All participants for the members of faculty category are expected to hold either a doctorate or a minimum master's degree with sufficient teaching experience, and are classroom instructors, departmental chairs, administrators or technology-based positions.

The main agenda of academic libraries is to support their institutions in teaching and research activities. OERs have numerous impacts on libraries in the institutions of higher education which include economic, technological, collection development, reference services and management. Librarians in these institutions have a role in promoting access and utilization of OERs, therefore, their involvement in this study helped to find out how they influence the adoption of OERs by members of faculty.

Librarians in institutions of higher education are actively involved in decision making, especially in the provision of information resources and they work very closely with

members of faculty fulfilling the information resources needs of the curriculum. The research was interested in identifying the librarians' role in awareness of OERs by members of faculty, their role in promotion of OERs as supplementary reference resources in institutions of higher education.

Table 3. 1 *Population Table*

	Full time Faculty	University librarians	E resources librarians
ANU	66	1	1
Kisii	300	1	1
KeMU	50	1	1
UoK	231	1	1
Total	**647**	**4**	**4**

3.7 Sampling Techniques and Sample Size

According to Oso (2016, p. 126) a sample is a collection of participants or subjects drawn procedurally from the accessible or target population to serve as a representative sample of the population. The researcher will focus on studying that portion of the target group. For university librarian and e resources librarians purposive sampling technique was used to gather information.

The formula below was adapted from Yamane (1973) to determine the sample size for members of faculty, with a 95% confidence interval assumed at p=0.05. each stratum was allocated the same number of samples.

Thus,

$$n = \frac{N}{1 + N(e)^2}$$

Where;

n = sample size required

N = population size

e = required sampling error (95% confidence level or 0.05 precision level, is assumed)

Substitute numbers in the formula

$$n = \frac{647}{1 + 647(0.05)^2}$$

n=247

Table 3. 2 *Sample size for members of faculty*

Institution	Sample calculations	Sample size
ANU	66/647×247= 25	25
Kisii	300/647×247= 115	115
Kemu	50/647× 247 = 19	19
UoK	231/647× 247 =88	88
Total		247

3.7.1 Sampling Techniques

According to Kamau et al. (2014), sampling procedure/design/method is a way of identifying a proportion of population that would be included in a study. In majority of studies, researchers hardly work with the entire population but will always work with a small group referred to as a sample. Cooper and Schindler (2011b, p. 364) noted that the main reason for sampling is to choose some of the features in a population from which one may draw conclusions about a whole population. By sampling, the researcher was in a position to lower cost therefore there were economic benefits of taking a sample rather than census and greater accuracy of the results was attained. Cooper and Schindler further noted that the quality is more appropriate with sampling than with census because there is a chance of more thorough investigation, better interviewing, better processing, better supervision than if a complete coverage was done. For this study, the purposive sampling technique was applied to e resources librarians and to the university librarians. For members of faculty, stratified random sampling was used whereby members of faculty were stratified according to departments, simple random sampling was used within the stratum to come up with members of faculty who participated in the study.

3.7.1.1 Purposive Sampling Technique

Is a non-probability sampling method that the researcher chooses which people to include in the sample based on a variety of factors, such as their expertise in the subject matter of the study or their capacity and willingness to participate (Bryman & Bell, 2011). In purposive sampling technique, the researcher deliberately targets a group of individuals thought to be in possession of information for the study. The strength of purposive

sampling as stated by Kombo and Tromp (2006, p. 82), is based on choosing information-rich cases for in-depth analysis related to the primary items being examined.

The main participants in this study were members of faculty, university librarians as well as e resources librarians. Purposive sampling technique was applied to librarians who participated in this study. The method was chosen because it allowed the researcher to select participants based on how closely they related to the study's topics. Because these participants were subject-matter experts, they were exceptionally qualified to provide insightful answers. Data collected was useful for this study and it was convenient as well as economical because the researcher was the only one involved in the selection (Johnson & Christensen, 2014, p. 364).

3.7.1.2 Stratified Random Sampling Technique

In a stratified random sampling procedure, the population is divided into uniform subgroups, and a simple random sample is then taken from each subgroup. According to Kombo and Tromp (2006), p. 79, the sample selection process makes sure that specific subgroups of the population are represented in the sample in proportion to their number in the population. Members of faculty were stratified according to departments that exist in that institution and then simple random sampling was applied within the given department. In this case individual members of faculty from each department participated in the research.

In this study stratified random sampling which was done according to different departments perfectly reflected the entire participants being studied because the researcher stratified all members of faculty before applying random sampling criteria. This made better coverage

of all members of faculty since the researcher controlled the subgroups to guarantee that all of them are represented in the sampling.

Stratified random sampling technique offered sufficient data for investigating the various sub-populations, and due to the fact that it enables diverse research methods and procedures to be used in different strata. This provided a pronounced improvement in statistical efficiency.

3.8 Data Collection Tools

The term "data collection" refers to the process of obtaining information or proving facts. In this study, "data collection" refers to acquiring precise information with the goal of confirming or refuting certain facts about the subject of inquiry. In order to gather data for the study the researcher used interview guides and questionnaires in collecting data. The nature and design of these two instruments are described below.

3.8.1 Interviews

According to Saunders et al. (2009, p. 318), an interview is a purposeful dialogue between two or more people. Saunders et al., (2009) continues to say that usage of interviews can help the researcher gather accurate and trustworthy information that is pertinent to the research objectives and questions. Interviews are categorized as semi structured, structured and unstructured or in-depth interviews (Gill, Stewart, Treasure, and Chadwick, 2008).

Two interview guides were used in this study, allowing for a systematic in-depth investigation that allowed the researcher to elicit further information where necessary when respondents' answers were not very clear. University and e resources librarians were in a

position to describe their experiences, elaborate responses and also give examples. According to (Alsaawi, 2014), an open-ended question list that guides the interview process is advantageous because it gives interviewers the freedom to ask follow-up questions or seek clarification as issues come up throughout the interview.

For this study the interview guides for university and e resources librarians were built from the research questions of the study which are outlined in section 1.5 in Chapter One. An outline of the relevant broad areas of knowledge was drawn from reviewed literature where specific questions within each major area have been identified (see appendix iii and iv for interview guides). Major areas were shaped to fit respondents with a goal of tapping librarian's experiences and expertise.

3.8.2 Questionnaires

Kombo & Tromp (2006, p. 89) refers to a questionnaire as a research instrument that collects data over a large sample. Kamau et al., (2014, p. 80) describes questionnaire as a structured practice of data gathering consisting of a number of questions that respondents answer for obtaining information. It is a research tool that includes a variety of standardized questions with the aim of gathering data from a certain target audience or group. The choice of a questionnaire in this study was primarily because information was collected from a large sample (see Table 3.5). Questionnaires also saved time, and the confidentiality of respondents was upheld while at the same time there was no opportunity for interviewer bias since questions were presented in paper format.

The researcher is also aware that the use of questionnaires at times responses can be relatively low and at times dealing with misunderstanding of a question can be hard since

the researcher has no direct contact with the respondents. Furthermore, there is no chance to seek additional information associated with the responses given or to get reasons for incomplete responses. To minimize the weaknesses, the researcher gave a good cover letter to motivate the respondents in answering the questions and the value of the study was articulated. Efforts were made to have a few open-ended questions which were very clear and explicit. In recruiting the research assistants thorough training was carried out to help them in clarifying the questions as well as answering any queries arising from the questionnaire.

One type of questionnaire was used in the study: questionnaire for full time members of faculty. Simple open-ended and closed-ended questions were both incorporated within the questionnaire's structure. In order to establish real opinions on predetermined constructs, closed-ended questions were graded on a Likert scale. For this research a questionnaire was developed by gleaning key issues from the reviewed literature. Very long questionnaires were avoided but the researcher tried to make them as interesting as possible. The questionnaire had clear instructions and had an attractive layout to improve the questionnaire's response rates. See appendix 2 for members of faculty questionnaire.

3.9 Pre-testing of Research Instruments

According to Hilton (2015), pre-testing research tools is a process that ensures that questions function as intended and are well understood by the respondents who will respond to them. It is closely related to a larger study and involves a risk-reduction strategy to reduce the likelihood of failure in a larger project. It was the goal of pretesting or preparation studies to evaluate the performance characteristics and capacities of study designs, measures, processes, and operations that were being considered for inclusion in a

later or larger study**.** For the effectiveness of the questionnaires to be ensured a pre-test was conducted. Pretesting of the questionnaire with a small representative sample from Machakos University on university librarian, e resources librarian and 10 members of faculty was carried out. It was essential for this research to carry out pretesting because the researcher noted errors that had been committed and reduced them which helped in improving the quality of data significantly. Pretesting that was conducted helped to ascertain potential problems that the researcher needed to tackle before beginning the projected future study (Ghauri et al., 2020, p. 125). The researcher herself conducted the pretest, the same sampling techniques described in this study were used to collect samples from faculty members, university librarians, and systems librarians.

3.10 Validity of Research Instruments

Validity is basically related to the integrity of the decisions that are produced from a work of research (Bryman and Bell, 2011, p. 42). The purpose of measurement is to quantify what is intended to measure (Zikmund, 2003, p. 301); Cooper and Schindler, 2011b, p. 280). In other words, validity is the extent to which findings from data analysis accurately reflect the phenomena being studied. It has to do with how correctly the research data collection process captures the study's variables.

There are various forms of validly which include: content validity, cross cultural validity, construct validity, predictive, concurrent, criterion related, convergent, consequential validity, internal and external validity (Bryman & Bell, 2011, p. 42; Mugenda & Mugenda, 1999, p. 100; Ghauri and Gronhaug, 2010, p. 80; Cooper & Schindler, 2011a, p. 280). To achieve validity in this study, the researcher was keen on the following:

3.10.1 Construct Validity

Construct validity is a measure for how accurately and expressively data obtained from an instrument reflects or portrays a theoretical concept. It refers to how accurately an operationalization measures the idea that it is intended to measure. It refers to the extent to which a measuring instrument measures a character that cannot otherwise be seen directly. Construct validity is essential for meaningful and interpretable research findings (Ghauri and Gronhaug, 2010, p. 281);(Cooper and Schindler, 2011a, p. 282). In this research, the researcher expected that the use of interview sessions and questionnaires would answer the research questions and cover the objectives of the study. A pretest was also conducted at Machakos University to establish the strength of the research instruments whereby ten questioners were issued to members of faculty and interviews were conducted on the university and e resources librarian and any necessary adjustments on tools were made.

3.10.2 Content/face Validity

The degree to which a research tool appears to measure what it was intended to measure is referred to as face validity. According to (Zikmund, 2003, p. 302), a scale should reasonably appear to measure what it was designed to measure. Face validity can be proven by enquiring from other people whether or not the measure appears to be getting at the perception that is the focus of attention, or whether the items in the instrument seem to be relevant, reasonable, unambiguous and clear (Bryman & Bell, 2011, p. 160).

When a measuring tool provides adequate coverage of the research's guiding investigative questions, it is said to have content validity. A determination of content validity involves judgment through a careful definition of the topic, also use of a panel people to review how well the instrument enhances the expected standard. (Cooper & Schindler, 2011a, p. 281).

Content validity in this study was achieved through pretesting the questionnaires, interview guides, also seeking guidance and advice from supervisors. The use of both qualitative and quantitative approaches made it easier to gather relevant data for the study.

Adequate questions covering all the research objectives were given so as to get enough information. The questionnaire and interview schedules were made clear and easy to understand so that accurate answers would be provided. The researcher also spent ample time in the field as well as observing research guidelines and procedures which involved triangulating and confirming data from various sources which addressed the same problem in order to build explanations during analysis, matching unfolding patterns was done to make meaningful interpretations.

3.11 Reliability of Research Instruments

Reliability refers to the repeatability of study findings (Bryman & Bell, 2011, p. 41); Brown (2010) defines reliability as the extent to which measures are error-free and produce consistent results. Reliability, according to Cooper & Schindler (2011b, p. 280), is concerned with the accuracy and precision of a measuring procedure. Threats to the validity of research should be avoided or minimized by: Participant error, defined as any factor that negatively affects how a respondent performs like the time of the day when the interview is being carried out was reduced by trying to apply the same factors to all interviewees. By making the atmosphere as inviting as possible, participant bias, which is any factor that results in an incorrect response, was minimized. Interviews weren't completed in a single day to prevent fatigue or researcher error, or any other element that changes the researchers' interpretation. Objectivity was evaluated for researcher bias or any

element that might lead to bias in the researcher's recording of responses. To check the consistency of respondents' responses to all the items in a variable, the researcher used the Cronbach's coefficient alpha to conduct an inter-item internal consistency reliability test. According to Bryman and Bell (2011), a Cronbach's coefficient of 0.7% or more was considered appropriate.

Table 3 *Reliability Results*

Constructs	Cronbach's Alpha
Adoption of OERs teaching and research (Y)	0.851
Level of awareness of OERs (X_1)	0.826
Status of OERs (X_2)	0.759
OERs support for teaching (X_3)	0.769
OERs support for research (X_4)	0.826
Framework for adopting OERs (X_5)	0.903

The study findings in Table 3.3 show that the Cronbach's coefficient alpha is above 0.7 for all research variables. This meant that the elements included in the tools for each variable were dependable and could hence be used.

3.12 Data Collection Procedures

This section gives a description of how the methodological techniques were used to collect the data required to identify factors required for the adoption of OERs. It described the procedure used to collect data. The procedure for collecting data is influenced by the

research instruments used (Kombo and Tromp, 2006). Once the research design has been formalized and instruments are ready, the process of gathering information from respondents begins. The procedures to be followed in collecting data are as outlined below.

3.12.1 Procedure for Conducting Interview

The researcher first booked an appointment for the interview sessions and all the interviews were administered by the researcher. The interview procedure began by 'warm-up' questions that respondents answered easily. This helped in building rapport between the participants and the interviewer. During the interviewing process, the language of the interview was adjusted according to the respondents whilst the respondents were motivated to answer as completely and honestly as possible. In order to provide thorough and elaborate answers to the important questions, probes were started. At the conclusion of the interview, when a relationship has already been established, difficult or perhaps embarrassing questions were asked. The final question provided some closure for the interview and helped the subject feel in control, heard, and grateful for their time spent speaking with the researcher. The following guide by Bryman and Bell (2011, p. 255), about the specific procedure was followed: Courtesy and flexibility was observed in arranging the date and time of the interview. Date, time and place were confirmed by the participants. The purpose of the interview was made clear, how the information was to be used and how long the interview would take place. It was also stressed that the information given was to be anonymous. The researcher also ensured questions were clear as possible, they related to the objectives and tailored carefully to get the information needed. The researcher also recorded the interview because in doing this it freed up thinking about the responses to the questions rather than carefully taking notes.

During the interview the researcher arrived on time, was friendly and courteous. A reminder about the purpose of the interview was also done. Permission was also sought from the interviewee to record the conversation and the agreement was recorded as part of the interview. Interview sessions were recorded and a notebook was also used to note important information to back up the recordings. Time of the person being interviewed was kept as agreed upon but where more time needed permission was asked to continue a little longer. Where the interview was not recorded the researcher went over the notes made to ensure they were complete and lastly a thank-you note or email was sent to the interviewee.

After the interview session was over, there was a debrief where participants could ask questions, contribute more details, and explain any ambiguities. Because it was recorded at this point, it was helpful in case important information could not have been captured during the interview.

3.12.2 Procedure for Administering Questionnaire

As was already noted, faculty members were given a self-completion questionnaire to complete for the study. According to Ghauri and Gronhaug (2010, p. 123); Bryman and Bell (2011, p. 232), before distributing the questionnaire, a cover letter outlining the purpose of the study and the criteria used to choose the recipient was provided. Brief but clear instructions were included and where items were similar or follow the same format, general instructions were given. In administering questionnaires research assistants were used. They received instruction and information on what was expected of them during the exercise. The training's objective was to guarantee that each research assistant had a

complete understanding of the research tools and would ask questions in a manner that would convey the right information to the respondents.

3.13 Data Analysis and Presentation

Data analysis is the process of analyzing data to support decisions by applying both logical and analytical reasoning. Obwatho (2014) states that the major goal of data analysis is to allow researchers to come to meaningful information and findings that can aid in decision-making. Kombo and Tromp (2006, p. 117) define data analysis as closely examining survey data and drawing deductions and inferences from it. It entails finding underlying structures, looking for anomalies, putting any underlying assumptions to the test, and extracting crucial variables. Due to the mixed research methods approach used in this study, both qualitative and quantitative techniques were employed in analyzing the collected data. Both qualitative and quantitative techniques are described below.

3.13.1 Analysis of Quantitative Data

In order to describe and understand the phenomena that those observations reflect, quantitative data analysis involves the numerical representation and manipulation of observations (Babbie, 2014, p. 412). Before being processed and evaluated, quantitative data expresses very little significance to the researcher and to the majority of individuals. In order to make data meaningful and transform it into information, processing is crucial (Saunders et al., 2016, p. 496; Ghauri et al., 2020, p. 205). All close-ended questionnaires were coded in the SPSS database version 24 to assist quantitative analysis.

The descriptive (percentage mean and standard deviation) method was used to analyze data which assisted in summarizing large sum of data and Inferential statistics (correlation

analysis). Pearson correlation analysis was applied in this study basically to check the connections between variables. The quantitative results (descriptive) of each variable were presented first followed by interpretation and exhaustive discussion of the same. The study also carried out inferential analysis which enabled testing of research questions and assessing the overall purpose of the study. The findings and inferences made were then used to develop a framework which was the ultimate output of the study.

3.13.2 Analysis of Qualitative Data

Qualitative data analysis included organizing, explaining and accounting for the data. Basically, according to Cohen et al. (2011), this process involves determining the meaning of data in relation to the respondents, defining the situations, and noting the patterns, themes, categories and regularities.

Qualitative data derived from field notes was read comprehensively so that the researcher was familiar with it. Notes from interviews were edited and cleaned up as data was being organized. The responses gathered during interviews and from open-ended questions were coded using themes derived from the main construct of the study. The researcher assessed and analyzed the data after acknowledging the themes, categories, and patterns to determine the sufficiency of information, credibility, usefulness, consistency, and validation in responding to the research questions.

The qualitative findings are explanatory in nature; hence they were integrated in the discussion in order to arrive at a conclusion regarding a phenomenon. For this study qualitative and quantitative studies were conducted simultaneously. Cooper and Schindler (2011b, p. 182) refer to merger of qualitative and quantitative methods as Triangulation.

The term "triangulation" refers to the combination of various qualitative methods or the combination of qualitative and quantitative methods. According to Cooper, combining the approaches improves the perception of the quality of the research, particularly when a quantitative study comes after a qualitative one and confirms the findings of the qualitative study. Qualitative methods were also applied to avail vital contextual information that supplemented the findings of the quantitative research.

3.14 Ethical Considerations

Ethics is the study of moral standard and how they affect the study, it relates to how one carries out identified research tasks, and it rotates on concerns about issues like how to deal with people on whom one is carrying out research and the matters one should not engage in relations with them (Hair et al., 2020, p. 60). Ethics in research ensure that the rights of all parties are not violated and this calls for high level of integrity among all players such as researchers, respondents, clients and the general public. It concerns itself with issues such as if there is damage to participants, lack of well-versed consent, intrusion of privacy and if dishonesty is involved. Issues relating to ethics are diverse and broader since they are both emended in the type of research one is carrying out and the location of the research. A researcher may be required to adopt different behavior in different situations when carrying out research, thus research ethic is contextual (Kamau et al., 2014, p. 20) (Bryman and Bell (2011, p. 122) (Schindler, 2019, p. 460).

3.14.1 Researcher and Ethical 1ssues

The researcher undertook the following ethical considerations: since all research projects carried out in Kenya, including by independent faculty researchers, master's thesis and doctoral dissertation are required to obtain a research permit from the National

Commission for Science and Innovation (NACOSTI), clearance was sought prior to commencing data collection, second approval was sought from Kisii University, ANU, KEMU and UoK.

There was also the ethical issue of falsifying data. Collecting data is not easy as many people are unwilling to release information. The temptation is very high especially among students from underdeveloped countries(Kamau et al., 2014, p. 25). To deal with this problem of falsifying data, the researcher employed services as well as trained ethical researchers as assistants to collect data on one's behalf. Data was also analyzed appropriately; all sources of information and methods used to obtain and analyze data were disclosed and acknowledged and data was not fabricated during analysis.

In this study, the researcher tried to identify the gatekeepers who control access to data in advance before embarking on data collection in order to avoid frustrations and for this study gatekeepers include coordinators/directors of research in universities to be involved. Considering that the key aim of this study was to come up with new knowledge, then information was presented without misinterpretation and utmost desire to avoid errors. As supported by (Obwatho, 2014, p. 76), the following important aspects regarding research ethics were observed together with the ethical issues already highlighted in the foregoing discussion. The researcher explained the nature and purpose of the study to the participants. Respect, dignity and rights of the participants including right to participate or withdraw without coercion and high standard of confidentiality was maintained to avoid jeopardizing participants image, legal and social standing associated with OER utilization and adoption. Unique codes were used to track participants for anonymity.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

The chapter presents the study's findings and their interpretations. The results are then discussed using the empirical literature from chapter two as a guide. The material that is provided in this chapter is arranged in accordance with the main study variables. Each variable's quantitative results (descriptive) are first presented, then each result's interpretation and in-depth discussion are covered. The qualitative findings are explanatory in nature, and hence, they are integrated in the discussion to expound on observed aspects or explain actions taken by university and or e-resources librarians. The study also included inferential analysis, which allowed for the testing of research questions and evaluation of the study's overall purpose. The findings and inferences made were then used to develop an OER framework which was the ultimate output of the study. It is important to note that the interpretation of the findings and inferences reported in this study were based on the collected data. In addition, references were made to past empirical studies, available reports and other applicable guidelines. The chapter begins by outlining the respondents' demographics and response rate.

4.2 Response Rate

In this section, the findings on response rate of the three types of respondents (teaching staff, e-resources librarians and university librarians) are provided. The study interviewed four e-resources librarians and four university librarians and all of them were available;

hence, 100%. As for the teaching staff, the study had administered 247 questionnaires whose return rates from the four universities are shown in Table 4.1.

Table 4. 1 *Questionnaires response rates*

Institution	Sample size	Number of returned and valid questionnaires	Percentage
ANU	26	20	77%
Kisii	114	85	75%
KeMU	19	16	80%
UoK	88	72	82%
Total	247	193	78%

From the results, the study received 193 valid questionnaires from members of faculty across the four universities. This represented a 78% response rate. Out of this, 20 (77%) came from ANU, 85(75%) were from Kisii, 16 (80%) from KeMU, and 72 (82%) were from UoK. According to Hendra and Hill (2019), this response rate was good for use in the analysis. The researcher had thoroughly trained the research assistants for the field hence the impressive response rate. Besides, the respondents were cooperative except in a few cases.

4.3 Background Information of Respondents

Understanding the background was critical in informing attributes of Open Educational Resources in the study. Regarding the objectives that underpinned the study, background characteristics of teaching staff, e-resources librarians and university librarians were analyzed. The study was interested in background aspects including teaching experience and length of service within the employed universities. Each category of respondents' demographic characteristics is discussed separately in the subsequent sections.

4.3.1 Demographic Characteristics of Teaching Staff

The demographic characteristics sought in this study were regarding the position of a teaching staff member and teaching experience at university level. The findings on these two demographic characteristics are shown in Tables 4.2 and 4.3 respectively.

Table 4. 2 *Teaching experience of faculty members*

Length of Service	Frequency	Percent
Less than one year	23	11.9
1 to 5 years	79	40.9
6 to 10 years	46	23.3
11 to 15 years	27	13.5
16 to 20 years	15	7.8
21 and above	3	1.6
Total	**193**	**100.0**

The study sought to establish the length of teaching service of the teaching faculty members from the selected universities. Length of teaching in the universities was necessary so that the research establishes objectiveness on the assessment of the adoption of Open Educational Resources by the members of faculty. According to Table 4.2, most faculty members seventy-nine (40.9%) had between 1- and 5-years teaching experience. Forty-six, (23.3%) had between 6 and 10 years, while twenty-seven (13.5%) had between 11- and 15-years' length of teaching service. It is only twenty- three (11.9%) faculty members who had served in the university for less than one year. The findings show that about 15 (7.8%) of teaching staff worked for 16 and 20 years and only 3 (1.6%) worked for 21 years and above. It is clear from the findings that about 125 (64.8%) of the faculty members had teaching experience of five years or more. This shows that the members of faculty in the universities had sufficient teaching experience. This gave the research a lot of confidence in the kind of responses provided in this research. Their length of teaching service was

critical in laying a good foundation from their responses which finally enabled for development of credible proposed framework for adopting OERs in teaching and research at selected Universities in Kenya.

The study was further interested in establishing the position of the faculty members teaching in the represented universities. A summary of the faculty members' positions is presented in Table 4.3.

Table 4. 3 *Results on the position of faculty members*

Position	Frequency	Percent
Professor	8	4.1
Associate Professor	29	15.0
Senior lecturer	36	18.7
Lecturer	80	41.5
Tutorial fellow/ assistant lecturer	40	20.7
Total	193	100.0

Table 4.3 shows that the majority, 80 (41.5%) of university teaching faculty were at lecturer's position, while 40 (20.7) were assistant lecturers /Tutorial fellows. The Associate Professors were represented by 29 (15.0%), while 36 (18.7%) were at senior lecturer's position. Those at professor's position were 8 (4.1%). The findings show that universities had more lecturers and tutorial fellows. Although the numbers of highly qualified teaching staff reduced as one went up the rank, the results show that teaching faculty members were adequately qualified; hence, better endowed with knowledge and competencies to respond to questions regarding the adoption of Open Educational Resources in universities. This agrees with the study of Nafukho et al. (2019) who argue that Kenyan university have highly productive staff, owing to their academic achievement. Therefore, the Kenyan schools do not suffer the lack of qualified staff because the available faculty members are

experienced in their fields. The findings are inconsistent with CUE reports which have complained of few qualified teaching staff in local Universities.

4.3.2 Working experience of e-resources and university librarians

The study sought to establish the working experience of e-resources and university librarians to ascertain familiarity with Open Educational Resources. The findings indicated that 95% of e-resources and university librarians had more than 8 years' work experience at universities while the remaining 5% had less than eight years work experience.

4.4 Adoption of Open Educational Resources in teaching and research by members of faculty

The dependent variable in this study was the adoption of OERs in teaching and research. Data regarding this variable was gathered from teaching staff, university and e-resources librarians. The study applied the concurrent nested design in performing data analysis and interpretation of the findings from the three categories of respondents. In this study, the quantitative data collected from the teaching staff were predominant. They were then complimented by data from university and e-resources librarians. This helped in concurrent triangulation of data, but also provided explanation to aspects under investigation. Consequently, the qualitative data from university and e-resources librarians was nested / embedded to complement and substantiate the quantitative data collected from teaching staff. This approach was also applied in assessing the predictor variables of the study.

Several statements based on indicators on adoption of Open Educational Resources in teaching and research were offered to respondents in order to measure the dependent variable in a 5-level Likert rating scale, ranging from 1 to 5; where, NA =not at all (1), SE

= to a small extent (2), ME = to a moderate extent (3), LE = to a large extent (4), and VLE = to a very large extent (5). The statements covered issues such as access to free world's best courses, content and tools that can be adapted to the local context, speed in the dissemination of information, access to affordable and high-quality information resources, sharing of resources by wider community, development of knowledge and skills; enhanced collaborative development of curriculum, and increased opportunities for publishing and promoting knowledge and resources.

Adoption of OERs in teaching and research by faculty members was measured as a latent variable. This was because, one single statement is not sufficient to determine the state of adoption of OERs for teaching and research. Consequently, several statements on aspects of adoption of OERs were used to measure this construct. In order to measure the construct as a composite or latent variable, the responses to each aspect were added together. In light of this, the mean values and standard deviation (SD) for each factor were calculated. This aided the researcher in interpreting the construct's descriptive findings.

Similar calculations were made for the KMO and Bartlett's test of sphericity which helped to assess whether the sampling attached to the aspects of adopting OERs was adequate to be considered in data analysis. According to Cooper and Schindler (2011), Bartlett's test of sphericity should be less than 0.05 and KMO value should be at least 0.6. For adequacy of sampling. The KMO results for each main variable provided confidence to the researcher in using the indicators in measuring a given latent variable. Table 4.4 provides a summary of the findings.

Table 4. 4 *Adoption of OERs in teaching and research by members of faculty*

Aspects on adoption of OERs in higher learning institutions (n = 193)	**VSE(1)**	**SE(2)**	**ME(3)**	**LE(4)**	**VLE(5)**	**Mean**	**Std. Dev**
There is fast dissemination of information resources regardless of geographical location	2(1.0%)	4(2.1%)	64(33.2%)	19(9.8%)	104(53.9%)	4.13	1.01
Provide free learning, teaching and research resources.	0	2(1.0%)	4(2.1%)	64(33.2%)	123(63.7%)	4.49	.685
One develops knowledge and skills needed in various academic areas.	0	2(1.0%)	10(5.2%)	76(39.4%)	105(54.4%)	4.47	. 646
Open sharing of resources with other members of faculty and learners	0	2(1.0%)	21(10.9%)	72(37.3%)	96(50.8%)	4.38	.719
Obtain information resources that help to improve curriculum.	4(2.1%)	2(1.0%)	12(6.2%)	76(39.4%)	99(51.3%)	4.37	.819
There is collaborative development of the curriculum.	0	2(1.0%)	25(13%)	74(38.3%)	92(47.7%)	4.33	.738
Access to affordable and high-quality information resources	0	4(2.1%)	21(10.9%)	78(40.4%)	90(46.6%)	4.32	.749
Avail opportunities for publishing and promoting resources.	2(1.0%)	4(2.1%)	22(11.4%)	92(47.7%)	73(37.8%)	4.19	.797
Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy = .754							
Bartlett's Test of Sphericity = .000							

Table 4.4's findings provide a KMO value of 0.754 and a Bartlett's test of sphericity that is significant (P=.000) for all aspects of adoption of OERs for teaching and research by teaching staff. In this variable (adoption of OERs in higher learning institutions), the results

of the Bartlett's test of sphericity and KMO verified that the sampling was adequate, hence, the aspects for determining the adoption of OERs in teaching and research by teaching staff were regarded adequate; hence, used in the analysis. The results further show a high rating on all aspects of adopting Open Educational Resources in teaching and research by teaching staff, where the mean value was above 4 and a standard deviation was below one in each case. This shows that the mean values were stable considering that the deviation from the mean for each aspect was small.

The results in Table 4.4 show the aspects that had the highest mean were regarding free learning, teaching, and research resources (mean = 4.49). This was followed by development of knowledge and skills needed in various academic areas (mean = 4.47), and the usefulness of OERs in enhancing sharing of resources with other members of faculty and learners was noted (mean = 4.38). OERs were also described as useful not only in improving (mean = 4.37). Also, in enabling collaborative development of the curriculum (mean = 4.33), although aspects such as OERs affordability and high quality (mean = 4.32). Opportunities for publishing and promoting resources (mean = 4.19), and OERs enabling fast dissemination of information resources regardless of geographical location (mean = 4.13) had lowest rating in the Table 4.4, a considerable high number of respondents also indicated a large and high extent to these two aspects.

The above findings indicate that members of faculty had adopted OERs in enhancing teaching and research in the universities. The results of the interview with e-resources and university librarians concurred with these findings. Although the adoption of OERs by faculty members in teaching and research was not widespread, the results from teaching

staff and from e-resources and university librarians confirmed that there were noticeable initiatives in the targeted universities. A study by Hilton III (2020) had demonstrated that physical learning materials are becoming expensive by the day, necessitating seeking of alternatives. Many learners and faculty members were found to favor OERs in their learning and teaching. Besides Bahrawy (2019) showed the necessity for developing OERs as technological tools in education. Therefore, these studies support the research findings on the adoption of OERs in selected Kenyan universities.

The results show that members of faculty acknowledged the value of OERs in higher learning institutions. The results seem to suggest that members of faculty had started reaping the benefits of adapting the contents to local context, hence, there were better products in terms of curriculum improvement on some courses. The findings agree with Mays (2017) study by showing that OERs are instrumental in transforming pedagogy in African universities. However, the low uptake of OERs is testimony of Mays (2017) claims that literature on OERs have no theoretical analysis; hence, lack massive adoption in African universities.

The members of faculty saw value of OERs owing to opportunity to access to free world's best courses, content and tools, adaptability of the same to local context; speed in the dissemination of information, access to affordable and high-quality information resources, enhanced collaborative development of curriculum, and increased opportunities for publishing and promoting knowledge and resources. The result confirmed the significance of OERs in higher learning institutions. This agrees with the studies conducted by Inamorato dos Santos et al. (2016); Kwan (2011); Mays (2014) and Ngimwa and Wilson (2012); Bialobrzeska and Louw (2014, p. 11); World Bank (2019) on OERs, showing their

significance in improving higher education and in curriculum development. The authors also argued that OERs contribute to teaching competence and provide access to current information sources for effective teaching and learning.

The study cross-examined the responses gathered from e-resources and university librarians during interview on why their libraries had considered providing Open Education Resources. Twenty-nine statements were received whose analysis led to six themes that included affordability, availability, resource sharing, unrestricted, transferability and collaborations. These themes further demonstrate the value and benefits of OERs. University librarian number three (UL3) noted,

> "*With limited funding in the library, OERs help to bridge the gap by providing access to free quality resources, hence saving costs of information materials. Our university is keen on moving with the new technological advances hence it has started investing on ICT infrastructure which will enable utilization of e resources like OERs"*

The e-resources librarian number two (EL2)) submitted,

> *"Open Educational Resources supplement the ones that the university has subscribed. This enriches the library collection. We have started realizing the importance of OERs because they are flexible, can be accessed any time and they have no geographical boundaries.".*

Like Babson Survey Research Group (2014) had observed, university librarians must lead in creating awareness among faculty members to champion textbook substitute strategies through the adoption of OERs. Besides, they must educate them on integrating OERs into their courses. Moreover, Open Educational Resources enjoys 24/7 availability and

therefore, the end users can access them anywhere and anytime. The university librarian number one (UL1) further noted that,

"*The distance and e-learning modes of education delivery are becoming increasingly widespread, and therefore, OERs are helpful in supporting online learning and teaching".*

These findings agree with the assertions of Awandu (2021) and Kathula (2021, p. 106) that since the Covid-19 epidemic, numerous institutions of higher education have adopted e-learning in considerable numbers. The need for e-learning that was created by the pandemic still remains to ensure education continuity and avoid disruptions of any kind to learning. Therefore, institutions need effective approaches to provide digital avenues for active learning. So far, OERs have been effectively suited to serve this purpose.

The re-usability was another reason librarian preferred the adoption Open Educational Resources in teaching. University librarian number one (UL1) said,

"Faculty members can re-focus and customize the Open Educational Resources to fit their needs without worries about permissions. No need to re-invent the wheel. The library has a strong ICT team who are ready to support members of faculty".

These findings agree with Marshall (2008, p. 4) and Salem (2016, p. 1) who claimed that OER supports the use, sharing, and re-use of information. With the information available in these resources, it becomes readily available without the need to create new information for use. The e-resources librarian (EL1) also concurred with the teaching staff that,

"*OERs enable fast dissemination of information resources hence effective in supporting diffusion of knowledge to the academia. We have started recognizing the significance of OERs because they present flexible library resources that can be accessed anywhere at any time"*

In this study, it was noted that some faculty members had not adopted Open Educational Resources in teaching and research work. Libraries undoubtedly facilitate the resources for teaching, learning, and research, hence, the researcher sought views from university librarians on what hindered the usage of OERs for the teaching and research purposes. The responses provided during the interview thematically identified the lack of awareness of the existence of OERs and application of creative common licenses, repurposing, limited IT skills to fully utilize the electronic resources, negative attitudes about OERs, poor internet connection, challenge of infrastructure for accessing especially the online information resources while outside the campus, and absence of a policy on OERs in the university. As indicated by e resources librarian number two, (EL2),

"*Members of faculty sometimes do not consult librarians when developing programs and they only bring the librarian on board at the time when the programme is being approved. If the OERs are to be adopted the librarians and the faculty members have to work together and librarians need to train the university fraternity on awareness about OERs".*

This is consistent with the findings of CENGAGE (2016) and Adala (2016, p. 65) that lack of awareness is one of the challenges hindering the adoption of OERs in universities. The study also confirmed Hori et al. (2015, p. 2)'s assertions that many faculty members lack the necessary skills, mainly the IT skills to use OERs. This creates negative attitudes towards the use of OERs, hence their low adoption.

Nevertheless, the university librarians said that they were making some efforts to enhance the adoption of OERs by teaching staff. Some notable measures stated by university

librarians included sending links to faculty members on OERs that are useful to specific units. On the same, e-resources librarian number four (EL4) said,

> "*Our library provides information literature search service to members of faculty, and depending on information requested, the library directs / guides them to the appropriate sources of the information which are sometimes the OERs."*

The university librarian number four added that, *"Our library usually encourages faculty members who have cited Open Educational Resources in research paper to publish such findings to demystify OERs and this will contribute to elevating their value in teaching and research".*

The above findings show that although the adoption of Open Educational Resources in teaching and research was relatively good, there were eminent challenges that seemed to be affecting the rate of adoption. In agreement to this observation, the librarian number one (UL1) said, "*most faculty members prefer traditional education resources."* This can be attributed to technophobia or to some reasons mentioned in above discussion. Besides, Open Educational Resources are available via Internet and therefore, users of OERs require information retrieval skills. However, university librarian number three (UL3) noted,

"*Some teaching staff had poor information literacy skills whereby you find that they are not able to search properly for relevant information materials, and also unable to evaluate their search results well*". This indicates a need for measures to address the

aforementioned challenges to demystify Open Educational Resources, build capacities and provision of continuous support from libraries.

4.5 Awareness of OERs at higher learning institutions

This first objective of this study aimed to assess the level of awareness of OERs among faculty members in selected universities in Kenya. The information regarding this construct was provided by three categories of respondents; that is, teaching staff, university librarians and e-resources librarians. The study adopted a concurrent nested/embedded design in analyzing and interpreting data from the above three categories of respondents. This was because the quantitative data collected from the teaching staff was predominant when discussing results of each variable; although, it was not alone sufficient in explaining the full state of awareness of OERs among teaching staff. As such, the qualitative data from university librarians and e-resources librarians was embedded / nested to complement the quantitative data. As such, the information provided by the library staff helped to clarify the adoption process of OERs and effort made to create awareness of the same at higher learning institutions.

The first independent variable in this study was the concept of OER awareness in higher learning institutions. By providing teaching staff with a number of tabular statements regarding their familiarity with OERs in higher education institutions, it was evaluated as a latent variable. The respondents were required to express their opinions on a 5-point Likert scale, which ranged from 1 to 5; where, NA =not at all (1), SE = to a small extent (2), ME = to a moderate extent (3), LE = to a large extent (4), and VLE = to a very large extent (5). Each statement posed was addressing an indicator / aspect regarding the awareness of OERs in higher learning institutions. The aspects measured examined the

awareness in terms of knowledge of the sites for OERs, familiarity with OERs and the open access licenses by creative commons; willingness to give OERs a trial, knowledge on how to evaluate OERs, and ability to use them in teaching.

The responses to each indicator of OER awareness at higher education institutions were added up to quantify the construct as a composite or latent variable. The mean values and standard deviation for each indicator were calculated in this context. This aided the researcher's interpretation of the descriptive results. For each independent variable, KMO and Bartlett's test of sphericity were calculated to determine whether the sample was sufficient to be taken into account in the data analysis. The researcher had confidence in using the indicators to measure the concept as a latent variable because to the results of the KMO and Bartlett's test of sphericity. The results regarding the awareness of OERs in higher learning institutions are shown in Table 4.5. below

Table 4. 5 *Awareness of OERs among members of faculty*

Awareness of OERs among members of faculty (n = 193)	**VSE(1)**	**SE(2)**	**ME(3)**	**LE(4)**	**VLE(5)**	**Mean**	**Std. Dev**
I know the sites for OERs	4(2.1%)	13(6.7%)	42(21.8%)	81(42%)	53(27.5%)	4.36	.751
I know what OERs are	2(1.0%)	6(3.1%)	22(11.4%)	79(40.9%)	84(43.5%)	4.23	.848
I am willing to give OERs a trial	0	6(3.1%)	28(14.5%)	83(43%)	76(39.4%)	4.19	.795
I know OERs are useful in teaching and research	0	10(5.2%)	27(14%)	78(40.4%)	78(40.4%)	4.16	.854
I am aware of open licenses by CC	10(5.2%)	13(6.7%)	39(20.2%)	54(28%)	77(39.9%)	3.91	.983
I know how to evaluate OERs	4(2.1%)	13(6.7%)	42(21.8%)	81(42%)	53(27.5%)	3.86	.966

Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy = .653
Bartlett's Test of Sphericity = .002

Table 4.5's findings demonstrate that a KMO value of 0.653 and a Bartlett's test of sphericity are relevant for factors relating to faculty members' awareness of OERs. The effectiveness of sampling was confirmed by the KMO and Bartlett's test of sphericity results; hence, the indicators on awareness of OERs among members of faculty were regarded adequate for use in the analysis. The results further show a high rating on all aspects regarding awareness of OERs among members of faculty. This is because the mean value was above 3.8 and a SD below one in each case. This shows that the mean values were stable considering that the deviation from the mean was small.

The results in Table 4.5 show that members of faculty understood what OERs are (mean = 4.23, SD = .848), were aware of the sites for OERs (mean = 4.36, SD = .751), knew their usefulness in teaching (mean = 4.16, SD = .854) and were willing to try them out (mean = 4.19, SD = .795). More than half of the faculty members also indicated that they were aware of OERs open licenses by CC (mean = 3.91, SD = .983) and knew how to evaluate them (mean = 3.86, SD = .966). These results indicate that teaching staff were aware of OERs. This level of awareness was high; hence, the teaching staff were expected to be gainfully utilizing OERs. These results were different from the findings submitted by Butcher and Hoosen (2019), UNESCO (2020) and CENGAGE (2016), who cited the need for raising OER awareness among faculty members. If anything, these authors established that lack of awareness among faculty was one of the most significant challenges facing the adoption of OERs in higher learning institutions.

The e-resources and university librarians were asked to describe the measures taken by their libraries to increase the awareness of OERs by teaching staff at their institutions. The measures reported during the interview as indicated by e resources librarian number three (EL3) who said,

"In our library we normally support OER awareness through faculty training sessions, in deans meeting, through email communication, during e-resources week, academic workshops, and departmental faculty board meeting, and sharing information in social networks".

Despite the efforts, three university librarians said that, "s*ome faculty members still confuse OERs with open access resources. They fail to understand that the CC license differentiates OERs from Open Access resources".*

On additional measures undertaken by libraries to increase awareness of OERs by faculty members, the e-resources librarian number one (EL1) said,

"We have improved operations in the library and I have created a special link on the library website to interest staff and students. We have also incorporated / integrated a link to Open Educational Resources with other e-resources subscribed to by the university".

The e-resources librarian number one further said,

"*We have scheduled bi-annual information retrieval training for faculty members during which staff are introduced to OERs. The library also creates awareness during new staff induction".*

Having established a higher level of awareness of OERs among teaching staff at higher learning institutions, the study wanted to empirically determine the correlation between awareness and the adoption of OERs in teaching and research.

4.5.1 Correlation between awareness and the adoption of OERs in teaching and research

Pearson correlation was adopted to assess the correlation between awareness and the adoption of OERs in teaching and research. Table 4.6 provides the findings.

Table 4. 6 *Correlation between awareness and the adoption of OERs*

			X1	Y
Pearson's rho	X1	Correlation Coefficient	1.000	
		Sig. (2-tailed)	.	
		N	193	
	Y	Correlation Coefficient	.315**	1.000
		Sig. (2-tailed)	.000	.
		N	193	193

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

According to the findings shown in Table 4.6, there is a positive relationship between faculty members' awareness of Open Educational Resources and their adoption in research and teaching at selected universities in Kenya. This is due to r =.315 and p = 0.000. This demonstrates that the p-value is less than 0.05, indicating that there is a statistically significant relationship between faculty members' awareness of Open Educational Resources and their adoption of OERs in their teaching and research. This means that the relationship between the two variables is positive and statistically significant. This suggests that a rise in faculty members' awareness of Open Educational Resources will result in a rise in the adoption of OERs in both teaching and research. These data suggest that the adoption of Open Educational Resources in teaching and research at the selected universities in Kenya is significantly influenced by the faculty members' level of awareness of these resources. Indeed, the findings support the assertion by Karunanayaka, Fernando and Silva (2013) on the criticality of raising awareness on OERs among faculty members to increase their adoption and full exploitation.

4.6 Status of OERs uptake by members of faculty

The second objective of this study aimed to examine the status of OERs uptake by faculty members in selected universities in Kenya. The information regarding this construct was provided by three categories of respondents; that is, teaching staff, university librarians and e-resources librarians. Multiple statements about the status of OERs uptake by faculty members were presented to respondents in a tabular format since the status of OERs uptake by faculty members was evaluated as a latent variable. The respondents were required to give their opinions on a 5-point Likert scale, ranging from 1 to 5.; where, NA =not at all (1), SE = to a small extent (2), ME = to a moderate extent (3), LE = to a large extent (4), and VLE = to a very large extent (5). Each statement posed was addressing an indicator regarding the status of OERs uptake by members of faculty. The specific aspects measured focused on faculty referring learners to OERs and how to engage in re-use, remix and revising OERs, using OERs when developing course outline, new curriculum or updating existing ones, and when writing conference papers.

The researcher was able to measure the status of OERs uptake by faculty members as a composite / latent variable by adding the responses received against each indication. In this context, each indicator's mean value and standard deviation were calculated. This gave the researcher more context for interpreting the descriptive findings. To determine whether the sample was sufficient to be taken into account in the data analysis for each independent variable, KMO and Bartlett's test of sphericity were computed. Table 4.7, a summary of the findings, is indicated.

Table 4. 7 *Status of OERs uptake by members of faculty*

Status of OERs uptake by members of faculty (n = 193)	**VSE(1)**	**SE(2)**	**ME(3)**	**LE(4)**	**VLE(5)**	**Mean**	**Std. Dev**
I refer learners to OERs and how to engage in re-use, remix and revise OER	4(2.1%)	8(4.1%)	16(8.3%)	93(48.2%)	72(37.3%)	4.21	.863
I utilize OERs in updating existing curriculum	2(1%)	4(2.1%)	19(9.8%)	73(37.8%)	45(23.3%)	4.08	. .826
I have used OERs when writing conference papers	6(3.1%)	7(3.6%)	39(20.2%)	75(38.9%)	66(34.2%)	3.99	.1.031
I use OERs for course outline development	6(3.1%)	14(7.3%)	28(14.5%)	93(48.2%)	52(26.9%)	3.88	.953
I utilize OERs in developing new curriculum	4(2.1%)	24(12.4%)	44(22.8%)	82(42.5%)	41(21.2%)	3.71	.977
Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy = .695							
Bartlett's Test of Sphericity = .000							

According to the data in Table 4.7, the status of faculty members' adoption of OERs is indicated by a KMO value of 0.695 and a Bartlett's test of sphericity that is significant (P =.000). The KMO and Bartlett's test of sphericity results supported the adequacy of the sampling for this construct; hence, the indicators on uptake of OERs among members of faculty were regarded adequate for use in the analysis. The results further show a high rating on all aspects on the status of OERs uptake by members of faculty. This is because the mean value was above 3.7 and a SD around one in each case. This shows that the mean values were stable considering that the deviation from the mean was small.

Furthermore, according to the results in Table 4.7, most teaching staff, 93(48.2%) usually refer learners to OERs, where 93(48.2%) said that they do it to a large extent, while 52(26.9%) was to a very large extent (mean = 4.21). This finding shows a wide acceptance and use of OERs in supporting learning in universities. It also shows the value of OERs in knowledge discovery and acquisition. This finding implies a need for close collaborations between the library and faculty in identifying appropriate OERs for a given unit. These findings are also supported by Okonkwo (2012) submission that OERs are becoming accepted as sources of information in higher learning institutions. However, they disagree with Butcher and Hoosen (2019) who claimed that there's little proof of OER acceptance in many African countries. Nevertheless, the lack of proof cannot be used to conclude that people are not accepting OERs in higher learning institutions. Besides, Butcher and Hoosen (2019) presented a significant study showing the faculty members are willing to use OERs as information sources in higher learning institutions.

From the results, the teachings staff indicated that they usually use OERs while developing course outline (mean = 3.88). This demonstrated aspects of confidence that members of faculty had on OERs. Notably, university education is wide and requires a learner to have broad-based perspectives, hence, various reference materials are provided for one unit. Ordinarily, a course outline usually provides a list of core texts book(s) that a learner can utilize. A list of further reading references is also provided which helps a learner to understand a given concept or topic further and clearly. By using Open Educational Resources, a lecturer is therefore able to enrich course outlines.

A considerable high number of teaching staff, 73(37.8%) said that they utilize OERs in updating existing curriculum to a large extent, while 45(23.3%) was to a very large extent

(mean = 4.08). OERs are also used by members of faculty when developing new curriculum, 82(42.5%) said they were doing that to a large extent, while 41(21.2%) did it to a very large extent (mean = 3.71). These findings show that some faculty members had integrated OERs into the curriculum and others had also used them to develop new curricula. This is achieved by including some reference materials from OERs as sources of information. The utilization of OERs to update existing curriculum may also mean including certain approaches or newer contents with a view to improving what already exists. According to the guidelines from the Commission for University Education (2019), curriculum ought to be revised after every learning cycle; hence the OERs are useful in the exercise. A comment from university librarian number (UL4) corroborated with this finding saying,

"*Some lecturers integrate them as part of the content they use for teaching by providing students with links to access specific OER*."

Developing a new curriculum requires capturing emerging issues in a given field so that a learner may be prepared to handle the contemporary, and upcoming issues and trends. Using OERs when developing new curriculum, therefore helps a member of faculty to incorporate global trends and emerging issues noted from other countries. Besides, OER Africa (2016) claims that the curriculum is a challenge in local universities, arguing that it requires significant attention. This creates the need to use OER to openly license educational materials to address the curriculum challenges.

The findings further show that OERs are also used for professional development by some members of faculty; where, 75(38.9%) said that they use them when writing conference

papers to a large extent, while 66(34.2%) said to a very high extent. This indicates that some faculty members consult OERs when writing conference papers. This finding further amplifies the value of Open Educational Resources in that some OERs have content that is scholarly in nature and that is why some teaching staff utilize them for professional development.

The study sought opinion of librarians on how OERs had been received by members of faculty. Their responses seemed to concur with the findings obtained from the teaching staff. The uptake of Open Educational Resources was largely described as positive by most university librarians. The university librarian number two (UL2) said,

"*Open Educational Resources are easily accessible, downloadable and have little limitations as compared to the subscribed ones. The university has an institutional repository that showcases the university research output. Most faculty members refer their post graduate students to the repository when conducting research".*

Another comment from university librarian number one concurred (UL2) saying, "*Our faculty members received OERs very well. Most lecturers have embraced and integrated them in their day-to-day research and teaching to supplement the physical books."* Nevertheless, the e-resources librarian number three (EL3) noted that, "*Some teaching staff rarely ask for OERs unless guided by a librarian concerning their availability and importance".*

To improve this above situation, the university librarian number four (UL4) said, "*we are making an effort to increase sensitization meetings with faculty members regarding OERs".*

4.6.1 Correlation between the status of OERs uptake by members of faculty and the adoption of OERs in teaching and research

The results presented in the preceding section has revealed a state of OERs uptake by members of faculty. The study wanted to examine how the status of OERs uptake by members of faculty related with adoption of OERs in teaching and research at selected universities in Kenya. To evaluate the correlation between the two variables, the Pearson correlation analysis was used. The results are presented in Table 4.8.

Table 4. 8 *Correlation on OERs uptake by members of faculty*

			X2	Y
Pearson rho	X2	Correlation Coefficient	1.000	
		Sig. (2-tailed)	.	
		N	193	
	Y	Correlation Coefficient	.413**	1.000
		Sig. (2-tailed)	.000	.
		N	193	193

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

According to the findings shown in Table 4.8, there is a positive relationship between the adoption of Open Educational Resources (OERs) in teaching and research at selected institutions in Kenya and the status of OERs uptake by faculty members. This is due to r =.413 and p = 0.000. This demonstrates that the p-value is less than 0.05, indicating that there is a statistically significant relationship between faculty members' OERs uptake and their adoption of OERs for teaching and research. This indicates that there is a positive and statistically significant relationship between the two variables. This suggests that an increase in faculty members' uptake of Open Educational Resources would result in a rise in the adoption of OERs in both teaching and research. These findings indicate that the

uptake of OERs by members of faculty is significant in determining the adoption of the same in teaching and research at selected universities in Kenya.

4.7 How OERs support teaching in universities

The third objective of this research was to evaluate how OERs were used to enhance teaching in selected universities in Kenya. Three categories of respondents contributed information about this construct; that is, teaching staff, university librarians and e-resources librarians. OER uses in supporting teaching were evaluated as a latent variable, hence numerous statements based on this variable were tabulated and presented to respondents. The respondents were asked to give their opinions on a 5-point Likert scale, ranging from 1 to 5; where, NA =not at all (1), SE = to a small extent (2), ME = to a moderate extent (3), LE = to large extent (4), and VLE = to a very large extent (5). Each statement posed was addressing an indicator regarding the uses of OERs in supporting teaching. The specific aspects measured were about adaptability of OERs to the local context, enhanced sharing and dissemination of knowledge and resources across the world, access to affordable, free and high-quality resources, impact on knowledge and skills development in various academic areas, and creation of opportunities for publishing and promoting information resources.

The researcher was able to measure OERs' uses in supporting teaching as a composite or latent variable by adding up the responses obtained in response to each indicator. In this context, each indicator's mean value and standard deviation were calculated. This gave the researcher more understanding of the descriptive findings. To determine whether the sample was sufficient to be taken into account in the data analysis for this construct, KMO

and Bartlett's test of sphericity were computed. Table 4.9 provides an overview of the results.

Table 4. 9 *Uses of OERs in supporting teaching in higher learning institutions*

Statements on OERs and teaching (n = 193)	**VSE(1)**	**SE(2)**	**ME(3)**	**LE(4)**	**VLE(5)**	**Mean**	**Std. Dev**
Fast dissemination of knowledge across the world.	0	7(3.6%)	9(4.7%)	75(38.9%)	102(52.8%)	4.41	.745
Lead to improvement of courses.	0	2(1%)	17(8.8%)	84(43.5%)	90(46.6%)	4.36	.686
Access to affordable and high-quality resources	2(1%)	2(1%)	11(5.7%)	97(50.3%)	81(42%)	4.31	.719
Enhance development of knowledge and skills.	1(0.5%)	4(2.1%)	10(5.2%)	100(51.8%)	78(40.4%)	4.30	.708
Sharing of resources with other faculty members.	2(1%)	0	20(10.4%)	90(46.6%)	81(42%)	4.28	.734
It is easy to adapt OERs to the local context.	4(2.1%)	8(4.1%)	15(7.8%)	79(40.9%)	87(45.1%)	4.23	.913
Create opportunities for publishing and promoting information resources.	2(1%)	22(11.4%)	33(17.1%)	68(35.2%)	68(35.2%)	4.17	.814
Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy = .796							
Bartlett's Test of Sphericity = .000							

The results are shown in Table 4.9, where the KMO value is 0.796 and the Bartlett's test of sphericity is significant (P =.000) for the elements of using OERs to support teaching. The

results on KMO and the Bartlett's test of sphericity confirmed the adequacy of sampling for this construct; hence, the indicators on the uses of OERs in supporting teaching were regarded adequate for use in the analysis. The results show that all the aspects on the uses of OERs in supporting teaching have high ratings; where, the majority of teaching indicated high or very high extent, and mean values being above 4, while the SD is below one in each case. This shows that the mean values were stable considering that the deviation from the mean was small in each case.

From the findings, it was clear that OERs have enabled fast dissemination of knowledge across the world (mean = 4.41). This was probably because one is able to access affordable and high-quality resources (mean = 4.31). This shows how the presence of OERs has contributed to the spread of knowledge across the globe. The disseminated knowledge which is in form of quality resources which would have been costly to access before. The results show that the disseminated knowledge is utilized by members of faculty to improve courses at the universities (mean = 4.36). This leads to further development of knowledge and skills (mean = 4.30) and facilitate wide sharing of resources with other faculty members (mean = 4.28). It is also clear that OERs create opportunities for publishing and promoting information resources (mean = 4.17). In addition to these findings, the e-resources librarian number one (EL1) said, "*some members of faculty see OERs as substitutes to the digital resources provided by the library. As librarians we train faculty members on the difference between digital resources and OERs by making them aware of the different Creative Commons Licenses that are embedded on OER resources*"

The above findings present Open Educational Resources as a vital commodity that facilitates knowledge exchange and avenue for disseminating academic and scholarly

information to academic and scholarly communities. Along the same vein, university librarian number three (UL3) indicated that,

"*OERs expose teaching staff to other teaching approaches and content that have worked elsewhere. This allows the transfer of knowledge and best practices which minimizes duplication of efforts and OERs are also learner centered".*

The study also sought to understand the kind of assistance the library provides to members of faculty to help them adopt OERs in teaching. From this interview question which was posed to university and e-resources librarians, 21 statements were received whose main themes were narrowed down to the library working with IT department to ensure maintenance of ICT infrastructure, facilitating one-on-one advanced information retrieval training, ensuring long term visibility and access of OERs via the library website, providing LibGuides to help find high quality OERs, and assisting lecturers to develop effective search strategies for fast identification of OERs.

The e-resources librarian number four (EL4) said, "*I work closely with faculty members to assist them to identify and evaluate quality OERs. Librarians usually facilitate training sessions on use of OERs and other digital library resources that support blended and e learning content development".*

The study was also interested in determining how frequently faculty members used OERs. In that connection, several statements regarding use of OERs by members of faculty were prepared and presented to respondents, requiring them to indicate their opinion in a 5-level Likert rating scale, ranging from 1 to 5; where, NA =not at all (1), SE = to a small extent (2), ME = to a moderate extent (3), LE = to a large extent (4), and VLE = to a very large

extent (5). The study endeavoured to measure aspects such as awareness of OERs repositories, the understanding of the conditions that go with creative commons licenses, ability to adapt the OERs to local context, knowledge in reusing, reworking and remixing materials legally, enhancing learning outcomes, wide use of OERs by other members of faculty known to the respondent. The adoption and usage of OERs by teaching staff was measured as a composite / latent variable by the researcher using the total of responses collected for each indicator. In this context, each indicator's mean value and standard deviation were calculated. This gave the researcher more context for understanding the descriptive findings. In a similar manner, KMO and Bartlett's test of sphericity were computed to determine whether the sample was sufficient to be taken into consideration in data analysis. Table 4.10 below provides an overview of the results.

Table 4. 10 *The use of OERs by teaching staff*

Adoption of OERs for teaching (n = 193)	**VSE(1)**	**SE(2)**	**ME(3)**	**LE(4)**	**VLE(5)**	**Mean**	**Std. Dev**
OERs are being used by other members of faculty that I know	10(5.2%)	19(9.8%)	43(22.3%)	69(35.8%)	52(26.9%)	4.19	.835
I'm aware of OERs repositories and can access them	2(1%)	22(11.4%)	33(17.1%)	68(35.2%)	68(35.2%)	3.92	1.035
OERs are equivalent with traditional educational resources	8(4.1%)	37(19.2%)	51(26.4%)	63(32.6%)	34(17.6%)	3.78	1.029
I'm able to adapt the OERs to local context	6(22%)	22(11.4%)	37(19.2%)	85(44%)	43(22.3%)	3.71	1.035
I understand the options for reuse and stipulated conditions of Creative Commons licenses regarding OERs.	4(2.1%)	30(15.5%)	41(21.2%)	66(34.2%)	52(26.9%)	3.68	1.094
Through use of OERs learning outcomes are achieved	1(0.5%)	9(4.7%)	19(9.8%)	87(45.1%)	77(39.9%)	3.40	1.110
Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy = .833							
Bartlett's Test of Sphericity = .000							

According to the results shown in Table 4.10, the adoption and use of OERs by teaching staff is significantly correlated with a KMO value of 0.833 and a Bartlett's test of sphericity (P=.000). The KMO and Bartlett's test of sphericity results supported the suitability of the sampling for this construct; hence, the indicators on the adoption and use of OERs by teaching staff were regarded adequate for use in the analysis. The results show that all the adoption and use of OERs by teaching staff have relatively high ratings; where, the majority of teaching staff indicated high or very high extent, and mean values being above 3.4, while the SD is around one in each case. This shows that the mean values were stable considering that the deviation from the mean was small in each case.

From the findings in Table 4.10, faculty members were aware of other colleagues who were using OERs (mean = 4.19) and were also aware of OERs repositories (mean = 3.92). The fact that more than 60% of faculty members were aware of other colleagues who were using OERs is an indication of knowledge exchange amongst themselves. This meant that a considerable number of teaching staff talk about OERs and that a good number were known to be using them. This supports the claims by Hilton III (2020) who showed that teaching staff have significant knowledge concerning OERs. Apart from understanding about OERs many faculty members use them as information sources in their teaching.

The teaching staff further said that they were aware of OERs repositories which include and are not limited to OER Africa, OpenUCT, AVU, NOUN eCourseware and Unisa Open. This shows that a considerable number of teaching staff were aware of the sources of OERs, and that there was good information exchange amongst teaching staff. The study noted that the availability of Open Educational Resources repositories was very significant in facilitating the diffusion and sharing of knowledge amongst teaching staff.

This may explain why 66(34.2%) said that they understood the options for reuse and the stipulated conditions of creative commons licenses regarding OERs to a great extent, while 52(26.9%) indicated to a very high extent (mean = 3.68). In addition, more than 50% of teaching staff said that they were able to adapt the OERs to local context (mean = 3.71). This shows that teaching staff were not only aware of OERs, but some were also actively adapting them to local context within the stipulated creative commons licenses conditions. These results support the assertion by Adala (2016, p. 19) on the increasing adoption of OERs by faculty members in various universities in Kenya.

This observation is also supported by the high number of teaching staff who described OERs as being equivalent to the traditional educational resources (mean = 3.78). This may explain why more than 50% of teaching staff said that the use of OERs had contributed to the achievement of learning outcomes as indicated by a mean of 3.40. The findings from university librarians also had similar observation. The University librarian number one (UL1) submitted,

> "*Some members of faculty are able to customize their class instructions using Open Educational Resources, and while others incorporate OERs as part of the teaching content by providing links to students for accessing specific OERs".*

These findings provide a compelling conviction that the rates of utilization of OERs among teaching staff in teaching was relatively high. This confirms the versatility of OERs and hence, the need for libraries to strengthen awareness programs among teaching staff. This supports the findings of Inamorato dos Santos et al. (2016) and (Pete et al. (2017) on the increasing use of OERs in higher learning institutions across the globe.

To improve the level at which teaching staff engage with Open Educational Resources university librarian number one (UL1) insisted that,

"There is need to strengthen orientation programs and promotional information retrieval trainings concerning open educational resources and enriching digital institutional repositories with links to OERs". Besides, Bradshaw, Younie, and Jones (2013, p. 189) had submitted that digital literacy is critical on OERs. Therefore, training users on how to use OERs is significant in supporting their adoption.

4.7.1 Correlation between the uses of OERs in supporting teaching and the adoption of OERs in teaching and research

The results presented in the preceding section have exposed how OERs are used in supporting teaching by members of faculty. It was therefore important to determine how the uses of OERs in teaching by members of faculty related with the adoption of OERs in teaching and research at selected universities in Kenya. In that connection, the Pearson correlation analysis was conducted to assess the correlation between the two variables. The results are presented in Table 4.11.

Table 4. 11 *Correlation on OERs in supporting teaching and research*

			X3	Y
Pearson rho	X3	Correlation Coefficient	1.000	
		Sig. (2-tailed)	.	
		N	193	
	Y	Correlation Coefficient	.439**	1.000
		Sig. (2-tailed)	.000	.
		N	193	193

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

According to the data in Table 4.11, there is a positive relationship between the use of OERs by faculty members to support their teaching and the adoption of OERs in Kenya's

selected universities for teaching and research. As a result of r =.439 and p=0.000. This demonstrates that the p-value is below 0.05. and, therefore, the relationship between the uses of OERs in supporting teaching by members of faculty and the adoption of OERs in teaching and research is statistically significant. This indicates that there is a positive and statistically significant relationship between the two variables. This suggests that an increase in faculty members' use of OERs to support teaching would result in a favorable rise in OER adoption in both teaching and research. These results suggest that using OERs to support teaching by members of faculty is significant in determining the adoption of the same in teaching and research at selected universities in Kenya.

4.8 How OERs support research activities among members of faculty

The fourth objective was interested in finding out how OERs support research activities among members of faculty. The information regarding this construct was provided by three categories of respondents; that is, teaching staff, university librarians and e-resources librarians. Teaching staff research activities were evaluated as a latent variable, therefore numerous statements based on this variable were tabulated and presented to respondents. The respondents were instructed to give their opinions on a 5-point Likert scale, ranging from 1 to 5; where, NA =not at all (1), SE = to a small extent (2), ME = to a moderate extent (3), LE = to large extent (4), and VLE = to a very large extent (5). Each statement posed was addressing an indicator regarding the effects of OERs on research activities by teaching staff. The specific aspects measured were about open resources for research, seamless accessibility, and flexible, allowing members of faculty to repurpose the content, preservation in OER repositories, sharing of knowledge, increased visibility and reputation, connections and networking with colleagues around the world.

The researcher was able to quantify the effects of OERs on teaching staff researchers' research activities as a composite or latent variable by adding the responses collected for each indicator. The mean value and standard deviation of each indicator were calculated in this context. The researcher was able to comprehend the descriptive findings to a greater extent as a result. Similar calculations were made for KMO and Bartlett's test of sphericity, which aided in determining whether the sampling was sufficient to be taken into account in the data analysis for this construct. Table 4.12 below provides an overview of the findings.

Table 4. 12 *How OERs support research activities by teaching staff*

How OERs support research activities Research (n = 193)	**VSE(1)**	**SE(2)**	**ME(3)**	**LE(4)**	**VLE(5)**	**Mean**	**Std. Dev**
OERs enable free sharing of knowledge, hence resourceful when developing manuscripts.	2(1%)	0	19(9.8%)	79(40.9%)	93(48.2%)	4.36	.746
OERs enable fostering connections with colleagues around the world, hence opportunities for multidisciplinary research.	0	5(2.6%)	17(8.8%)	75(38.9%)	96(49.7%)	4.35	.752
OERs promote lifelong learning hence good in research.	2(1%)	2(1%)	14(7.3%)	88(45.6%)	87(45.1%)	4.32	.745
OERs are used in research because they are accessible anytime anywhere	2(1%)	0	22(11.4%)	77(39.9%)	92(47.7%)	4.32	.760
By sharing OERs members of faculty gain through increased visibility.	0	7(3.6%)	21(10.9%)	68(35.2%)	97(50.3%)	4.31	.812
OERs avail open resources that support research	2(1%)	0	22(11.4%)	77(39.9%)	92(47.7%)	4.30	.809
OER repositories allow access to huge amounts of data and information useful in research.	0	2(1%)	25(13%)	81(42%)	85(44%)	4.28	.728
Enables digital preservation of innovations which provides bases for others to build upon	2(1%)	2(1%)	21(10.9%)	89(46.1%)	79(40.9%)	4.25	.774
OERs are used in research because they are flexible, and permit members of faculty to repurpose them for intended need.	0	6(3.1%)	23(11.9%)	82(42.5%)	82(42.5%)	4.24	.783
Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy = .669							
Bartlett's Test of Sphericity = .002							

The findings presented in Table 4.12 show a KMO value of 0.669 and a Bartlett's test of sphericity being significant (P= .002, df = 15) for aspects on the effects of OERs on research. The results on KMO and the Bartlett's test of sphericity confirmed the adequacy of sampling for this construct; hence, the indicators on how OERs support research activities were regarded adequate for use in the analysis.

The findings in Table 4.12 show high rating on all indicators provided to the respondents regarding the effects of Open Educational Resources on research, where more than 40% responded in affirmative indicating very high extent. The indicator that recorded highest mean values were: OERs enable free sharing of knowledge, hence resourceful when developing manuscripts (mean = 4.36), OERs enable fostering connections with colleagues around the world, hence opportunities for multidisciplinary research (mean = 4.35), OERs are used in research because they are accessible anytime anywhere (mean = 4.32), OERs promote lifelong learning hence good in research (mean = 4.32), by sharing OERs members of faculty gain through increased visibility (mean = 4.31); and OERs avail open resources that support research (mean = 4.30). It was clear that OERs are used in research because they are flexible, and permit members of faculty to repurpose them for intended need (mean = 4.24). Results further show that OER repositories allow access to huge amounts of data and information useful in research (mean = 4.28), and that they enable digital preservation of innovations which provide bases for others to build upon.

All the aforementioned aspects and features underscore the value of OERs in supporting research activities. From the results, it is clear that the teaching staff who use OERs for research needs, do so because they find OERs valuable, flexible, credible, freely accessible anytime and anywhere, and being unrestricted in the usage. In addition, the presence of

repositories allows access to huge amounts of data and information which are preserved and are accessible by all. The teaching staff further described OERs as good in enabling sharing of knowledge and in fostering networking and connections with colleagues around the world, hence, opportunities for multidisciplinary research. These aspects justify why teaching staff find OERs resourceful when developing manuscripts and other related research works.

The potential of OERs in supporting research is eminent and undisputable. Therefore, the e-resources and university librarians were asked during the interview to state how Open Educational Resources were supporting research activities at their universities. The responses gotten pointed out collaboration between researchers. Meaning that OERs enable researchers to collaborate in research works, for example in coming up with appropriate issues and aspects that need to be addressed in given discipline. University librarian number four (UL4) noted,

"OERs allow experimentation and innovation, when adapting, altering and sharing the content. This enables researchers to further explore concepts and bring local issues into perspectives". An opinion was sought whether OERs support research activities, e resources librarian number two (EL2) indicated that, "*OERs are critical in supporting research. Institutions need to embrace these new technologies like OERs because they are flexible and support both physical and online learners who are undertaking research".*

These results support the submission by Adala (2016) on the African Network for Internationalization of Education (ANIE) that advances quality research in universities. Awandu (2021) urges universities in Kenya to establish solutions to the challenges

experienced in the education sector in the modern world. It uses OERs to share information, showing how they are important in research. Regarding the specific measures taken by library to support members of faculty about adopting OERs in research activities, few efforts were noted from e-resources librarians which as indicated by e resources number three (EL3) who said,*"In our library we notify lecturers of known materials available in OER databases, conducting customized literature searches of OERs for a particular course. We also carry out special one-on-one training on OERs, locating OERs appropriate for certain research areas, and assisting them to publish materials under Creative Commons Licenses".*

4.8.1 Correlation between the uses of OERs in supporting research and the adoption of OERs in teaching and research

The results presented in the preceding section have expounded on how OERs are used in supporting research activities by members of faculty. It was therefore important to determine how the uses of OERs in research activities by members of faculty related with the adoption of OERs in teaching and research at selected universities in Kenya. In that connection, the Pearson correlation analysis was conducted to assess the correlation between the two variables. The results are presented in Table 4.13.

Table 4. 13 *Correlation on the uses of OERs in supporting research*

			X4	Y
Pearson rho	X4	Correlation Coefficient	1.000	
		Sig. (2-tailed)	.	
		N	193	
	Y	Correlation Coefficient	.497**	1.000
		Sig. (2-tailed)	.000	.
		N	193	193

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

From the findings presented in Table 4.13, the study observed a positive relationship between the uses of OERs in supporting research by members of faculty and the adoption of OERs in teaching and research in selected universities in Kenya. This is because, r =.497, p= 0.000. This shows that the p-value is less than 0.05 and, therefore, the relationship between the uses of OERs in supporting research by members of faculty and the adoption of OERs in teaching and research is statistically significant. This means that the relationship between the two variables is positive and statistically significant. This suggests that an increase in the usage OERs by faculty members to assist their research will result in a rise in the use of OERs in both teaching and research. These results demonstrate the importance of faculty members' utilization of Open Educational Resources to assist their research. in determining the adoption of the same in teaching and research at selected universities in Kenya. Besides, OER Africa, (2016) demonstrate the need to use OER in learning, teaching and research. Moreover, Wolfenden, Buckler and Keraro (2012, p. 2) claimed that OERs can serve as sources of information for research to address the challenge of inadequate information sources.

4.9 Framework for adopting OERs in teaching and research

The study's fifth objective was to develop a framework for faculty members at Kenyan universities for adoption of OERs for teaching and research. The information regarding this construct was provided by three categories of respondents; that is, teaching staff, university librarians and e-resources librarians. Several statements based on the framework for adopting OERs in research and teaching were identified as latent variables, and respondents were given tabular presentations of these statements. A 5-point Likert scale

with a scale of 1 to 5 was used by respondents to indicate their opinions.; where, NA =not at all (1), SE = to a small extent (2), ME = to a moderate extent (3), LE = to large extent (4), and VLE = to a very large extent (5). Each statement posed addressed an indicator regarding the framework for adopting OERs in teaching and research by faculty members in universities. The measurement focused on aspects such as regular workshops/training, forming partnerships with OER providers, institutional support for OER, faculty awareness of the value and benefits of OERs and improving their quality.

The researcher was able to measure the framework for OER adoption in teaching and research by faculty members in universities as a composite / latent variable by adding the responses collected for each indicator. In this context, each indicator's mean value and standard deviation were calculated. This gave the researcher more context for understanding the descriptive findings. To determine whether the sample was sufficient to be taken into account in the data analysis for this construct, KMO and Bartlett's test of sphericity were computed. Table 4.14 below provides a summary of the results.

Table 4. 14 *Framework for adoption of OERs in teaching and research*

Framework for adoption of OERs in teaching and research (n = 193)	**VSE(1)**	**SE(2)**	**ME(3)**	**LE(4)**	**VLE(5)**	**Mean**	**Std. Dev**
Increasing members of faculty awareness about the value and benefits of OERs in teaching and research.	0	2(1%)	21(10.9%)	72(37.3%)	98(50.8%)	4.38	.719
Availing institutional support for OER creation	0	6(3.1%)	18(9.3%)	72(37.3%)	97(50.3%)	4.35	.776
Regular training on creating, revising, remixing and redistributing OERs	2(1%)	4(2.1%)	22(11.4%)	68(35.2%)	97(50.3%)	4.32	.835
Involve members of faculty OER adopters in activities that enable expansion of adoption	2(1%)	4(2.1%)	21(10.9%)	79(40.9%)	87(45.1%)	4.27	.816
Forming partnerships with OER Providers, faculty, librarians and students	0	2(1%)	26(13.5%)	83(43%)	82(42.5%)	4.26	.767
Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy = .860							
Bartlett's Test of Sphericity = .000							

According to the findings reported in Table 4.14, the framework for faculty members in universities using OERs in their teaching and research has a KMO value of 0.860 and is significant according to the Bartlett's test of sphericity (P =.000, df = 15). The findings of the Bartlett's test of sphericity and the KMO verified that the sampling was adequate for this construct; hence, the indicators on the framework for adopting OERs in teaching and research by faculty members in universities were regarded adequate for use in the analysis. The results show that all the aspects on the framework for adopting OERs in teaching and research by faculty members in universities have high ratings; where, the majority of teaching staff indicated high or very high extent, and as validated by mean values being above 4, while the standard deviation is below one in each case. This shows that the mean values were stable considering that the deviation from the mean was small in each case.

The findings in Table 4.14 show a high rating on all indicators provided to the respondents regarding the framework for adopting OERs in teaching and research by members of faculty in universities, where more than 42% responded in affirmative, indicating very high extent. The indicators that recorded the highest mean values were increasing faculty members awareness about the value and benefits of OERs in teaching and research (mean = 4.38), availing institutional support for OER (mean = 4.35), and regular training on creating, revising, remixing and redistributing OERs (mean = 4.32). Other aspects for developing a framework noted from the results were about forming partnerships with OERs providers (mean = 4.26) and involving members of faculty OERs adopters in activities that enable the expansion of adoption (mean = 4.27). These results provide critical hints to the aspects that need to be considered in the development of a framework for adopting OERs in teaching and research at universities.

The interview session with university and e-resources librarians solicited information elements which would be considered by other universities that are planning to adopt OERs in supporting teaching and research. Critical points were noted from their responses, which largely corroborated with the views of faculty members. The response from university librarian number three (UL3) supported by indicating that,

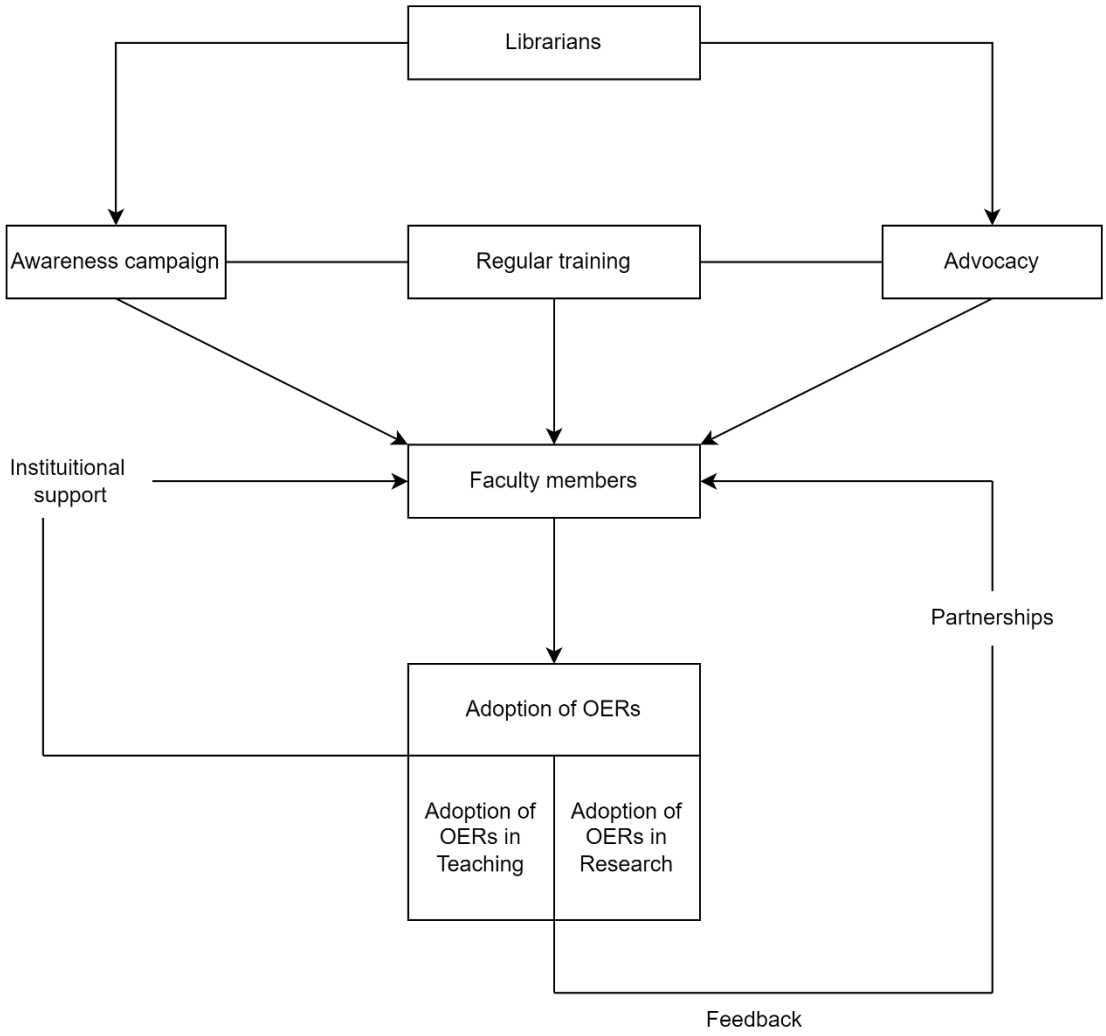
"*As librarians we support members of faculty through holding training workshops, raising awareness of OERs, updating curriculum by including OERs as library's e resources, providing metadata to make OERs more retrievable and discoverable, developing an OER portal and provide a link via library website, providing infrastructural support and bandwidth, and sharing OERs information via social media platforms like face book, twitter and in blogs".* E resources librarian number 4 (EL4) opinion on developing and OER framework stressed that, "*key stakeholders like the institutions management have a role in developing the framework by establishing policies and offering financial support towards adoption of OERs".*

These findings were regarded significant and were therefore used to inform the development of the proposed framework for adopting OERs in teaching and research at universities. Information about development of the proposed framework is provided below.

4.9.1 The development of a framework for adopting OERs in teaching and research

A holistic consideration of the five aspects culminated to a diagrammatic demonstration of these components as shown in Figure 4.3.

Figure 4.3: Proposed Framework for Adopting OERs in teaching and research at universities



The ultimate output of this study was to come up with a proposed framework for adopting OERs in teaching and research at selected Universities in Kenya. The study is in cognizance of the provision of OERs globally as an approach to eliminating barriers of access to library resources and training modules; including lecture notes, reading lists, course assignments, syllabi, tests, samples and simulations as noted by Butcher (2016),

Butcher and Moore, 2015), Blake and Morse (2016), and OER Africa (2016). However, the engagement and adoption of OERs in teaching and research was still not a mainstream activity in many institutions and libraries especially in developing countries, probably due to lack of an implementation framework.

The information gathered during interviews with university and e-resources librarians suggested that the library has a crucial role to play in promoting the use of OERs in teaching and research in higher education institutions. Some of the critical roles identified by e resources librarian number two (EL2) are that, "*In our library we help users discover, describe, manage and the use OERs, searching, identifying and evaluating OERs, promoting their utilization, providing subject-based guides about OERs, providing, metadata and resource descriptions to enhance fast retrieval and adoption*". Besides, university librarian number one (UL1) indicated that, "*In the library we educate faculty members on intellectual property rights, we are also integrating OERs with other e-resources on the library website and promoting appropriate application of CC licenses on OER".*

The above findings bolstered confidence in developing a proposed framework which would incorporate the aforementioned ideas. The study had initially come up with five research questions which helped to guide the investigation. Besides, the empirical findings reported in the study, were regarded as a springboard and basis for proposing a suitable framework. The five research questions covered the following aspects:

- Level of awareness of OERs among members of faculty
- Status of OERs uptake by members of faculty

- How OERs support teaching
- How OERs support research
- Suitable framework

The process of developing a proposed framework was informed by the findings gathered from respondents. Reference was also made to the existing empirical literature and theoretical framework presented in chapter two. The quantitative and qualitative results of this study seemed to narrow down on the following constructs:

- Increasing awareness of OERs
- Regular training
- Advocacy
- Institutional support
- Partnerships

These aspects were therefore regarded as key components of the proposed framework. Each configuration and composition of each component is described below.

4.9.1.1 Increasing awareness of OERS

In the first instance, the findings of the study reported in sections 4.4 to 4.8 underscore the need for increasing awareness of OERs among members of faculty, with emphasis on their value and benefits in teaching and research. The findings presented in Tables 4.7, 4.9, and 4.10 specifically demonstrate the value and benefits of OERs. The results have also shown the potential and significance of OERs in enhancing teaching, learning and research. Some of the benefits of OERs which were validated in this study are: affordability, availability, resource sharing, unrestricted, re-usability, transferability, and avenues for collaborations.

To encourage adoption of the same by members of faculty, the study noted the indispensable role of awareness campaigns. Research such as Yaya (2017) linked utilization of services to awareness. Obviously, faculty members cannot utilize Open Education Resources unless they are aware about them. The Ranganathan law of library says that books are for use. Therefore, the value of OERs has to be communicated to user community to elicit utilization (Nyambura & Muthee, 2022). The awareness referred to in this study applies to both library staff and members of faculty. This implies a need for aggressive marketing strategy to create awareness and encourage engagement of OERs in teaching and research by teaching staff at universities.

4.9.1.2 Regular training

The adoption of Open Educational Resources requires faculty members to be trained on a continuous basis. The Librarian is therefore expected to come up with a training program for faculty members. Notably, the sensitization meetings and regular workshops featured prominently in this study as appropriate capacity building measures that can be considered by libraries. This has implications on funds allocations by the university management for regular library sensitization meetings and trainings on creating, revising, remixing and redistributing OERs contents. Indeed, this supports the claims made by Leng, Ali, and Hoo (2016) on the need for training programs to support OERs. These authors claimed that awareness and the use of OERs can be supported through training programs, symposiums, and seminars.

4.9.1.3 Advocacy

A sustainable OERs adoption strategy ensures that early adopters (teaching staff who are already using OERs) are actively involved in progressing advocacy campaigns and in

coming up with more OERs. This implies a need for librarians to create OERs advocacy group comprising of teaching staff (early adopters) and e-resources librarians. This will address the assertion by Leng et al. (2016) on the need for OER advocates because of their role in OER promotion. It becomes a significant role for university libraries and library staff to advocate for OERs in higher learning institutions for effective and increased OER adoption.

4.9.1.4 Institutional support

The adoption of OERs in supporting teaching and research cannot be driven by librarians and faculty members alone. The process requires institutional support and concerted effort from all stakeholders. The university library should therefore solicit institutional support and solidarity. The institutional support also comprises policy framework and structures for supporting uses of OERs in teaching and research. This necessitates a need for the library to lobby for support from all stakeholders and concert their effort towards adopting and utilizing OERs in teaching and research. Besides, UNESCO (2020) noted the need for supporting OERs adoption in higher learning institutions, to increase their creation, access, use, reuse, and distribution. Therefore, institutions must support this initiative, including through policies. It also implies establishment of relevant policy to support and strengthen the entire process.

4.9.1.5 Partnerships

In order for universities to be effective in adopting OERs in teaching and research activities, the library would have to liaise with developers for OERs, and also other organs such as the Directorate of Open and Distance Learning, chair of departments, deans of schools, and further pursue appropriate partnerships in the education sector. These

collaborations are essential in forging requisite support and sustainability of the initiatives. Similarly, UNESCO (2011) recommended a partnership between libraries and students. This means that there must be significant partnerships between all stakeholders to make sure OERs adoption in universities is a success. A collaboration between all stakeholders will lead to increased efforts to address the challenges facing the adoption of OERs in higher learning institutions.

4.9.2 Description of the relationship of components in the proposed framework

Figure 4.3 demonstrates the suggested framework for adopting OERs to promote learning and research in higher education institutions. As was mentioned in the discussion above, adoption of OERs in teaching and research at higher education starts with awareness. The awareness in this context applies to both librarian and faculty members. As for the librarian, the awareness is usually followed by exploration, familiarization and experimentation. This may involve searching and discovering the features of OERs from respective open access repositories. This exercise brings forth confidence to an extent that a librarian feels free to disseminate information to members of faculty.

The faculty awareness initiatives are followed by sensitization and training programs, after which, there will be a critical mass. From the trained teaching staff, a team of early adopters is formed. This comprises of faculty members who are fast in adopting OERs in teaching and research. The librarian can then work with this team as advocacy group who play a role in popularizing the uses of Open Education Resources towards supporting teaching and research activities by faculty members in the universities.

The interplay of the awareness programs, regular trainings, and advocacy championed by the library and faculty members require a strong collaborations and partnerships from all stakeholders and OERs creators. The process essentially requires institutional support, where structures, policies and systems for adopting Open Educational Resources are established. The operationalisations of the same would require the concerted effort from deans of schools, chair of department, and program leaders. The whole system will also require finance support from the management of an institution.

The development of the proposed framework for adopting Open Educational Resources is regarded as a huge milestone which would result to reducing cost of training materials and duplication of effort, foster faculty collaborations with OERs creators and with the university library. It is envisaged that adoption of the proposed framework would also create avenue for knowledge diffusion and gainful sharing of the same among teaching fraternity.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the research findings, draws conclusions from the data in chapter 4, and makes recommendations. It starts off by providing an overview of the entire study. The general objective of the study was to investigate the adoption of Open Educational Resources by faculty members with a view to proposing a framework for adopting OERs in teaching and research at selected Universities in Kenya. Its research objectives were to determine the faculty's level of awareness of OERs, assess the level of uptake of OERs by members of faculty, assess the effects of OERs on teaching, examine how OERs affect research activities, and propose a framework for the adoption of OERs.

5.2 Summary of research findings

The study registered an overall response rate of 78% for all respondent categories: teaching staff, e-resources librarians, and university librarians. Notably, the study's e-resources librarians and four university librarians were all available; hence, there was a 100% response rate for these respondent categories. This response rate was adequate, showing that the study results were reliable. The following is a summary of key study variables and constructs.

5.2.1 Summary of results on demographic characteristics of respondents

The study showed that most faculty members, 40.9% had between 1 and 5 years of teaching experience. Of the faculty who responded, 23.3% had between 6 and 10 years, while 13.5% had between 11 and 15 years of teaching experience. Also, 11.9% of faculty members had

served in the university for less than one year. Therefore, about 7.8% of teaching staff worked between 16 and 20 years, only 1.6% had worked for over 21 years, and about 64.8% of the faculty members had over five years of teaching experience. Moreover, 41.5% of university teaching faculty were in lecturer positions, while 20.7% were assistant lecturers /tutorial fellows. Only 15.0% were in associate professor's positions, while 18.7% were in senior lecturer positions. Those in the professor's position were 4.1%. Lastly, 95% of e-resources and university librarians have over eight years of working experience.

5.2.2 Summary of results on adoption of Open Educational Resources in teaching and research by members of faculty

The results showed a high rating on all aspects of adopting OERs in teaching and research by faculty members, where the mean value was above four, and the standard deviation was below one in each aspect. The aspects with the highest mean were regarding OERs enabling fast dissemination of information resources notwithstanding geographical location. It was followed by free learning, teaching, and research resources, and then the development of knowledge and skills needed in various academic areas. The results also noted the usefulness of OERs in enhancing sharing of resources with other members of faculty. OERs were also described as helpful in improving and enabling the collaborative development of OERs.

5.2.3 Summary of results on the level of awareness of OERs among members of faculty in selected universities in Kenya

The study established that faculty members had a high awareness of OERs. The analysis of the awareness results produced a KMO value of 0.653, while Bartlett's test of sphericity was significant (P= .002, df = 15). The results showed a high score on the rating of all

aspects regarding awareness of OERs among faculty members, demonstrating that OERs awareness among faculty members was adequate in the universities covered by the study. This means that faculty members knew about OER sites and their usefulness and were willing to try them out. They also understood OER open licenses and how to evaluate them.

The findings indicated that university librarians used several strategies to create OER awareness, including faculty training sessions, dean's meetings, email communication during e-resources week, academic workshops, departmental faculty board meeting, and sharing information in social media platforms. An analysis of the awareness results showed a positive correlation between OER awareness among faculty members at selected universities in Kenya and the adoption of OERs. Therefore, OER awareness was found to significantly affect OER adoption in higher learning institutions.

5.2.4 Summary of results on the status of OERs uptake by members of faculty in selected universities in Kenya

Indeed, the research demonstrated a high uptake of OERs by faculty members at selected universities in Kenya. The results indicated a significant acceptance and use of OERs in supporting teaching in universities because 48.2% of the teaching staff in the selected universities usually refer learners to OERs, to a very large extent, and 26.9% to a large extent; hence, presenting a mean of 4.21 and SD = .863. These findings underscore the expressive value of OERs in knowledge discovery and acquisition, therefore necessitating close collaborations between libraries and faculties in identifying appropriate OERs for a given unit.

The inferential results showed a positive correlation between OERs uptake by faculty members and the adoption of OERs in teaching and research in selected universities in Kenya. The results further indicate that faculty members have significant confidence in OERs because they use them to prepare course outlines, update the current curriculum, develop new curricula, and prepare for professional development. Besides, librarians in the studied universities claimed that many faculty members demonstrated a positive uptake of OERs in teaching and learning. Therefore, increasing OER uptake leads to a positive increase in OERs adoption in teaching and research.

5.2.5 Summary of results on OERS support on teaching in selected universities in Kenya

The study noted that all the aspects of the uses of OERs in supporting teaching had high ratings, with the majority of the teaching staff indicating a high or very high extent, with a slight deviation from the mean of the results. It was evident that OERs have been used widely to disseminate knowledge globally because they provide access to high-quality information sources. The results showed faculty members use knowledge of OERs to improve university courses, develop knowledge and skills, and facilitate the broad sharing of resources with other faculty members.

It also became clear that OERs create opportunities for publishing and promoting information resources. These findings demonstrate that OERs are instrumental in facilitating knowledge exchange and creating a platform for disseminating academic information to the academic community. Besides, they expose educators to other teaching approaches and content that have worked elsewhere.

Moreover, the results showed a positive correlation between the uses of OERs in supporting teaching by members of faculty and the adoption of OERs in teaching and research in selected universities in Kenya. Although this relationship could have been stronger, it demonstrated that increasing the use of OERs in supporting teaching by faculty members would positively improve the adoption of OERs in teaching and research.

5.2.6 Summary of results on how OERs are used to support research activities among members of faculty in selected universities in Kenya

The findings demonstrated a high rating on the indicators provided to the respondents concerning the effects of OERs on research. It became evident that OERs enable the free sharing of knowledge and foster connections with colleagues worldwide. They are also used in research because they are accessible anytime and anywhere. In addition, OERs promote lifelong learning, hence suitable for research. When faculty members share OERs, they gain increased visibility. Also, OERs provide open resources that support research. Such resources are flexible, enabling them to repurpose them for their intended needs.

The results confirmed that OER repositories allow access to vast amounts of data which can be valuable in research. They particularly enable the digital preservation of innovations, providing bases for others to build. The findings also showed a positive correlation between the uses of OERs in supporting research by members of faculty and the adoption of OERs in teaching and research in selected universities in Kenya. Therefore, increasing the use of OERs in supporting research by faculty members would positively improve the adoption of OERs in teaching and research.

5.2.7 Summary of results on proposed framework for adopting OERs in teaching and research by members of faculty in universities in Kenya

The research findings showed that all the aspects of the framework for adopting OERs in teaching and research by members of faculty in universities had high ratings, with the majority of teaching staff indicating great or very high extent, mean values of above 4, and a standard deviation of below one in each case. These findings were supported by indicators like increasing members of faculty awareness about the value and benefits of OERs in teaching and research, providing institutional support for OER, and regular training on creating, revising, remixing, and redistributing OERs. It also included forming partnerships with OERs providers and involving faculty members, and OERs adopters in activities that enable adoption.

To develop the adoption framework, the results from University and e-resources librarians underscored consideration of aspects such as training workshops, raising awareness of OERs, updating curriculum by including OERs, providing metadata to make OERs more retrievable and discoverable, developing an OER portal and providing a link via the library website; providing infrastructural support and bandwidth, as well as sharing OERs information via social media platforms like Facebook, Twitter and in blogs. Other aspects of consideration that stood out from the results were increasing awareness of OERs, regular training, institutional advocacy support, and partnerships.

5.3 Conclusion

The researcher cross-examined the findings reported in this study to develop amicable conclusions. The conclusions were made based on the research variables as presented

below. On the first objective, which investigated the level of awareness of OERs among faculty members, the study concluded that the teaching staff from the universities that participated in the study were aware of OERs, OERs sites, and OERs' open licenses. From the inferential analysis, the study concluded that the level of awareness of members of faculty on Open Educational Resources was statistically significant in determining the adoption of the same in teaching and research at selected universities in Kenya. Consequently, the teaching staff were expected to gainfully utilize OERs to support teaching and research activities.

From the results, the study established that the university libraries which took part in the study had played a key role in promoting and creating awareness of OERs to the teaching staff. Some avenues used by university libraries included: conducting faculty training sessions, disseminating information during dean's meetings, e-resources week, academic workshops, and departmental faculty board meetings, sending email communication to teaching staff and sharing information with faculty members on social media platforms.

Regarding the second research objective, which assessed the status of OERs uptake by members of faculty, a wide acceptance and use of OERs in supporting teaching and research in universities was evident. The study noted that faculty members demonstrated a significant uptake of OERs in teaching and research activities. This led to the conclusion that the university teaching staff acknowledged the expressive value of OERs in knowledge discovery; hence, the reported uptake played a critical role in enhancing the wide adoption of OERs among faculty members.

The faculty members said uptake of OERs was evidenced in the course outlines, core reading texts, and a list of further reading references. Uptake was also noted in updating the existing curriculum, developing a new curriculum, and adding more recent content in a course module and in professional development. The university libraries were actively enhancing the uptake by holding sensitization meetings with faculty members regarding OERs and assisting them in searching and identifying relevant OERs for a given unit. Such a working relationship was strengthening the collaborations between the library and faculty in resource identification and utilization.

The results based on the third objective presented evidence of how OERs had helped to support university teaching activities by providing access to high-quality information sources. By adopting OERs in teaching, members of faculty were facilitating knowledge sharing and creating a platform to distribute academic information to the rest of the academic community. This led to the improvement of content for various courses offered at the universities, which eventually resulted in the development and enhancement of knowledge and skills of learners. It also provided faculty members with opportunities for publishing and promoting information resources. This indicates that Open Educational Resources are a vital commodity that facilitates knowledge exchange and provides an avenue for disseminating educational information to academic communities.

Consequently, the university libraries had a crucial role in supporting the endeavor. Some of the initiatives embraced by university libraries in supporting the use of OERs in teaching included establishing a close working relationship with the IT department to ensure the

maintenance of ICT infrastructure, facilitating one-on-one advanced information retrieval training, ensuring long-term visibility and access of OERs via the library website, providing LibGuides to help teaching staff find high-quality OERs, and assisting lecturers in developing effective search strategies for fast identification of OERs.

Regarding the fourth objective, which assessed the use of OERs in supporting research activities among members of faculty, the study noted that OERs are used by faculty members in progressing their academic research and professional development. The study also noted that OERs are preferred by faculty members because they are valuable, flexible, credible, unrestricted and freely accessible anytime and anywhere. Another consideration is their flexibility, considering that one can repurpose and customize them to fit the intended research needs. Moreover, the OERs afforded members of faculty the opportunities for collaboration in multidisciplinary research and allowed digital preservations, hence the promotion of lifelong learning and wider research impact.

From the results, it was clear that the potential of OERs in supporting research was eminent and indisputable. A sizeable number of faculty members were using them to develop manuscripts. This underscores the crucial role of university libraries in supporting university research activities. Hence, the specific functions of libraries role include notifying lecturers of known scholarly materials available in OER databases, conducting customized literature searches of OERs for a particular course, carrying out special one-on-one training on OERs, locating OERs appropriate for specific research areas, and assisting members of faculty in publishing materials under Creative Commons Licenses.

The fifth objective aimed to develop a framework for adopting OERs in teaching and research by faculty members in Universities in Kenya. The process of developing the proposed framework was therefore an actual output of this study. The study noted that the invaluable contribution of OERs in supporting teaching and research in the university is undisputable, considering their availability, adaptability, and flexibility in re-focusing, remixing and customizing. Their adoption in universities is inevitable to save on cost, reduce duplication, and promote knowledge sharing.

Systematic mechanisms that guide universities in the adoption of OERs are therefore indispensable. They underscore working collaborations between members of faculty and university libraries.

In that connection, a proposed framework for adopting OERs in teaching and research by faculty members in Universities in Kenya was developed. It comprises five main components. These are awareness of OERs, regular training, advocacy, institutional support, and partnerships. The interplay and details have been explained and demonstrated through a schematic framework presented in Figure 4.3. The study envisages that adopting the proposed framework will create an avenue for knowledge diffusion and promote widespread and gainful utilization and sharing of OERs by teaching staff.

5.4 Recommendations of the Study

The findings of this study empirically demonstrated the significance of OERs adoption in supporting teaching and research in Kenyan universities. Therefore, the study made the following recommendations:

5.4.1 Recommendations on awareness of OERs among Members of Faculty

The findings underscored the significance of faculty members' awareness in adopting Open Educational Resources to support university teaching and research. In that connection, the university libraries should strengthen activities for increasing awareness of OERs among faculty members through customized training sessions, dean's meetings, email communication, e-resources week, academic workshops, departmental faculty board meetings, and sharing information on social media platforms. The findings have implications for library budgetary allocations by university management. Sufficient budgetary allocations will enable the library to effectively plan and execute OERs awareness programs to demystify Open Education Resources and educate faculty members on identifying, evaluating, re-using, re-focusing, repurposing, utilizing and integrating OERs into their courses.

5.4.2 Recommendations on Uptake of OERs by Members of Faculty

In the new dispensation, the librarians should assist faculty members in having adequate access to OERs for use in their teaching to improve course content in the universities, develop knowledge and skills, share resources and utilize opportunities for publishing and promoting identified information resources. To uphold the uptake of Open Educational Resources, university libraries should collaborate with faculty members to identify appropriate OERs for a given unit. Also recommended are vigorous sensitization meetings and campaigns by librarians to faculty members regarding OERs' use in teaching and research.

5.4.3 Recommendations on use of OERs in supporting teaching at universities

Teaching at universities is a versatile activity and a duty that requires availability and access to adequate and quality information resources. Libraries are usually at the centre of providing access to information resources to support teaching staff in executing their mandate. Therefore, the use of Open Educational Resources in teaching requires university libraries to play a role in identifying resources and ensuring seamless access. The study, therefore, recommends that libraries liaise with the IT department to provide adequate bandwidth, uninterrupted internet access, and timely maintenance of ICT infrastructure. They should also ensure more accessible access to OERs by faculty members via the library website and provide online library guides to help users find and access OERs with minimal consultations.

Curriculum development and review is a challenge due to emerging issues, trends, and labour market shifts. However, adopting Open Educational Resources solves this challenge, notwithstanding the benefits. Therefore, the study recommends fully embracing OERs in teaching and research in all universities. This has implications for many universities' curriculum development and review processes and practices. It implies a need for chairpersons of academic departments to appreciate and embrace OERS to champion the process of utilizing them to develop new curricula and or update the existing ones.

5.4.4 Recommendations on use of OERs in supporting research at universities

The potential of OERs in supporting research is unquestionable. OERs have been found to have scholarly content; hence their adoption in progressing research activities is ideal. Therefore, the study recommends that librarians should strengthen their faculty outreach programs and actively engage faculty members in interacting with scholarly materials

available in OER databases and OER repositories. The librarians should also assist teaching staff by conducting customized literature searches on OERs for a particular subject-specific area, carrying out special one-on-one training on OERs, locating OERs appropriate for specific research areas, and helping faculty members to publish materials under Creative Commons Licenses.

5.4.5 Recommendations on the proposed framework for adopting OERs in supporting teaching and research at universities

The most valuable output of this study is the proposed framework for adopting OERs in teaching and research by faculty members in Universities in Kenya. It comprises five main components: awareness of OERs, regular training, advocacy, institutional support, and partnerships. Therefore, the study recommends that the university libraries and university management in Kenya fully implement the proposed framework in adopting Open Educational Resources in supporting teaching and research.

5.4.6 Recommendation on Findings on Theories, Practices, and Policies

The study's findings demonstrated that faculty members have different information-seeking behaviour, which links well with Wilson's information-seeking behaviour model, which asserts that information-seeking is essential to acquiring data. Besides, when people need information, they seek it from formal and informal sources to satisfy their information needs. The findings of this study agree with this theory because faculty members in universities seek information in OERs to meet their teaching and research information needs. Librarians usually support their search process. This study's findings also agree with the Concerns Based Adoption model to forecast, characterize, and elucidate faculty members' actions when prompted or mandated to embrace Open Educational Resources

(OERs). According to CBA, faculty members' concerns are critical and need to be taken seriously in order for innovation to occur. Higher education institutions in Kenya will need to make a major effort to support the adoption of Open Educational Resources (OERs) by their teachers and librarians. Additionally, the institutions themselves must be committed to creating rules and incentives that would encourage the use of OERs.

The study findings have implications for the university management, Senate and libraries on curriculum development. The study's results demonstrated the significance of OERs in developing new curricula and updating the existing curriculum. This observation will influence universities and stakeholders like the Commission for University Education and other regulatory bodies to establish policies supporting adopting and using OERs in the university curricula. Besides, universities will create effective frameworks for adopting OERs in teaching and learning by faculty members.

The findings also have implications for library budgetary allocations by university management. Sufficient budgetary allocations will enable the library to effectively plan and execute OERs awareness programs to demystify Open Educational Resources and educate faculty members on identifying, evaluating, re-using, re-focusing, repurposing, utilizing, and integrating OERs into their courses and research work. Mutual collaborations and concerted efforts of stakeholders; for example, faculty, students. library, ICT department, Senate, Chairpersons of Department and OERs developers, are crucial in ensuring the effective adoption of OERs in supporting teaching and research activities in universities in Kenya.

5.5 Recommendations for Further Studies

During the process of carrying out and implementing this study, the researcher identified other areas for further studies, as stipulated below:

1. The current study focused on adopting Open Educational Resources in teaching and research by faculty members in selected universities in Kenya. It was noted that partnerships are instrumental in enhancing the adoption of OERs in teaching and research. However, this was not explored in this study. Therefore, there is a significant need to investigate the kind of partnerships that support the adoption of OERs in teaching and research.
2. The population in this study consisted of librarians and faculty members. However, this study demonstrated that OER adoption in teaching and research implies students' success. Nevertheless, the scope of this study did not factor elaboration on this crucial stakeholder. Therefore, it is necessary to investigate how adopting OERs in teaching impacts students' academic achievement and determine their perceptions towards OERs.
3. This study established that OERs adoption in teaching and research is relevant because of its advantages to university education. An empirical study is needed to measure the impacts of OERs on multidisciplinary and donor-funded research globally and in developing countries.

REFERENCES

Abeywardena, I. (2017). An empirical framework for mainstreaming OER in an academic institution. 12*(2)*, 230–242. https://doi.org/10.1108/AAOUJ-11-2017-0036

Adala, A. A. (2016). Current state of advancement of Open Educational Resources in Kenya. UNESCO Institute for Information Technologies in Education. http://creativecommons.org/licenses/by-sa/3.0/

Agripah, K. (2015). Educators challenges and behavioural intention to adopt Open Educational Resources: Case of Africa University Zimbabwe. http://hdl.handle.net/11427/20062

Allen, I., & Seaman, J. (2016). Opening the textbook: Educational resources in U.S. higher education.

https://www.onlinelearningsurvey.com/reports /openingthetextbook2016.pdf

Al-Suqri, M. (2017). Information-seeking behavior of social science scholars in developing countries: A proposed model. The International Information & Library Review, 1*(43)*, 1–14. https://doi.org/doi:10.1016/j.iilr.2011.01.001

Angell, C., & Hartwell, H. (2011). The emergence of public health open educational resources. Health Education, Vol. 111 Issue: 4, Pp.256-265. https://doi.org/10.1108/09654281111144238

Atkins, D. E., Brown, J. S., & Hammond, A. L. (2007). A review of the Open Educational Resources (OER) movement: Achievements, challenges and new opportunities. William and Flora Hewlett Foundation. http://www.hewlett.org/uploads/files/ReviewoftheOERMovement

Awandu, S. (2021). Kenyan universities face big challenges going digital. But it can be done. [Online post]. https://theconversation.com/kenyan-universities-face-big-challenges-going-digital-but-it-can-be-done-162673

Babbie, E. (2007). The practice of social research. WADSWORTH CENGAGE Learning.

Babbie, E. (2014). The practice of social research (14th ed.). WADSWORTH CENGAGE Learning.

Babson Survey Research Group. (2014). Opening the curriculum: Open Educational Resources in U.S. higher education. https://eric.ed.gov/?id=ED572730

Bahrawy, N. (2019). Digital pedagogy, new media literacies and Open Educational Resources: Exploring the impact of dgital resources in higher education.

Balasubramanian, K., Clarke-Okah, W., Daniel, J., Ferreira, F., Kanwar, A., Kwan, A., Lesperance, J., Mallet, J., Umar, A., & West, P. (2009). ICTs for higher education. Commonwealth of Learning, Vancouver. http://oasis.col.org/handle/11599/278

Bell, E., Bryman, A., & Harley, B. (2019). Business research methods (5th ed.). Oxford University Press.

Bell, S. (2015). Start a text book revolution continued: Librarians lead the way with Open Educational Resources. http:// www.libraryissues.com/pub/PDF3505May2015.pdf

Bialobrzeska, M., & Louw, J. (2014). Research on Open Educational Resources for development. South African Institute for Distance Education.

Bissell, A. (2011). OER and open licenses: The dual-pub solution. http://www.saide.org.za/resources/Library/Bissell%20-%20OER%20and%20Open%20Licenses.pdf

Blake, M. R., & Morse, C. (2016). Keeping your options open: A review of open source and free technologies for instructional use in higher education. Reference Services Review, Vol. 44 Issue: 3, Pp.375-389.

Bradshaw, P., Younie, S., & Jones, S. (2013b). Open education resources and higher education academic practice. Campus-Wide Information Systems, 30*(3)*, 186–193. https://doi.org/10.1108/10650741311330366

Brasley, S. (2018). Advancing faculty adoption of Open Educational Rsources: A Delphi study [Brandman University]. https://digitalcommons.brandman.edu/edd_dissertations/225

Bryman, A., & Bell, A. (2011a). Business research methods (3rd ed.). Oxford University Press.

Bunyi, G. W. (2013). The quest for quality education: The case of curriculum innovations in Kenya. Europen Journal of Training and Development. http://dx.doi.org/10.1108/EJTD-01-2013-0008

Butcher, N. (2016). Open Educational Resources and higher education. http://www.oerafrica.org/foundation/FoundationOERHome/BundaCollegeofAgriculture/tabid/878/Default.aspx

Butcher, N., & Hoosen, S. (2019a). Hanessing OER practices to drive pedagpgical improvement: The role of continuing professional development. https://www.oerafrica.org/resource/harnessing-oer-practices-drive-pedagogical-improvement-role-continuing-professional

Butcher, N., & Moore, A. (2015). Understanding Open Educational Resources. http://creativ ecommons.org/licences/by-sa/4.0.

CENGAGE. (2016). Open Educational Resources (OER) and the evolving higher education landscape. CENGAGE learning. cengage.com

Commonwealth of Learning and UNESCO. (2011). Guidelines for open educational resources (OER) in higher education. http://www.col.org/PublicationDocuments/Guidelines_OER_HE.pdf

Commonwealth of Learning and UNESCO. (2015). A basic guide to Open Educational Resources(OER). (http://creativecommons.org/licenses/by-sa/3.0/ igo/).

Cooper, D. R., & Schindler, P. S. (2011a). Business research methods. McGrawHill.

Cooper, D. R., & Schindler, P. S. (2011b). Business Research methods. (11th.ed.). McGrawHill.

Cox, G., & Trotter, H. (2016). An OER framework, heurstic and lens: Tools for understanding lecturers. https://www.openpraxis.org/index.php/OpenPraxis/article/view/571

Cox, G., & Trotter, H. (2017a). An OER framework, heuristic and lens: Tools for understanding lecturer's adoption of OER. https://doi.org/10.5944/openpraxis.9.2.571

Cox, G., & Trotter, H. (2017b). Factors shaping lecturers adoption of OER at three South African Universities. https://www.researchgate.net/publication/337498281_Factors_Shaping_Lecturers'_Adoption_of_OER_at_Three_South_African_Universities

Creswel, J. (2012). Educational Research: Planning, conducting and evaluating qualitative nad quantitative research. Pearson.

Creswel, J. W. (2016). Advances in mixed methods: Computer assisted qualitative data analysis [Online post].

Creswell, J. W. (2018). Research design: Qualitative, quantitative and mixed methods approaches. SAGE publiations.

Das, A. K. (2011). Emergence of open educational resources (OER) in India and its impact on lifelong learning. http://dx.doi.org/10.1108/10650741311330366

de Langen, F., & Bitter-Rijkema, M. (2012). Positioning the OER business model for open education.

Fitzgerald, B. (2007). Open Content licensing for Open Educational Resources. www.oecd.org/edu/oer

Gakindi, M. W. (2010). Information Access Needs of Satellite Campuses in Kenya-Can OER Close the Gap?: The Case of Moi University Nairobi Campus [Høgskolen i Oslo. Avdeling for journalistikk, bibliotek-og informasjonsvitenskap]. https://oda.hio.no/jspui/handle/10642/861

Ghauri, P., & Gronhaug, K. (2010). Research methods in business studies. (4th.ed.). Prentice Hall.

Ghauri, P., Gronhaug, K., & Strange, R. (2020). Research methods in business studies (5th ed.). Cambridge University Press.

Gill, P., Stewart, K., Treasure, E., & Chadwick, B. (2008). Methods of data collection in qualitative research: Interviews and focus groups.

Hair, J., Page, M., & Brunsveld, N. (2020). Essentials of business research methods (4th.ed.). Routledge.

Hodgkinson-Williams, C. (2010). Benefits and challenges of OER for higher education.

Hori, M., Ono, S., Kobayashi, S., Yamaji, K., Kita, T., & Yamada, T. (2015). Learner autonomy through the adoption of open educational resources using social network services and multimedia e-textbooks. http://dx.doi.org/10.1108/AAOUJ-10-02-2015-B005

Inamorato dos Santos, A., Punie, Y., & Castaño-Muñoz, J. (2016). Opening up education: A support framework for higher education institutions. https://doi.org/27938 EN; doi:10.2791/293408

Kabir, S. (2016). Introduction to research. https://www.researchgate.net/publication/325846733_INTRODUCTION_TO_RESEARCH

Kamau, J. N., Githii, S. K., & Njau, M. M. (2014). Research methods: Design of a research project. Multiface solution Ltd.

Karunanayaka, S., Fernando, C., & Silva, V. (2013a). Designing an online learning environment on Open Educational Resources for science education. 8(1). https://doi.org/10.1108/AAOUJ-08-01-2013-B001

Karunanayaka, S., Fernando, C., & Silva, V. (2013b). Designing an online learning environment on Open Educational Resources for science education. http://dx.doi.org/10.1108/AAOUJ-08-01-2013-B001

Kathula, D. (2021). Technology: The classroom of the future for universities in Kenya. 4(1). https://stratfordjournals.org/journals/index.php/journal-of-education/article/view/731/854

Kirui, K., & Ndalo, A. M. (2016). Role of ICT in enabling high quality OERs for teacher education and training in Daadab refugee settlememt in Kenya. Research Journal for Education. http://arpgweb.com/?ic=journal&journal=15 &info=aims

Kivunja, C., & Kayuni, A. (2017). Understanding and applying research paradigms in educational contexts. Internatioanl Journal of Higher Education. https://doi.org/10.5430/ijhe.v6n5p26

Kleinman, M. (2008). How to attribute Creative Commons licensed work. https://open.umich.edu/oertoolkit/references/Kleinman_CC_HowTo_1.pdf.

Komba, W., & Mays, T. (2014). Mkwawa University College of Education and University of Dar-es-Salaam Tanzania: Integrating OER into teacher development programmes.

Kombo, D. S., & Tromp, D. L. (2006). Proposal and thesis writing: An introduction. Paulines publications.

Kundu, D. K. (2017). Models of information seeking behaviour: A comparative study. Internatioanl Journal of Library and Information Science, 7(4).

Kwamboka, L. (2016). The Kenya Open Data Initiative. https://www.centreforpublicimpact.org/case-study/open-data-kenya

Kwan, T. (2011). Developing quality learning materials for effective teaching and learning in an ODL environment: Making the jump form print modules to online modules. AAOU Journal, Vol. 6, No. 1, September 2011, 51-58.

Leavy, P. (2017). Research design: Quantitative, qualitative, mixed methods, arts-based and community based participatory research approaches. The Guilford press.

Leedy, P. D., & Ormrod, J. E. (2005). Practical research: Planning and design (8th ed.). Prentice Hall.

Leng, C. B., Ali, K. M., & Hoo, C. E. (2016). Open access repositories on open educational resources: Feasibility of adopting the Japanese model for academic libraries. Asian Association of Open Universities Journal, 11*(1)*, 35–49. https://doi.org/10.1108/AAOUJ-06-2016-0005

Liu, C., Lin, C., Deng, K., & Wu, Y. (2014). Online knowledge sharing experience with creative commons. https://doi.org/008-006-MY2 and 101-2511-S-008-005-MY3.

Marshall, S. (2008). The promise of Open Educational Resources. http://www.oerafrica.org/system/files/7675/promise-open-educational-resources_0.pdf?file=1&type=node&id=7675&force=

Marte, D., & Coolidge, A. (2016). OER policy development tookkit for higher education. http://policy.lumenlearning.com/

Mays, T. (2012). OER policy review and development tookit: A guide for higher education institutions interested in creating and using Open Educational Resources. South African Institute for Distance Education.

Mays, T. (2014). OER in teacher education: - 201403-oer-teacher-education-final.pdf. http://oerafrica.org/system/files/9810/201403-oer-teacher-education-final.pdf?file=1&type=node&id=9810

Mays, T. (2017). Mainstreaming use of Open Educational Resources in an African context. 9(4), 387–401. https://doi.org/DOI: https://doi.org/10.5944/openpraxis.9.4.714

Megalou, E., Gkamas, V., Papadimitriou, S., Paraskevas, M., & Kaklamanis, C. (n.d.). Open Educational Practices: Motivating Teachers to Use and Reuse Open

Educational Resources. Proc. of the END2016 Int. Conference on Education and New Developments. Retrieved March 23, 2017, from http://dschool.edu.gr/p61cti/wp-content/uploads/2015/02/END2016_OEPs_Megalou_et_al.pdf

Ministry of Education. (2019). Ministry of Education Sessional Paper No.1 of 2019. https://www.education.go.ke/images/NESSP/SESSIONALPAPER2019.pdf

Mmuya, M. (2007). Developing and and writing a research proposal.

Mtebe, J., & Roisamo, R. (2014). Investigating perceived barriers to use the Open Educational Resources in higher education in Tanzania. International Review of Research in Open and Distance Learning, 15*(1)*, 249–271.

Mugenda, O., & Mugenda, A. (1999). Research methods: Quantitative and qualitative approaches. African Centre for Technology Studies.

Munyoki, J. M., & Mulwa, A. S. (2012). Social science research. Downtown printing works.

Mutisya, S. (2020). TESSA Open Educational Resources: A springboard for Kenya's competency-based curriculum. https://www.researchgate.net/publication/343640121_

Mutula, S. M. (2002). University education in Kenya: Current developments and future outlook. http://dx.doi.org/10.1108/09513540210422219

Mwamlangala, D. F. (2015). Report of academic exchange programme: Shangai Open University and African Counsil for Distance Education. Open University of Tanzania.

Mwangi, M. N., & Udoto, O. (2011). Quality of learning facilities and learning environment: Quality assurance in education. http://dx.doi.org/10.1108/09684881111158036

Neil, B., & Moore, A. (2015). Understanding Open Educational Resources. http://www.nba.co.za/

Ngimwa, P. (2010). OER Readiness in Africa. Retrieved March 21, 2017, from http://www.blurb.com/bookstore/detail/1578859-oer-readiness-in-africa

Ngimwa, P. (2012). A collaborative design process for educational resources in African higher education.

Ngimwa, P. G. (2012). A collaborative design process for educational digital resources in African higher education.

Ngimwa, P., & Wilson, T. (2012). An empirical investigation of the emergent issues around OER adoption in Sub-Saharan Africa. Learning, Media and Technology, 37*(4)*, 398–413. https://doi.org/10.1080/17439884.2012.685076

Ngu, C., & Butcher, N. (2011). OER sensitization workshop: Introducing Creative Commons Licensing. http://creative commons .org

Ngugi. (2013). Higher education in a time of economic crisis: OER as an equalizer. GUIDE Association 6th International Conference.

Ngugi, C. (2009a). OER Africa: An introduction [Online post].

Ngugi, C. (2009b). The relevance of Open Educational Resources in Africa. https://www.oerafrica.org/resource/relevance-open-educational-resources-higher-education-africa

Ngugi, C., & Juma, R. (2016). OER country profile: Kenya. SAIDE.

Nikoi, S., & Armellini, A. (2012). The OER mix in higher education: Purpose, process, product and policy. Distance Education, 33*(2)*, 165–184. https://doi.org/10.1080/01587919.2012.697439

Obwatho, S. (2014). Academic research writing: The logical sequence. Starbright Services Ltd.

Ochieng, V., & Gyasi, R. (2022, February). Open Education Resources offer many benefits: How to remove obstacles. Daily Nation, Col 1-4.

OER Africa. (n.d.). The 2016 OER Africa Convening: Report of proceedings [Online post]. www.oerafrica.org/sites/default/fines/2016 08 16 OER Africa Convening Workshop Report

OER Africa. (2016). The 2016 OER Africa convening: Report of proceedings [Online post]. http://dx.doi.org/10.1108/EJTD-10-2012-0052

OER Africa. (2020). How can you get involved in the open COVID pledge for education. https://www.oerafrica.org/whats_new

OER Africa. (2021). Emerging insights from African OER iitiatives in higher education. https://www.oerafrica.org/resource/emerging-insights-african-oer-initiatives-higher-education

Okonkwo, C. (2012). A needs assessment of ODL educators to determine their effective use of Open Educational Resources. The International Review of Research in Open and Distance Learning, 13(4).

Onguko, B., Jepchumba, L., & Gaceri, P. (2013). “For us it was a learning experience”: Design, development and implementation of blended learning. European Journal of

Training and Development, 37*(7)*, 615–634. https://doi.org/10.1108/EJTD-10-2012-0052

Oso, W. K. (2016). Social science research: Principles and practices. The Jomo Kenyatta Foundation.

Ossiannilsson, E., Zhang, X., Wetzler, J., Gusmao, C., Aydin, C., Glapa-Grossklang, J., & Harichandan, M. (2020). From Open Educational Resources to OPen Educational Practices: For resilient sustainable education. https://doi.org/10.4000/dms.5393

Oyieke, L. I., & Dick, A. L. (2017). Empowering academic librarians for effective e-services: An assessment of Web 2.0 competency levels. https://doi.org/10.1108/EL-10-2015-0200

Pete, J., Mulder, F., & Neto, J. (2017). Differentiation in access to, and the use and sharing of Open Educational Resources among students and lecturers at Kenyan universities. https://openpraxis.org/index.php/OpenPraxis/article/view/574

Porter, D. (2013). Exploring the practices of educators using Open Educational Resources in the British Columbia Higher Education System. http://summit.sfu.ca/item/13663

Prabhala, A. & Commonwealth of Learning. (2016). Copyright and Open Educational Resources.

Johnson, & Christensen, L. (2014). Educational Research: Quantitative, qualitative and mixed approaches. SAGE publiations.

ROER4D. OER Country Profile: Kenya | OER Africa. (n.d.). Retrieved March 23, 2017, from http://oerafrica.org/resource/roer4d-oer-country-profile-kenya

Rotfeld, H. J. (2014). The pragmatic importance of theory for marketing practice. Journal of Consumer Marketing, Vol. 31, pp.322-327. http://dx.doi.org/10.1108/JCM-02-2014-0854

Sabadie, J. A., Munoz, J. C., Punie, Y., Hoo, C., & Vuorikari, R. (2014). OER: A Europe perspective. https://doi.org/10.5334/2014-05

Salem, J. (2016). Open pathways to student success: Academic library partnerships for Open Educational Resources and affordable course content creation and adoption. https://www.oerafrica.org/resource/open-pathways-student-success-academic-library-partnerships-open-educational-resources

Salem, J. A. (2016). Open Pathways to Student Success: Academic Library Partnerships for Open Educational Resource and Affordable Course Content Creation and Adoption. http://www.oerafrica.org/system/files/12550/open-pathways-student-success.pdf?file=1&type=node&id=12550&force=

Sandarayake, T. (2019). Promoting Open Educational Resources-based blended learning. 16(3). https://doi.org/10.1186/s41239-019-0133-6

Saunders, M., Lewis, P., & Thornhill, A. (2009). Research methods for business students. (5th.ed.). Prentice Hall.

Schindler, P. (2019). Business research methods (13th ed.). McGraw-Hill.

Silva, P. A., Rogerson, D., Pektas, H., Ogunleye, O. A., & Otay Demir, F. (2012). OER Mapping Discussion DRAFT Report. JAMMO ISSN 2146-3328. http://www.journalacademicmarketingmysticismonline.net/index.php/JAMMO/article/view/828682780

Simon, M. K., & Goes, J. (2013). Dissertation and scholarly research: Recipes for success. Dissertation success LLC.

South, J. (2017). Reimaging the role of technology in education: 2017 National education techology plan update [US Department of Education.]. http://tech.ed.gov

Suber, P. (2004). Creating an intellectual commons through open access. http://dlc.dlib.indiana.edu/dlc/bitstream/handle/10535/4445/Suber_Creating_041004.pdf

The World bank. (2000). Higher education in developing countries: Peril and promise. World bank.

Tiampati, J. (2014a). Speech by Principal Secretary Ministry of Information Communications and Technology. Ministry of Information Communications and Technology.

Tiampati, J. (2014b). Speech by principal secretary ministry of information communications and technology [Audio recording]. https://creativecommons.org/2014/10/22/kenya-ministry-of-ict-congratulates-school-of-open-for-transformative-model-of-learning/

Tlili, A., Jemni, M., Khiribi, M., Huang, R., Chang, T., & Liu, D. (2020). Current state of Open Educational Resources in the Arab region: An investigation in 22 coutries. https://slejournal.springeropen.com/articles/10.1186/s40561-020-00120-z

Trev, N. (2012). Creative commons license. Lect publishing.

UNESCO. (2011). UNESCO/COL guidelines for open educational resources in highre education. OER Workshop.

UNESCO. (2012). 2012 World Open Educational Resources (OER) Congress UNESCO. [Online post].

UNESCO. (2020). Launch of the UNESCO dynamic coalition for Open Educational Resources. https://en.unesco.org/news/launch-unesco-dynamic-coalition-open-education-resources-oer

Vázquez-Cano, E. (2016). Personal learning environments and Open Educational Resources in higher education. https://doi.org/DOI: http://dx.doi.org/10.4025/notandum.43.10

Welch, T. (2008). On OERs: Five ideas to guide engagement with Open Education Resources movement. SAIDE.

Wiley, D. (2016). Iterating toward openness- the access compromise and the 5th R. https://opencontent.org/blog/archives/4397

Wolfenden, F., Buckler, A., & Keraro, F. (2012). OER adaptation and reuse across cultural contexts in Sub Saharan Africa: Lessons from TESSA (Teacher Education in Sub Saharan Africa). Journal of Interactive Media in Education, 2012*(1)*. http://jime.open.ac.uk/article/viewFile/2012-03/pdf/

World Bank. (2000). Higher education in developing countries: Peril and perish. World bank.

Xu, L., Zhang, J., & Zheng, Q. (2014). The landscape of Chinese open educational resources research. https://doi.org/DOI 10.1108/CWIS-09-2013-0056.

Zikmund, W. G. (2003). Business Research methods (7th.ed.). THOMSON South-Western.

APPENDICES

Appendix I: Letter of introduction

Dear Respondent

Re: Request to participate in collection of research data

My name is Beatrice Muthanga, a PhD student in Information Science and Technology at Kisii University.
I am carrying out research on adoption of Open Educational Resources for teaching and research by members of faculty in universities in Kenya.

This is an appeal for your consent to contribute in the above study. Please note that all personally identifiable data that you provide will be kept confidential, only to be used in an anonymized form and destroyed after the study is complete.

Your participation will be highly appreciated.

Sincerely

Beatrice Muthanga
Mobile phone number: 07240987072, Email muthangabeatrice@gmail.com

Appendix 2: Questionnaire for members of faculty

Kindly tick in the spaces provided for appropriate response on each question

A. General background information

1. What programs\courses do you teach? ----------

2. How long have you taught the program indicated above?

Less than one year	[ ]
1 to 5 years	[ ]
6 to 10 years	[ ]
11 to 15 years	[ ]
16 to 20 years	[ ]
21 and above	[ ]

3. Which status /position do you hold in the institution?

Professor	[ ]
Associate professor	[ ]
Senior lecturer	[ ]
Lecturer	[ ]
Tutorial fellow/ assistant lecturer	

B. Adoption of Open Educational Resources in teaching and research by members of faculty.

Kindly indicate the appropriate option by ticking on the spaces provided.

No.		very large extent (5)	Large extent [4]	Moderate extent [3]	Small extent [2]	Not at all [1]	Total
	Importance of OERs in higher learning institutions						
1.	OERs provide learning, teaching and research resources that are free and legal from world's best courses, content and tools that can be adapted to the local context.						
2.	Through use of internet, OERs enhance fast						

	dissemination of information resources to a wide range of users across the world.						
3.	By using OERs members of faculty are able to access affordable and high-quality resources which can be adopted and used for specific subjects.						
4.	Through use of OERs as a member of faculty I will be able to share resources and open the door of opportunity to other members of faculty and learners.						
5.	OERs will help in developing knowledge and skills needed in various academic areas.						
6.	Through use of OERs collaborative development of the curriculum is enhanced which leads to better products and processes than one working alone.						
7.	Through use of OERs members of faculty are able to obtain information resources freely thus being able to improve their courses.						
8.	Use of OERs avails opportunities for publishing and promoting resources.						
	Awareness of OERs among members of faculty.						
1.	As a faculty member I know what OERs are.						

2. .	OERs are useful in teaching and have viable content.						
3.	As a member of faculty, I know how to evaluate OERs.						
4.	I am willing to give it a trial once I have heard about them.						
5.	As a member of faculty, I am aware of open licenses by Creative Commons and can apply them on OERs.						
	Status of OERs uptake by members of faculty.						
1.	I use OERs for course development and can create OER through re-use, remixing, revising and redistributing.						
2.	As a faculty I know about different Creative Commons Licenses and how to use them.						
3.	OERs have rich content and resources for writing conference papers.						
4.	I utilize OERs in developing and updating the curriculum.						
	Effects of OERs on level of teaching						
1.	OERs provide learning, teaching and research resources that are free and legal from world's best courses, content and tools that can be adapted to the local context.						
2.	Through use of internet, OERs enhance fast dissemination of knowledge to a wide range of users across the world.						

3.	By using OERs members of faculty are able to access affordable and high-quality resources which can be adopted and used for specific subjects.						
4.	Through use of OERs as a member of faculty, I will be able to share resources, open the door of opportunity to other members.						
5.	OERs will help in developing knowledge and skills needed in various academic areas.						
6.	Through the use of OERs members of faculty are able to obtain information resources freely thus being able to improve their courses.						
7.	Use of OERs avails opportunities for publishing and promoting resources.						
	Adoption and use of OERs						
1.	As a member of faculty, I'm aware of OERs repositories and can access them across the internet for example OER Africa, OpenUCT, AVU, NOUN eCourseware, Unisa Open etc.						
2.	As a member of faculty I understand the options for reuse and the context of stipulated conditions of Creative Commons licenses.						
3.	I'm able to adapt the OERs to local context						

	which involves reusing, reworking and remixing while respecting copyrighted materials.						
4.	I'm highly satisfied with OERs content for teaching and learning.						
5.	OERs are equivalent with traditional educational resources.						
6.	Through use of OERs learning outcomes will be achieved because of the availability of various formats						
7.	OERs are being used by other members of faculty that I know.						
	Factors that inhibit engagement of OERs in teaching and research						
1.	Too hard to find what I need for teaching and research.						
2.	Not enough resources for my subject and for research.						
3.	I don't know if I have permission to use and adopt OERs						
4.	OERs resources are not relevant to my local content.						
5.	I lack broadband, hardware and software to access OERs.						
6.	As a member of faculty, I am not willing to share or give away my intellectual property.						
7.	As a faculty I'm not willing to use resources produced by someone else.						

8.	I lack time to produce information resources for sharing.						
9.	Lack skills to select appropriate OERs, use and reuse them.						
10.	Lack of knowledge regarding copyright issues.						
11.	As a faculty I worry over losing materials that would otherwise earn them some income.						
	Effects of Open Educational Resources on Research						
1.	OERs avail open resources for research and learning to everyone.						
2.	They are digital thus accessible anytime anywhere through the internet therefore not bound geographically.						
3.	Are flexible, permitting members of faculty to repurpose them for their units as needed.						
4.	Open Educational Resources support research and learning at the user's comfort and pace.						
5.	Through OER repositories they allow access to huge amounts of data and information.						
6.	OERs promote lifelong learning and research.						
7.	The resources widen participation in higher learning institutions by expanding access for						

	information resources to all members of faculty.						
8.	OERs advance information by availing information for the advantage of all.						
9.	OERs enable sharing of knowledge which is compatible with academic requirements.						
10.	By sharing OERs members of faculty have personal gain through increased visibility and reputation.						
11.	OERs enable fostering connections with colleagues around the world.						
12.	The resources enhance preservation of records of teaching innovations and providing a base for others to build on.						
13.	OERs help to create an independent member of faculty who can access the internet and can utilize information materials from the top institutions and universities worldwide.						
	Framework for adoption of OERs in teaching and research						
1.	Provide regular workshops/training on creating, revising, remixing and redistributing OERs						
2.	Form partnerships with OER providers' e.g., MERLOT, OER Africa, etc. that develop, maintain, and host OER for most taught courses.						

3.	Make available institutional support for OER developers for professional development						
4.	Escalate members of faculty awareness of the value and benefits of OERs for research and teaching.						
5.	Involve members of faculty OER adopters in activities that enable expansion of adoption.						
6.	Increase the quality of OERs that are created and made available.						

Appendix 3: Interview guide for the University Librarians

Section A: General background information

1) How long have you worked as a university librarian? ----------

Section B: Adoption of Open Educational resources in teaching and research by members of faculty

2) Does your library provide access to Open Educational Resources to support teaching and research at your institution?
3) Explain the reason / motivation for providing access to Open Educational Resources at your university?
4) What do you think hinders the adoption of OERs in teaching and research activities?
5) What measures has the university taken in overcoming the hindrances?
6) In what ways does the library help the teaching staff to adopt OERs in teaching?

Section C: Awareness OERs in the library

7) Describe the measures taken by your library to increase the awareness of OERs by teaching staff at your institution.

Section D: Status of uptake of OERs by faculty members

8) How have OERs been received by members of faculty and students?
9) To what extent are members of faculty involved/engaged in OERs? Explain your answer.

10) What can be done to improve this engagement?

Section E: OERs and Support in Teaching

11) Provide your comments regarding the adoption of OERs by members of faculty for teaching?

12) In what ways does the library help the members of faculty to adopt OERs in teaching?

13) Describe how the library liaises with faculty members for the provision of OERs for supporting teaching at your institution.

Section F: Use of OERs in research

14) In what ways does Open Educational Resources support research activities at your university?

15) Explain measures taken by your library in supporting uses of OERs in research by members of faculty at your institution.

16) Explain how your library endeavors to improve the delivery of OERs toward supporting teaching and research at your institution.

Section G: Framework for supporting adoption of OERs in institution of higher learning

17) List down key aspects that should be considered by other universities that are planning to adopt OERs in supporting teaching and research.

18) What is the role of a university library in supporting teaching and research with OERs?

Appendix 4: Interview guide for the e Resources Librarians

Section A: General background information

19) How long have you worked as an e resources librarian? ----------

Section B: Adoption of Open Educational Resources in teaching and research by members of faculty

20) As an e resources librarian please describe your experience with OERs.
21) What role do you see the library participating in the adoption and utilization of OERs in teaching and research?
22) Explain the reason / motivation for providing access to Open Educational Resources at your university?
23) In your opinion do members of faculty utilize OERs for teaching and research at your institution?

Section C: Awareness OERs in the library

24) In what ways do you see the library supporting awareness of OERs?
25) Are there any plans to improve operations in the library geared towards promoting OERs.

Section D: Status of uptake of OERs by faculty members

26) How would you describe the engagement of faculty with OERs in terms of re-using, remixing and redistribution?
27) Are they aware of the different licenses governing adoption of OERs.
28) What can be done to improve this engagement?

Section E: OERs and Support in Teaching

29) Do you think OERs enhance teaching and how do members of faculty engage with OERs?

30) Do members of faculty utilize OERs in developing and updating the curriculum?

31) Describe how the library liaises with faculty members for the provision of OERs for supporting teaching at your institution.

Section F: Use of OERs in research

32) In your opinion do Open Educational Resources support research activities at your university?

33) How do members of faculty utilize Open Educational Resources for research?

Section G: Framework for supporting adoption of OERs in institution of higher learning

34) As an e resources librarian what is your opinion in developing a framework for adoption of OERs?

35) Does the library have any role in developing a framework for adoption of OERs?

36) What can you describe as the motivation behind developing a framework for adoption of OERs.

Appendix 5: NACOSTI research permit

REPUBLIC OF KENYA

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A PROPOSED FRAMEWORK FOR ADOPTION OF OPEN EDUCATIONAL RESOURCES FOR TEACHING AND RESEARCH BY FACULTY MEMBERS IN SELECTED UNIVERSITIES IN KENYA

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