Western‡Graduate&PostdoctoralStudies

Electronic Thesis and Dissertation Repository

7-27-2016 12:00 AM

Alternate Academy: Investigating the Use of Open Educational Resources by Students at the University of Lagos in Nigeria

Daniel Onaifo, *The University of Western Ontario*

Follow this and additional works at: https://ir.lib.uwo.ca/etd

Part of the Library and Information Science Commons

Abstract

Open educational resources (OER) are increasingly used to support pedagogical initiatives and learning needs at institutions of higher education across the globe. In this thesis, I examined key issues in the use of OER by students at the University of Lagos in Nigeria. Specifically, I examined how much awareness the students have of OER, their attitudes toward OER, and the benefit they derive from using the resources. I also examined the specific motivations behind their use of the resources as well as the challenges they face in doing so. A mixed methods research design, consisting of two data collection approaches (surveys and interviews) and two methods of analysis (grounded theory and principal component analysis [PCA]), was applied. Of the participants, 417 completed the surveys and 20 participated in the interviews. The thesis reveals that although participants frequently used OER, their overall knowledge of the resources was limited. Particularly, participants were limited in their understanding of the concept of OER as well as in their awareness of OER repositories. The thesis also shows that, in general, participants had a positive attitude toward OER, and benefited from using the resources in multiple ways. They were motivated to use OER because the resources facilitate the completion of assigned academic tasks. In spite of the benefits of OER, participants faced several challenges in using the resources, including the high cost of Internet access. Based on the results, a model of OER use was developed. Finally, while the results suggest a growing use of OER among students at the University of Lagos, it also highlights the importance of institutions and governments in facilitating better use of the resources. These insights further illuminate the overall understanding of the use of OER. They may also serve as additional resources for individuals interested in developing

and promoting OER at institutions of higher education, particularly at the University of Lagos.

Keywords

Acronyms

ASK	Anomalous State of Knowledge (Theory)
CC	Creative Commons
EFA	Exploratory Factor Analysis
IS&R	Information Seeking and Retrieval
ICTs	Information and Communication Technologies
JOCW	Japan Open Courseware Consortium
LIS	Library and Information Science
MIT	Massachusetts Institute of Technology
MOOCs	Massive Open Online Courses
OCW	Open Courseware
OER	Open Educational Resources
OECD	The Organization of Economic Cooperation and Development
OSI	Open Society Institute
PCA	Principal Component Analysis
SAIDE	South African Institute for Distance Education
SSA	sub-Saharan Africa
UGC	User-Generated Content
UNESCO	United Nations Educational, Scientific and Cultural Organization
WIPO	World Intellectual Property Organization

Acknowledgments

It is not possible to mention everyone who contributed to the completion of this dissertation. I am particularly grateful to the members of my dissertation committee: Dr. Anabel Quan-Haase, Dr. Lu Xiao, and Dr. Diane M. Rasmussen Pennington. Their support and feedback helped move this work from an idea to a completed study. Dr. Anabel Quan-Haase, my thesis supervisor, provided me with advice and guidance that challenged my thinking throughout the research process. Her sincere openness to the ideas I put forward, regardless of how far-fetched they seemed, really helped in building and sustaining my intellectual confidence in this work. She conveyed a genuine belief in my ability to complete this work even when she was being critical of my work and stretching the depths of my intellectual thinking. I thank Dr. Lu Xiao for her profound influence on this dissertation and my own development as a researcher. I greatly appreciate the amount of time she spent reviewing my work and providing constructive criticisms and commendations that really helped me convey the story I intended to tell. I will forever remain grateful to Dr. Diane M. Rasmussen Pennington for her patience and guidance, especially in those first few years I was trying to find my feet as a Ph.D. student. Her feedback and guidance helped move this work along at various points. I would like to thank the faculty and staff of the University of Lagos where I recruited participants and collected data for this project. Many of them were extremely generous with their time and effort in making my work a success. In particular, I thank the students at the University of Lagos who participated in this project for sharing their experiences regarding OER with me. I would also like to thank my Ph.D. cohort and many other students at Western University for sharing their time and experiences with me, and for sometimes serving as sounding boards for my excitement and frustrations in the course of this project.

Last, I cannot express enough how grateful I am to my family for their unflinching support throughout the time I embarked on this project.

Table of Contents

List of Tables

List of Figures

List of Appendices

Chapter 1

1   Introduction

1.1   Background to the thesis

Access to knowledge and information resources is increasingly essential for participation

in the global information society. Thus, scholarly interest in the way knowledge is

sought, found, created, disseminated, and used has also increased (Nonaka, 1994; Choo,

2000; Hedesstrom & Whitley, 2000; Gagnon, 2009; Lafrenière et al., 2013). In academia,

knowledge and information resources in the form of educational materials are essential to

the provision of quality education (Mulder, 2008). Institutions of higher education

consider educational resources, including digital educational resources, important tools

for supporting teaching and learning. Access to quality and affordable educational

resources is, in many cases, limited for many students and educators. The situation is

worse in many developing[1] countries where government funding of education is grossly

inadequate (World Bank, 2010). For clarity, educational resources in this thesis refer to

such teaching and learning materials as effectively designed curricula, textbooks, lecture

notes, syllabi, assessment materials, etc. These resources are not only useful to

---

[1] The terms for classifying countries on account of their economic conditions have evolved over the years from such descriptors as *first*, *second*, and *third* world to *developed* and *developing* countries. The problem with these descriptors is that they seem to ignore the social, cultural, economic, and political peculiarities and expectations of different countries, and base success on standards set by economically dominant countries. As a result, such terms perpetuate a prevailing sense of supremacy of certain countries over others solely on the basis of economic wealth. Recently, the descriptors *global north* and *global south* have been introduced as alternative to the former set of descriptors (Baruah, Nov. 2015). However, as Oluwafemi (2012) opines, being classified as part of the *north* still implies development as opposed to belonging to the *south*, which implies a lack thereof. Moreover, the use of north and south in the descriptors falsely signifies that countries with similar classification are located in the same region. This could be problematic and confusing. Thus, I have decided to stay with the more common descriptors of *developed* and *developing* countries in this work.

institutions and educators for undertaking pedagogical tasks; they are also important learning tools for students and other users.

One of the suggested ways of improving available teaching and learning resources at institutions of higher education, and for providing access to education in a truly scalable manner, is the use of OER (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2002; Atkins, Brown, & Hammond, 2007; The Organization for Economic Cooperation and Development [The OECD], 2007). The OECD (2007) declares that OER "could be a way to unlock the potential for African universities" by enabling free and open access to electronic learning resources for educators and learners (p. 23). Similarly, OER Africa, an OER development initiative in South Africa, indicates that OER could be used to support learners in several ways including the reduction of the cost of access to educational materials. Even though the use of OER to support teaching and learning has its own set of challenges, the support for OER in education has morphed into a global movement[2] (UNESCO, 2002; The OECD, 2007).

1.2   The history of open educational resources

Between 1994 and 1998, two concepts were developed that later set the stage for the development of OER. In 1994, Wayne Hodgins coined the term *learning objects* to describe digital resources that could be used to mediate learning (Metros & Bennett, 2002). The significance of the term in the development of OER is its propagation of the notion that electronic information resources can be designed and created in ways that

---

[2] Movement is used here in the sense of a group of people who share a common ideology and work together to achieve certain general goals (Unwin, Foote, Tate, & DiBiase, 2012).

enable their repurposing in different pedagogical circumstances. In 1998, David Wiley

coined the term *open content* (Unwin, Foote, Tate, & DiBiase, 2012) and used the term to

describe any creative work that could be copied and modified by others. The significance

of the concept of open content is that it popularized the notion that the principles of the

free and open source software movement can be applied to educational resources. In

2001, the Creative Commons (CC) was established by Lawrence Lessig and others to

develop open content licenses similar to those used in open source software (Harmon,

2013). This development was essential for the growth of the OER movement, as it

increased the confidence of users of the resources.

The OER movement has grown significantly in the last 14 years. The term OER

was coined at the 2002 UNESCO forum on the impact of open courseware for higher

education in developing countries (UNESCO, 2002). The conference, which attracted

participants from several countries, was organized in response to developments in open

courseware (a subset of OER) initiatives championed by the Massachusetts Institute of

Technology (MIT). In the early 2000s, MIT's Council on Educational Technology

introduced a plan to open its course content to the rest of the world for free (Kirkpatrick,

2006). MIT launched its open courseware website (http://ocw.mit.edu) with the help of

US$11 million from the William and Flora Hewlett and the Andrew W. Mellon

foundation (Kirkpatrick, 2006). The project contains free lecture notes, syllabi, reading

lists, course calendars, exam and quiz questions and answers, and some video lectures for

undergraduate and graduate courses. MIT noted that using its open courseware does not

represent learning accreditation from the institution, nor will it allow users to interact

with its faculty over the resources. In other words, the resources are meant to provide *arm's length* and stand-alone support to users at institutions of higher education.

MIT's position on open courseware, and OER in general, opened the floodgate of contributions to the development of OER. In the United States, several universities, including Stanford, Rice, John Hopkins, and Carnegie Mellon, started developing OER projects. In Canada, the BCcampus project in British Columbia commenced the Open Textbook initiative intended to make textbooks open and free for students by 2012. There are growing OER initiatives around the world. In Japan, six prestigious universities formed the Japan Open Courseware Consortium (JOCW) in 2005 (Aoki, 2011). OER projects have also been founded in China, Europe, and Africa. In Africa, OER Africa leads the way in the development of the resources. As stated on the OER Africa website, the project is a groundbreaking initiative established by the South African Institute for Distance Education (SAIDE). The primary role of OER Africa is to support higher educational institutions across Africa in the development and use of OER to support teaching and learning (SAIDE, 2013). In France, several universities collaborated in forming the ParisTech OCW project.

To provide further background, Appendix A contains a list of leading OER projects around the world. The list also contains a description of the projects and their affiliate institutions. Many of the projects are not only designed to provide access to OER; they are also intended to assist in training users, particularly educators, on how to apply the resources successfully. Another important observation from the list of projects is that even though anyone with Internet access can make use of the resources, most of the projects are domiciled in the United States.

Since the inception of OER, a number of international declarations or commitments have been made to bolster its propagation. In September 2007, the Open Society Institute (OSI) and the Shuttleworth Foundation convened a meeting in Cape Town, which attracted leading proponents of open education (Cape Town Open Education Declaration, 2014). The goal of the meeting was to find ways for OER partners to extend collaborations and to deepen OER initiatives worldwide. At the end of the meeting, the participants released a declaration of shared vision and common strategies for promoting OER. They listed the following goals, thereafter known as the *Cape Town Declaration*:

1. **E**ncourage educators and learners to participate actively in the emerging open education movement. OER participation is used to mean creating, using, adapting, and improving the resources.

2. **E**ncourage educators, authors, publishers, and institutions to release their resources openly.

3. **E**ncourage governments, school boards, colleges, and universities to make open education a high priority. They declare that, ideally, taxpayer-funded educational resources should be licensed as OER.

The notion of publicly releasing taxpayer-funded resources as OER was taken up in 2012 by the World Open Educational Resources Congress. In June 2012, the congress released the 2012 *Paris OER Declaration*. The declaration formally demands that governments openly license publicly funded educational materials (UNESCO, 2012). The premise of the declaration is that all resources, including educational resources generated from

publicly funded projects, should be placed in the public domain for equal access by all. In many countries, including Canada and the United States, governments fund a broad range of research projects, which often lead to the creation of data as well as the authoring of articles and textbooks. The Paris Declaration is an attempt to get governments to ensure that researchers make such works available for public use since they were funded by taxpayers.

In the 2010s, the support for OER and open education has reached new heights. Several initiatives have emerged from the notion of OER. An example is massive open online courses (MOOCs) whereby thousands of people from all over the world are simultaneously enrolled in an online course (Chamberlin & Parish, 2011). There is also the emergence of OER University and other open higher education initiatives, which promote access to higher education through OER initiatives. The statement below from the website of OER University shows how OER University works:

> Do you have an Internet connection? Interested in learning online with others from around the world? OERu gives you the chance to study independently, from home, with access to world-class courses from recognized institutions.
>
> Do you want your study recognized towards a formal academic qualification, but are looking for an affordable option? OERu is for you! With us, you can study online, for free, from anywhere in the world (OER University, 2014).

As these examples suggest, the advent and growth of open resources are facilitating creative new ways of supporting teaching and learning. Although OER has had a considerable effect on *opening* education, the exact meaning of the term has not been

fully clarified. Sometimes, OER is incorrectly used interchangeably with open

courseware or open education. The meaning of OER will be explored in the next section.

1.3   Defining open educational resources

1.3.1 What is OER?

Several definitions of OER have been proposed (UNESCO, 2002; The OECD, 2007).

UNESCO (2002) defines OER as the open provision of educational resources through the

use of information and communication technologies (ICTs), for consultation, use, and

adaptation by a community of users for non-commercial purposes. Although this

definition clearly identifies the relevance of ICTs in OER, its restriction of the resources

to non-commercial use is incongruous to practices in open content licensing. As we shall

see in more detail later (see Section 2.4.1), OER are created through systems that allow

authors to grant specific permissions regarding the use of their work. In some cases, the

licenses allow for commercial use of OER while, in other cases, they do not.

Furthermore, the definition does not specify the format of the resources. The OECD

(2007) defines OER as "digitised materials offered freely and openly for educators,

students, and self-learners to use and reuse for teaching, learning and research" (p. 10).

While the definition proposed by the OECD avoids limiting OER to non-commercial use,

it clearly eliminates all print-based information resources as OER. In his case, Wiley

(2007) equates learning objects with OER. He notes that while learning objects are digital

resources that can be used to mediate learning, OER are learning objects that can be

freely used, reused, adapted, and shared. In other words, OER are open learning objects.

As the definitions above suggest, the basic logic underlying OER is that free and open dissemination of educational materials is useful for supporting teaching, learning, and research. Shackled by intellectual property and copyright laws, many of the educational resources on the Web are restricted in the way they can be used. In general terms, the idea behind OER is the application of open licenses[3], such as CC licenses, to enable wider dissemination of educational resources. These special licenses enable the dissemination and use of educational and learning materials that are otherwise under copyright protection (Creativecommons.org). Resources distributed under such licenses are generally regarded as free and open[4]. McGreal, Kinuthia, Marshall, and McNamara (2013) suggest that teaching and learning resources distributed under open licenses are what are referred to as OER. Basically, OER are information resources with the following criteria: digital in nature, distributed with open licenses, modifiable, and supportive of teaching and learning. This understanding of OER will guide the remainder of the thesis.

---

[3] Generally speaking, open licenses are used to grant permission to access, repurpose, reuse, and redistribute a work with few or no conditions. The most commonly used open licenses are Creative Commons licenses (http://creativecommons.org/licenses/). CC licenses are extensively treated in the literature review section.

[4] The term *open* refers to the extent of use allowed for a creative work. Open resources are usually free of full copyright restrictions; however, certain conditions may still apply (http://creativecommons.org/licenses/).

1.3.2 The nature and types of OER

OER include learning objects such as lecture materials, references, readings, simulations, experiments, and demonstrations, as well as syllabi, curricula, and teachers' guides (UNESCO, 2002). These are resources that can be used to support instructional activities as well as for the purpose of learning. Wiley (2007) categorizes OER into two broad types: (a) OER designed for teaching and (b) OER designed for studying. Examples of OER designed for teaching include a set of presentation slides, syllabi, skeletal lecture notes, etc. These resources are designed on the assumption that they will be used by people with considerable knowledge in the content area. OER designed for studying include such materials as video lectures, interactive quizzes, and instructional simulations. These materials are usually heavy in content and are specifically designed to support learning.

OER are available in different formats. The most common format is the textual format. Textual OER take a variety of forms (Wiley, 2007), including HTML, XML, and PDF. Audio OER contents are mostly in MP3 format while video contents are in MP4. OER are also available in many different languages. The majority of OER are created in the English language and must be adapted to other languages for use by non-English speakers.

Although OER are mostly seen as digital materials (The OECD, 2007), print materials can be considered OER if such materials are open to modification, reuse, and dissemination. In the literature, OER often is used interchangeably with open courseware (OCW) (UNESCO, 2002; The OECD, 2007). However, while all OCW materials can be regarded as OER, not all OER are OCW materials. A subset of OER, OCW are teaching

and learning materials made publicly available by higher educational institutions through the use of open licenses. As the use of OCW and other types of OER continues to grow, it is important to continually learn more about the resources and how they are being used by different groups across the globe.

1.4   The purpose of the thesis

The purpose of the thesis was to investigate key issues in the use of OER among students at the University of Lagos in Nigeria. OER are teaching and learning resources licensed to be freely accessible, usable, modifiable, and distributable (The OECD, 2007). There is a growing body of literature on the use of OER for pedagogical purposes (Petrides, Jimes, Middleton-Detzner, & Holly, 2010; Commonwealth of Learning, 2011; Panke & Seufert, 2013). There is also a growing recognition of the supporting role OER can play on improving education and learning in developing countries (UNESCO, 2002; The OECD, 2007). Ngimwa and Wilson (2012) and Glennie, Harley, Butcher, and Wyk (2012) have shown with their studies that OER will be of special benefit to SSA. In spite of the commendable progression in OER research and the growth of OER initiatives around the world, the effects of the resources on teaching and learning practices is still not fully understood, and important questions regarding their use in many parts of the world remain unanswered. The lack of a complete understanding of the effects of OER, along with the litany of unanswered questions about their use, is attributable to the dearth of studies on the subject. For instance, studies on students' use of OER in SSA are almost non-existent. Even though developing countries have been regularly touted as core potential beneficiaries of OER initiatives (UNESCO, 2002; The OECD, 2007; Hu, Li, Li, & Huang, 2015), not much is known about students' use of the resources in those regions

of the world. While it can be speculated that OER serve important functions in supporting learning among students in general, it is vital that the underlying issues regarding OER use among students, particularly those in developing regions, such as SSA, is carefully examined. Such examination will not only facilitate a better understanding of the use of OER in developing regions, but it will also assist in the generation of strategies and policies for improving the development of the resources in such regions. This thesis, a response to the lack of empirical research focus on student users of OER in SSA, specifically examined students' awareness of OER, their attitudes toward OER, the benefits they derive from using the resources, and the challenges they face in doing so. It also examined the specific factors that motivate students to use OER.

1.5   Significance of the thesis

This thesis examined key issues on students' use of OER at the University of Lagos in Nigeria. OER are educational and learning resources openly licensed and freely available for use, modification, and dissemination. OER are gaining increasing importance in light of the role they play in supporting pedagogical and learning initiatives, particularly at institutions of higher education. Considering that the studies of OER have mostly been conducted from the perspectives of educators and academic institutions (UNESCO, 2002; The OECD, 2007; OER Africa, 2014), it is essential to look at the resources from the perspective of students. This thesis focuses on students for a couple of other reasons. First, students are the ultimate target of any learning initiative at educational institutions. Therefore, it is essential to have adequate knowledge of how they use available learning resources. Precisely, it is essential not only to have adequate knowledge of the benefits and factors that motivate their use of the resources, but also the barriers they face in the

process. Second, students, particularly those at institutions of higher education, are a unique demographic because they tend to use and benefit from online learning resources more than any other group (Okiki & Asiru, 2011). As a result, they are relevant to the discussion of online learning resources, including OER.

The setting of this thesis at an institution of higher education in Nigeria is important because the country is a significant part of the region of SSA that has been poorly represented with regard to OER research (this is clear from the literature review in Chapter 2). This is in spite of the fact that, as a developing region, it has been touted to be the main beneficiary of OER (UNESCO, 2002; The OECD, 2007; OER Africa, 2014). This thesis provides valuable insight into the significance of OER in education, specifically on the way students learn. Given the growing importance of OER in higher education, it is imperative to gain a better understanding of the key issues on students' use of the resources.

Findings from this thesis have potential implications for students, higher educational institutions, and governments, particularly in SSA. For example, access to quality educational resources is one of the main challenges of higher education in SSA (Wright & Reju, 2012). With better access to OER, particularly for students at institutions of higher education, the challenge can be ameliorated. All stakeholders in education, especially academic institutions and governments, have important roles to play in developing OER as well as in ensuring that the resources get into the hands of students. Essentially, institutions and governments can use the knowledge gained from this thesis to develop strategies and policies for creating quality OER for use by students, particularly in SSA. In addition, the knowledge gained from this thesis can assist

institutions and other OER proponents to identify OER use challenges, promote OER awareness, and facilitate OER use among the student population under examination.

The findings from this thesis are not only important for understanding how students find and use OER; they also highlight the significance of the study of OER within library and information science (LIS). The study of OER is especially important within LIS because it is related to the way information is sought and found. In other words, the study of OER is related to information behavior. Furthermore, the study of OER deals with issues of information and knowledge creation, sharing, and use. LIS researchers have long been interested in individuals' and groups' usage of information resources, as well as the motivation behind the adoption of certain information repositories (Belkin, 1980; Case, 2002; Fisher, Erdelez, & McKechnie, 2005). Several theories, notably *information seeking and retrieval* (IS&R), *uses and gratifications*, *anomalous state of knowledge* (ASK), and *sense-making* theories, have emerged from these works to explain users' adoption of information resources (Fisher, Erdelez, & McKechnie, 2005; Ingwersen & Jarvelin, 2005). By focusing on how OER is sought and found, this thesis contributes to the current understanding of knowledge creation and sharing in general as well as adds to the existing body of knowledge relating to information behavior in online spaces.

1.6   The role of the researcher

The role of a researcher is viewed differently depending on the type of research being conducted. In quantitative studies, the researcher, in theory, has little or no role in shaping the research outcome. Participants' responses and actions, and consequently, the results of the research, are not dependent on the researcher. This idea is grounded in the

positivist tradition of capturing *objective reality* in quantitative research (Fink, 2000). Essentially, quantitative research presupposes the non-interference of the researcher in the knowledge or *truth* that emerges from the research process. It is important to acknowledge that even in quantitative studies the experiences and preferences of a researcher may be manifest in the decisions he or she makes during the research process (i.e., the statistical technique adopted), and such decisions may influence the research outcome. However, the lesser the presuppositions, predispositions, and biases of a researcher that seep into a quantitative research process, the better (or more objective) the results.

In qualitative research, the role of the researcher shifts significantly from an architect (or discoverer) of objective reality to one whose experiences and even predilections are brought to bear in the research process (Fink, 2000). Qualitative research is a set of activities in which the researcher is situated in the world of the research (Denzin & Lincoln, 2008). The researcher in qualitative studies is the primary data collection instrument. Denzin and Cuba (1985; cited in Klenke, 2008) used the term "human-as-instrument" to highlight the unique position of the researcher in qualitative research (p. 136). The instruments used, as well as other actions taken by the researcher in qualitative studies, are often reflective of the overall objective of the research (Denzin & Lincoln, 2008; 2011). The overall research design is also reflective of the experience and subjective predispositions of the researcher.

The role of the qualitative researcher as described here could only be detrimental if accounts of his or her experiences, presuppositions, and predilections that may have an effect on the research process are not revealed, and reflected upon in a way that allows

others to better understand the results of the study. As Mruck and Breuer (2003) note, without such reflexivity and precise accountability, the outcome of the research could be misinterpreted. Considering these points, I provide a description of my role as the researcher in this work in the following section.

My background and prior experience ensured that I went into this project with certain knowledge, presuppositions, and predispositions. I was born and raised in Nigeria. I completed both elementary and secondary education in that country. Before traveling to Canada to complete my undergraduate and graduate studies, I had completed two diploma programs at the University of Benin in Nigeria. This experience provides me with useful knowledge of the context of higher education in the country. By the context of higher education, I mean the culture of the institutions represented by the language of participation and other social habits of students, faculty, and staff. Essentially, context is used here to mean the prevalent circumstances in the location of research (see Section 2.6 for a discussion of SSA as the broader context of this thesis).

The above facts, coupled with my experience as a practicing librarian (with special interest in digital resources collection) for more than five years, spurred my curiosity regarding the use of digital resources at institutions of higher education in Nigeria, as well as in the broader region of SSA. The challenges of education and learning in SSA are well documented (Dlamini, 2008; Mwenda & Muuka, 2009). At the heart of the issues is the high cost of learning materials, including textbooks. Students, as well as institutions, find it challenging to acquire educational resources for personal use or for placement in libraries. All of these culminate in the lack of access to required educational materials among students in SSA. As a student in Nigeria, I had a first-hand experience

with the difficulty of acquiring educational resources. However, given the proliferation of OER in North America and Europe, and particularly given the fact that the resources are free and could potentially be used to offset some of the cost of buying learning materials, it was natural for me to wonder how these materials could be used to help students in SSA. In the end, I decided that I might be able to help provide a better understanding of the use of OER through the examination of key issues relating to use of the resources by students at an institution of higher education in SSA.

This thesis has both qualitative and quantitative components. I adhered strictly to the methodological principles of both approaches, where required. Having said that, I consider myself the primary instrument of data collection, analysis, and interpretation, particularly in the qualitative aspects of this thesis. I designed the data collection instruments (surveys and interview guides) with consideration for the context of study. Although, I had gone into data collection with an open mind, expecting the unexpected, there were some occurrences for which I was unprepared. For example, given my background, I did not consider the possibility of *participation resistance* (i.e., participants' reluctance to take part in the research) on account of who I have become (i.e., someone who has lived outside of Nigeria for more than a decade). I had gone to Nigeria for data collection as an *insider* (at least in my mind), without the realization of how much difference research participants would ascribe to me. I underestimated how much, for example, the slight change in my accent would make me sound like an *outsider* to participants. I also underestimated the change in my overall understanding of the culture.

Although I describe in more detail (in the methodological section) how this perception of me by participants affected the process of data collection, it suffices to say here that many of them seemed distrustful of my intentions, at least at the initial stages. Some of them demonstrated this by exercising more than the necessary degree of caution in relating their experiences. They asked pointed questions about where I was from, and how specifically I was going to use the data. Participants' distrust of researchers and the research process is not uncommon (Dwyer & Buckle, 2009). However, it could make the research process unnecessarily tedious. Overall, I overcame the challenge of being seen as an outsider, to a considerable extent, through frequent interactions with participants. As I spent more time with the participants and answered their questions, there was the sense that I had allayed some of their fears and established some semblance of trust. It is difficult to tell if this would have happened as quickly as it did, without the knowledge and personal experience I brought to the thesis. Having said that, it is important to acknowledge that as a researcher one can never fully understand how much one's personal experience leads to a bias in a study. For example, while my personal experiences with OER may have been useful for conceptualizing the key issues regarding OER use among students, particularly at institutions of higher education in Nigeria, and for designing a research process to address the issues, it is also possible that those same experiences may have precluded me from seeing other important aspects of the resources that require empirical attention.

1.7   Structure of the thesis

This thesis consists of six chapters. In the first chapter, the background of the thesis is provided along with an introduction to the concept of OER. The chapter also outlines the

purpose as well as the significance of the thesis. The second chapter reviews key studies

in OER. The review includes a discussion of the broad concept of open knowledge as

well as the pedagogical situation in SSA. On the basis of the review, the chapter

identifies a gap in the study of OER and proposes specific pertinent research questions.

Chapter Three describes the methods used to address the research questions. Specifically,

it describes the methods employed in data collection and analysis. In addition, it presents

a discussion of ethical considerations in the thesis. In Chapter Four and Five, the results

of the thesis are presented and discussed. Chapter 4 presents and discusses the results

relating to participants' awareness of OER, their attitudes toward OER, the benefits they

derive from using the resources, and the challenges they face in doing so; while Chapter

Five presents and discusses participants' motivation for using the resources. Chapter Six

is the concluding chapter. It summarizes the results of the thesis and offers a model for

explicating OER use by the participants. The chapter outlines contributions of the thesis

as well as its potential limitations. Finally, the chapter proposes possible future research.

Chapter 2

2 Literature review

2.1 Introduction

This thesis investigated key issues relating to students' use of OER by students at the

University of Lagos, an institution of higher education in Nigeria. To provide the

background for this investigation, this review covers works from different areas of study.

As a concept, OER crosses several disciplines, particularly those of education,

information science, and knowledge management. The concept comprises both

informational and ideological components. OER are mostly studied as pedagogical tools

(a set of resources that support the transmission of knowledge) as well as the means for

the advancement of the ideological notion of opening and freeing up knowledge and

information resources for all users. In other words, OER are both information resources

and an offshoot of the ideology and practice of *open knowledge*. Given that OER are

information resources, the finding and using of OER is related to information behavior.

This review covers two broad areas: information behavior and open knowledge, an

umbrella term that includes OER and other open notions. The review also covers SSA as

the broader context of the thesis.

2.2 Information behavior

The investigation of students' use of OER is essentially the investigation of students'

information behavior. According to Ingwersen and Jarvelin (2005), information behavior

refers to any "human behavior dealing with generation, communication, use, and other

activities concerned with information, such as information seeking behavior and

interactive IR [information retrieval]" (p. 385). Presumably, any behavior that involves

engagement with information resources and channels is information behavior. Practices such as finding, searching, using, generating, and disseminating of OER are information behaviors. The literature on information behavior seems to fall into four broad categories: (1) information seeking, (2) information need/use, (3) information or knowledge creation, and (4) information or knowledge dissemination (Wilson, 2000; Bartlett & Toms, 2005; Ingwersen & Jarvelin, 2005). In the sections that follow, each of these information behavior categories will be reviewed to provide a background for the exploration of issues relating to finding and using of OER among students.

2.2.1 Information seeking

One of the primary objectives of this thesis is to investigate issues relating to finding of OER by students at an institution of higher education. The practice of finding OER can be conceptualized as information seeking behavior, using Wilson's (2000) definition of the term (see Section 2.2.2). According to Morville (2005), to *find* refers to locating or discovery of a particular object. It also means the navigation of a system or environment, or the retrieval of a particular object from that system or environment (Morville, 2005). In other words, to find means to navigate or browse through a system, such as an online repository in order to retrieve certain information resources. Thus, *information finding* is related to information seeking and information searching.

Information seeking is distinguishable from information searching. According to Wilson (2000), information seeking "is the purposive seeking for information as a consequence of a need to satisfy some goal," while information searching "is the 'micro-level" of behavior employed by the searcher in interacting with information systems" (p. 49). Information seeking relates to the determined plan to obtain information to satisfy a

need, while information searching involves the various activities undertaken to obtain

that information. In seeking information, the user is consciously making an effort to

acquire information in response to a need or gap in knowledge (Wilson, 2000; Case,

2002). The issue of the presence of a need or gap in knowledge for information seeking

to occur has been treated prominently by Belkin (1980; 2005) and Dervin (2005). Belkin

used the theory of ASK to make the point that a need in a person's state of knowledge is

an anomaly. In other words, with respect to certain issues, a person with ASK lacks

adequate capacity to resolve all problematic situations arising from those issues. To

correct this anomaly, the person may engage in information seeking. For example, a

student may seek certain OER because she has a need to deepen her knowledge about

certain topics. The ASK theory clearly relates to students' information behavior when

finding OER in that it proffers a specific rationale behind such action.

Belkin's *need* concept is related to that of Dervin's *gap*. Devin also used the theory

of sense-making to explain the rationale behind information seeking (Devin, 2005).

Devin suggests that people seek information when they intend to fill a certain gap in

knowledge or make sense of their world. The sense-making theory shows the relationship

between information seeking and knowledge acquisition (*knowing*). According to Case

(2002), information seeking is one of the most thoroughly discussed of LIS concepts.

Information is usually sought when people are making decisions, such as buying a house,

applying for college, and completing academic tasks. In the course of seeking

information, the individual may interact with different information systems or channels

(Wilson, 2000, p. 49).

The importance of channels of information seeking has been treated in LIS (Fisher et al., 2005). Diane Sonnenwald applied the theory of *information horizon* to explain the relevance of the context of information seeking (Sonnenwald, 2005). The premise of the information horizon theoretical framework is that the social network of an individual has an important role to play in his or her information seeking. The theory also postulates that information seeking is a process with a series of steps. In studying information seeking under the methodology of information horizon, participants are asked to describe their sources of information (information horizon). These sources of information may include individuals, websites, repositories, etc. Participants are also asked to rate the importance and role of the information sources in the process. With regard to OER, the information horizon of a student at an institution of higher education could be extensive. Students' information horizon may include classmates, educators at institutions anywhere in the world, and other learners. The advent of online information systems, such as social media, has greatly expanded the information horizon of students who are seeking information resources, such as OER.

Studying observable information seeking behavior is more tractable than studying the mental processes involved in closing the knowledge gap. This was the theoretical premise of Ellis's 1984 study of the processes of information seeking (Ellis, 2005). Ellis made some propositions about the process of information seeking. The author suggests that information seeking behavior involves a small number of different types of activities characterized by: (a) *starting*: the initial set of actions involving information search; (b) *chaining*: the using of the chains of citation or other forms of referential connections to find information resources; (c) *browsing*: semi-directed searching in a potential

information channel; (d) *differentiating*: the filtering of resources for quality and relevance; (e) *monitoring*: watching for developments in a particular area of interest for new resources; and (f) *extracting*: the process of systematically working through a particular channel to find the resources of interest.

Ellis (2005) admits that the process of finding information is not as linear as the model suggests. The individual information seeker and the context of information seeking determine the order of the steps taken to find information. Ellis also submits that his model of information seeking does not necessarily represent a set of steps that every researcher is expected to follow when investigating information seeking. However, the model does provide a framework for examining activities related to finding information resources. For the purpose of this thesis, Ellis' model is important for understanding the activities students undertake in finding OER in different information systems.

Choo and Detlor (1999) developed a behavioral model of information seeking on the Web, by using concepts in Ellis' model to describe information seeking on the Web. As Choo and Detlor (1999) note, *starting* occurs, for example, when users initiate their Web usage in pre-selected default Web pages, or when they visit a favorite site to begin browsing. *Chaining* happens when items of interest are encountered on the Web, often by chance, and then followed through hypertext links to more information on those items. In *differentiating*, users select sites that they expect will provide relevant information. Sites may be differentiated by a user based on the recommendations of other users or based on the user's personal experience. *Monitoring* relates to keeping up with relevant sites and information repositories. According to Choo and Detlor, there are two forms of monitoring on the Web: *pull monitoring,* whereby, for example, users select bookmarks

or enter a particular site to see available information; and *push monitoring,* whereby, for example, users receive alerts that new information has been added to a site they are monitoring. In *extracting*, the user may systematically search through one or more websites in order to find the information of interest.

One of the drawbacks of Ellis' (2005) model is that it does not address the cognitive or affective aspects of information seeking. Carol Kuhlthau's Information Search Process model, to some extent, addresses this limitation. Kuhlthau's model portrays information seeking as a process of *construction*. The model describes the process of information seeking related to assigned learning tasks (Kuhlthau, 2005, p. 230). According to Kuhlthau (2005), information seeking can be described in six stages: (a) *initiation*: an individual becomes aware of a need for information or a gap in knowledge, which often leads to uncertainty; (b) *selection*: the problem is identified, relieving some of the initial uncertainty; (c) *exploration*: during the initial search for information, inconsistent and incompatible information is obtained, resulting in increased uncertainty; (d) *formulation*: a focused perspective is formed after additional information search, reducing uncertainty; (e) *collection*: information related to the focused perspectives is gathered, uncertainty subsides, and understanding increases; and (f) *presentation*: the search is completed, with a new understanding and ability to put what is learned to use. The model incorporates the user's thoughts, feelings, and actions, unlike Ellis' (2005) model. Although the model helps to show how information seeking is a process of learning, like the Ellis' (2005) model, it does incorrectly assume a linear process. As a result, it has been criticized for lacking the complexity and flexibility necessary for studying the topic of information behavior (Weiler, 2005).

Research on the topic of information seeking in LIS is prolific, and most of the studies have focused on different groups of information users (Fisher et al., 2005). George et al. (2006) examined the information seeking behavior of graduate students at the University of Pittsburgh. The study particularly focused on students' "information behavior related to their process of inquiry and scholarly activities." According to the authors, graduate students prefer online resources to print materials. Some of the factors that influence how students find digital information resources include the convenience of the channel of information, knowledge of the channel of information, and course requirements.

Overall, for users to find information or knowledge resources on the Web or any online repositories, it is assumed that they will engage in certain activities similar to the ones described in this section. Some of these activities are assumed to be undertaken by students searching for OER. Finding information resources is not the same as applying the resources. In the next section, the use of information resources, once they have been obtained, will be discussed.

2.2.2 Information use

This thesis focuses mainly on issues relating to students' use of OER at the University of Lagos in Nigeria. The use of OER is tantamount to the application of information in the completion of educational tasks. Information use is an important aspect of information behavior. Wilson (2000) refers to any behavior related to the application of information as "information use behavior" (p. 50). According to Wilson, information use behavior "consists of the physical and mental acts involved in incorporating the information found in the person's existing knowledge base" (p. 50). Information use is a hermeneutic

process of producing understanding through interpretation and dialogue with information

resources such as OER. According to Choo (2002), hermeneutics is a process by which a

person derives meaning from certain experiences. The hermeneutic process of

interpretation is complicated and produces results that are continually changing.

Consequently, an individual's knowledge about an issue is also in flux depending on the

information sought, found, and used by that individual. The information use described

here represents the cognitive perspective of information use (Wilson, 2000; Ingwersen &

Jarvelin, 2005). The cognitive perspective has led to significant advances in different

areas of LIS, such as user studies and information retrieval (Belkin, 1990). More about

the cognitive integration of information into an existing knowledge state will be

discussed further in the section on knowledge creation below.

While the cognitive perspective of information use is essential for understanding the

relationship between information and knowledge, information use goes beyond the

mental integration of new information into existing knowledge. Information use also

involves the *domain* of application. What do people specifically do with the information

once it has been obtained? Bartlett and Toms (2005) indicate, "surprisingly, information

science often stops short of examining what people do with the information once it has

been received" (p. 1). This perspective of information use relates to the application of

information resources to the completion of specific tasks and accomplishment of certain

goals. The importance of studying this aspect of information use is relevant because, as

Bartlett and Toms (2005) suggest, it can assist in understanding how well information

resources are applied in the completion of certain tasks or in the accomplishment of

certain goals. Using this perspective, OER are presumably used in the completion of

education-related tasks, including learning about certain topics. I define education tasks as those related to the completion of certain educational goals while educational goals are the set objectives in structured academic endeavors. For students at institutions of higher education, it could represent the overall completion of a degree requirement or the mastery of a particular topic. For students at institutions of higher education in SSA, the specific tasks to which they apply OER are not very clear.

The use of electronic information resources, such as OER, by students for the completion of educational tasks is very well established (Peterson, Rowat, Kreiter, & Mandel, 2004; Ozoemelem, 2009). Peterson et al. (2004) investigated the use of information resources by medical students and found that students embrace and use electronic information resources much more than it is acknowledged. Looking at the use of electronic information resources by graduate students at a Nigerian university, Ozoemelem (2009) observes that despite the low level of skillfulness in the general use of electronic information resources by participants in the study, students' usage of electronic resources is quite high. Gakibayo, Ikoja-Odongo, and Okello-Obura (2013) studied students' utilization of electronic information resources in Uganda's Mbarara University Library. The authors found that students' use of electronic information resources was affected by low information literacy skills, inadequate computers, and slow Internet connectivity. In contrast to Ozoemelem's (2009) findings, the authors note that these challenges result in the low use of electronic information resources at the university. These somewhat contrasting findings may indicate that there is a disparity in the frequency of use of electronic information resources among students. Nonetheless, none

of the existing studies specifically investigates issues relating to the use of OER by students at institutions of higher education in SSA.

2.3 Knowledge creation and dissemination

2.3.1 Knowledge creation

Other than the finding and using of information and knowledge resources, another important aspect of information behavior is knowledge creation. Knowledge creation is the formation of new ideas through interactions between an individual's tacit knowledge and explicit codified knowledge, such as a written text, video, image, and voice. This description of knowledge creation is derived from the theoretical framework of organizational knowledge creation developed by Nonaka (1994). An important part of understanding knowledge creation is recognizing the distinction between tacit knowledge and explicit knowledge. Citing Michael Polanyi's (1967) aphorism: *we can know more than we can tell*, Nonaka (1994) describes tacit knowledge as personal knowledge that is difficult to formalize or communicate. Hedesstrom and Whitley (2000) note, "there is general agreement that tacit knowledge is the knowledge that *resides in the heads* [emphasis mine] of people" (p. 47), and, therefore, difficult to express. Alternatively, explicit knowledge is the kind of knowledge that can be easily codified into written text, image, sound, or voice (Nonaka, 1994; Hedesstrom & Whitley, 2000).

		to	
		Tacit	Explicit
from	Tacit	Socialization	Externalization
	Explicit	Internalization	Combination

Figure 1: Nonaka's model of knowledge creation

Figure 1 shows how Nonaka (1994) uses the relationship between tacit knowledge and explicit knowledge to describe four knowledge creation processes. In *socialization*, there is interaction between tacit knowledge of one individual and that of another. Socialization occurs through the interaction between tacit knowledge and tacit knowledge. Nonaka (1994) notes that this interaction does not necessarily require the use of articulable language. An example would be an apprentice observing and learning crafts from a mentor. In the process, the tacit knowledge of the mentor and the apprentice interacts, and knowledge creation occurs. Also referred to as *learning*, *internalization* occurs when there is a dialogue between tacit and explicit knowledge. Individuals internalize knowledge by integrating explicit knowledge to existing tacit knowledge, for example, by watching a video lecture or reading a book. This notion particularly speaks to the usefulness of knowledge dissemination and acquisition through the creation and use of OER. Nonaka (1994) uses the concept of *combination* to describe the integration of forms of explicit knowledge. Combination involves the *mashup* of information resources to produce something new. In *externalization*, tacit knowledge is expressed in a codified external form. This may involve writing down ideas and creating innovative videos and images.

The last two forms of knowledge creation processes described above (i.e.,
combination and externalization) are very relevant to the discussion of digital content
creation (often referred to as user-generated content [UGC]) and, consequently, the
creation of OER. The OECD (2007) defines UGC as any creative content that is made
outside of professional routines and practices, and made publicly available on the
Internet. In other words, UGC represents content created by non-media professionals.
McKenzie et al. (2012) provide three overarching models of UGC: (a) creative content,
(b) small-scale tools, and (c) collaborative content. According to McKenzie et al. (2012),
creative content includes textual, audio, image, video, and multimedia content that are
created and distributed through such platforms as blogs, Flickr, Twitter, and YouTube
while small-scale tools are applications, such as mobile apps, that are written by
individuals to provide additional functionality to certain existing hardware or software.
The authors describe collaborative content as *consortia* that collaboratively produce and
distribute UGC. Examples include Wikipedia and Apache. Overall, UGC is any material
created and uploaded to the Internet, such as product reviews on sites like Amazon,
academic lecture videos on YouTube, pages on Wikipedia, consumer apps, and student
profiles on Facebook and Twitter. Users have generated content since the advent of the
Internet, but growing availability of high-speed Internet, falling prices of computer
products, and growing digital literacy skills, among other things, have made such content
the dominant form of global media. OER can be classified as part of UGC. Usually, OER
are produced by educators who are not media professionals. The creation of open
resources not only represents the participation of users in Web content development, but
it also represents the dissemination of knowledge and information resources. The creation

of knowledge is equally as important as its distribution. In the next subsection,

knowledge dissemination will be discussed briefly.

2.3.2 Knowledge dissemination

Knowledge creation and knowledge dissemination go hand in hand. Gagnon (2009)

defines knowledge dissemination as the active process of communicating, in which a

particular audience is targeted with tailored and packaged messages. Knowledge

dissemination is the distribution of knowledge and information resources within a

particular context, with the expectation that someone will be able to make use of it either

conceptually (i.e., learn from it) or instrumentally (e.g., modify it to produce further new

resources). Knowledge dissemination is a growing field of study (Lafrenière et al., 2013).

Lafrenière et al. review the literature on knowledge dissemination and indicate that the

term is used interchangeably with other terms such as *knowledge translation*, *knowledge

diffusion*, *knowledge exchange*, and *knowledge transfer*. Certainly, this plethora of terms

makes it more difficult to work with the literature of knowledge dissemination.

According to the Institute of Health Economics (2008), a major intent of dissemination is

to provide information for use as input in individuals' decision-making and institutions'

policy development. The goal of knowledge dissemination is to effect change in the

behavior or attitude of the target audience through the use of predetermined channels of

information and planned strategies (Lafrenière et al., 2013). This description of

knowledge dissemination is relevant to the discussion of OER. The dissemination of

OER is not only necessary for increased awareness of the resources, but also for the

transmission of information and knowledge.

Akhavan, Ghojavand, and Abdali (2012) suggest that the dissemination of knowledge has an effect on its creation. In other words, the manner in which knowledge resources are made available determines the creation of subsequent knowledge. For example, when OER are disseminated as open resources, users are able to find and use the resources to engage in the further production of new knowledge and information resources. However, the distribution of knowledge resources, such as OER, is affected by several issues: (a) technology (UNESCO, 2002; McGreal et al., 2013), (b) skill and awareness (Holloway, 2000; Okonkwo, 2012), (c) value congruence (the conviction of the importance of knowledge dissemination) (Sharratt & Usoro, 2003), and (d) existing policies (Mulder, 2008; Oosthuizen, 2012). In short, for an individual to be able to disseminate OER, she must possess the conviction, willingness, technical skills, knowledge of a specific topic of interest, and access to appropriate technologies. In addition, there must be the existence of favorable policies, for example, on the use of less restrictive licenses, for OER to be efficiently made as widely available as possible.

In the online context, knowledge dissemination goes beyond making information resources available on the Internet. It also involves employing strategies that ensure the visibility of the resources in the information-crowded cyberspace. The advent of social media sites, such as Twitter and Facebook, has made it possible to increase the extent of information resources dissemination. Scanfeld, Scanfeld, and Larsen (2013) reviewed one thousand Twitter status updates that were randomly selected for content analysis and categorization. The authors conclude that social media is an important tool for disseminating all sorts of information. The authors also suggest that people tend to see

resources obtained from their personal networks to be likely more credible than those found elsewhere.

Another important aspect of online information dissemination is search engine optimization (Onaifo & Rasmussen, 2013). According to Onaifo and Rasmussen, search engine optimization involves the tweaking of certain characteristics of a digital content to make it more visible in search engine result lists. Creating knowledge and information resources is not enough. It is also important to ensure that users are able to find such resources. Supporting this notion, Young (2009) argues that the importance of search engine optimization for scholarly resources cannot be overstated. He posits that search engine optimization, the "practice of coding websites for the highest possible search result ranking," is a crucial means of making information resources easily accessible to potential users (p. 5). It is also important to emphasize that dissemination involves planned strategies. The opening of educational resources is a strategy that is intended to disseminate information and knowledge resources to as many people as possible. Thus, search engine optimization can play an important role in getting the resources into the hands of users. In the next section, the literature on the notion of *open* in OER will be reviewed.

2.4   The notion of "open" in OER

The concept of OER is an extension of the *open* notions in knowledge dissemination: open knowledge, open source, open access, and open education. This section provides a review of the literature on these concepts.

2.4.1 The notion of open knowledge

OER is a relatively new concept that has emerged from knowledge creation and dissemination. OER is based on the premise that knowledge, as well as certain paraphernalia of knowledge, such as data, content, information, etc., are collectively owned, and should, therefore, be regarded as social property (Rejas-Muslera, Cuadrado, Abran, & Sicilia, 2008). The idea that knowledge is socially owned, as well as the practice of *opening and freeing* up knowledge resources for all users, is grouped under the umbrella term of *open knowledge*. According to DeFillippi, Arthur, and Lindsay (2006), open knowledge is used to denote a set of principles and methodologies related to the production and distribution of knowledge in an open manner. Open knowledge is generally used in the literature to mean the availability of knowledge resources to everyone, as well as the practice of collective cooperation in the production of knowledge (Garcia-Penalvo, Figuerola, & Merlo, 2010). However, the exact meaning of *openness* is still under scrutiny.

Ideally, openness signifies the elimination of restrictions on the use of information resources. In other words, for a resource to be deemed open, it must be freely available to all users, and such users need to be able to apply, modify, and disseminate the resources without incurring any copyright infringement (Reagle, 2004; n.d). Thus, openness has economic, social, and legal dimensions. It also has a technological dimension, as technology represents the most effective means of disseminating open resources. Essentially, openness entails: (a) the removal of the financial cost of access to open resources; (b) the freedom to modify and share open resources; and (c) the use of technologies to support the dissemination of information resources.

In practice, openness with regard to information resources has a complex and varied signification. The extent to which a resource is open is dependent on the condition imposed by the license under which it is disseminated. Open information and knowledge resources are commonly created with CC licenses, the most popular of the open licenses. CC licenses, according to Alecu (2012), "allow the authors to retain copyright in their works while granting some rights to others, like the permission to modify or to use the work for commercial purposes" (p. 2). CC licenses are varied, and each attaches certain conditions when applied to intellectual property. According to the World Intellectual Property Organization (WIPO), intellectual property refers to the creations of the mind, such as inventions, literary and artistic works, designs as well as symbols, names, and images used in commerce (http://www.wipo.int/about-ip/en/). Information resources are examples of intellectual property. Usually, the creator of an intellectual property or a creative work is granted copyright to that work by default. According to WIPO, copyright is the rights that creators have over their creative works. The implication is that for anyone to use a copyrighted work, he or she must meet the condition imposed by the copyright, usually to obtain the permission of the creator. While copyright legislation protects creators from infringement, it creates complications for creators who are willing to make their works open. For example, it could take considerable time, effort, and resources for a creator to respond to hundreds of requests for permission to use a creative work. With CC licenses, creators could disseminate creative works with accompanying permission for any would-be user.

As noted above, CC licenses are issued through the Creative Commons, a non-profit organization that advocates for the sharing and use of knowledge and information

resources. According to the Creative Commons, CC licenses are different, and each type imposes certain conditions when applied to a creative work (http://creativecommons.org/). The first type of CC license is the *Attribution license*, symbolized by CC-BY. The CC-BY license allows users to use, repurpose, modify, commercialize, and distribute a creative work as long as credit is attributed to the original creator. The second type of CC license is the *Attribution-NoDerivs license*, symbolized by CC BY-ND. This license enables the commercial or non-commercial redistribution of a creative work as long as the creative work is not modified and the original creator is credited. The third type of CC license is the *Attribution-NonCommercial-ShareAlike*, with the symbol of CC BY-NC-SA. The CC BY-NC-SA allows the use, repurposing, modification, and distribution of a creative work as long as it is not commercialized, attribution is given to the original creator, and derivatives or modifications are shared under the same original license.

The other creative commons licenses are *Attribution-ShareAlike* (CC BY-SA), *Attribution-NonCommercial* (CC BY-NC), and *Attribution-NonCommercial-NoDerivs* (CC BY-NC-ND). The CC BY-SA allows the use, repurposing, modification, commercialization, and distribution of a creative work as long as the modifications are distributed under the original licensing terms and the original creator is credited. According to Creative Commons, the CC BY-SA license is commonly compared to the *copyleft* free and open source software licenses. This is the type of license attached to Wikipedia entries, for example. The CC BY-NC allows the use, repurposing, modification, and distribution of a creative work as long as credit is attributed to the original creator and the work is not commercialized. Users do not need to license their

modified version of the work under the terms of the original license. The CC BY-NC-ND

is the most restrictive of all creative commons licenses. It allows users to use and

distribute a creative work as long as the creator is credited. However, it does not allow

users to modify or commercialize the work. The most open of all CC licenses is the CC0

license. A CC0-licensed creative work is equivalent to a work in the public domain. Any

creative work distributed with the CC0 license has no conditions attached. As the

descriptions of the CC licenses portray, the degree of openness of any open creative

work, including knowledge and information resources, is dependent on the type of license

applied to the work. This is the case with all open-related works, including open source

software, open access publications, and OER.
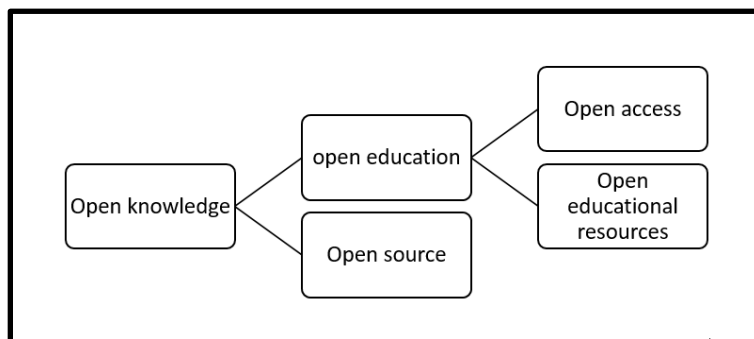
Figure 2: Relationships in open notions

Figure 2 above shows the relationships between open concepts and practices. Open

knowledge broadly encompasses open source software and open education while open

access publications and OER are types of open education. These open concepts and

practices will be reviewed next.

2.4.2 Open source software

Open source software is part of the broad practice of open knowledge. The usage of *source* in open source software does not necessarily correspond to the traditional meaning of the word. Bergman (2014) describes the significance of *source* in explaining open source software. According to Bergman, an "open source software is a software (computer programs) which has been developed in a collaborative way by many people" (p. 2). The Open Source Initiative (OSI), an organization that sets the standard for open source licensing and promotes open source initiatives, defines open source software as software that can be freely used, changed, and shared (in modified or unmodified form) by anyone (http://opensource.org/licenses). Some examples of open source software include the Linux operating system, Open Office applications, Android mobile applications, and Mozilla web browser.

To explain the semantics of the concept of open source software and the process of developing it, Bergman (2014) wades into a brief lesson of computer science. According to Bergman, computers are able to process instructions in machine language, which consists of binary codes and arithmetic operations. This is the language that the processing unit of the computer understands. Sometime around the 1950s, computer programmers started developing high-level languages that enabled people to write programs in algebraic notations and English words instead of the binary codes of machine language. However, high-level programming languages still need to be translated to machine language for the computer processor to be able to work with it. According to Bergman, the translation requires a program known as a *compiler*. The program used as input to the compiler is known as the source program or *source code*.

According to Spinellis (2003), the source code is "the definitive medium for communicating a program's operations and for storing knowledge in an executable form" (p. 1). A source code can be compiled to an executable form, and it can be read and understood. It essentially describes how a program works. A software program can be modified and developed through its source code. For this reason, programmers and program owners keep their source code secret. Open source software has an open source code. This means that anyone can make changes to, and develop, open source software.

According to the OSI, open source licenses consist of a range of open licenses that allow "software to be freely used, modified, and shared" (http://opensource.org/licenses, n.d.). Similar to CC licenses, there are different types of open source licenses. The most popular ones include the GNU General Public License. The GNU General Public License is similar to the CC BY-SA license (i.e., the copyleft license), as it requires that any derivative or modification of software with a GNU General Public License must be shared alike—that is, shared with the same license. For example, if a software developer writes a software program and releases it with a GNU General Public License, and then another person modifies and distributes her modified version, the new version must be distributed with a GNU General Public License as well. Thus, both the original software and the new derivative software become open source. Other examples of open source software licenses are Mozilla Public License, MIT License, and the Apache License.

Open source licenses are to software what CC licenses are to other creative works. Both licensing regimes assist software developers, authors, and artists in granting permission for the use of their work through the relaxation or elimination of the default copyright restrictions. However, while open source licenses seem to be geared toward

building and opening up Internet infrastructures, such as operating systems (e.g., Linux),

Web browsers (e.g., Mozilla), and applications (e.g., Open Office), CC licenses are

geared mainly toward building and opening up online content (note that CC licenses can

also be applied to print materials), including educational resources. In fact, CC licenses

are critical to advancing *open education*.

2.4.3 Open education

Open education is used to refer collectively to practices and initiatives intended to

remove all barriers to formal education. The notion of open education was originally

coined during the 1960s to represent an ideology that values the learner as the primary

determinant of the appropriate curriculum and methods for teaching (Stanford University,

2014). Open education represented the fundamental recognition that the learner should

conduct her own inquiries and learn her own way, with the teacher functioning as an

observer and guide. The meaning of open education has metamorphosed to the need for

the elimination of barriers to formal education (Open Education Week, 2014; Open

Education Consortium, 2014). According to the Open Education Consortium (2014),

open education "incorporates free and open learning communities, educational networks,

teaching and learning materials, open textbooks, open data, open scholarship, and on and

on" (para. 3). The organization further describes open education as a means of giving

people access to knowledge, platforms for sharing, innovation, and communities of like-

minded users. Overall, open education is now concerned with two main issues: the

elimination of restrictions to institutionalized education and the opening up of access to

educational resources.

Generally, access to formal educational institutions, particularly higher educational institutions, is restrictive. Admission to colleges and universities is primarily determined by the applicant's high school performance, and to complete the program successfully students must be able to afford tuition and other associated costs. Ideally, an open-oriented institution of higher education should be free of tuition cost and accept applicants irrespective of their high school qualifications. However, the near impracticality of *no-tuition* higher education institutions is not missed on even the most ardent proponents of open education. As a result, opening education has become more about opening up admission into higher educational institutions rather than the elimination of tuition. Essentially, open education means the removal of academic admission requirements so that more applicants can be admitted. In Canada, for example, Athabasca University has only one formal entrance requirement for all undergraduate students: They must be at least 16 years of age (Athabasca University, 2014). The issue of eliminating academic qualifications for admittance to higher educational institutions is obviously controversial given that most institutions of higher education still require some form of pre-admission academic qualification. As noted in the website of the Open Education Week, a conference of proponents of open education, open education "seeks to scale up educational opportunities by taking advantage of the power of the Internet, allowing rapid and essentially free dissemination, and enabling people around the world to access knowledge, connect, and collaborate" (Open Education Week, 2014, para. 3). Contemporary open education campaigns have had more success in opening up educational resources than in eliminating pre-admission academic qualifications. Some of these resources include open access publications and OER. Basically, open access

publications and OER are subsets of open education. Technically, open access

publications, or simply open access, are also OER. However, the resources have been

treated separately in the literature.

2.4.4 Open access

Open access is often used to refer to open peer-reviewed publications. The Budapest

Open Access Initiative, an organization of open access proponents, believes that open

access:

> will accelerate research, enrich education, share the learning of the rich with
>
> the poor and the poor with the rich, make this literature as useful as it can be,
>
> and lay the foundation for uniting humanity in a common intellectual
>
> conversation and quest for knowledge (Budapest Open Access Initiative,
>
> 2002, para. 1).

As the description above suggests, open access is beyond mere access to peer-reviewed

publications. It also includes the freedom to use, modify, and disseminate. With open

access, the old tradition of sharing in academia is strongly augmented by new Internet

technologies. There is a public good in opening access to peer-reviewed journal literature.

Open access will enable all researchers, educators, students, and other learners to have

access to quality educational resources. As altruistic as open access might seem, the

availability of peer-reviewed works has been very limited. This is attributable to a

number of causes, including creators' fear of loss of rights to creative works, economic

concerns on the part of creators, lack of awareness of the process of opening up creative

works, etc.

2.5   Open educational resources

OER are a major part of open education, and of open knowledge. The OER literature

seems to have grown more than any other open knowledge initiatives with the exception

of open source software. Overall, the review of OER literature shows that OER are

mostly studied from the perspective of educators and educational institutions (Panke &

Seufert, 2013). The review of OER literature also reveals a synergy of interest in three

key areas of the subject: (a) support for educators and institutions in the development and

use of OER; (b) the identification of the challenges to OER initiatives; and (c) the

identification of the benefits of OER. This review will focus on these areas of the

literature.

2.5.1 Support for educators and institutions

The first forum on OER organized under the auspices of UNESCO was mostly attended

by educators and representatives of institutions that support development in education

(UNESCO, 2002). According to the report published at the end of the forum, one of the

primary objectives of the forum was to find ways of using OER to support teaching at

institutions of higher education. Essentially, participants wanted to encourage the use of

open courseware, such as course descriptions, syllabi, calendars, lecture notes,

demonstrations, assessments, simulations, and learning objects among teachers. The

consensus at the forum was that OER could be used as a means of providing "educational

resources for college and university faculties to adapt in accordance with their curricular

and pedagogical requirements" (p. 5).

Petrides, Jimes, Middleton-Detzner, and Holly (2010) explored some of the ways teachers discussed, shared, and collaborated around OER for the purpose of supporting teaching and learning. The authors suggest that teachers need to be supported in their use of OER to transform pedagogy, and one way of doing this, the authors further argue, is through the exposure of teachers and educators to the resources as well as creating a platform for them to collaborate. Collaboration among teachers is not only necessary for sharing OER, but it is also useful for teachers interested in obtaining knowledge about finding, applying, and creating resources.

The Commonwealth of Learning (2011) published the guidelines for supporting teachers' effective use of OER. The publication covers the role of governments, institutions, and teachers in ensuring the effective integration of OER in the classroom. Governments' role in supporting teachers and institutions in the use of OER include contributing to the raising of awareness about OER among teachers, creating policies that encourage the use and creation of OER in higher education, setting up an overarching national policy on licensing frameworks, promoting the adoption of appropriate open standards to ensure full access to and sharing of open resources in higher education, promoting national ICT and connectivity strategy given the significance of ICT to accessing and sharing of OER, and providing support for national initiatives to develop local content as well as global efforts to develop OER repositories.

As with governments, according to the Commonwealth of Learning (2011), institutions of higher education have a critical role to play in providing a conducive environment for teaching staff to access, use, and create OER. There is a need for ongoing professional development for teachers and other users of OER on how to find

and use the resources. Institutions can develop institutional strategies for integrating OER into a range of pedagogical activities. According to the report, institutions can also provide incentives to support investment in the development, acquisition, and adaptation of OER. As further stated in the report, other possible institutional roles in supporting the use of OER by educators include promoting the publication of educational materials as OER within institutional protocols, promoting research on using, reusing, and repurposing OER, encouraging collaboration both within and beyond the institution in developing open materials, and developing institutional policies and practices to store and access OER.

The Commonwealth of Learning (2011) report also indicates that not only governments and institutions have roles to play in supporting teachers' use of OER; teachers themselves must take certain actions to ensure their effective use of the resources. Such actions include developing skills for the evaluation of OER. In cases where there is a deficiency in the use of OER, teachers should seek institutional support for the development of relevant skills. Teachers should also leverage OER networks and communities of practice. As Petrides et al. (2010) suggest, teaching staff can benefit tremendously from using networks and communities of practice collaboratively to develop, adapt, and share OER. Last, according to the report, it is also recommended for teachers to endeavor to develop skills to adapt and contextualize existing OER to respond to diverse learning needs of students as well as support a variety of learning styles.

2.5.2 Identification of the benefits of OER

Like any other learning resource, the primary role of OER is to support learning. OER play an important role in the dissemination of information and knowledge. It is difficult

to find any work in the subject area without a reference to the beneficial role of OER as important learning resources and tools for knowledge propagation. Diallo, Thuo, and Wright (2012) indicate that the flexibility of access allowed by digital academic content such as OER makes it possible for learners in multiple locations to be reached. They further state that OER assist in facilitating access to quality education. Diallo and colleagues also note that the most important role of OER in education is the reduction in the cost of learning. Cost savings from OER can result from time saved when teachers repurpose and reuse OER for teaching instead of creating new materials from scratch. Learners, particularly students, can reduce the cost of learning when they are assigned textbooks that are openly and freely available.

Other than the reduction in the cost of learning and education, OER provide inexpensive ways of disseminating knowledge. The non-rival nature of digital materials such as OER makes them suitable for dissemination to multiple users in multiple locations. This attribute of OER is the reason why several scholars have argued for their use in supporting learners in difficult to reach locations of the world (UNESCO, 2002; Mulder, 2008; Gakindi, 2010; Wright & Reju, 2012; Ngimwa & Wilson, 2012).

The OECD (2007) addresses the question of incentives for "universities and faculty staff to deliver their materials to OER initiatives" (p. 3). The paper outlines several beneficial reasons for academic institutions and faculty to be involved in the development and deployment of OER programs. For academic institutions, according to the report, first, sharing knowledge is in line with academic traditions and a good thing to do; second, the quality of teaching resources available to institutions can be improved and the cost of content development reduced by sharing and reusing open resources; and

third, it is good for the institution's public relations to have an OER project as a platform for attracting new students.

For individual teachers, according to the OECD (2007), there are personal benefits for using and partaking in the development of OER. Teachers can gain publicity and a better reputation within the *open community*[5] if they participate in OER initiatives. It is thought provoking to note the suggestion in the report that the reason for faculty and institutional support for the development of OER goes beyond the altruistic act of sharing. As Malloy, Jensen, Regan, and Reddick (2002) note, the open sharing of educational resources benefits institutions and faculties. The authors argue that the open sharing of educational resources "can revitalize the teaching profession through the rapid evolution of pedagogy, technique, and content in ways that allow peer review of work" (p. 202) In other words, through faculty participation in OER programs, the quality of available content can be ensured.

2.5.3 Identification of challenges to OER initiatives

There are several challenges, both at the individual and institutional levels, in the use of OER as well as in the development and deployment of sustainable OER initiatives (UNESCO, 2002; The OECD, 2007; Walsh, 2011). One of the main challenges is the lack of enthusiasm and support on the part of some stakeholders in OER development and use. Walsh (2011) recognizes this challenge and outlines strategies for successfully

---

[5] The concept of open community is used here to refer to the network of individuals, groups, and organizations committed to the promotion and sharing of open resources through open licenses. This notion is applied in Simon Phipps' (2012) work on open source strategies for business enterprises.

dealing with it. According to the author, it is essential for OER developers to involve

institutional leaders early in the planning stages of OER initiatives. It is important that

developers demonstrate the significance of OER initiatives to the overall strategic goal of

the institutions. Ideally, OER program developers should show how OER initiatives

would support students' learning as well as the reduction of cost associated with

instruction.

Another considerable challenge in the development and deployment of OER is

that of technology (UNESCO, 2002; McGreal et al., 2013). McGreal et al. (2013)

acknowledge the significance of the challenges posed by technology when they indicate

"… technical issues … should be addressed by producing organizations and institutions"

(p. xxii). It is often the case that open resources are created with software programs that

are proprietary, thus, making it difficult for users without access to such specific

programs to use the resources. Several scholars have argued for the development and

adoption of technical standards and specifications in the creation of OER in order to

promote interoperability and cross-platform application of the resources (UNESCO,

2002; McGreal et al., 2013). According to the UNESCO report (UNESCO, 2002), the

development and use of sustainable software in the creation and distribution of electronic

content enables the content's reapplication in different technological platforms. A

number of scholars have also raised concern about how issues of connectivity, such as

inadequate bandwidth and limited access to the Internet, could be problematic for many

potential OER users (UNESCO, 2002; Dhanarajan & Porter, 2013). Speaking with

reference to SSA, Ngimwa and Wilson (2012) sum the foregoing notion by proclaiming

that the inadequate access to appropriate technologies is a barrier to successful OER

development. According to the authors, the barriers to OER use and development in SSA include limited and costly Internet bandwidth, limited access to computers, and power supply interruption. The challenges of technology to the adoption of OER in SSA are acknowledged by several other scholars including UNESCO (2002); Wilson (2008); and McGreal et al. (2013). Thomas et al. (2012) are right in their contention that the barriers and challenges to using OER are not different from those associated with using other technologies for supporting learning and teaching.

Overall, research on OER is prolific and, as expected, studies with a focus on students' use of the resources are beginning to emerge (Hu et al., 2015). Hu et al. examined "Chinese college students' usage of OER and perceived barriers impacting the diffusion of OER" (p. 957). The authors found that several issues affect the use of OER among the students, including individual student's experience, the nature of OER, and the available technological platforms for accessing the resources. Rolfe (2015) investigated students' perception of the quality of OER. Rolfe found that students rated OER in terms of their currency and the authenticity of the author. That is, students place a premium on open materials that are up-to-date and are created by reputable sources. The students also assessed OER in terms of the ease of use of the resources. Rowell (2015) analyzed factors that may contribute to student perceptions of courses that assigned OER as part of the curriculum. Specifically, the author looked at how such factors as course discipline, age, gender, and course delivery mode affect students' perception of OER. Overall, the author found that the academic discipline, student age, student gender, enrollment status, and course delivery mode were of no significance to students' perception of courses that incorporated OER. Even though OER researchers are beginning to recognize the

importance of students' perspectives in the overall understanding of OER, studies in the area is still sparse. And importantly, OER research with a focus on students in SSA is still almost non-existent.

Okonkwo's (2012) work focuses on the challenges posed by the lack of adequate knowledge in the use of OER. The author's study looks at the willingness, readiness, and needs of open distance learning professionals from two hybrid universities in Nigeria to deploy OER in support of teaching and learning. Participants in the study consisted of 20 academic staff members from the two universities. No students were involved in the study. The study reveals that one of the major challenges of developing OER initiatives in SSA is the lack of appropriate skills on the part of educators to use OER. Therefore, Okonkwo recommends the need to train educators in the use of OER. The other issues raised by the author include the lack of support for OER initiatives among top stakeholders, the application of appropriate technologies in OER creation, and the prevalent ineffective OER policies. Hart and Oosthuizen (2012) also call for the need to develop policies that will facilitate the development of OER initiatives. According to the authors, institutions of higher education need to start establishing positive OER development positions in order to ensure the success of OER initiatives.

Mulder's (2008) interest lies in the sociocultural, political, and economic challenges in the adoption of OER. Mulder suggests that there is a problem with the way OER are adopted in SSA. The author notes that even though OER have the potential to affect social, economic, and political life in SSA positively, the mere creation of technological infrastructures for delivering OER is not enough. The concept of OER, according to the author, can only work if Africans become more involved in the creation

and adaptation of the resources according to their specific needs. The author believes that the development and implementation of necessary OER policies are required to achieve this goal. If Africans are to enjoy the benefits of OER, the author suggests that both institutional and Africa-wide policy concerning OER is necessary in the continent.

Other issues that have been treated in the literature include copyright and licensing in OER use and production (Prabhala, 2010), assessment and accreditation of OER-supported independent learning (Conrad et al., 2013), and the localization or appropriation of OER (Jimes, Weiss, & Keep, 2013). Olakulehin and Singh's (2013) work examines the rationale, approach, difficulties, opportunities, and benefits of the National Open University of Nigeria's (NOUN) experience in opening access to higher education in Nigeria. The authors conclude that even though OER hold enormous potential for facilitating learning, there are significant challenges in the adoption of the resources, especially in SSA countries, including Nigeria. In the next section, the use of OER will be broadly contextualized in SSA to set the stage for the exploration of OER use by participants in this study.

2.6   Sub-Saharan Africa: contextualizing the study of OER

Although this thesis focuses on students at an institution of higher education in Nigeria, the broader context is SSA. Nigeria is the most populous country in SSA. The designation SSA is commonly used to indicate all of Africa except northern Africa, with the Sudan included in SSA (United Nations Statistics Division, 2012). Basically, SSA consists of all the African countries that are located south of the Sahara.

Figure 3: Region of Sub-Saharan Africa

Although SSA are comprised of some of the poorest countries in the world, they are also experiencing the fastest growth in information and communication technology (ICT) adoption (World Resources Institute, 2007). Much scholarly attention has been given to certain aspects of information behavior in SSA, particularly those related to the use of ICTs (Adeya, 2001; Pigato, 2001; Minges et al., 2008; Akue-Kpakpo, 2013). According to the United Nations Economic Commissions for Africa, ICTs cover "Internet service provision, telecommunication equipment and services, information and technology equipment and services, media and broadcasting, libraries and documentation centers, commercial information providers, network-based information services, and other related information and communication activities" (Adeya, 2001, p. 3). An important aspect of ICTs, the Internet arrived in SSA from the early 1990s onward: Kenya in 1993, Uganda and Nigeria in 1995, and Togo in 1996 (Akue-Kpakpo, 2013). As with other regions of the world, the advent of the Internet in the region set the stage for a revolution in information behavior in online information spaces. It also set the stage for the

development of new tools for finding, using, creating, and disseminating information and knowledge resources, such as OER.

The literature on OER in SSA reveals two main significant observations: (a) OER is seen as a means of alleviating some of the pedagogical challenges of the region and (b) OER is seen as a means of closing the gap in access to information and knowledge resources between SSA and the developed countries of Europe and North America.

2.6.1 Supporting pedagogy in SSA with OER

As noted in the seminal report produced by the first forum on the subject in 2002, one of the primary functions of OER is that OER will be used to support teaching in developing countries, such as SSA (UNESCO, 2002). According to the report, OER will serve as "educational resources for college and university faculties to adapt in accordance with their curricular and pedagogical requirements" (p. 5). At African Virtual University, one of the attendees of the conference suggested that OER is important to SSA, as it can help "improve the quality of education by tapping the best resources, in Africa and worldwide" (p. 16). Ngimwa and Wilson (2012) also argued that OER have the potential to make an immense contribution to teaching and learning in SSA. Essentially, it is well acknowledged by several OER scholars that SSA will benefit pedagogically from the use of OER. Glennie, Harley, Butcher, and Wyk (2012) declare that OER should resonate with SSA given that it has the lowest tertiary educational institutional gross enrollment ratio in the world. The authors further suggest that the use of "freely available, high-quality resources (OER) to serve teaching and learning in resource scarce contexts" as SSA is important to the region (p. 4). As Ngalande (2010) observes, reviewing the

literature on OER shows that the use of the resources is growing because it is believed that it will improve the quality of teaching materials as well as the methods of teaching.

2.6.2 Closing the gap with OER

The gap between SSA and developed countries comes in many forms. In this review, I will focus only on two aspects. The first is the gap in the enrollment numbers between institutions of higher education in SSA and developed countries. It is generally acknowledged that a disparity exists in access to institutions of higher education between SSA and developed countries (Glennie et al., 2012; McGreal et al., 2013). Overall, higher education or post-secondary enrollment in SSA is between 5% and 6% (Glennie et al., 2012; McGreal et al., 2013), compared to Canada, for example, where about 6 of every 10 adults between 25 and 64 years of age had completed some form of postsecondary education, according to the Canadian Information Center for International Credentials (CICIC) (CICIC, 2014). Many factors contribute to the lack of adequate access to formal education in SSA, including insufficient funding for education, prevalent household poverty, and the lack of educational infrastructure. McGreal et al. (2013) argue that OER will contribute to increased access to the overall quality of education in SSA. Generally, OER have the potential to support a wide variety of learning experiences for people with difficulty accessing formal education. Wilson (2008) suggests that OER does not only support access to formal education. It can also be used to increase and support learning for anyone on any subject matter.

The second gap between SSA and developed countries that can be closed with OER is related to the overall use of electronic resources. There is a general gap between ICT use in SSA and developed countries. The existence of this type of gap between

countries or groups is what is referred to as the digital divide (The OECD, 2001). Digital

divide could also be used to refer to the disparity between the use of electronic

information resources, such as OER, in developed and developing countries. In general,

the disparity in access to ICT, such as Internet between SSA and developed regions of the

world translates to a disparity in access to digital information resources. Haßler and

Jackson (2010) note that there is a significant gap between available Internet bandwidth

in developing and developed countries. The authors further note that low Internet

bandwidth in developing countries such as SSA is an important contributing factor in the

slow uptake and use of OER in developing countries.

2.6.3 Problems with the adoption of OER in SSA

Other than the technological challenges apparent in the use of OER in SSA, there are

other issues relating to the adoption of OER in SSA worth considering. One of the main

problems with using OER for pedagogical support at institutions of higher education in

SSA, as well as for closing the gap in digital information resource use between SSA and

developed countries, is that there is little or no consideration for the contextual and

cultural specificity of the region. Wilson (2008) indicates that the majority of the open

resources are created in the English language. According to the author, this represents a

linguistic problem because most people in SSA do not have English as their first

language. Even though many OER have been translated from the English language to

languages spoken in the regions, the fact that the original works are not specifically

designed for the audience in the region may result in inadequate usability of the

resources.

The need to localize OER for use in SSA has been raised (Connolly, Wilson & Wolfenden, 2007; Wilson, 2008; Ngimwa &Wilson, 2012; Wolfenden, Buckler, & Keraro, 2012). Connolly et al. (2007) explored the *re-versioning* or localizing of OER for use in SSA. According to the authors, to localize OER means to leverage the educational value of the resources through the addition of one's own personal improvements and adaptations. Ngimwa and Wilson (2012) argue that localizing OER for use in SSA may help reduce the difficulty with the understanding of the content. For non-native speakers of the English language using OER, Ngimwa and Wilson (2012) suggest that there may be culturally embedded issues associated with the use of English as a production language. Wolfenden et al. (2012) argue that OER have the potential to promote diversity as well as promote the voice of the *local* in information resource development. Essentially, through localization, OER could be used to support the learning styles of a variety of people without the need to create new original materials in each learning situation. Localization makes open materials relevant to the cultural context and heritage of each locality (Wolfenden et al., 2012). Despite the advantages of localization, there is concern that users in SSA lack the skills and technology to re-version OER to suit their own consumption (UNESCO, 2002).

There is also the concern that the adoption of OER, particularly those created outside the region of SSA, may stifle the creativity of users in the region. Africa Virtual University specifically raises this concern in the inaugural forum of OER organized by UNESCO (UNESCO, 2002). The UNESCO report shows that African Virtual University expressed caution against the adoption of OER in SSA by making the following statement:

It is important not to inhibit the creation and dissemination of knowledge by

scholars in developing countries, and the unique roles and stature of local

higher education institutions must not be diminished when open courseware is

applied. Open courseware is intended to be shared, not imposed (UNESCO,

2002).

It is important to note the implication of *knowledge imposition* in the quote above.

Because of Africa's colonial history, it is not rare to find scholars of African descent who

are wary of Western-style packaged educational resources. Mulder (2008) suggests that

some of the challenges experienced in the African educational system result from the

imposition of the European system of education. According to the author, this has

resulted in a mismatch between African higher education and African needs. The author

draws a connection between these colonial experiences and the adoption of OER in

Africa by implying that the dissemination of OER, mostly produced in Western countries,

may not be appropriate for fulfilling the educational needs of Africans.

To guard against these concerns, it has been proffered that users of OER in SSA

must be encouraged to be creators and disseminators of the resources as well (Connolly et

al., 2007; Wolfenden, Buckler, & Keraro, 2012). For use in higher educational

institutions, OER has been dominated by a few elite institutions in the United States and

Western Europe, such as MIT, Rice University, and Stanford University. OER from these

institutional repositories often require major adaptations to ground them in the cultural

realities of many SSA countries. Wolfenden et al. (2012) report that there is a gradual

increase in the practice of OER production in many SSA countries. According to the

authors, OER are "designed and created collaboratively by teams of academics from

across sub-Saharan Africa" (p. 4). While it is important for SSA users to keep creating local-specific OER, the practice may be self-defeating, as one of the main benefits of OER is the ability to repurpose them and to avoid needing to create new resources from scratch. Having said that, there is a need for balance in the flow of open resources, representing all regions of the world in cyberspace.

2.7   Discussion

This review is extensive because of the broad and interdisciplinary nature of the concept of OER. To fully explore the concept and nature of OER, studies in LIS, education, knowledge management, and computer sciences are included in the review. The review portrays OER not only as information, knowledge, and learning objects but also as ideological notions and practices. The informational behaviors related to OER go beyond using the resources, to creating, adapting, and disseminating the resources. OER have been shown to be beneficial to the promotion of global learning, and for equaling the learning disparity between developed countries and developing countries. However, there are a number of challenges in achieving these objectives, particularly in SSA.

As this review has shown, the literature on OER is growing. However, studies in the subject area are characterized by foci on OER issues, viewed from the perspective of educators and institutions. While these efforts have had considerable positive effect on education, as well as increased the depth of the literature, they also reveal a sense of abandonment of student-users of OER. This concern is aptly noted in a statement by Thomas et al. (2012) below:

Much of the analysis undertaken around the UK OER Programmes focused on

educators' use of open educational resources. However, part of the way through

the Programme it became apparent that there was no systematic data being

collected about learners' attitudes towards the use of OERs (p. 22).

Although this statement by Thomas and his colleagues is based on their observation of

OER programs in the United Kingdom, the same can be said of other regions, including

North America, Asia, Africa, and the rest of Europe. The concept of OER, as Mulder

(2008) argues, can only work for Africans if they become more involved in creating and

adapting the resources according to their specific needs. As Thomas et al. suggest, not

much is known about how users in SSA engage with OER. In particular, not much is

known about students finding and using of OER in the region. While many of the current

works in the literature of OER are useful in understanding several aspects of the subject

area, as have been shown above, the foci of most of the works on the subject can be

grouped under three general themes: (a) the use of OER to support educators and

educational institutions; (b) the benefits or motivation for using OER, and (c) the

challenges in the use of OER. However, the general focus of the literature has mostly

been mostly on educators and institutions, not on students (see Hu et al., 2015; Rolfe,

2015; Rowell, 2015 for a few recent studies on students' use of OER). In the next section,

I will discuss how the lack of studies with a focus on students, particularly those at

institutions of higher education in SSA, including Nigeria represents a gap in OER

literature.

2.8   The research problem

The above review has shown that OER literature is growing. However, studies in the subject area are mostly characterized by foci on OER issues that are, in most cases, examined from the perspective of educators and learning institutions. Overall, the review reveals three general themes in the current knowledge of OER. First, several of the existing OER studies reveal a scholarly interest in how the resources can be used to support educators in the delivery of educational services. In other words, the literature shows a significant interest in the use of OER as a pedagogical aid. These studies provide invaluable knowledge vis-à-vis the use of OER by teachers and school administrators in supporting teaching and curricula development. However, what is lacking from these studies is an in-depth look at how students, particularly those at institutions of higher education in SSA, including Nigeria could benefit from using open educational materials. Relatedly, the literature does not indicate motivational factors in students' use of OER. This lack of student-centered focus represents one of the gaps in the literature that this thesis addresses. To address this issue, questions relating to students' awareness of OER, their attitudes toward the resources, the benefits they derive from using the resources, the challenges they face in using the resources, and their motivation for using the resources will be answered. The provision of answers to these questions will not only help in understanding how students at institutions of higher education find and use OER, it will also enable OER developers and institutions design effective OER initiatives that cater to the pedagogical needs of educators and school administrators. In addition, it will enable the design and creation of OER initiatives that better support student-users of the resources. For example, understanding how much students know about OER will enable

designers to decide how much effort to place on the promotion of the resources in a designated student population.

The second theme of focus in the reviewed literature is centered on the challenges of using OER. Some of the issues raised in the literature include challenges of the use of appropriate cross-platform technologies for the creation and dissemination of OER, the prevalence of inadequate technical skills in finding and using OER, particularly in developing countries, and the lack of useful policies for the effective development of OER at institutions of higher education. Again, these issues are mostly addressed from the perspective of educators. While the knowledge gained from these studies is very useful, their focus on mostly educators reveals a gap in the full understanding of the use of OER. In other words, the lack of a specific focus on student-users in the examination of the challenges of OER adoption limits our understanding of the subject. Consequently, not much is empirically known about the issues that students face in finding and using OER. Thus, the key question emanating from this gap is: What challenges do students face in finding and using OER? To fill this gap in knowledge, one of the objectives of this thesis was to examine the challenges that students face in finding and using OER. Understanding the challenges that students encounter in search for OER is important for two reasons. First, it may help system (OER repositories) developers to design better user interfaces suited for student users of the resources. Second, it may help OER creators to ensure that the resources are available in formats suited to the devices mostly used by students. For example, if it is known that most students use mobile devices to access OER, then the resources could be optimized for better use with mobile phones and tablets.

The third theme of focus in the literature of OER generally centers on the benefits of OER. One of the main conclusions drawn by many of the studies reviewed is that OER can be used to support student learners of all types, particularly those in difficult to reach locations. Open learning resources, like all other electronic resources with non-rival characteristic, can be easily disseminated to support almost anyone without incurring additional cost. Once OER are made available online, they can be accessed by anyone. However, because of the dearth of studies with a focus on student-users, the way students use OER is not particularly clear. This lack of clarity represents another gap in the literature that this thesis sought to address. What kinds of benefits do students derive from using OER? Understanding the benefits students derive from using OER may provide an insight into what they do with the resources once obtained. It may also make the aspect of students' learning that OER support become clearer.

In addition to the research problems identified above, there is also the fact that not much is empirically known about the use of OER in SSA, including Nigeria. OER have not only been roundly touted as means of ameliorating the unintended consequences of intellectual property and copyright laws on education and learning, but they have also been seen as the means through which the disparity in formal education between developed and developing countries can be equalized. However, the bulk of the existing research and knowledge about OER is premised on contexts in developed countries of North America and Europe. Even though leading OER-supporting institutions and organizations have made declarations to the effect that OER hold the key to learning and educational advancement in developing countries, there is a dearth of research concerning finding and using OER, particularly by students, in many developing regions of the

world, including SSA. The sparsity or non-existence of empirical studies on student-users of OER in SSA, including Nigeria represents a gap in the literature. Addressing this gap is important given that students in SSA, directly or indirectly, are the ultimate target of all learning initiatives in the region, including OER initiatives. This thesis, conducted at the University of Lagos in Nigeria, is intended to fill that gap partly by attempting to answer the questions about students' use of OER at institutions of higher education.

2.9   Research questions

1. How aware are students at institutions of higher education of OER?

2. What attitudes do students at institutions of higher education have toward OER?

3. What benefits do students at institutions of higher education derive from using OER?

4. What kind of challenges do students at institutions of higher education face in using OER?

5. What specific factors motivate students at institutions of higher education to use OER?

As has been noted above, the existing OER studies are very important, with findings that are crucial to the advancement and adoption of OER as well as for the development of learning and educational initiatives. However, the importance of understanding the issues from students' perspectives cannot be over-emphasized. The lack of focus on issues relating to finding and using of OER among students at institutions of higher education in SSA, including Nigeria represents a significant gap in OER literature. As a result, in this thesis, the focus will be on examining students' perspective about OER as reflected in the research questions above. The study of social phenomena and issues such as the ones

undertaken in this project are complicated and multifaceted, and sometimes requires the

application of certain theoretical lenses for guidance in the development of appropriate

research questions, the collection of data, as well as the analysis of the data collected. In

the following chapter, the methodological approaches undertaken in this thesis will be

discussed.

Chapter 3

3 Methodology

3.1 Introduction

In this thesis, through the application of a mixed methods research design, I examined

key issues relating to the use of OER among students at institutions of higher education.

The current chapter describes the research design. Specifically, the chapter discusses the

decisions with regard to the techniques and tools for data collection and analysis, as well

as the theoretical premise upon which such decisions were made. Figure 4 broadly

illustrates the research design applied in this thesis.
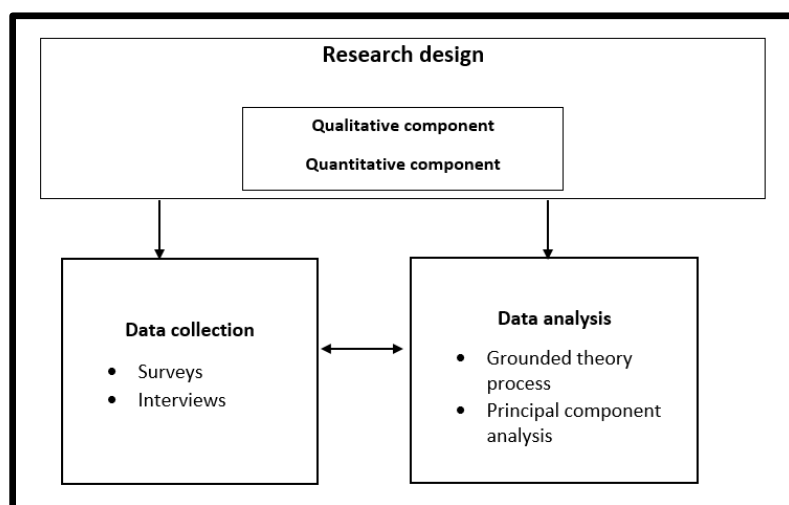
Figure 4: Mixed-methods research design

3.2 Epistemology: constructivism

This thesis is based on constructivist epistemology. To explain this notion and its

relevance to this thesis, I will take apart the constituent concepts, constructivism and

epistemology, and then provide a brief independent description of each. First, according

to Tennis (2008), epistemology simply means *how we know*. A core branch of philosophy, epistemology relates to the theory of knowledge, particularly of its methods, scope, and validity. Bailey (2006) uses two key questions to substantiate the basis of epistemology. What is knowledge? How do we know that we know? The first question deals with the nature of knowledge. In this thesis, knowledge represents the interpretive conclusions drawn from participants' responses. It is reflective of the experiences expressed by participants within the bounds of my interpretive contemplation. The other question deals with justifying claims of knowledge. It concerns the explication of the basis of knowledge. To this end, I placed a premium on the multiplicity of participants' responses to the research questions and issues in determining the common emerging patterns in their experiences. In other words, *knowledge* is created by closely examining the data, and then comparing and contrasting participants' responses and facts as they relate to the issues under investigation.

Second, as a learning paradigm, constructivism presupposes that knowing is an active, constructive process. In the history of epistemology, the constructivist idea represents a movement from the static, passive, *behavioral* approach of knowing to a more active and adaptive one (Applefield, Huber, & Moallam, 2000). In completing this project, I regarded *what is known* as transient—always dynamic and adaptive—as each additional piece of data is placed in the analytic mix. I considered knowledge to be in a perpetual state of construction. Essentially, I am acknowledging that knowledge production in this thesis began in the minds of participants as they constructed and reconstructed their experiences with words, actions, and gestures, and then in my own mind as I strove to carve out meanings from what they reported, as well as what they did

not report. As Charmaz (2014) points out, in the context of research (context is used here to mean the prevalent circumstances in the location of research. See Section 2.6 for a discussion of SSA as the broader context of this thesis), both participants and researchers work co-constructively to produce certain forms of understanding. Charmaz (2014) further argues that the "constructivist approach perspective [sic] shreds notions of a neutral observer and value-free" researcher (p. 13). The point is that, as the researcher, it was not possible or even necessary for me to take a completely outside or objectivist position in the research process. Even Corbin, a grounded theorist with an objectivist bent, agrees with this idea when she proclaims as follows:

> I agree with the constructivist viewpoint that concepts and theories are constructed by researchers out of stories that are constructed by research participants who are trying to explain and make sense of their experience and/or lives, both to the research and themselves. Out of these multiple constructions, analysts construct what they call knowledge (Corbin & Strauss, 2008, p.10).

Following these points, it was pertinent that I should not only be reflexive, and aware of my privileges as a researcher, but also be expressive of how my experiences may have influenced the *knowledge* or facts that emerged from this thesis. From the constructionist viewpoint, meaning or truth cannot be simply described as *objective*, nor can it be simply described as *subjective* (Binz-Scharf, 2003). The same can be said of the constructivist perspective, from which knowledge is seen to be created through the interaction between *consciousness* and *objects* under certain conditions. Thus, the conditions and experiences of participants (as well as my own experiences as the researcher) may have influenced

knowledge construction in this thesis, but it does not diminish its relevance when applied appropriately.

Essentially, I chose to undergird the process of knowing in this thesis with constructivist epistemology. Thus, I assume that the results produced are not just the product of the interactions between the participants and me, but also of interactions between participants, myself, and the context of our interactions. In other words, by adopting an interpretive approach embedded in a constructivist epistemology, the following were assumed in this thesis:

- Knowledge of OER is constructed from a combination of social actions.
- Students' use of OER is dependent on their personal experiences, as well as the actions of others.
- The context of use has an important role in OER access.
- By analyzing the social actions as well as the context, one can make sense of the social processes that shape the creation, finding, and usage of OER.

To summarize, in making sense of the issues reported by participants in this research, I regarded the ensemble of participants' statements, actions, inactions, and contexts (i.e., social, technological, economic, and cultural processes) as important. These thoughts also had a part in my overall design of the research, methodologically. The research design adopted in this thesis is discussed next.

3.3 Research methods

In this thesis, I examined issues in students' use of OER at institutions of higher education using a mixed methods research design. The following sections explain the

components of the design and how they are applied. First, an overview of the mixed methods research design is provided including a detailed description of the qualitative and quantitative approaches adopted in this thesis. Second, issues of data collection, including the study population and sampling, the instruments of data collection, and the ethical issues relating to this thesis are discussed. Third, the process of data analysis is described along with the qualitative and quantitative tools applied in the analysis.

3.3.1 Mixed methods research design

In the most basic sense, according to Yin (2009), research design is the logical sequence that connects data to a study's initial research question, and ultimately to its conclusions. It describes the steps taken in research from the collection of data, through its analysis, to its conclusions and recommendations. Thus, the choice of a research design is determined by the phenomenon under investigation, the available methodological resources, and the preference of the researcher. To achieve the objectives of this thesis, I adopted a mixed methods qualitative and quantitative research design. A mixed methods research design encompasses the collection and analysis of both qualitative and quantitative data in a single study (Creswell, 2006). The main rationale behind the combined use of both qualitative and quantitative approaches in this thesis stems from my desire to understand better the problems outlined. Given the complexities of the issues under investigation, I believe neither qualitative nor quantitative methods, applied alone, would have given me the flexibility to examine the issues rigorously as I did in this thesis. In addition, the application of a mixed methods research design also provided me with more investigative tools to examine the issues of concern. As Flick (2002) (cited in Denzin & Lincoln, 2008) further argues, the combination of multiple methodological practices, techniques, and

perspectives in a single study "adds rigor, breadth, complexity, richness, and depth to any inquiry" (p. 7). In sum, the use of a mixed methods qualitative and quantitative research design in this thesis enabled an in-depth analysis and understanding of the issues relating to the use of OER by the students who participated in this research. As tabularized below, I applied mixed methods techniques in both data collection and analysis.

Table 1: Summary of research questions and methodology

Research questions	Data collection	Data analysis	Objective
1. How aware about OER are students?	Semi-structured interviews	Grounded theory approach. QDA software: Atlas.ti	Provide a description of students' awareness of OER.
2. What are students' attitudes toward OER?	Semi-structured interviews	Grounded theory approach. QDA software: Atlas.ti	Provide a description of students' attitudes toward OER.
3. What benefits do students derive from using OER?	Semi-structured interview	Grounded theory approach. QDA software: Atlas.ti	Show the kinds of benefits students derive from using OER.

4. What kinds of challenges do students face in using OER?	Semi-structured interviews	Grounded theory approach. QDA software: Atlas.ti	Describe and explain the specific challenges students face in the use of OER.
5. What factors motivate students to use OER?	Survey	Statistical analysis (PCA) QDA software: SPSS	Explain and describe the motivation behind students' use of OER.

Table 1 is a summary of the research questions as well as the methods of data collection and analysis that were applied in the investigation of each of the questions. In research questions 1, 2, 3, and 4, a qualitative approach was employed in the collection and analysis of data while, in question 5, a quantitative approach was used in the collection and analysis of data. The objective column provides a description of the general objective(s) for each of the research questions. The choice of the methodological approach used for examining each of the research questions rested not just on investigative convenience, but also on a deeper consideration for my need to gain deeper and richer insights on the issues. The following sections provide detailed but separate discussions of qualitative and quantitative methods of inquiry, as well as their specific use and relevance to this thesis.

3.3.2 The qualitative component

As indicated in the preceding section, I employed a qualitative research design in the collection and analysis of data for research questions 1, 2, 3, and 4. A qualitative research design is suitable for the study of students' awareness of OER as well as their attitudes toward the resources. It is also suitable for investigating the benefits students derive from using OER, as well as for identifying the challenges they face in the process. That is because finding answers to these sorts of questions requires introspection from research participants and forces them to *dip* into their lived experiences for answers. According to Denzin and Lincoln (2008), qualitative research is drawn to "postpositivist, humanistic, and naturalistic conceptions of human experience" (p. 10). Constructs, such as "awareness of OER," "attitudes toward OER," "benefits of using OER," and "challenges of using OER" may vary experientially from individual to individual. Thus, a qualitative approach—an approach that lends itself to the study of how *individuals* experience the world—is apt for the study of such constructs.

The objective of research question 1 is to determine whether students are cognizant of the existence of OER, whether they are knowledgeable about OER properties, and whether they know the online location of the resources. A qualitative research approach is appropriate for investigating students' awareness of OER because it enables the capturing of expressive information about perception, knowledge, values, and beliefs about the use of the resources that may be inadequately conveyed in quantitative terms. The use of a qualitative research approach is also appropriate for studying students' attitudes toward OER for similar reasons.

As with students' awareness of OER, students' attitudes toward OER are also better investigated with a qualitative research approach, as it facilitates the capturing of expressive information about the emotional and cognitive processes involved in decisions about the use of the resources.

A qualitative research design is appropriate for capturing reports of experiences that cannot be adequately expressed in numerical terms. The main objective of research question 3 is to determine the benefits students derive from using OER within the context of education. The use of a qualitative research approach to collect data for this question is necessary, as it allows participants to provide statements regarding the benefits of using OER. This can lead to a clearer understanding of students' interpretations of the benefits of using the resources.

The same argument can be made for the necessity of using a qualitative research approach in the examination of the challenges students face in using OER. Another important advantage of using a qualitative research approach is that it takes the complex nature of social realities into account and incorporates different perspectives on social issues. The challenges students face in using OER are complex and multifaceted. A qualitative research approach is appropriate for investigating the challenges students face in the use of OER, as it enables the collection of data about the social, cultural, economic, and technical issues related to the use of the resources.

3.3.3 Grounded theory

For the qualitative component of this thesis, I used grounded theory as the approach to address the research questions raised (see Table 1 for an outline of the questions). The rationale for using grounded theory is explained in the following section.

Theory generation

Among the various methodological traditions subsumed under qualitative research, grounded theory represents the best investigative technique for examining most of the research questions raised in this thesis, and for developing theoretical accounts representative of the overall nature of the issues that have emerged. It is important to point out that even though I agree with the likes of Strauss and Corbin (2008) and Luker (2008) that theory generation should not be the only objective of social research, and that sometimes mere description of social actions and processes are potentially equally useful outcomes of empirical works, I also believe that it is essential to give credence to the development of theories for explicating and possibly for predicting behaviors relating to social phenomena. Using the grounded theory approach, theories, *grounded* in data collected in this thesis, were generated to explain the issues, behaviors, and processes relating to students' use of OER at institutions of higher education.

Pre-data collection literature review

Grounded theory enables the conception of a preliminary hypothesis through exploration of the research area, thus, allowing the relevant issues of significance to emerge (Charmaz, 2014; Jones & Alony, 2014). In other words, the approach (or versions of it) supports reviewing literature in the substance area of study before data are collected.

Because this is a controversial issue with grounded theorists (see Dunne, 2011; Charmaz, 2014), I am going to make my position clear. In this project, I began by generally reading about OER and OER use, and then found that discrepancies exist regarding the focus of research on the subject. Most of the existing studies on OER are geared toward educators, and less toward students. I was also able to identify some of the key issues regarding OER use, including awareness of the resources, attitudes toward the resources, benefits of using the resources, challenges of using the resources, and the motivational factors for using the resources. Furthermore, and more importantly for this project, the exploration of the substantive research area revealed that these issues have not been examined from the perspective of students, particularly those at institutions of higher education in SSA, including Nigeria. The point here is that I chose grounded theory because it is flexible and supports the review of literature before data collection and because the review of literature before collecting data enabled me to gain a sense of the main issues to consider.

To add to the above point, in many doctoral studies, including the current one, avoiding review of literature in the substantive area of study is impractical given that funding and even progression in the dissertation process are dependent on the production of a detailed review of the study area prior to data collection. Grounded theory is suitable for investigating issues with a dearth of research and paucity of knowledge (Dunne, 2011). There is little or no existing empirical work concerning students' use of OER in Nigeria, or SSA in general. However, I could not have ascertained this dearth of knowledge as well as determine how to make contributions to the area in an authentic way without first conducting a detailed review of literature in the area. Precisely, I subscribe to the prevalent grounded theory maxim: *open mind does not mean empty head*

(Bryant & Charmaz, 2007). Engagement with the literature in a substantive area of research before data collection does not necessarily remove the authenticity and originality of grounded theory studies. Instead, such reviews enhance and strengthen the process of identifying and filling relevant gaps in knowledge.

Supports investigation of complex social issues

In addition to the reasons provided thus far, the grounded theory technique was adopted in the qualitative component of this thesis because it allows for the investigation of complex social phenomena. As Jones and Alony (2014) argue, the detailed, rigorous, and systematic approach to grounded theory makes it suitable for the investigation of complex social phenomena. Furthermore, for entrant researchers, the methodology permits flexibility and freedom in investigative analysis. As Hussein, Hirst, Salyers, and Osuji (2014) indicate, grounded theory methodology has an intuitive appeal for entrant researchers because it permits deep immersion within the data. For me, this immersion played out as engagement in constant comparison (i.e., comparing new data with previous data to ascertain categories), memoing (i.e., engagement with the process and categories by free writing ideas and experiences), and coding (i.e., identifying relevant concepts from the data). These steps are part of grounded theory's *heuristics devices* that Charmaz (2014) says enable new researchers to begin and finish their projects on time. Applying such heuristics devices essentially enabled me to progress faster in the research process.

A tradition of grounded theory in LIS

Last, grounded theory has a strong tradition in LIS (Tan, 2009). Since this work was conducted under the auspices of an LIS doctoral program, it was encouraging and useful to see that there are precedents in the use of the methodology in the discipline. The use of grounded theory in LIS can be traced to works in information behavior research. Mansourian (2006) writes about the use of grounded theory in LIS:

> GT is a credible methodology in its place and for the researchers who know how to implement it. GT is applicable in LIS when the researcher does it well, and it is weak when the researcher does not do it as thoroughly as he/she should. GT requires a long time engagement with the research context. Constant comparison is a pivotal point for success of GT in a research project. Long time interaction between the researcher and the dataset is an indispensable part of GT. Different concepts and their links only emerge after long time interplay with the data. Therefore, GT is more suitable for long-term projects like PhD research... (Mansourian, 2006, p. 399).

In sum, I considered grounded theory to be appropriate for this thesis because of its procedural flexibility, its usefulness in the investigation of multifaceted and complex social phenomena (such as the one under examination), and its clear and unambiguous directions for entrant researchers.

3.3.4 Selecting a version of grounded theory

My discussion of the controversy over a pre-data collection literature review in grounded theory alludes to the existence of ideological conflicts among grounded theorists. This

ideological struggle was pioneered by Glaser and Strauss (Charmaz, 2014), the founding

developers of the methodology. There is no point in fully discussing the conflict here, as

they have been well treated in other works (see Charmaz, 2014; Dunne, 2011; Onions,

2006). To provide a context for my selection of a particular grounded theory version in

this thesis, I provide a summary of the differences between Glaser's views on grounded

theory (or Glaserian grounded theory) and Strauss' views on the methodology (Straussian

grounded theory) below, starting with the tabularized summary in Table 2. These ideas

were gleaned from the work of Charmaz (2014).

Table 2: Some key differences between Glaserian, Straussian, and constructivist grounded theory

Glaserian Grounded Theory	Straussian Grounded Theory	Constructivist Grounded Theory
Begins with general wonderment (an empty mind)	Begins with a general idea of where to start	Begins with a general idea of where to start
Theory is emergent (with neutral questions)	Theory is forced (with structured questions)	Theory can be emergent
There is emphasis on the development of a conceptual theory	Conceptual descriptions are acceptable	There is emphasis on the development of a conceptual theory (conceptual

	(description of situations)	descriptions are also acceptable)
There is emphasis on theoretical sensitivity (i.e. ability to perceive variables and relationships) that comes from immersion in data	Theoretical sensitivity comes from methods and tools	There is emphasis on theoretical sensitivity (i.e. ability to perceive variables and relationships) that comes from immersion in data
The theory developed is grounded in the data collected	The theory is interpreted by an observer	The theory developed is grounded in the data collected as well as in the interpretation of the observer
The credibility of the theory, or verification, is derived from its grounding in data	The credibility of the theory comes from the rigor of the method	The credibility of the theory, or verification, is derived from its grounding in data and from the rigor of the method
The grounded theory researcher is passive, exhibiting disciplined restraint	The grounded theory researcher is active	The grounded theory researcher is active
Data reveals the theory	Data is structured to reveal the theory	Data reveals the theory

Coding is less rigorous through a constant comparison of incidents with other incidents. Advises against over-conceptualization, and suggests identification of key points	Coding is more rigorous and is derived from 'micro-analysis' (with word-by-word coding)	Coding is rigorous even with constant comparison of incidents with other incidents. Coding can also be derived from 'micro-analysis' (with word-by-word coding)
Two coding phases or types: simple (fracture the data, then conceptually group it) and substantive (open or selective, to produce categories and properties)	Three types of coding: open (identifying, naming, categorizing and describing phenomena), axial (relating codes to each other) and selective (choosing a core category and relating other categories to that)	Two coding phases or types: initial coding and focused coding. Axial coding can also be used

As the table above indicates, since the inception of grounded theory, Glaser and Strauss have moved significantly apart, ideologically. Even though the two grounded theory

versions that resulted from the split retained the core principles of the original version, the methodological and philosophical divide affected the way the methodology is applied. Evidence of this is shown in recent publications (Glaser, 1992; Strauss & Corbin, 2008; Charmaz, 2014). While Glaser, over the years, has remained consistent to the 1978 explication of the method in which he defined grounded theory as a method of discovery, regarded categories as emergent from data, considered concepts to be variables, and emphasized basic social processes, Strauss (working alone, and with Juliet Corbin) moved grounded theory to a technique of verification (Strauss & Corbin, 2008; Charmaz, 2014). Particularly in their earlier works, Strauss and Corbin preferred the application of additional technical procedures rather than emphasizing emergent theoretical categories and comparative methods that distinguished earlier grounded theory strategies (Charmaz, 2014, p. 11). Apparently, not impressed by these changes to the method, Glaser (1992) strongly criticized Strauss and Corbin's new stance on grounded theory methodology. Among other things, Glaser (1992) argues that Strauss and Corbin's procedure ignores *emergence*, force data, and analysis into preconceived categories, and, thus, only produces mere conceptual descriptions, which are not grounded in data. In essence, Glaser argues that Strauss and Corbin's approach is a significant contradiction to the original principles of grounded theory. Despite these criticisms, Strauss and Corbin's version of grounded theory remains very popular among grounded theorists. It is important to note that variants of grounded theory, other than Strauss and Corbin's, have emerged as well.

As I mentioned earlier, because of the existing ideological conflicts in the grounded theory approach, a brief contextual description of the main conflicting issues is

warranted. The description provides a basis for taking a position in the ideological debate because, as Onions (2006) acknowledges, researchers wishing to utilize grounded theory are almost obliged to take a side in the debate. For this project, I have jettisoned the two leading versions of grounded theory described above and selected the constructivist brand of grounded theory, a version that is increasingly becoming popular among qualitative researchers for its somewhat pragmatic and middling stance on the issues (Mills, Bonner, & Francis, 2006).

3.3.5 Choosing constructivist grounded theory approach

Sociologist and former student of Glaser and Strauss, Kathy Charmaz, is the founder and leading proponent of constructivist grounded theory (Mills, Bonner, & Francis, 2006). Charmaz's constructivist approach to grounded theory is detailed in her book, *Constructing Grounded Theory* (2014). As Table 2 shows, constructivist grounded theory adhere to principles from both Glaserian and Straussian grounded theory. According to Mills et al. (2006), the approach is a prevalent method for research studies in the disciplines of psychology, education, and nursing. Constructivist grounded theory is ontologically relativist and epistemologically subjectivist. I chose this version of grounded theory because it brings to the fore the role of the researcher as a partaker as well as a contributor to the facts and knowledge that emerge from the research process. Thus, it fits nicely with the constructivist epistemological paradigm and interpretive theoretical perspective adopted in this work.

According to Charmaz (2014), constructive grounded theory adopts the classic grounded theory principles of induction, comparative analysis, open-endedness, and emergence. It emphasizes Strauss' iterative logic as well as focuses on action and

meaning inherent in the pragmatic tradition. Constructivist grounded theory is a response to the criticisms leveled against the original version of grounded theory. Charmaz (2014) posits that constructivist grounded theory reflects the flexibility of the method. She argues that it answers critics who claim that the practitioners of the methodology are clinging to an outdated, postmodernist epistemology, which adopts enlightenment views on truth, universality, and knowledge.

Overall, the starting point of constructive grounded theory is that social reality is multiple, processual, and constructed (Charmaz, 2014). It takes the researcher's perspectives, privileges, and interactions into consideration in the research process. Furthermore, it recognizes that social reality exists within contexts and includes the contributions of researchers and participants alike. Researchers' reflexivity is an essential component of constructivist grounded theory. For this project, I have been reflexive not only about my personal position on the methodological approach but also on such issues as my influence on the interactions with participants during data collection. For example, it is important to reflect on (as I did in Section 3.4.3) how participants' perceptions of me may have affected their interactions with me. Essentially, even though a constructivist grounded theory approach sees research as a construction, it also acknowledges that such constructions occur under specific conditions, whether the individuals involved are aware of such conditions or not. So far, in this section, I have mostly provided the philosophical justification for adopting constructivist grounded theory in this thesis. In the next subsection, I will provide the *practical* rationale for adopting the methodology.

3.3.6 The practical rationale for adopting constructivist grounded theory

This thesis follows the philosophical stance, and procedural steps consistent with constructivist grounded theory. The rationale for using constructivist grounded theory is based on the consideration of certain issues. First, like all variants of grounded theory, constructivist grounded theory is suitable for studying social-technical[6] phenomena, such as the one under investigation (Tan, 2009). Studying social-technical phenomena usually requires the investigation of complicated and multifaceted parts in order to understand the whole. I found that by using constructivist grounded theory, I was able to examine systematically the key questions raised in this thesis.

Second, as cited in Tan (2009), Goulding (1998) indicates that grounded theory is useful for research topics that have "been relatively ignored in the literature, or has been given superficial treatment" (p. 8). As revealed in the review of the literature in the substantive area of research, the topic under investigation fits this category. By adopting a constructivist variant of grounded theory, I was able to stretch the applicability of the methodology in this work. Specifically, I was able to examine the issues raised in this thesis in a manner that acknowledges not only the role of the participants and researchers on the research process and outcomes but also that of SSA as the broader context of inquiry. Essentially, I was able to suitably examine issues in students' use of OER (a socio-technical phenomenon) at an institution of higher education in SSA, an area with a

---

[6] The concept of a socio-technical phenomenon is used to stress the reciprocal nature of the interrelationships between humans and technology in the makeup of certain phenomena (Ropohl, 1999). As a system, OER is comprised of both social and technological components.

dearth of empirical understanding, with a constructivist version of grounded theory, by privileging the positions of the participants, the influence of their context, and my own preconceptions and experiences.

Third, constructivist grounded theory is selected in this thesis because it can be successfully used in conjunction with other methods, as I have done in this thesis. Precisely, constructivist grounded theory was selected to examine the issues raised in this thesis because it is the most suitable for the purpose. Using this specific methodology adds value to my professional experience, particularly as an entrant user of grounded theory. The guidelines it provides helped me to be patient, open-minded, sensitive, flexible, and reflexive in the research process.

3.3.7 The procedures in constructivist grounded theory

Irrespective of the grounded theory version selected, according to Tan (2009), there is agreement with respect to the basic research process: data collection, coding, categorizing, theoretical sampling, saturation, and theory generation. However, constructivist grounded theory has unique procedural steps for analyzing data. This will be explored further.
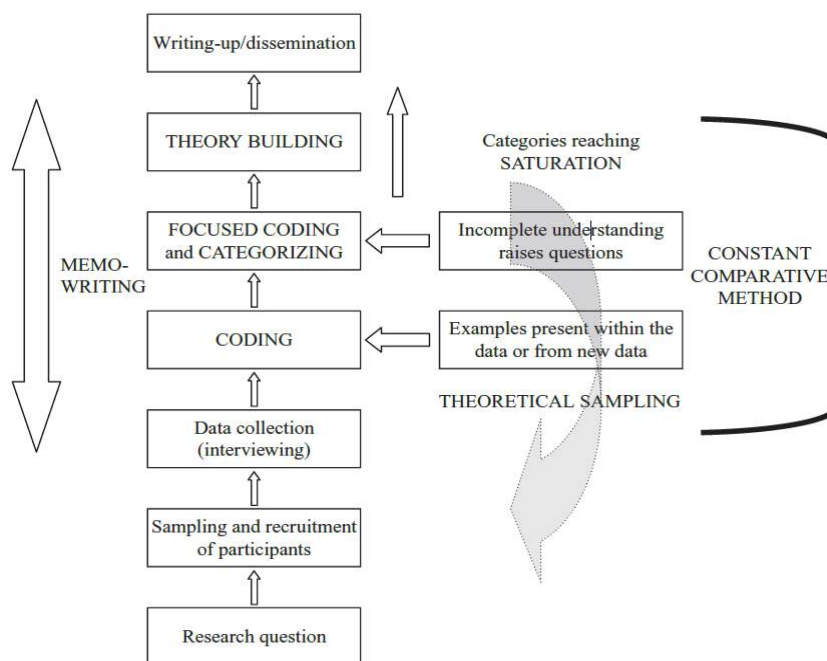
Figure 5: Visual representation of a constructivist grounded theory

Figure 5 is taken from the work of Tweed and Charmaz (2012). It reflects the overall steps I have taken in this project. As shown in the diagram, the starting point of constructivist grounded theory is having an exploratory interest in a certain topic of inquiry, and developing that into a series of research questions. The next stage is the sampling and recruitment of participants. After identifying research participants, data collection is conducted. One key unique attribute of grounded theory is the simultaneous collection and analysis of data. As data are collected, analysis of the same is begun through coding. This process allows for constant comparison between and within the data as well as the theoretical sampling of the categories to further understand incomplete ideas contained in the data. This is done until the point of saturation, and theory begins to emerge. Memo writing is an essential and ongoing aspect of constructivist grounded theory. It is basically the capturing of the researchers' thoughts, hunches, interpretations,

and decision making throughout the analysis (Tweed & Charmaz, 2012). The final step is writing up the dissertation.

One key attribute of Kathy Charmaz's (2014) constructivist grounded approach is its coding procedure. In constructivist grounded theory, initial coding (i.e., a much more detailed line-by-line or statement-by-statement coding) replaces open coding in traditional grounded theory. In addition, constructivist grounded theorists use focused coding as the second stage of coding instead of selective coding preferred by traditional grounded theorists. Overall, other than in name, it appears that there is no difference in the procedural application of focused coding and selective coding. Last, constructivist grounded theorists may make use of gerunds for coding to reflect the emphasis on process and actions, and not necessarily on topics and themes. For example, in this project, I coded a category for identifying the economic benefits of using OER as *economizing*, instead of the more intuitive topical concept, *economical*. Coding with gerunds portrays the use of OER as possibly an economic decision. As Charmaz acknowledges, coding with gerunds is difficult at first, but it allows us to see processes that might have otherwise been invisible. In this section, I have discussed the qualitative component of this thesis and specifically described how the various aspects of the qualitative research approach adopted—grounded theory—informed the methodological decisions I made. Next, I will provide a discussion of the quantitative component of the mixed methods research adopted in the thesis. It is pertinent to indicate that even though the quantitative tools applied in this thesis were useful in answering the questions for which they were directed, qualitative tools were applied in the larger aspect of this research. As shown in Table 1, I applied a qualitative approach in investigating the first

four research questions, and a quantitative approach is only used in the fifth question. In a way, I consider this thesis more of a qualitative study than a quantitative one considering the scope of methodological contributions of both approaches. Perhaps this perception informed the discrepancies in the level of detail provided on both approaches in the thesis. Nonetheless, a brief but adequate discussion of the quantitative component of this thesis is provided below.

3.3.8 The quantitative component

While qualitative approaches to research provide tremendous usefulness in the investigation of social phenomena, quantitative approaches proffer significant value in understanding certain aspects of social issues. Quantitative research is a process of "explaining phenomena by collecting numerical data that are analyzed using mathematically based methods (in particular statistics)" (Muijis, 2011, p. 1). Looking at this definition, three key steps are apparent in the quantitative research process: the first is the process of explaining a phenomenon or the answering of a social research question. In this thesis, a quantitative method was used to address research question 5. This question deals with the issue of the motivation behind the use of OER. The review of the literature revealed that a range of factors inspires the adoption and use of OER. I applied quantitative methodological tools to investigate and determine the key motivational factors for students' use of the resources. The second step is the collection of numeric data. Data about the rationale or the motivation for students' use of OER were collected through the application of self-administered surveys. The Likert-type scale survey questionnaires were converted into numerical data to allow for the third step of the

process: data analysis, with a mathematically based technique (i.e., PCA). More about

data analysis is contained in the section for data analysis.

One vital advantage of using quantitative research in this thesis is that it allowed

for the involvement of a large number of participants. In this thesis, survey questionnaires

were completed by 417 participants. The use of qualitative methods, such as

interviewing, would have been unrealistic, as it would have required too much effort,

given the limited amount of time and resources allocated to this project. Moreover,

quantitative design is suitable for the study of students' rationale for using OER because,

as Boswell and Cannon (2014) indicate, it centers on the "why" of social phenomena (p.

205). For this aspect of the thesis, a quantitative method is useful for gathering and

analyzing data. The next section describes the methods of data collection.

3.4   Sampling and data collection

The process of collecting data for a study begins with the identification, enlisting, and

encouragement of potential participants to take part in the study. Participants are sampled

from the target population of study. In this section, I will provide a brief overview of the

University of Lagos, the site of participant recruitment for the thesis. Then, I will discuss

participant sampling and recruitment as well as the actual procedures I undertook to

collect data.

3.4.1 Background information on the University of Lagos

This exploratory doctoral study recruited participants from a single institution of higher

education in Nigeria, the most populous SSA country. Specifically, participants for this

thesis were recruited from the University of Lagos. The University of Lagos is "one of

the foremost universities in Africa" (Adeniran & Oyelowo, 2013, p. 69). Established in 1962, the university is a research-oriented institution with several major faculties, including medical sciences, social sciences, engineering, and education. It has a student population of approximately 45,000 as at 2010 (University of Lagos, 2010). The university is made up of two campuses. The main campus, housing such faculties such as arts, education, and social sciences as well as the College of Medicine, which is located a few kilometers away from the main campus. Students from both campuses were recruited for participation in the thesis. As of 2009, the school has a total staff strength of 3,365, made up of 1,386 Administrative and Technical Staff, 1,164 Junior staff, and 813 Academic Staff (University of Lagos, 2009).

The University of Lagos has consistently ranked high on the Webometrics Ranking of World Universities, an initiative of the Consejo Superior de Investigaciones Cientificas (CSIC), the largest research body in Spain, and one of the first research organizations in Europe (CSIC, 2015). Through its Cybermetrics Lab, the CSIC ranks universities based on the quantitative analysis of their Internet content, especially those related to scholarly communication and scientific knowledge. The University is also ranked number one in Nigeria by 4 International Colleges & Universities (4ICU [4 International Colleges & Universities], 2015) for Web popularity.

The University of Lagos is one of the few institutions in SSA that has a direct link from the main page of its website to an OER repository: MIT Open courseware. This suggests that the university has an interest in making students aware of OER as well as ensuring that students gain access to the resources. Taken together, there is a strong possibility that students of the university are exposed to online learning resources, and

that their chances of encountering OER have improved as a result of the exposure. This seeming exposure to online learning resources makes students from the school especially suited for taking part in this exploratory study of OER use among students.

Furthermore, as found in a study by Jones, Johnson-Yale, Millermaier, and Perez (2009), students as a group exhibit similar Internet preferences and online behaviors. Although the study is based on samples collected from colleges in the United States, it does strengthen the notion that students, particularly those who share similar backgrounds, for example, geographical location and level of study, may be prone to engage in relatively similar online behaviors. Presumably, students from the University of Lagos are suitable for this thesis because they share certain characteristics with their counterparts, particularly those in SSA. As Dunlosky et al. (2013) note, generally students in many countries, including SSA, share similar characteristics, such as the desire and capacity to engage Internet-based learning apparatuses. As a result of these similarities, some of the findings from this thesis may be generalizable to the larger context of study: students at an institution of higher education in SSA. In the following section, I describe the process of obtaining permission for data collection for this project.

3.4.2 Obtaining permission to recruit students

Any research has the potential of bringing about unexpected challenges at one point or another during the life of the project. Particularly, studies whereby data collection involves international travel may pose unique and significant challenges. The data collection for this thesis was done in Nigeria, which means I needed to manage issues that would have been absent had data been collected in Canada.

Before traveling to the site of data collection, I wanted to obtain permission from some of the schools to reduce the overall time spent collecting data and the overall time spent in Nigeria. In all, over 100 email messages were initially sent to different institutions of higher education in Nigeria seeking information concerning how to obtain permission to recruit students for the thesis. After three months, only three schools responded, suggesting I come to the universities to make the request in person. I did not obtain any other response to further inquiries on the matter. The problem, it seems, is that most of the email contacts obtained from the schools' websites and other databases were not monitored regularly.

I traveled to Nigeria for data collection in early January of 2015 and submitted new requests for permission to recruit students at the registrars' and deans' offices at several universities. Only one of the schools, the University of Lagos, expressly granted permission for the recruitment of students on their campuses. At the time of writing, more than one year later, the other schools have yet to make a decision on the request. This personal experience raises two main concerns: one, communicating with certain schools in Nigeria via email is challenging; and two, there is a need for schools, particularly those in Nigeria, to improve their mechanisms for managing research requests from other institutions. In addition, researchers planning to undertake research projects in other countries, particularly in Nigeria, must ensure there is adequate time for obtaining permission for participant recruitment.

3.4.3 Sampling: recruiting students from the University of Lagos

Sampling, according to Thompson (2012), "consists of selecting some part of a population to observe so that one may estimate something about the whole population"

(p. 1). It is the procedure for finding samples in a study. Samples are basically a group of people or things that are taken from a larger group and studied or questioned to gain information. While sampling is an essential aspect of both qualitative and quantitative research, the sampling strategies applied for each may be different. Sampling in qualitative research is not as rigidly prescribed as it is in quantitative research (Coyne, 1997). In qualitative studies, sampling tends to be conducted purposively, unlike in quantitative studies. A purposive sampling (commonly conflated with purposeful sampling) occurs when the researcher searches for information-rich cases that can be studied in-depth, as opposed to studying every case in a large population. As Coyne (1997) suggests, purposive sampling is another phrase for selective sampling. In selective sampling, as Coyne argues, a researcher visits a particular site and deliberately identifies participants for the study based on such criteria as research interest (both initial and consequent), time allocated for project completion, research framework, and any constraints brought about by conditions in the field or research environment (context). As I have mentioned, the broader context of this thesis is SSA, but I selected participants from only the University of Lagos in Nigeria because it was the only institution from which I was granted permission to recruit students. The terms of ethics approval for collecting data in this thesis required that I obtained permission from the institutions participants would be recruited for the thesis. Definitely, with more time, effort, and resources, I would have been able to gain permission to recruit students from other schools. However, because this is a doctoral project with limitations in time and resources, I made a decision to recruit students from only the University of Lagos. Aside from this, as an exploratory study, the lessons learned from this process will enable me to

attempt larger projects in the future, with data collected from multiple institutions in multiple countries across SSA.

My experience in obtaining permission for participant recruitment from universities revealed that there seems to be a preference for face-to-face interaction at some of the institutions consulted. Therefore, in recruiting students for the thesis at the University of Lagos, I approached them in person to ask for their participation. As specified in the research proposal, the initial approach of going to classrooms to talk to students did not work, as students often rushed off to other classes at the end of one. It was difficult to get their attention in such circumstances to fill out a 40-item questionnaire. Instead, I met students at their "relaxation points" around the campuses. Specifically, many of the survey questionnaires were given to students at a park fondly referred to as the "love garden." The park is at the Faculty of Arts, and it is mostly frequented by students from several departments. Surveys were also distributed to students at a park in the Faculty of Education as well as at the one beside the Dean of students' office. At these parks, students were usually sitting on benches, having quiet times with friends and schoolmates. Along with the research assistant, I would approach the students and talk to them about the research, and then ask if they would like to participate. In most cases, students readily agreed to participate. One of the advantages of mingling with students at the three parks was that it might have removed the issue of *otherness*, a situation whereby potential participants see the researcher as an outsider, a non-member of a social group, and untrustworthy. As Dwyer and Buckle (2009) acknowledge, being regarded as an outsider in social research poses certain problems for the researcher. For example, participants may be worried that their circumstances may

not be fully appreciated by someone of a different experiential background. At the initial

stages of data collection in this project, interacting with students was a bit more difficult.

Many participants seemed wary and unsure about talking to me. Often, they would ask a

series of off-the-record clarification questions about who I was and what I intended to do

with the data, before committing to taking part in the research. Clearly, at the beginning,

they did not trust me enough to share their experiences with me, most likely because they

thought of me as an outsider. Upon reflection, I realize now that the issue was not only

with the participants. At those beginning stages, I was a bit unsure of how to engage the

participants. There were times I struggled with how best to phrase the questions I asked.

For example, when I asked a participant about the difficulties or problems she

encountered in using OER, she responded that she had no difficulties or problems.

However, when I rephrased the question and asked "what kind of challenges" she faced

in using OER, she provided me with a whole list of challenges. She may have been of the

opinion that I was questioning her personal abilities to use OER, and was not comfortable

with that.

Nevertheless, as I spent more time at the parks, the participants and I became

increasingly confident in talking to each other. Even students who did not want to take

part in the research would come and talk to me from time to time, asking questions about

the study, providing opinions on the issues, and generally asking questions about

education in Canada. To me, such informal interactions were just as useful and

informative in understanding the subject of inquiry.

Clearly, the sampling I have undertaken in this project is purposive. As Coyne

(1997) indicates, the cases or participants selected in purposive sampling are those the

researcher suspects can provide a great deal of information about the issues under investigation. Sampling purposefully is a hallmark of grounded theory, particularly during initial sampling. Glaser (1978) agrees that in the initial stages of sampling, researchers will:

> Go to the groups which they believe will maximize the possibilities of obtaining data and leads for more data on their question. They will also begin by talking to the most knowledgeable people to get a line on relevancies and leads to track down more data and where and how to locate oneself for a rich supply of data (cited in Coyne, 1997, p. 625).

The other type of sampling that is essential in grounded theory is theoretical sampling (Charmaz, 2014). The difference in the two types of sampling is the stage in the research process in which they are applied. While purposive sampling is applied at the beginning of a study, theoretical sampling is subsequently emergent as part of an ongoing data analysis. This distinction is warranted, as there have been instances of conflation of the techniques in qualitative methods literature (Coyne, 1997; Denzin & Lincoln, 2011). Nevertheless, as prescribed in grounded theory studies, after doing a preliminary analysis of the first set of data I collected (around the 10th participant), I conducted subsequent participant interviews with an eye toward developing the concepts and categories that were emerging from the preliminary analysis. So far, I have discussed the sampling process undertaken in this thesis. The next section is focused on discussing the actual data collection tools applied.

3.4.4 Data collection: using survey questionnaires

I started the data collection process in this thesis with survey questionnaires. The survey method was used to collect data about the motivations behind students' use of OER (RQ5). The items in the survey were designed to determine students' motivations for using the resources. In the social sciences, surveys are one of the most commonly used data collection methods (Marsden & Wright, 2010). Statistics Canada (2010) defines surveys as:

> any activity that collects information in an organized and methodical manner about characteristics of interest from some or all units of a population using well-defined concepts, methods, and procedures, and compiles such information into a useful summary form (Statistics Canada, 2010, p. 1).

Essentially, surveys are research techniques whereby data are collected from individuals with regard to their experience of certain phenomena through the use of questionnaires. Surveys are used in a variety of ways to collect data from study participants. Such methods include the face-to-face method, whereby the researcher administers the questions in person to research participants; telephone method, whereby the questionnaire is administered over the phone; and the Web or email method, whereby a link to the survey is e-mailed to research participants for self-administration. A combination of face-to-face and web methods was used to collect data in this thesis. The benefits of using survey methods in such a study as this are articulately presented by Check and Schutt (2012). According to the authors, surveys are important for three main reasons: they are versatile, efficient, and generalizable.

The choice of using surveys to collect data in this thesis stemmed from their versatility. As has been noted by several scholars (Marsden & Wright, 2010; Statistics Canada, 2010; Check & Schutt, 2012), surveys are the choice technique for data collection in the social sciences. Specifically, Check and Schutt (2012) indicate that researchers have used survey methods in the investigation of several areas of education, including school desegregation, academic achievement, teaching practice, and leadership. As the authors suggest, it should be noted that even though surveys are not ideal for learning about every educational phenomenon, a well-designed survey can assist in advancing knowledge in just about any educational issue, OER not exempted. The second reason for using surveys in this thesis is that it suited the collection of data about several issues simultaneously without substantially increasing the overall cost of the data collection. The third reason for the use of surveys to collect date here is perhaps the most cogent for the purpose of this thesis: that is, they lend themselves to sampling from large populations. According to Check and Schutt (2012), survey research is very appealing when *sample generalizability* is a central research goal, as it is with this thesis, particularly the quantitative component. In the next paragraph, the details of this application are described.

The survey questions are contained in Appendix B. Participants were asked to select the most appropriate answer on a Likert-type scale ranging from 1 = "strongly disagree" to 5 = "strongly agree" to indicate the reasons they use OER. There was a total of 40 items designed to measure the reasons students use OER.

Overall, survey forms were distributed to approximately 600 students, and approximately 500 of them attempted to complete the forms. Ultimately, 417 participants

fully completed them. All of the participants who agreed to take part in the research were first asked to complete the survey. The information letter distributed along with the survey provided the opportunity for participants to indicate whether, in addition to completing the survey, they wanted to be included in the semi-structured interview phase of the data collection.

The number of survey responses received exceeded my initial expectation. The somewhat higher than expected response rate is attributable to the person-to-person approach I adopted in recruiting participants as well as the significant amount (about four weeks in total) of time I spent with students at the site of data collection. I also set up a Web survey, using Fluid Survey, an online data collection platform. However, only about 10 students completed the questionnaires using the online platform. It appears that the length of the survey discouraged some students from completing the questionnaires, as there were actually many attempts, but just the 10 completions. At the University of Lagos campuses, students were handed a survey package that included four pages of information letter, one page of the consent form, and five pages containing 10-15 demographic questions and the 40-item survey questionnaires. Some students were immediately discouraged by the size of the package. Another issue was the completion of the consent form. Some students expressed apprehension about writing their names on the consent form. However, once I explained to them that their anonymity would be protected, many agreed to sign the form. However, there were a few participants who refused to sign the consent form no matter the assurances I provided but insisted on completing the surveys (these could not be included in the analysis). There was also the issue of some students not being familiar with the term *open educational resources* or

OER. However, once I explained what the resources are, the usual response (paraphrased) was "oh yeah, I use those, but I did not know they are called OER or open educational resources." In addition to the length of the survey, this lack of familiarity with the concept is probably part of the reason many students did not complete the survey online.

At the initial stages of data collection, I allowed students to take home the survey materials with the understanding that they would bring back the completed forms. It quickly became clear that a lot fewer forms were being retrieved than were handed out. Therefore, I made the decision to encourage students to complete the surveys while I waited to pick them up. This had its advantages, as some students used the opportunity to ask for clarification about some of the items in the survey. Others used the chance to relate their experiences informally about using OER and other online learning resources. On the whole, I consider this approach a more efficient method of managing the data collection, given the circumstances.

3.4.5 Profile of survey participants

In all, 417 participants completed the surveys. Of that number, as shown in Table 3, 245 were males, and 171 were females. The majority of the participants, 335, were between the ages of 18 and 22.

Table 3: Gender and age of participants

Gender		Age of Participants				
Male	Female	18-22	23-28	29-34	35-40	Over 40
245	171	335	56	5	2	1

Table 4: Level and year of participants

Level of Study		Year of Study				
Undergraduate	Graduate	First year	Second year	Third year	Fourth year	Fifth year
401	15	187	101	77	33	11

The majority of participants were in the first to third year of higher education. As shown in Table 4, 187 participants were in their first year, 101 in their second year, 77 in their third year, and 33 in their fourth year. Table 4 also shows that 96% of participants were undergraduate students while less than 4% were graduate students. This information may help explicate some of the results. Particularly, it may help explain participants' low level of skills in finding and using OER, as well as their limited awareness of OER repositories.

Table 5: Status and frequency of OER use among participants

Previously used OER		How often participants use OER				
Yes	No	Daily	A few times per week	a few times per month	A few times per year	other
412	5	88	155	92	23	16

Table 6: Type and frequency of OER use among participants

Type of OER used	Frequency	
	Yes	No
Textbooks	254 (61%)	158 (39%)
Lectures	109 (26%)	303 (73%)
Articles	229 (55%)	183 (44%)
Practice exams, texts, and quizzes	173 (42%)	244 (58%)

In all, 412 (nearly 99%) survey participants reported that they have previously used OER. This is thought-provoking because it suggests that nearly all students at institutions of higher education in the region under investigation have used OER at one point or another. Furthermore, the frequency of OER use is impressive. Most of the participants, nearly 90% of them, reported that they use the materials from at least once

per day to a few times per month. In terms of the specific type of OER they use, as Table 6 shows, 61% of participants said they have used open textbooks, 26% have used open lectures while approximately 55% have used open articles. As for practice exams, tests, and quizzes, 42% of participants have used the resources.

3.4.6 Data collection: using semi-structured interviews

The semi-structured interview method was used to collect data regarding students' awareness of OER, their attitude toward the phenomenon, the benefits they derive from using OER, and the challenges they face in using the resources. One of the main characteristics of a semi-structured interview is that they are more flexible than the structured interview. The interviewer in a semi-structured interview has some leeway in adjusting and modifying the questions based on the responses of the participants and the focus of the research. Lodico, Voegtle, and Spaulding (2006) indicate that the interview is considered semi-structured because the researcher can change the order of questions, omit questions, or vary the wording of the questions depending on what happens at the interview. The authors further note that even though semi-structured interviews are flexible, there is still need to identify topics to be covered in advance. Usually, the questions for semi-structured interviews are pre-formulated in an interview guide. As Schensul, Schensul, and LeCompte (1999) note, essentially, semi-structured interviews are useful for delineating relevant factors in a study and for the development of preliminary hypotheses at the initial stages of data collection. In this thesis, the semi-structured interview was important in identifying relevant factors relating to students' finding and using of OER at institutions of higher education. One of the essential elements of semi-structured interviews is the development of an interview guide, or

interview protocol as Lodico et al. (2006) call it. The purpose of the interview guide, as

the term suggests, is to serve as a guide for the questions (closed and open-ended) to be

asked by the researcher in the interview. The interview guide for this thesis can be found

in Appendix B.

The approach to sampling in grounded theory studies, as in many qualitative

inquiries, is flexible. Interview participants for this thesis were identified from those who

completed the survey. After receiving ethics approval, students were contacted to

complete the survey. Among the 600 participants contacted for the survey, some of them

indicated interest in taking part in the interviews. Participants who indicated interest in

the interviews were contacted and initial interviews were arranged between the months of

January and February 2015.

Participants for the interviews must have completed the survey, have some

experience with the use of OER, and consent to being interviewed for the research. One

of the challenges that arose was the difficulty in tracking down potential interviewees.

Even though many participants opted to be contacted for the interviews after completing

the survey, some became reluctant in going through with the process. Many complained

of difficulty finding time for the interviews. As a result, there were some who did not

attend scheduled interviews. As one participant noted, it seemed that some of them were

afraid of "saying the wrong thing" given that the thesis is originating from a foreign

university. As I have discussed in previous sections, perhaps the reluctance by some

students to participate in the interviews resulted from their mistrust of people perceived

to be outsiders, as I may have seemed, even though I did not feel like an outsider having

been born and raised in Nigeria. These issues are not uncommon with undertaking a

study that requires engagement with participants in countries other than the one where the study originates.

To solve the problem of no-show interviewees, I adopted the tactics of interviewing participants who agreed to do so immediately after they completed the survey. There was no need to schedule an appointment. In other cases, I elected to meet participants wherever they wanted within the school premises for the interviews. Most of the interviews were conducted this way, mostly in parks and areas where students waited in-between classes. One of the drawbacks of this strategy was that the locations were not always quiet. The Android recording software (installed in a Samsung tablet) I used in recording the interviews was very sensitive and sometimes picked up background noises coming from other students. It is difficult to estimate how much the interview setting affected the interview process and the responses participants provided.

Table 7 shows some demographic information of the participants who were interviewed for the thesis. The length of interviews ranged from 5 to 16 minutes. Note that the participants have been anonymized as required by the terms of the ethics approval committee. The table shows the aliases of each participant, gender, level of education (graduate or undergraduate), year of study, and information on whether each has used OER. In all, 20 participants were interviewed for the thesis, 11 males, and 9 females. The majority of the participants were first- and second-year students between the ages of 18 and 35. They all noted that they had experience with the use of OER.

Table 7: Profile of interview participants

Number	Alias	Gender	Level	Year
1	IP1	F	Undergraduate	1
2	IP2	F	Undergraduate	2
3	IP3	M	Graduate	1
4	IP4	F	Undergraduate	2
5	IP5	M	Undergraduate	1
6	IP6	F	Undergraduate	1
7	IP7	M	Undergraduate	3
8	IP8	M	Undergraduate	2
9	IP9	M	Graduate	1
10	IP10	M	Undergraduate	2
11	IP11	M	Undergraduate	1

12	IP12	F	Undergraduate	1
13	IP13	M	Undergraduate	1
14	IP14	F	Undergraduate	1
15	IP15	M	Undergraduate	1
16	IP16	M	Undergraduate	2
17	IP17	F	Undergraduate	1
18	IP18	F	Undergraduate	1
19	IP19	M	Undergraduate	4
20	IP20	F	Undergraduate	2

3.5 Ethics

The adherence to ethical norms in social science research is vital for the growth of

knowledge in the discipline and for the welfare of research participants. Published under

the auspices of National Institute of Environmental Health Sciences, a report by Resnik

(2015) concludes that the adherence to ethical standards in academic research is useful

for the following reasons: (1) the promotion of the objectives of research, such as knowledge, truth, and avoidance of error; (2) the promotion of the values that are essential to collaborative work, such as trust, accountability, mutual respect, and fairness; (3) the promotion of accountability on the part of researchers; (4) the promotion of a variety of other important moral and social values, such as social responsibility, human rights, animal welfare, compliance with the law, and health and safety of research participants; and (5) the building of public support for academic research. To add to this list, the adherence to ethical standards is important for ensuring the privacy and confidentiality of research participants. With this in mind, this thesis abided by relevant ethical research standards set out by the Office of Research Ethics at Western University—the ethical supervisory body for the thesis.

That said, the present research poses only *minimal risk* to participants. In this case, the definition of minimal risk provided by the Panel on Research Ethics in Canada (Panel on Research Ethics, n.d) is applied. According to the panel, minimal risk research is used to mean research where the probability and magnitude of harm or discomfort anticipated for participants are not greater, in and of themselves, than those normally encountered in daily life or during the performance of routine physical or psychological examinations or tests. None of the methods of data collection outlined above was expected to result in more than minimal risk to the participants. Alternatively, special care was taken to ensure that participants were not negatively affected by their participation in the research. The data collected from participants were anonymized. In cases where personal information was provided, extreme care was taken to protect the privacy and confidentiality of the participants. For interview participants, I used numbers

to identify them based on their appearance on the interview list. For example, the first interview participant is represented as IP1, the second as IP2, and so forth.

Ethical consideration in research involves not only risks, but also the potential benefits of the study in question to the participants. One of the main principles of research ethics is that of beneficence (Gostin, 1991). In its simplest sense, the principle entails the responsibility on the part of the researcher to maximize benefits for study participants and/or society while minimizing their exposure to harm and risk. The main benefit accruable from this thesis is the additional knowledge gained about OER. In a general sense, this knowledge can assist in designing better retrieval systems for OER access. It may also assist educators in designing better OER initiatives that better suit student users of the resources. Specific to the participants of the thesis, participation may bring about better knowledge of finding and using OER. In the next section, the process of analyzing the data collected in this thesis will be described.

3.6   Data analysis

In line with the mixed methods approach in data collection, both qualitative and quantitative analytical tools and techniques were used in the analysis of data collected in this thesis. The data collected in the course of a study, irrespective of the method used, often require some manipulation and analysis to make them ready for interpretation. In general terms, data analysis involves the systematic application of statistical and/or logical techniques to reduce and transform data to produce useful information and draw valid conclusions (Shamoo & Resnik, 2015). According to Corbin and Strauss (2008), analysis "involves examining a substance and its components in order to determine their properties and functions, then using the acquired knowledge to make inference about the

whole" (p. 45). These techniques provide a way of drawing useful inferences from data

(Shamoo & Resnik, 2015). The method of analysis selected in a study is dependent,

among other things, on the type of data (i.e., qualitative or quantitative) collected, and the

overall research objective. Consistent with the mixed methodological approach used in

data collection, the analysis of data in this thesis applied both qualitative and quantitative

approaches. Specifically, both grounded theory, a qualitative approach, and PCA, a

quantitative approach, were applied. The combined use of grounded theory and PCA in a

single study is not without precedent. Stenberg (2012) used both techniques to study how

gender as a social and cultural construction could affect patients with neck and back pain

during different parts of the rehabilitation process. The application of both grounded

theory and PCA is based on the need to provide a complete picture of the issues relating

to finding and using of OER among the student population under investigation. In the

next section, the manner of application of these two methods of analysis will be

described.

3.6.1 Qualitative component: data analysis with grounded theory procedures

Grounded theory is both a method of data collection and a method of data analysis

(Charmaz, 2014). The previous discussion of grounded theory earlier in this chapter

focused mainly on the general principles of grounded theory, the specific version of

grounded theory adopted in this thesis, and the practical rationale for doing so. The

discussion also focused on the process of using grounded theory for data collection in this

thesis. In this section, I will discuss the aspect of grounded theory that relates to the

analysis of data collected in this thesis. I used grounded theory procedures to analyze data

collected for research questions 1, 2, 3, and 4. One of the features of grounded theory is its prescriptive nature. It underlines the process and procedures for analyzing data, in order to "*construct* [emphasis added] a coherent and explanatory story from data" (Corbin & Strauss, 2008, p. 47). Figure 6 shows the iterative, grounded theory, analytic process undertaken in this thesis.
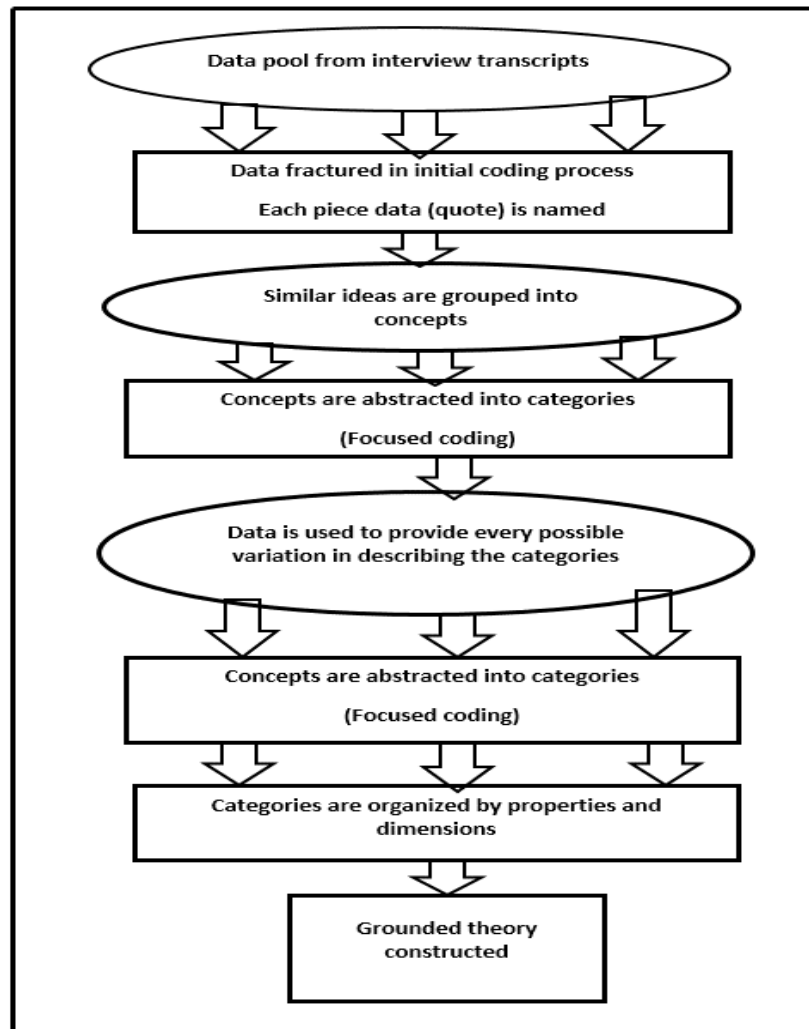
Figure 6: Grounded theory iterative analytic process

The grounded theory analytic process depicted in Figure 6 (an adaptation from Binz-Scharf, [2003]) is representative of Kathy Charmaz's constructivist grounded theory

analytic approach, and slightly differs from that of Strauss and Corbin (Charmaz, 2014).

In her book, *Constructing Grounded Theory* (Charmaz, 2014), the author detailed her

approach to grounded theory analysis. Charmaz's approach involves such steps as initial

coding, focused coding, and theoretical coding. Initial coding can be accomplished in

three ways: word-by-word, line-by-line, or incident-with-incident. The type of initial

coding applied is dependent on the type of data being analyzed (Charmaz, 2014). In this

thesis, I used incident-with-incident coding in the initial coding phase. I had planned to

use line-by-line coding, which basically "means naming each line of the written data"

(Charmaz, 2014, p. 124). However, line-by-line coding sometimes seemed arbitrary since

not every line in the data contains a complete or even useful sentence. When I realized

that the data contained many such arbitrary lines of incomplete sentences and phrases, I

opted for incident-with-incident coding.

Incident-with-incident coding is similar to line-by-line coding (Charmaz, 2014, p.

128). Charmaz argues that grounded theorists do often use this type of coding through a

comparative study of the *incidents* contained in study data. In this type of coding,

incidents are compared to other incidents, and to codes, to determine similarities in their

properties. In essence, similar incidents or statements are applied to similar codes.

Basically, the unit of analysis in this thesis was represented by incidents in the interview

transcripts. Examples of incident-with-incident coding as applied in this thesis are shown

in Table 8.

Table 8: Initial and focused coding

IP3 Interview: on the benefits of using open educational resources by students

IP3 is a first-year post-graduate student at the University of Lagos. He was responding to questions relating to the benefits he derives from using open educational resources.

Initial codes	Focused codes	Interview statements
- Learning from formal classes is insufficient - Access to faculty is sometimes impossible -Regarding OER as surrogate tutorials -Supporting the completion of academic tasks -Perceiving OER as complementary learning materials	Complementing formal learning Surrogate tutoring	IP3: Not all course [inaudible] can be taught in classes, and you can't get materials elsewhere. And you can't go and meet the people who are teaching in classes. You can also get other tutors online. IP3: It's basically assignments and projects or things related to that, when you have to write on something. But in my own case, it was assignments and projects. IP3: Yeah. With the availability of Internet facility now, you can reach them anywhere. That's what it is. Then it's

		cheap. Yes, it's not expensive. You don't have to consult someone for a textbook; you don't have to buy a textbook. So you have a lot of sources, a lot of options to pick from.
-Accessing OER from anywhere and anytime	Ubiquitous access	
-Inexpensive cost of access		
-Not needing to pay	economizing	R: Options? By that, you mean the different kind of materials. If you want an article, you get an article? If you want a video, you get a video?
-Having multiple sources of learning materials		
-Options (optionality)	Optionality	IP3: Yes.

After the initial incident-with-incident coding, the next stage of the coding process I applied was focused coding. According to Charmaz (2014, p. 138), focused coding means:

> Using the most significant and/or frequent earlier codes to sift through and analyze large amounts of data. Focused coding requires decisions about which initial codes make the most analytic sense to categorize your data incisively and completely. It also can involve coding your initial codes (Charmaz, 2014, p. 138).

Focused coding involves the further abstraction of initial codes. It is the second, selective and conceptual, phase of the constructivist grounded theory coding process (Charmaz, 1983). The practice involves the application of initial codes to larger amounts

of data. The focused code is deemed selective because it requires sifting through the data and developing useful categories; it is conceptual because the codes are intended to sort data by analytic level rather than the provision of a mere summary or topic labels (Charmaz, 1983). An example of how focused codes were generated in this thesis is also shown in Table 8.

In this thesis, focused coding was useful in developing and clarifying categories through a close examination of the data. It was useful in subdividing the categories and developing sub-categories. Once a set of focused codes were determined, as Charmaz (1983) urges, I used the "knowledge of the literature to expand and clarify the codes" (p. 117). Essentially, constructivist grounded theory strongly emphasizes action and process (Charmaz, 2014). Thus, I refrained from treating the categories developed separately as single topics, but rather as a form of connection in a processual analysis through which participants' experiences can be explicated (Charmaz, 1983). In the section below, I provide a definition of the core categories as applied in this thesis.

3.6.2 Defining the core categories

Several core categories emerged from analyzing the data collected in this thesis. In this section, I define each of the categories.

Having limited awareness of the OER concept

In this thesis, awareness is used to mean being cognizant or knowledgeable about something. This core category was used to identify responses indicating that even though participants may have previously used OER for academic learning purposes, their awareness of the resources was limited. That is, they were not familiar with the term *open educational resources* or its acronym OER. The category also codes all responses indicating or implying that participants did not understand enough of the unique

properties of OER to be able to differentiate them from other digital educational learning resources.

Lacking adequate awareness of OER repositories

This core category was used to identify statements showing that participants did not have adequate awareness of specific OER repositories. When participants indicated knowledge of only a single (or no) OER repository or reported inability to locate OER sites online (except through popular search engine results), this category was applied.

Having positive impression of OER

This category identifies participants' positive attitude toward OER. Attitude is used in this thesis to mean the manner of one's thinking and feeling about a phenomenon that may have an influence on one's behavior. This category was used to identify participants' responses indicating that they favor the existence of OER. It was used to identify participants' statements indicating or implying that they think positively of OER, have good feelings about their use, and generally appreciate the availability of the resources.

Ambivalence

While all participants interviewed had a positive impression of OER, many also expressed reservations about the use of the resources among students. For example, some participants opined that some of the resources may be lacking in credibility, and a few others reported that OER is having a negative influence on students' learning behaviors by making them unable or unwilling to engage in *deep research*. This category was used to identify such statements that showed participants' expression of concern about the use of OER.

Complementing formal learning

This category was used to identify participants' responses showing that students' learning is supported, or perceived to be supported, through the use of OER. The category was

also used to identify responses indicating participants' use OER to support *personalized learning* or facilitate individualized learning arrangements. As digital materials, some participants noted that OER help them stay current on academic issues largely because they are modifiable to reflect current facts. This category was used to identify responses that imply OER is useful for supporting academic currency. In addition, the category was used to identify responses indicating that OER support *surrogate tutoring* (a concept I used to describe participants' use of OER for extra tutorials on academic topics).

Ubiquitous access

The *ubiquitous access* category was used to identify statements that reflect easy access, digital access, and globalized access/learning as benefits of using OER. It was also used to identify responses indicating that the lack of temporal and spatial restrictions on the use of the resources is beneficial to users.

Networking

The *networking* category was used to identify responses indicating that using OER allows participants to interact, connect, or collaborate with peers.

Economizing

The *economizing* category was used to identify statements that reflect the reduction of the overall cost of education and learning as a benefit of using OER. Such participants' statements about OER that indicated them as "free," "cheap," "investment," etc. were coded under this category.

Optionality

Optionality is a category used to identify participants' statements indicating that OER provide optional and varied channels of learning materials to participants.

Dealing with cost of access

One of the challenges expressed by participants in using OER is the issue of cost. This could be related to Internet service subscription (paying for data plans), acquiring smartphones, or buying computers. Some participants also related that they needed to subscribe to certain websites to access open materials. This category was used to identify such instances.

Experiencing disruptions

The *experiencing disruptions* category was used to identify responses indicating disruption of access to OER as a challenge. Many participants reported not having access to OER because of irregular and or poor Internet connection as well as outages of electrical power as a major challenge. This category was used to identify statements indicating such notions.

Lacking sufficient skill for access

Although this was not always explicitly stated in the interviews, certain responses suggest that participants lacked the adequate skill to search properly for OER relevant to their desired topics. This category was applied when such notions were expressed by participants or interpreted by the researcher. The category was also used to identify statements showing participants' lack of knowledge of OER repositories as a challenge.

3.7   Using qualitative data analysis software: Atlas.ti

Although grounded theory analytic approach or procedures were adopted in the qualitative component of this thesis, the operational implementation of those procedures were undertaken with Atlas.ti. In a way, I complemented the manual analysis of the interview data as demonstrated in Table 4 with Atlas.ti. The use of data analysis software in studies with a qualitative component has become increasingly commonplace (Strauss & Corbin, 2008, Luker, 2010). The practice has generated some debate among researchers. According to Binz-Scharf (2003), while some argue that certain qualitative data analysis (QDA) software based on conceptions of grounded theory methods overemphasize coding and undermine nuanced interpretive analysis, others claim that such programs appear to be more suited for objectivist rather than constructivist grounded theory. Nevertheless, like many other QDAs, Atlas.ti supports the exploration and systematic analysis of unstructured data, such as text, video, audio, and images. For this thesis, the program was useful in developing and tracking of codes, notes, memos, and annotations. It also helped me to visualize clearly the codes, notes, and memos created in this thesis, thus, facilitating easier interpretation.

The coding procedure provided by Charmaz is, overall, clear, and easy, particularly with manual coding. However, she does not describe how to use QDA software, such as Atlas.ti, to accomplish coding in constructivist grounded theory. The current Atlast.ti version does not seem to have a simple and direct way of creating initial codes, which is the first step in Charmaz's constructivist grounded theory coding process. Woolf (2014) provides a workaround that enables the use of Atlas.ti to create initial codes. Using Atlas.ti to create initial codes in this thesis required a bit of creativity.

Basically, I used Woolf's (2014) approach to complement the overall coding guidelines

provided by Charmaz (2014) for conducting coding in constructivist grounded theory.

Grounded theory generally involves several phases of coding activities with each phase

built on the results of the previous one. In essence, the idea is to reduce large amounts of

data to a reasonably small number of concepts or codes that explicate the phenomenon

under investigation.

Woolf (2014) notes that the main purpose of initial coding is the naming of codes

in a way that reflects actions and processes in segments of the data transcript. The initial

coding phase in constructivist grounded theory is not necessarily for data reduction;

rather, it is intended to identify theoretical possibilities in each individual segment of data

(Woolf, 2014). Woolf added that initial coding activity is, therefore, not well suited to

being represented by Atlas.ti's featured coding mechanism. The argument Woolf is

making is that if each individual segment or statement (i.e., a word, a sentence, a line, or

a statement) with theoretical possibilities is coded using Atlas.ti's code feature (keeping

in mind the point of initial coding is not for data reduction), there would be a significant

number of codes developed. For example, if there are 1,000 identified segments in a

project, and each segment is coded, there will be 1,000 codes for the researcher to

manage. This process is too cumbersome and defeats the overall purpose of coding

qualitative data, which is to reduce the data to a manageable level.

A more efficient approach to creating initial codes with Atlas.ti suggested by

Woolf (2014) is first to apply the free quotation feature in Atlas.ti to set up the initial

codes. The process starts by creating free quotations representing the segments,

statements, or incidents. Even though Atlas.ti's free quotation feature marks off each

segment of ideas, the ideas are not linked to any other data by the program. They are simply free-floating independent statements. The next step is actually to turn the quotations into initial codes by naming each of the quotes to create unique codes.
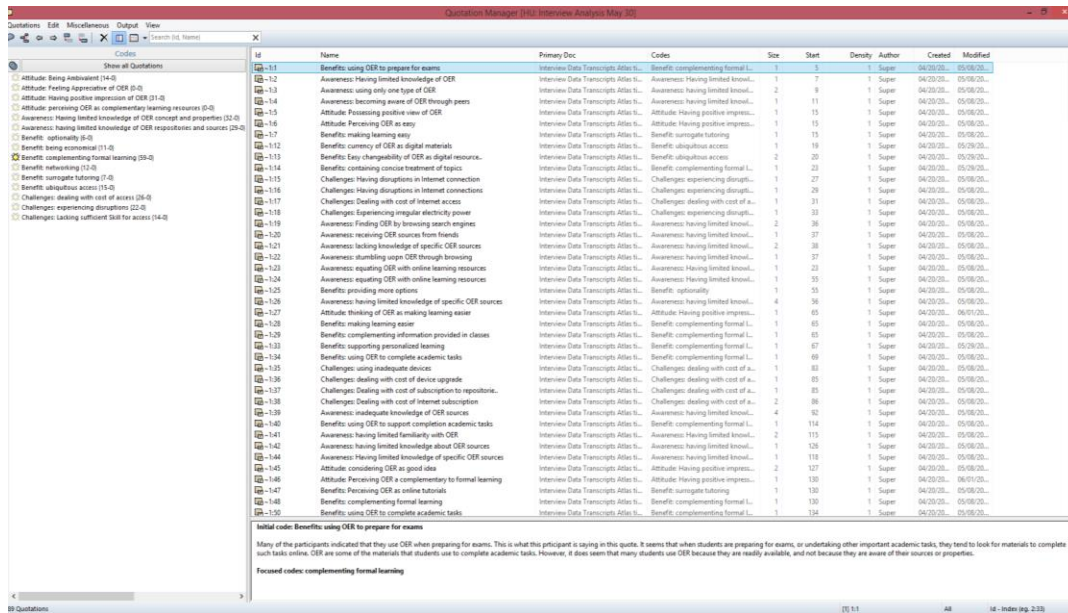
Figure 7: Screen capture of Atlas.ti's quotation manager
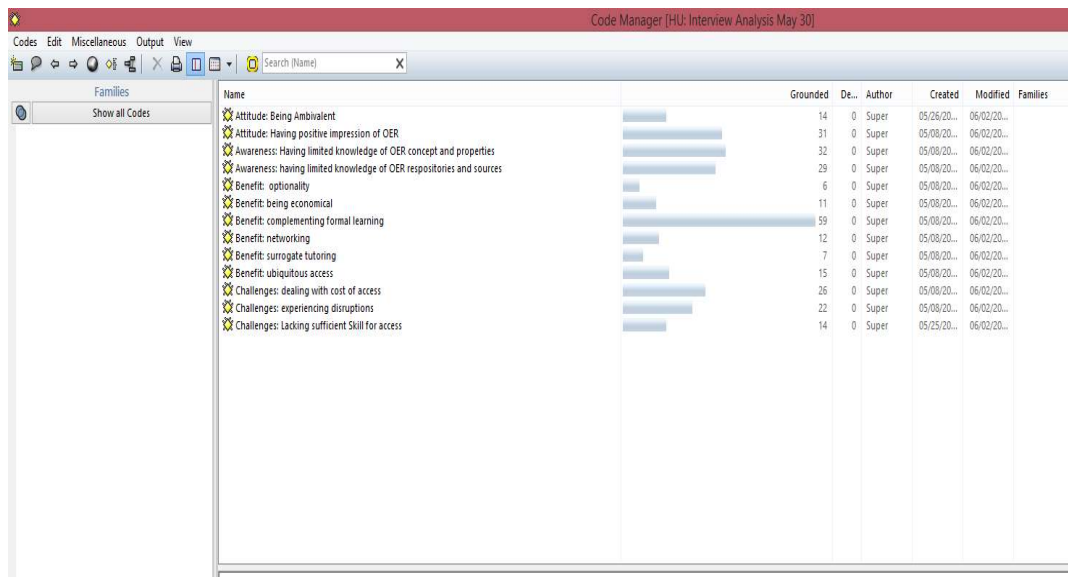
Figure 8: Screen capture of Atlas.ti code manager

In the second phase of coding, focused coding, data reduction does come into play. This is when Atlas.ti's code feature is applied. The quotes (now initial codes) are reexamined. The most frequent and significant ones are coded to represent a smaller set of focused codes. Figure 7 shows Atlas.ti's quotation manager. Note the *Name* and the *Codes* columns. The name column shows the initial codes created from the free quotes by naming them uniquely. The initial codes are linked to specific focused codes in the code column. Figure 8 shows only the focused codes. Note the *Grounded* column indicating the number of initial codes (free quotes or pieces of data) under which the focused codes are grounded, or linked. For example, the "being ambivalent" code is grounded on 14 initial codes or pieces of data while the "complementing formal learning" code is grounded on 59 initial codes or pieces of data.

Using Atlas.ti, the steps described in the preceding sections were followed to create initial codes and focused codes in this thesis. This approach does not only eliminate the issue of dealing with large amounts of initial codes, but it also ensures a more efficient analysis of the data collected.

3.8   Inter-coder and Intra-coder reliability

Reliability is an important concept in research, particularly in quantitative studies. In qualitative studies, there have been some debates about its usefulness. The position of qualitative researchers with regards to the measure of reliability in qualitative studies ranges from outright rejection to firm adherence (Davey, Gugiu, & Coryn, 2010). There are two common measures of reliability: inter-coder (or interrater) and intra-coder reliability. According to Davey, Gugiu, and Coryn (2010), inter-coder reliability is related to the extent to which different coders appraise the same information in the same

way. That is, do different people interpret and code the same qualitative data in similar ways? Intra-coder reliability measure, on the other hand, examines whether the same coder conducts the coding process in a stable way over a period of time (Tjondronegoro, Song, & Docherty, 2013).

For some researchers, the perceived objectivity inferred in inter-coder reliability makes it a more suitable measure. However, researchers, working alone (as in the current project), are also expected to ensure the reliability of their study. The procedure for determining intra-coder reliability involves selecting a portion of an interview transcript, for example, and coding it at different times. If there is a correlation or agreement between the codes, then intra-coder reliability has been achieved. It seems that in grounded theory, there is no emphasis on this type of reliability. This is perhaps because grounded theory coding system inherently involves iterative actions intended to *confirm* emergent codes (i.e., memoing, theoretical sampling, initial coding, and focused coding). In other words, codes are developed and revised throughout the process of data collection and analysis in grounded theory. Furthermore, codes, particularly initial codes, like memos, are provisional and are merely a means of obtaining the end results: theories and or descriptions of the phenomenon being investigated. Thus, in grounded theory, one may argue that the final analysis (theories and or descriptions) is more than the sum of the codes. This is because the final analysis is not just a product of the integration of the codes, but also a product of the researcher's interpretation, explanations, and overall scholarship relating to the phenomenon under investigation. Nevertheless, to achieve intra-coder reliability in this thesis, I essentially coded the whole transcript three different times over a period of several months. As expected, certain codes were revised, but

retained consistency in meaning. For example, "being economical" was changed to "economizing" in the last stage of coding to better capture students' use of OER as a cost saving measure. It is important to emphasize that this example, more than anything else, probably merely only reflects improvement in my coding technique.

3.9 Quantitative component: data analysis with PCA

I used the PCA statistical technique to analyze the quantitative data collected in this thesis. Specifically, the statistical procedure was used to analyze the data collected with survey questionnaires regarding the motivations behind participants' use of OER (RQ5). Before continuing with the discussion of the rationale for using PCA in this thesis, it is important to distinguish the technique from EFA because of their similarities.

3.9.1 Distinguishing PCA from exploratory factor analysis (EFA)

PCA is very similar to EFA. According to Brown (2015), both techniques often produce similar results, which makes it difficult to satisfactorily justify the use of one of the techniques over the other in data analysis. Nevertheless, making a distinction between the two techniques and providing a rationale for selecting one over the other is important. This is reflected in the discussions and debates about the appropriateness of the techniques in research (see Plonsky, 2015; Brown, 2015). PCA and EFA share many similarities, including the fact that they are both used to extract a certain set of variables in place of a larger set. Citing Conway and Huffcutt (2003), Plonsky distinguishes PCA and EFA thusly:

> If a researcher's purpose is to understand the (underlying) structure of a set of variables (which will usually be the case), then the use of a common factor model

(EFA) such as principal praxis or maximum likelihood factoring represents a high-quality decision. If a researcher's purpose is a pure reduction of variables… then the use of PCA represents a high-quality decision (Plonsky, 2015, p. 185).

Conceptually, the main difference between PCA and EFA is that in the process of extracting the representative or proxy variables, PCA analyzes variance while EFA analyzes covariance. PCA analyzes all variance including those unique to each of the variables, those common among all the variables, and error variance; whereas EFA includes only the common variance in its analysis (Plonsky, 2015). That is why EFA is referred to as the *common factor* technique. EFA is useful if a researcher's aim is to account for the variance in a study in which a theory about the relationship between the variables already exists, and the researcher is merely looking to better understand the underlying construct (s). This is because the exclusion of the unique and error variance helps highlight what is really happening with the covariance of the variables. However, if a researcher is exploring a set of data without a preconceived theory about the relationship between the variables, and his or her objective in the exploration is to see what patterns will emerge in the data, PCA perhaps becomes a more suitable option. Furthermore, PCA works well with the inductive principles of grounded theory as applied in this thesis. Then again, this is not to imply that that EFA does not work well with grounded theory. In any case, proponents of PCA have argued that PCA is perhaps a:

"…superior alternative, in view of the fact that PCA possesses several desirable statistical properties. For instance, it is computationally simpler; it is not susceptible to improper solutions; it produces results similar to EFA; and PCA is able to calculate participant's score on a principal component, whereas the

indeterminate nature of EFA complicates such computations (Brown, 2015; p. 20).

3.9.2 Selecting PCA

In spite of the above, it is pertinent to emphasize that either PCA or EFA would probably have sufficed for the analysis of the quantitative data in this thesis. In the end, my decision to use PCA probably has more to do with my familiarity with PCA than anything else. I am more familiar and comfortable using PCA than EFA. Moreover, precedent exists for the use of PCA to analyze data relating to student motivation (Leal, Miranda, & Carmo, 2013). Originally developed by Pearson (1901), PCA is widely used in both the physical and the social sciences (Chalton, Brunsdon, Demšar, Harris, & Fotheringham, 2010). Figure 9 illustrates the composition of principal components.
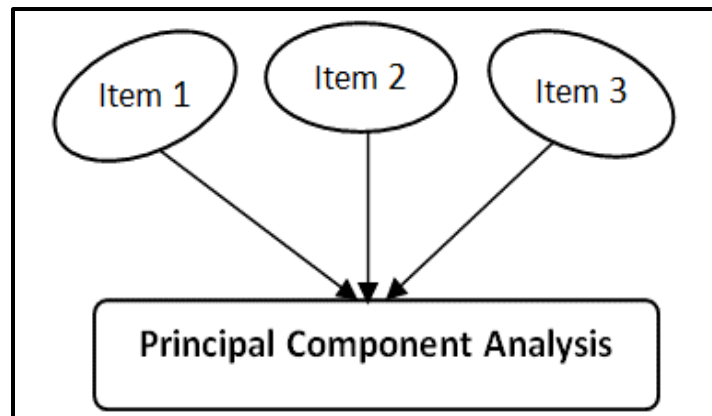
Figure 9: Principal component analysis causal pathway

PCA is a means of identifying patterns in data and expressing such data in a manner that highlights their similarities and differences. Once the patterns in data have been identified, they can be compressed to a manageable number of components that

represent all of the variables, without much information loss. Chalton et al. (2010) note that there are several practical uses of PCA. Some of the uses are restated as:

- to examine the correlation between variables in a selected set of items;

- to reduce the basic dimensions of variability (components) in a measured set of items;

- to eliminate variables that contribute relatively little information to a set of items; and

- to weigh each variable in a set of items and allocate them to constructed components.

The main advantage of using PCA to analyze the data regarding the motivation for students' use of OER is that it allowed for the grouping of the survey items into a manageable number of components. Basically, PCA is a variable reduction statistical technique. It is used to reduce a large set of variables into a smaller set, referred to as the principal components. These components are supposed to account for most of the variance in the original variables. The most common instance of PCA use is when items suspected of measuring the same underlying constructs are reduced to identify the items that most closely represent the construct. In this thesis, to determine the specific motivations for the use of OER among the student population under investigation, a 40-item survey was designed (see Appendix A), and participants were asked to rate (using a Likert-type scale) how much each of the survey items represented their motivation for using the resources. Essentially, I used the PCA technique to reduce the items to a smaller number of proxy components.

3.9.3 Conducting the PCA with IBM SPSS

The QDA software used in analyzing the quantitative data collected in this thesis is the IBM SPSS software package (version 22). SPSS has a feature for performing a PCA. The complete PCA procedures followed in this thesis are presented in more detail in Table 9.

Table 9: Steps in conducting principal component analysis

Conducting the PCA	
Step 1	I clicked the following buttons: Analyze > Dimension Reduction > Factor on the main menu of SPSS
Step 2	I transferred all items into the variable box in the dialog box presented
Step 3	On the dialog box, I clicked the "Descriptive" button
Step 4	On the "Descriptive" dialog box, under "statistics," I selected "initial solution" and under "correlation matrix," I selected the following: coefficients, KMO, and Bartlett's test of sphericity, and reproduced. Then I continued by clicking the button to return to the dialog box.
Step 5	On the dialog box, I clicked the "Extraction" button

Step 6	On the "Extraction" dialog box, I ensured that principal component is selected. Then, I left all default selections as is except "scree plot," which I checked. I clicked "Continue" to return to the dialog box.
Step 7	Next, I clicked "Rotation" on the dialog box.
Step 8	On the "Rotation" dialog box, I selected Direct Oblimin in the methods area. Then, in the display area, I selected "rotated solution" and "loading plot." I clicked continue to return to the dialog box.
Step 9	I clicked "Options" on the dialog box. Then, I selected "sorted by size" and "suppress small coefficients," and changed the "absolute value below" to 0.5. Then, in the missing value area, I selected "exclude cases listwise."
Step 10	I clicked "Continue" to return to the factor analysis dialog box, and then clicked continue again to generate the PCA results.
Step 11	After interpreting the scree plot (along with eigenvalue and total variance), I went back to the main dialog box and clicked on "Extract." Then, under a fixed number of factors to extract, I entered "13." This is the number of components that the items were reduced to, using the weight of eigenvalues of the components and the results of the scree plot as a measure (see Section 3.9.4).

3.9.4 Screening the data: suitability of data for PCA

The first issue to consider in conducting a PCA is the determination of the suitability of

the technique for the data under analysis. To use SPSS to determine PCA suitability,

three factors are considered. The first is sample size. The size of the sample is an

important consideration in PCA, just as in any other empirical analysis. Citing Comfrey

and Lee (1992), Osborne and Costello (2004, p. 2) suggest "the adequacy of sample size

might be evaluated very roughly on the following scale: 50 – very poor; 100 – poor; 200

– fair; 300 – good; 500 – very good; 1000 or more – excellent." Osborne and Costello

also cite Barrett and Kline (1981) and Aleamoni (1976) in recommending a sample size

of 50 to 400 as appropriate. The implication is that there is no agreement on the specific

number of participants required for conducting a PCA, other than the higher the number

of participants the better. It is also agreed that the number of items determines the

required number of participants. However, the rule of thumb is that the minimum

required sample size should range from 5 to 10 participants to 1 item. That is, 1 survey

item will require a minimum of 5 to 10 participants. This thesis has 40 items in the survey

and, overall, 417 participants completed the survey, thereby exceeding the minimum.

Table 10: KMO and Bartlett's test results

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin measure of sampling adequacy		.851
Bartlett's test of sphericity	Approximate chi-square	3601.547
	df	780
	Sig.	0.000

The second method I used in determining sample size adequacy in this thesis is the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. The KMO measure is an index for comparing the magnitudes of observed correlation coefficients with the magnitudes of partial correlation coefficients. The smaller the value of the index, the less suitable PCA is for the data. In general, KMO scores above .60 are acceptable, above .70 are good, and above .80 are better (Henry, Sharma, Lapenu, & Zeller, 2003). As shown in Table 10, the results of this thesis revealed a KMO of .851, supporting the assumption that PCA can be suitably used for analyzing the data.

The third method used in determining sampling adequacy is Bartlett's test of sphericity (Sobh, 2008). Conducting a PCA also requires an adequate correlation between the variables. Bartlett's test of sphericity was used to make this determination. The result of Bartlett's test of sphericity in this thesis assumes that the correlations between survey items are sufficient for PCA to be appropriate. In other words, the correlations within the matrix variables are sufficiently different from zero to warrant a PCA. As shown in Table 10, Bartlett's test of sphericity is 0.000. Because the value is less than .05, this result is significant, indicating that PCA is appropriate for the data (Sobh, 2008). Finally, as shown in Appendix D, the *commonalities* for all 40 items were all above .5, which further support the assumption that each item shared some common variance with other items. Overall, given these indicators, PCA was deemed suitable for the data.

3.9.5 Test of Reliability

One common method of testing the reliability of items on a scale is the use of Cronbach's alpha (Tavakol & Dennick, 2011). Table 11 below shows the Cronbach's alpha for the survey items in this thesis. Cronbach's alpha is useful for measuring the internal

consistency of the items in a scale. It is used to gauge the extent to which the items in a

scale measure the same construct (Tavakol & Dennick, 2011). The higher the items are

correlated to each other, the higher the value of alpha. However, as Tavokol and Dennick

(2011) observed, a high alpha coefficient does not necessarily represent a high degree of

internal consistency. Alpha is also affected by the length of the test. If the test is too short

or the number of items is too few, the value of alpha will be reduced. Alternatively, an

overly high value of alpha, say > 0.90, may mean redundancies in a scale, thus,

necessitating a shortening of the scale (Tavakol & Dennick, 2011). In this thesis, I

determined that 40 items are enough to achieve a suitable alpha. As Table 11 shows, the

alpha coefficient for the 40 items is .772, indicating that the items have a relatively high

internal consistency. Note: in social sciences, a reliability coefficient of .70 or higher is

considered acceptable for the determination of internal consistency of a scale. The last

column in Appendix E shows what the alpha of the scale will be if each of the items is

deleted. If any of the items is deleted, the alpha for the items will still be between .70 and

.80. In other words, there will be no substantial increases in alpha if any of the items is

eliminated. To sum, the alpha generated from the reliability test shows that there is

internal consistency in the data, supporting the conduction of a PCA.

Table 11: Reliability statistics

	Cronbach's Alpha Based on Standardized Items	N of Items
Cronbach's Alpha		
.772	.857	40

3.9.6 Determining the appropriate number of principal components

PCA analysis requires the determination of the desired number of components to which the items should be reduced. In this thesis, two methods were used to make this determination. The first was the use of the scree plot test while the second was the use of the coefficient of the *initial eigenvalues*. The use of these two methods for determining the components to be extracted in a PCA is fairly common in the literature (Kellow, 2006).
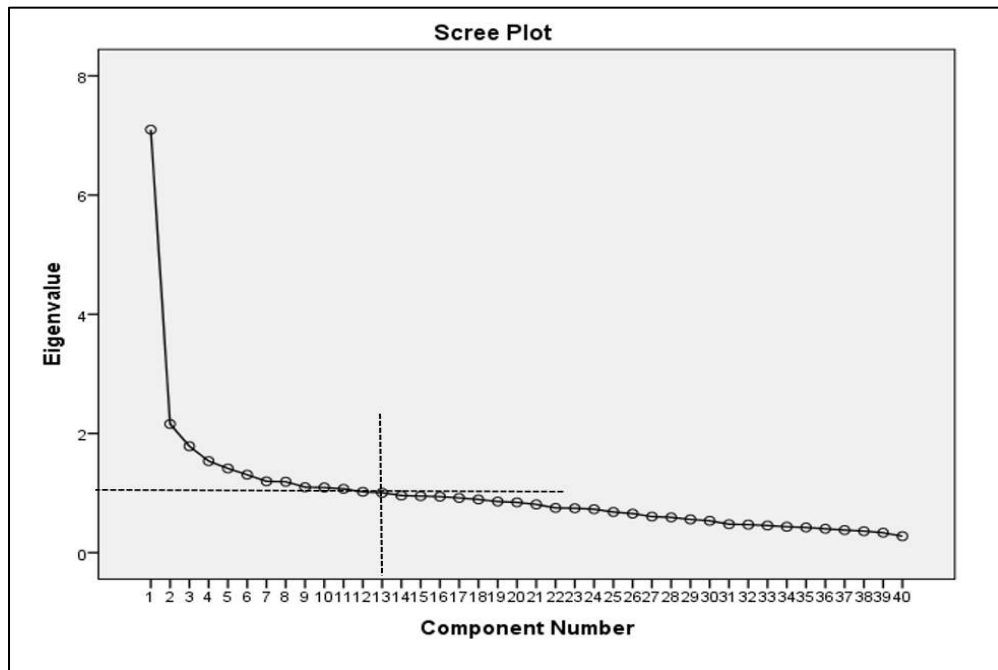
Figure 10: Scree plot showing the components and eigenvalues

In Figure 10 above, there is a noticeable break around the 13th component in the L-shaped scree plot (notice how the break starts from the point eigenvalue is equals to 1). Using this information, I decided to reduce the variables to 13 components. Thus, the PCA was rerun and a fixed number of "13 components" were extracted (see Table 9 for the complete set of PCA steps).

The second method used to determine the number of components to extract was the use of initial eigenvalues. This is the most widely used method of retaining components in a PCA (Kellow, 2006). In this procedure, all components with eigenvalues greater than one are retained. The initial eigenvalue is useful in identifying the principal components and how much of the total variance each of the components explains. Appendix F shows the original components and their eigenvalues. Note that 13 components have values equal to or higher than 1, which is the standard eigenvalue. These are the significant components to focus on. Cumulatively, the 13 components selected account for approximately 57% of the total variance explained. The implication is that the selected components explain the majority of the variance in the data.

3.9.7 Rotation strategies

Once the appropriate number of components to be extracted has been determined, part of a PCA is the determination of a rotation strategy. The purpose of the *rotation* of the factors (i.e., components) is to obtain a sharper conceptual solution (Kellow, 2006). The rotation strategy adopted is dependent on whether the data are correlated or uncorrelated. There are two types of rotation: orthogonal and oblique.

In orthogonal rotation, the output consists of uncorrelated factors or components (Kellow, 2006). One of the most common orthogonal procedures available in statistical packages is varimax. The other method of rotation is oblique rotation. In oblique rotation, the output consists of correlated factors or components (Kellow, 2006). The main oblique procedures are oblimin and promax. Kellow (2006) further distinguishes the two methods of rotation thusly:

If an orthogonal rotation is used, the correlation between a variable and component represents the *total* contribution of the variable to the respective component (called a structure coefficient). In the case of orthogonal rotation, the components will be uncorrelated, and the structure coefficients and pattern coefficients will be identical**.** In contrast, when an oblique rotation is employed the correlation coefficient associated with a particular variable, and a component indicates the *unique* contribution of that variable to the component after partialling out the variance attributable to the variable's covariance with other components (called a pattern coefficient) (Kellow, 2006, p. 96).

I applied oblique rotation (i.e. direct oblimin) in this thesis. The main reason for this is that the method is more suitable for capturing the reality of the construct under investigation. It is only reasonable that a multidimensional construct such as the motivation for using OER will be composed of dimensions that are dependent on one another. In any case, having established that the items are correlated, it was only logical to apply a method that supports such data.

In summary, this chapter describes the methodological steps and techniques I used in collecting and analyzing data in this thesis. Specifically, it describes the process of data collection through the use of surveys as well as interviews. It also describes the process of sampling and recruitment of the participants in this research. Furthermore, the chapter describes the use of grounded theory and PCA in the analysis of the qualitative and quantitative data, respectively. In the next chapter, the results of the analysis undertaken in this chapter will be presented.

Chapter 4

4 Results and discussions: awareness, attitudes, benefits, and challenges

4.1 Introduction

This thesis focuses on key issues relating to student use of OER at the University of Lagos, an institution of higher education in Nigeria. In the previous chapter, the process of data collection and analysis undertaken in the thesis was described. In this chapter and the next, the results that emerged from the analysis will be presented and discussed. In the current chapter, I will present the results relating to participants' awareness of OER (RQ1), their attitudes toward the resources (RQ2), the benefits they derive from using the resources, and the challenges they face in doing so (RQ3). After the presentation of each section of the results (organized around the research questions), discussions will be undertaken to situate the results within current literature with a view to highlighting the implications.

On the whole, a total of 278 initial codes and 11 focused codes were developed from the analysis of the qualitative data. The focused codes represent the core categories. Table 12 shows a breakdown of the number of initial codes and the core categories that emerged from this thesis.

Table 12: Breakdown of initial and focused codes

Research Questions	Focused Codes (Core Categories)	Number of Initial Codes
How aware about OER are students?	• Having limited awareness of the OER concept	32
	• Having inadequate awareness of OER repositories	29
What are students' attitudes toward OER	• Having positive impression of OER	31
	• Ambivalence	14
What benefits do students derive from using OER	• Complementing formal learning	66
	• Ubiquitous access	15
	• Networking	12
	• economizing	11
	• Optionality	6
What kinds of challenges do students face in using OER?	• Dealing with the cost of access	26
	• Dealing with disruptions	22
	• Lacking sufficient skill for access	14

Table 12 also shows the research questions examined in this thesis. The semi-structured

interviews conducted in this thesis were framed around these questions. The focused

codes in the table represent the core categories that emerged from the analysis of the

interview transcripts (see Section 3.6.2 for the definitions of the core categories). On the whole, four main results, as summarized below, emerged from the results presented in this chapter:

- Students overall awareness of OER is limited.

- In general, students have positive attitudes toward OER but are also ambivalent about the negative effects of the resources on learning practices.

- Students receive several benefits from using OER, particularly as a complement to formal academic learning.

- There are several challenging issues that disrupt participants' use of OER.

In the sections that follow, these results will be further developed.

4.2   How aware of OER are students?

As the use of digital learning resources continues to expand, including OER, and their relevance is recognized by academic institutions and educators, it is essential to understand how much students, particularly those at institutions of higher education in developing countries, are aware of the resources. According to the "Oxford Pocket Dictionary of Current English" (2009), awareness means to be concerned and well-informed about a particular situation or development or to have knowledge or perception of a situation or fact. In other words, to be *aware* means to be knowledgeable about something through one's own perception or through information received from others. Basically, awareness in this thesis is used to mean having knowledge of something by being informed about it. Understanding students' awareness of OER is important for

understanding students' use of the resources. It is also important for discerning specific

issues regarding the use of OER, including accessibility, retrieval, and application.

Furthermore, by investigating how much awareness students have about OER, it may be

possible to recommend strategies for providing better student access to OER and other

digital learning resources.

The analysis of the qualitative data relating to students' awareness of OER

resulted in the development of 61 initial codes (see Table 12). It also resulted in the

development of two core categories: (a) having limited awareness of the OER concept

and (b) lacking adequate awareness of OER repositories. In the sections that follow, these

results will be developed further.

4.2.1 Student awareness of the OER concept

OER are digital learning materials with unique characteristics. They are intended to

mitigate the effects of copyright legislation on the use of educational resources; thus,

depending on the type of open license used in creating OER, they can be freely used,

modified, and disseminated by any user with access to the Internet (UNESCO, 2002; The

OECD, 2007; McGreal, 2013). The first core category that emerged from the analysis of

data relating to student awareness of OER reveals that participants were limited in their

awareness of the resources. This limit of awareness consists of two issues. The first

relates to familiarity with the term *open educational resources* or OER while the second

relates to the knowledge of OER properties or their unique attributes.

Only 2 of the research participants reported that they were familiar with the term

OER or open educational resources. The responses of the majority showed they had not

heard of the term or its acronym. This is somewhat expected given that, as Allen and

Seaman (2009) noted, most educators are unfamiliar with the term as well. Nevertheless,

this lack of familiarity with the term OER speaks significantly to the limitedness of

students' awareness of OER. The responses below succinctly capture this point:

> Okay. If you want to tag it with the name open educational resources, I might say
> I don't know much of what it is. Now that you've explained it a bit to me, I will
> say I use it, but not that much. But at least, most times [I use the resources] for
> assignments and things like that… researches basically [sic] (IP10).

> The term open educational resources, I don't seem to get it actually. Try and
> break it down (IP8).

> Of course! I didn't know what it meant but reading through the questionnaire it
> was easy... I do not really know much about it, but because of your questionnaire
> I was able to understand better (IP17).

It is interesting to note that, as the responses above suggest, even though most of the

research participants did not initially recognize the term open educational resources or its

acronym OER, they were all aware of what the materials represent, at least in some sense,

after reading through the survey or informational letter. Many also reported that they

recognized the resources after I provided them with a description or examples of the

resources (all participants were particularly familiar with Wikipedia, and many with MIT

open courseware). It is also interesting to note that once participants recognized the

resources, almost all of them reported that they had previously used the resources in some

form.

In addition to being unfamiliar with the OER term, participants were also limited in their awareness of the properties of OER. In general, most of the research participants were only aware of a few properties of OER, namely: that they are digital resources used to support academic learning, and that they are freely available online. However, being digital and freely accessible online are not unique to OER; such qualities are also attributable to many online resources that are not considered open resources. For example, many blog articles, e-books, news articles, pedagogical materials, and even peer-reviewed academic articles are freely accessible online but are not *open* in the true sense of the term as applied in this work. Being open entails that OER are sharable, remixable, modifiable, and reusable, in addition to being freely available online and supportive of education and learning. On the whole, it is clear that participants were not fully aware of the range of unique attributes that OER possess.

As the above points suggest, participants' limited awareness of OER was evident from their conflation of OER with other online learning resources. Even though some participants correctly identified OER as freely accessible digital learning resources, it seemed clear that they did not know what makes OER different from other digital learning materials. This response by IP11 echoes this point succinctly:

> [OER] simply means materials on the Internet. Materials on the net for educational purposes. Open resources [are resources] you can see on the Internet, like Wikipedia [sic] (IP11).

Clearly, participant IP11 believed OER are any kind of material found on the Internet that can be used for educational purposes. Although like many other participants, IP11

correctly recognized Wikipedia as an OER repository, he erroneously implied that any educational material found online amounted to a type of OER. Consider these other similar statements:

> I know they [OER] are basically learning materials- sometimes instructional materials- you find online, at school, [and] in the library. And generally they are things that we can use to boost our learning processes in school to help us become better [sic] (IP15).

> ...kind of like an avenue or should I say a means of making learning faster for students. There are certain times they [teachers] refer you to textbooks, and when you get to [the] textbooks, you will not understand it, but with this… it will enlighten you more, [and] it will open your brain... [sic] (IP7).

As demonstrated in the responses above, participants described OER as "instructional materials," that could be used to "boost" learning for all users; however, as I previously noted, this could be said of many other digital learning resources. Essentially, when participants were asked how much they were aware of OER, most of them did not describe the resources in terms of their unique properties or attributes, but rather in terms of their utility. Thus, it is plausible to assume that they were limited in their awareness of the concept. On the whole, participants in this research were clearly aware of the educational value of OER, but they were mostly unable to distinguish OER from other digital resources valuable to education and learning.

4.2.2 Knowledge of OER repositories

Other than the finding that participants were limited in their awareness of the OER concept, the other key result from the analysis of data relating to student awareness of OER is that most of the research participants were limited in their awareness of specific OER repositories. Other than Wikipedia, 18 of the 20 interview participants could not identify any of the, perhaps, hundreds of OER repositories available online. The knowledge of OER repositories may be important to students for two main reasons: (a) it may reduce the amount of time spent in finding and retrieving OER, and (b) it may foster access to multiple resources.

First, over the years, starting with MIT open courseware in the early 2000s, scores of high-quality OER repositories have been developed, and students can save a considerable amount of online navigation time if they are able to access the repositories directly. This is important for students at institutions of higher education, particularly those at the University of Lagos, because the less time spent online looking for learning resources, the less the cost of online access and of education. When asked how they find OER, many participants reported encountering the resources by chance, through browsing of search engine results, as the responses below indicate:

It was through a search engine. That is Google, to be precise. I just searched, and I was linked to a lot of them [OER] (IP3).

No, I can't remember. I think it was Google, and Google took me to the Website (IP11).

The use of search engines, particularly Google, for finding academic learning and other type of information resources is commonplace (Rieger, 2009; Neal, Campbell, Williams, Liu, & Nussbaumer, 2011). As Rieger (2009) acknowledged, "Google has become the search interface of choice for many faculty and students to address their information needs, far exceeding their use of library catalogs or other online citation databases" (p. 1). This is mainly because search engines offer easy and effective access to a significant amount of learning resources. Like any other digital resource, users are able to find access to open resources online through search engines. However, for many users, finding quality relevant materials through search engines is difficult and time-consuming. Consider the response below:

> The major challenge is when you don't get the specific information you need (IP3).

Nonetheless, for many participants in this research, search engines represented the only channel of access to OER because they were not aware of the many OER repositories available online. Although, as participants' responses suggested, search engines are useful channels to OER access; yet, they may not represent the most efficient means of accessing the resources, particularly when time saving is essential.

Second, the knowledge of multiple OER repositories provides users with viable means of evaluating and acquiring open learning materials. As I mentioned earlier, there are many OER repositories available online. It is important for users to be aware of the licensing status of the resources, as well as their provenance. OER provenance relates to the reputation of the creators of the materials, as well as the quality of the resources. The

overall lack of adequate knowledge about OER may be making it difficult for the

participants in this research to effectively assess and access OER required for completing

academic tasks.

It is pertinent to note that most participants reported using Wikipedia to find OER

articles. However, Wikipedia is just one of, perhaps, hundreds of OER repositories

available online. Moreover, most Wikipedia articles are considered by some educators to

be deficient, inaccurate, and unsuitable for students as learning resources (Azer, 2015).

Evidently, because most participants were not aware of specific OER repositories (except

Wikipedia), they used search engines and hoped to obtain useful digital learning

resources. In other words, they could not locate OER by going directly to relevant OER

sites.

Participants did not report that they directly searched for OER in search engines.

Instead, their responses suggest that they were merely looking for useful digital materials

for completing educational tasks when they encountered OER. This speaks to the fact that

they were limited in their awareness of the resources. On the whole, awareness of OER

repositories, such as MIT OCW, Coursera, Open Learning Initiative, and OER Africa,

will undoubtedly make finding OER easier. However, most of the research participants'

responses to how they found OER showed that they did not have sufficient awareness of

OER repositories to support easy and effective access to the resources. The lack of

sufficient awareness of OER repositories among students may be attributable to the

limitedness of their awareness of the concept of the resources. Given that participants

were not adequately aware of the distinguishing properties of OER, it is reasonable to

assume that they would not be aware of the specific places on the Web to find the

resources. Participants' awareness of OER in general, is connected to their attitudes toward the resources. This notion will be furthered explored in the presentation of the results relating to participants' attitudes toward OER in subsequent sections.

4.2.3 Discussion of student awareness of OER

As I previously mentioned, awareness in this thesis generally means having knowledge of something by being informed about it. In this thesis, OER awareness essentially equates to being knowledgeable about OER, as well as being familiar with the key attributes of the resources. It also entails the knowledge of online OER repositories. Overall, the findings from this thesis showed that many participants were limited in their awareness of OER. In other words, they were not familiar with the concept of OER nor were they adequately informed about the distinguishing characteristics of the resources. This is generally in line with the current understanding on OER awareness, according to researchers in the area (The OECD, 2007; Yuan, MacNeill, & Wilbert, 2008; Rolfe, 2012).

From the beginning stages of the development of OER, it has been recognized that awareness of the resources is crucial to its growth, adoption, and use (The OECD, 2007; The OECD, 2008). Yuan et al. (2008) suggested that there was a low level of OER awareness among teachers and researchers, resulting in limited dissemination of the resources. Rolfe (2012) explored the level of awareness among institutional staff in a United Kingdom university and found that there was generally a low level of awareness among faculty and educators. Although existing studies on OER awareness have focused on institutional staff and faculty, the results obtained were not different from the ones in this thesis, which showed that participants were unaware of the term OER in spite of

regularly using the resources to support academic work. This is reasonable since educators, who are expected to be *guides* in knowledge acquisition, are also deficient in their own knowledge of the resources. In the United States, a survey report by Babson Research group showed that even though faculty appreciate the notion of OER, "between two-thirds and three-quarters of all faculty classify themselves as unaware on OER" (Allen & Seaman, 2014, p. 2). The issue of OER awareness among educators is also the focus of the study conducted by D'Antoni (2008). According to the author, OER awareness emerged, "as the main priorities for promoting the advancement of the OER movement" (2008, p. 11). It is clear from these results as well as from the ones in this thesis that there is a need for the promotion of OER awareness among students, particularly at University of Lagos.

Significantly, this thesis revealed that awareness was not necessary for the adoption and use of OER. Many participants reported that even though they were not specifically aware of the concept of OER, they had indeed used the resources in the past. This result is also supported by the findings in the work of Allen and Seaman (2014). The authors also found:

> Awareness of OER is not a requirement for adoption of OER. More faculty are using OER than report that they were aware of the term OER. Resource adoption decisions are driven by a wide variety of factors, with the efficacy of the material being cited most often. These decisions are often made without any awareness of the specific licensing of the material, or its OER status (Allen & Seaman, 2014, p. 2).

Like educators, students' lack of OER awareness does not necessarily prevent them from using the resources. However, it hinders their adoption and efficient use of the resources. In this thesis, for instance, it was revealed that not only were participants not familiar with the term *open educational resources* or its acronym OER, they were also mostly unaware of OER online repositories. They mostly relied on using search engines, particularly Google, to locate OER, often serendipitously. This means that participants' searches for OER were not usually intentional and direct. They often set out to initially find digital learning materials, and then ended up encountering relevant OER serendipitously.

Serendipitous encounters with digital resources have been studied by several scholars (Foster & Ford, 2003; Quan-Haase & Martin, 2011; Rubin, Burkell, & Quan-Haase, 2011). The act of *noticing* is important in serendipitous encounters, particularly in online platforms (Rubin, Burkell, & Quan-Haase, 2011). For participants who encountered OER, noticing may not necessarily have resulted from the recognition of the resources by their unique attributes, but from perceived relevance of the resources to their topic of interest. In other words, when participants encountered OER, they did not do so because they were aware of the attached open license, indicating that the material is OER, but rather because they found the resources useful. In many cases, students are not necessarily aware that the materials are open. Thus, in most cases, the use of OER is merely driven by the desire to find useful resources to complete educational tasks and nothing else.

Since participants did not necessarily search for OER because they are open, it may seem that awareness of OER is irrelevant. It may be argued that the important thing

is for the students to be able to find useful digital materials, irrespective of their licensing designation. However, not knowing the copyright status of a material being used could result in serious copyright violation, even when it is unintentional. For example, while all digital materials are easy to disseminate and share, only open materials, with the right licensing designation, can be disseminated without incurring potential legal consequences. As Czerniewicz (2015) suggested, many students unintentionally access learning resources online illegally. In addition, students and other users tend to *mix, modify, and mash* digital learning resources. Such actions could be potential copyright violations if the resources are not appropriately licensed. It is important for students to possess adequate OER awareness, as well as be able to interpret open licensing designations, to avoid misuse of the resources. The knowledge of OER attributes and specific licensing will facilitate proper understanding of the limits of the use of open digital materials.

There are scores of well-stocked open resource repositories, from MIT OCW to OER Africa, where in most cases, students can find sufficient materials for completing many academic tasks. However, as this thesis revealed, many participants were not aware of such repositories. Instead, they relied on the *hit and miss* use of search engines to locate materials. Awareness of OER repositories will not only enable students to find relevant open resources, but it will also enable them to save time, money, and effort. As the thesis revealed, for many participants, it is expensive to be online, and the more time students spend accessing online materials, the higher the cost of access. It is reasonable to assume that if students are aware of specific OER repositories, they can directly access them

instead of browsing search engine results and expending more *network data* than necessary.

Despite the considerable effort by proponents of OER, there continues to be a lack of awareness about OER. Although this thesis has only revealed the limitedness of OER awareness among students who participated in this research, existing OER literature, as has been referenced earlier, have shown that many educators also lack sufficient awareness of the resources. Certainly, the lack of OER awareness among educators may be partly responsible for the lack of awareness among students. Educators cannot incorporate open resources into their teaching curriculum or recommend the resources to their students if they are not familiar with the resources. Perhaps it is this realization that has prompted the direction of most OER awareness initiatives toward educators. In SSA, there have been several initiatives directed at creating awareness about OER, as well as encouraging the use of the resources among educators (OER Africa, 2014). While there continues to be a need for such initiatives, there is also a need to set up initiatives that facilitate students' awareness of OER. Even though most of the participants in this research lacked sufficient knowledge of OER to ensure efficient use (i.e. access to high-quality OER in the shortest amount of time) of the resources, many of them engaged in the use of OER, particularly for completing educational tasks. Needless to say; with proper knowledge of OER, including their online repositories; the students' use of the resources will tremendously increase and become more efficient. This conclusion is represented by Proposition 1 below:

Proposition 1: *The students who participated in this research had limited awareness of OER as well as inadequate knowledge of their online repositories; thus, they were unable to adopt and make efficient use of the resources for completing educational tasks.*

4.3   What are students' attitudes toward OER?

This section presents the results of the analysis of data relating to students' attitudes toward OER. Attitude is used in this thesis to refer to the way an individual thinks and feels about certain phenomena, which may influence his or her behavior toward those phenomena. The investigation of attitude entails cognitive, affective, and behavioral dimensions (Vaughan & Hogg, 1995; Fazion & Olson, 2003). As Vaughan and Hogg (1995) pointed out, attitude relates to the evaluation (positive or negative) of a person, object, or an issue. The understanding of the notion of attitude is essential to understanding people's information behaviors concerning certain phenomena, such as OER. Ultimately, the objective of examining students' attitudes toward OER in this thesis is the determination of their cognitive and affective responses to OER, and how such responses affect their decisions to use the resources. Cognitive and affective responses represent the kinds of responses elicited by the way one thinks and feels about something (Fazio & Olson, 2003). To determine students' attitudes toward OER in this thesis, participants were asked what they thought of the resources in general. After analyzing the related responses, two core categories emerged: "having a positive impression of OER" and "ambivalence." These results are further elaborated below.

4.3.1 Positive impressions of OER

Attitude entails mental predisposition to favor or disfavor a phenomenon (Fazio & Olson, 2003). It involves the imputation of positive or negative evaluation about an entity. In this thesis, the overall manner of participants' descriptions of how they feel, think, and behave toward OER represented a positive impression of the resources. Essentially, all research participants were positively impressed with OER. IP9's statement below, a response to questions relating to his attitude toward OER, encapsulates this point insightfully:

> Oh very good, very excellent! And to a large extent, it has made things easier for the youths in this generation, particularly in this 21st century. Come to think of it, in those years, I am talking about 20-30 years when our lecturers and professors were still in school, they have to go to the library to do extra studies, they have to trace books, [and] they have to spend a whole lot of time in the library and resource centers looking for materials. Right now things have become so easy, particularly because we live in a globalized world, a world where you now see the triumph and ascendency of Western liberal ideology. Someone can just as well go online… In fact, it has been made so easy that even as far as your phone, you can Google it out and everything. So I feel to a large extent that it is very good, and it is a welcome development. I want to thank those who were instrumental as to coming up with the idea. They really made things much easy for you (IP9).

As the statement above shows, participants' impressions of OER were a function of the expected utility of the resources. The expected utility of OER is basically the subjective value of the resources as identified by users (i.e., what an individual user gains from

using the resources). Participants' attitudes toward OER were strongly related to their

perceived usefulness of the resources. This finding is supported by some of the principles

of expected utility theory. According to Morgin (1977), the theory, in a basic sense,

suggests that the decision to make use of certain resources is determined by their

expected usefulness. Many participants reported that they liked OER not only because

they have made the process of learning easier, but also because they can be easily

accessed online through various devices, including mobile phones, which are very

popular among students. The excerpts below clearly show participants' positive

impressions of OER:

> It is very good… (IP3).

> It is very nice and very educative (IP4).

> Very good idea (IP5).

> A very good thing! (IP9).

> It is good (IP10).

> ...They are very, very good… (IP12).

> I think it is perfect (IP13).

> I think it is a good idea… (IP18).

Clearly, participants had positive impressions of OER. Other than the ease of

access, as well as making the process of learning easier, many participants mentioned

other benefits as the reasons for their positive attitudes toward OER. IP16, for example,

said he thinks the resources are particularly required to support teaching in Nigerian schools:

> Generally, I think it is more beneficial to us as Nigerians because of how our learning is here. I don't think the learning here is sufficient. That's why we are really going extra. I think it will be better if learning in our classrooms are improved to the maximum capacity so we won't have over reliance on OER. It all starts from our classrooms… (IP16).

In sum, it is evident that the perceived utility of OER was instrumental in participants' attitudes toward the resources. In essence, participants liked to use OER because they offer certain benefits. Having said that, even though most participants expressed appreciation for the existence of the resources and the opportunities they provide, some of them were ambivalent about the effects of the resources on learning behaviors.

4.3.2 Ambivalence

The other main category that emerged from the analysis of data relating to students' attitudes toward OER is *ambivalence*. Even though all the interview participants acknowledged having positive impressions of OER, many of them also expressed concern over the use of the resources. I coded participants' statements that reflected such notions as "ambivalence." The statement below made by IP9 captures this notion thoroughly:

> ...So I feel to a large extent that it [OER] is very good, and it is a welcome development. I want to thank those who were instrumental as to coming up with

the idea. They really made things much easy for you. But the only disadvantage of it is that it has made a lot of students become very lazy. People don't want to go out there… to study the hard copies. In fact, a lot of people don't go to the library anymore. All they do is just to go online, download, print it out, and read it on the convenience of their beds. After all, these materials are always available online. So I feel it has made a lot of students very lazy, and they are so much dependent on the computer… dependent on the Internet. As a matter of fact, in the course of their trying to download, they actually diversify into Facebooking and all that. So it actually whiles away time… [sic] (IP9).

Evidently, IP9 was of the opinion that while having access to OER is a good idea, the resources have also engendered "lazy" learning behavior among students. The participant further explained that because of the ease with which students can access OER, they no longer want to use the library and other print materials for deeper engagement with the subject of study. Whether this concern is warranted or not, it shows that some participants were ambivalent about the effects of OER on education and on learning practices. Similarly, IP9 also mentioned that students become distracted, as well as engage in "time wasting" when attempting to use OER because they are confronted with several online materials. IP12 agreed that the availability of OER and other digital learning materials was making it difficult for students to engage in deeper research beyond online resources.

The other cause of participants' ambivalence about OER has to do with the credibility of the resources. For example, IP12 pointed out:

> ... But it's only that sometimes the sources might not really be accurate because
>
> they can be edited… (IP2).

The concern alluded to in the statement above is related to a fundamental attribute of OER, which is that they are modifiable. Some participants were concerned that because the materials were modifiable, their credibility could be suspect. They were worried that OER repositories would become saturated with materials created by what IP7 referred to as "amateurs." The same concern was raised by respondents in Xiao and Askin's (2014) study on the use of Wikipedia for academic publishing. Participants in the study were worried that the platform could enable "non-experts" to edit published academic work (p. 342). In the quote below, IP14 questioned the accuracy of the materials from certain OER sites, such as Wikipedia, even though she agreed that the resources could be very helpful:

> How do I explain it? OER is very, very helpful, depending on what I am looking
>
> for. But the problem with it… why I don't really like it is that it is mostly written
>
> by people, students that are not really learned about it [the subjects]. They just
>
> assume that they know. It is not really the main facts we get from… Wikipedia
>
> OER and the rest [sic] (IP14).

Some participants also raised issues with the over-reliance on Wikipedia. As IP12 pointed out, students' over-dependence on popular OER platforms such as Wikipedia could restrict access to a diversity of ideas obtainable from other OER repositories. Consider the following response:

> ...But these OER, most of them are common especially Wikipedia. And that's
>
> where most students get it [learning materials] from. So most times, it will now be

like you guys copied each other. So most times, the research is not like really

deep... Somehow it's a problem because... if they give an assignment, most people

don't even bother to use different sources. So most people use Wikipedia, and

everybody will be on the same thing [sic] (IP12).

Apparently, the over-reliance on a single OER repository undermines the very

essence of the creation of the resources, which is to provide diversity and multiplicity of

channels to learning resources. However, it is clear that many participants' sources of

ambivalence about OER mostly resulted from their limited awareness of the resources.

For example, better awareness of the availability of OER repositories will curb the

dependence on only one or a few. Regardless, participants' concerns were real, and it

affected their attitude toward the value and use of OER. On the whole, there was a sense

among participants that the benefits of OER outweigh whatever problems may come with

their use. This sense of ambivalent attitude toward OER is expressly captured by IP9's

statement:

It [OER] has both a good and side effects. But the very good aspect of it actually

outweighs the negative aspects (IP9).

To summarize this section, students' attitudes toward OER influence their

behavior toward the resources. The results of this thesis indicate that in general

participants had a positive impression of OER, but they were ambivalent about the effects

of the resources on the way students learn. They were worried that in spite of the

usefulness of OER in supporting learning, the use of the resources may breed lazy

tendencies among users. Participants believed that students are now reluctant to consult

print materials in the libraries because of the ease with which they can access open content online. They were also concerned that some of the available OER that students often use may be lacking in acceptable quality.

4.3.3 Discussion of students' attitudes toward OER

The students who participated in this research generally had positive impressions of OER. That is one of the conclusions from the analysis of data in the thesis. Participants largely agreed that the existence of OER is good for learning. They used such phrases as "fantastic," "very good," and "perfect" to describe the idea of OER. Attitudinal disposition is an important consideration in discussing technological adoption and use. Past studies have shown that a relationship exists between attitudes toward electronic resources and the use of such resources (Ray & Day, 1998; Sivathaasan, Murugathas, & Chandrasekar, 2014; Ukachi, Onuoha, & Nwachukwu, 2014). Ordinarily, positive attitudes toward a technology portend its adoption and application. This means that students' positive attitudes toward OER are translatable to the actual adoption and use of the resources. This is because all of the participants who reported having a favorable impression of the resources also confirmed that they have used the resources to varying degrees. Users are more inclined to use certain resources if they have a favorable evaluation of such resources.

Students at institutions of higher education are highly familiar with digital resources and are, therefore, more likely to encounter and use the resources. Essentially, students' positive attitudes toward OER and other electronic learning resources are a consequence of their continual access and use of the resources. This means that positive attitudes do not only portend behavioral inclination; behavioral tendencies may also be

influenced by attitude. This idea is supported by the principles of social information

processing theory (Johnsrud, Harada, & Tabata, 2005). Citing Salancik and Pfeffer

(1978), Johnsrud, Harada, and Tabata (2005) noted that according to social information

processing theory, "social information influences individual attitudes and behaviors and

once individuals have behaviorally committed to a situation, they tend to develop

attitudes consistent with their commitment" (p. 3). In other words, participants' positive

attitudes toward OER may be the result of their committed use of digital resources.

Furthermore, even though participants reported favorable attitudes toward OER in this

thesis, because they, in many cases, equated OER with other digital learning resources, it

is not clear if their attitudinal predisposition is toward OER specifically, or toward digital

learning resources in general.

According to Sugar, Crawley, and Fine (2004), the adoption of technology is

influenced by the adopter's attitude toward that technology, which is usually shaped by

"specific underlying personal beliefs about the consequences of adoption" (p. 201).

Basically, an individual's attitude toward technology is influenced by his or her belief in

the usefulness of the technology. In this thesis, participants' favorable evaluations of

OER was usually followed with mention of the benefits they derive from using the

resources. When participants spoke of their impressions of OER with regard to learning,

it was always within the context of the beneficial application of the resources in solving

academic tasks. This clearly means that the students like OER because they are beneficial

to the process of learning. Although this thesis did not examine the relationship between

derivable (perceived) benefit and attitudinal strength, it seems that student's attitudes

toward OER are strengthened by the benefits they derive from using the resources. The

point here is that attitude predisposes behavior. People with a favorable attitude toward a certain phenomenon are more likely to exhibit behavioral tendencies regarding that phenomenon. Put another way, using technology as an example, people with a positive attitude toward certain technology tend to use that technology because they expect to receive certain benefit.

Having said that, it is pertinent to recognize that attitude is a personal disposition. Even though external factors might have some role in attitude formation, an individual's personal experience and beliefs are important progenitors of his or her attitude. As Sugar, Crawley, and Fine (2004) posited, attitude toward a behavior reflects an individual's personal disposition toward engaging in that behavior. The process is mediated by the individual's assessment of personal beliefs regarding the target behavior's effectiveness in creating favorable and unfavorable outcomes. Precisely, attitude is an important predictor of behavioral intention. Consequently, students' positive attitudes toward OER are indicative of their intentions or willingness to use the resources. While this may be the case, attitude is also affected by awareness. Attitude toward a phenomenon can be influenced by an individual's knowledge of that phenomenon. Of course, attitude formation does not require adequate awareness; inadequate information or misinformation could also result in attitude formation. However, if it is taken for granted that some knowledge is required for attitudinal predisposition, then awareness is an important construct of consideration in the discussion of attitude formation. In this thesis, many participants' responses showed that they lacked adequate awareness of OER. However, they possessed some level of understanding of the resources, particularly the usefulness of the resources in supporting learning activities. Presumably, such

knowledge, albeit limited, explains their positive impression of the resources. An important area of future research is the study of the relationship between students' level of OER awareness and the strength of their attitudes toward the resources. This is important because as revealed in this thesis, despite having a positive disposition toward OER, many participants were concerned about using the resources. They exhibited attitudinal ambivalence toward the resources.

So far, it is clear that attitude toward a phenomenon, particularly a technological one, is influenced by the expected benefits of the technology. The participants in this research were appreciative of the ease with which they could access and apply OER. The students' positive impressions of OER were related to their belief in the usefulness of the resources to complete academic tasks. This assessment is supported by the work of Kim, Chun, and Song (2009). According to the authors, attitude toward technology is influenced by the "perceived usefulness and perceived ease of use" of that technology. As Kim, Chun, and Song (2009) noted, the relationship between individual psychological states, such as beliefs, attitudes, and behavioral intention, and actual technology usage is explained by the technology acceptance model. Basically, the model suggests that the acceptability of a technology is determined by its perceived usefulness and perceived ease of use. Precisely, an individual's perceived usefulness will affect his or her attitude, which in turn will affect his or her behavior regarding the use of the technology. Although there is some controversy regarding the role of attitude in explaining behavioral intention (see Venkatesh et al., [2003, p. 447] for the theorization that "attitude toward using technology" is not a direct determinants of intention), it is clear that this thesis'

participants' attitudes toward OER are in some way predictive of their actual usage of the resources.

Alternatively, it is also clear that the use of technology also strengthens attitude toward that technology. It seems that students' frequent exposure to digital learning resources, including OER, have a strengthening effect on their attitudes toward the resources. This is because the regularity of use (or experience) of technology may perpetuate a greater amount of information or knowledge about the technology. That is, the more a person uses a system, the more familiar he or she becomes with that system, and the easier his or her use of the system will become. Presumably, the consistency in the application of OER not only strengthens awareness or knowledge of the resources, as discussed earlier, it also strengthens attitude toward the resources. The repeated use of OER may engender better consideration of the resources, as well as help to find shorter routes of executing commands in the system. In the end, as Kim, Chun, and Song (2009) would agree, this could create a stronger attitude toward performing behavior that is persistent and predictive. The core of the following point is that attitude formed through experience will favor greater use. Students will be more confident about the expected benefits of OER as well as their application of the resources if given the opportunity to use the resources consistently.

Ambivalence about the role of OER

Attitudinal ambivalence refers to the degree to which the object of an attitude is evaluated positively and negatively at the same time (Jonas, Broemer, & Diehl, 2000). It also speaks to the strength of the attitude. As Kim, Chun, and Song (2009) noted, attitude

affects a person's behaviors by filtering information and shaping his or her perception. The strength of a person's attitude is important because it determines the resilience of commitment. For example, an individual who holds a strongly favorable attitude toward using a certain technology may consistently use the technology, irrespective of existing *challenges*, but an individual with a weak favorable attitude toward using technology may be easily persuaded from adopting and using the technology (Kim, Chun, & Song, 2009). In this thesis, even though most participants reported a positive impression of OER, many seemed to be concerned about the possible negative effects of the resources on students' learning behaviors. Such responses in which participants simultaneously indicated positive and negative evaluation of OER were coded under the "ambivalence" core category. This means that some students possess an ambivalent attitudinal disposition toward OER. In this thesis, ambivalent attitude is measured by the degree to which participants provided conflicting evaluating opinions on OER. Many participants in the thesis used such phrases as "making students lazy" and "distraction" to describe the effects of OER on students' learning behaviors, having previously stated the positive attributes of the resources. The "ambivalence" core category basically reflects the notion that even though study participants liked to use OER, they were worried about the unintended negative effects from the use of the resources to support academic learning activities. It is unclear how much (and if) such concerns affected their use of the resources. Nevertheless, even though this thesis did not measure the strength of students' attitudes toward OER, it is presumable that any form of negative evaluation is a detraction from the strength of their positive impressions of the resources. Consequently, for some students, the adoption and continuing use of OER may be hindered.

Ambivalence could result from a myriad of sources, including the level of an individual's knowledge about the phenomenon of interest. Notably, attitudinal ambivalence may result from less than complete understanding of a phenomenon. In this thesis, some participants expressed concern over the inadequacy of relevant open resources, even though they appreciate using the resources. While there may be a valid argument for the continuous creation of OER, as revealed in the thesis, many participants were not aware of the many OER repositories currently available online. In most cases, they were only aware of one or a few OER repositories, thus, suggesting that their evaluation of the resources may be based on insufficient knowledge. Similarly, the concern over being distracted online can be reduced or eliminated if students are aware of the many useful OER repositories. Instead of navigating search engine results from, sometimes, poorly constructed key search terms, students can go straight to OER online repositories, thereby limiting encounters with irrelevant materials that may cause distractions.

On the whole, it is logical to propose that there is a relationship between participants' awareness of OER and their attitudes toward the resources. Participants' ambivalent evaluations of OER seemed to emanate from poor knowledge of the resources. Arguably, students' use of OER is affected not only by their awareness but also by their attitudes toward the resources. The points of this section are represented by Proposition 2:

Proposition 2. *The students who participated in this research were positively impressed with OER. However, their limited knowledge of the resources engendered attitudinal ambivalence about the effects of the resources on students' learning practices.*

4.4 What benefits do students derive from using OER?

One of the main areas of focus in this thesis is the examination of the benefits participants

derived from using OER. The current section presents the findings from the analysis of

the related data. It is well established that OER present many benefits to users,

particularly within the context of formal education; however, as the literature review in

Chapter 2 reveals, many of the discussions about the benefits of OER have been focused

on educators and educational institutions (UNESCO, 2002; The OECD, 2007).

Specifically, OER have been determined to have important roles in the effective delivery

of many instructional and pedagogical initiatives (UNESCO, 2002). Alternatively, the

benefits students, particularly those at institutions of higher education in SSA, including

Nigeria, derive from using the resources have not been completely made clear, at least

through empirical evidence. In this thesis, RQ3 was specifically designed to determine

the benefits students derived from using OER. All 20 participants responded to questions

inquiring about the benefits of using the resources. In analyzing the data, approximately

110 initial codes and 5 core categories were developed. The core categories are (a)

complementing formal learning, (b) ubiquitous access, (c) networking, (d) economizing,

and (e) optionality. The core categories will be further developed in the following

sections.

4.4.1 Complementing formal learning

The responses of all 20 interview participants showed that OER had mostly a

complementary role in their formal academic learning. This finding is not a surprise for

one main reason: teachers are still mostly limited in their awareness of OER (Allen &

Seaman, 2014), and as such, are a lot less likely to assign open materials as a part of

formal syllabi. Thus, students' uses of OER are mostly independent, and not as a part of formal school curricula. Essentially, when students use open materials, they do so to supplement or complement formally assigned learning materials. The key point of interest here is not only to determine whether OER complement the overall process of learning for students, but also to determine the specific ways that the resources are complementary. The research participants reported that OER complement their learning in different ways, including in completing assigned academic tasks (e.g., through engagement in deeper research, fostering of unique perspectives, and staying current on topics of interest), as well as in making the process of learning easier and faster (e.g., through the provision of additional tutorials).

The first complementary role of OER presented here is their use in the completion of assigned academic tasks. Many participants in this research reported using OER to complete certain academic tasks. Naturally, when students are faced with important academic assignments, such as examinations and essay writing, they are likely to consider available channels of relevant information. The growing number of OER, as well as the ease of access to the resources, make it likely that students would consider open materials for additional knowledge when undertaking such academic tasks. Consider the following participants' responses on the specific ways participants used OER:

> [I used OER] when I was studying for my JAMB [Joint Admission and Matriculation Board is a college entrance examination in Nigeria]...Yes, I have gained a lot from it [OER]. Some of the exams I put in, I passed; and it's because I went online… (IP1).

I used it [OER] when I was trying to face an international exam (IP8).

It depends… [I use OER] When I am writing an essay, before an exam, and when I am reading (IP2).

I used it [OER] for getting information… compiled for my final year project...It's basically [used for] assignments and projects or things related to that; [as well as] when you have to write on something [essay topics]. But in my own case, it was for assignments and projects (IP3).

I used it [OER] for research, assignments, and tests (IP5).

… at times when there is a need for you to do extra research, you have assignments, you have projects… that's when I am forced to use the open educational resources…[sic] (IP9).

...I will say I use it [OER], [but] not that much, not that much. But at least, most times, for assignments and… [for conducting] researches basically [sic] (IP10).

As the responses above indicate, many participants said they used OER to prepare for (and complete) different academic tasks. Students normally seek additional learning materials when undertaking certain academic tasks, particularly if they want to improve their chances of success. Although the use of OER may not necessarily entail deficiency in the quality of formally assigned materials, some participants did suggest that they used OER because the learning resources they received from their formal classes needed to be supplemented. IP7 and IP16 echoed this notion when they said:

Sometimes I am not satisfied with the textbooks and the things they teach so I feel like for me to be the best which I aim to be, I need to go wider, I need to go online [sic] (IP7).

I, personally… the way education is in Lagos, we are not really taught in-depth in classes. I don't really learn much in class because of my capacity and all. So I prefer to learn by myself with laptop and online resources, [such as] MIT open courseware, and other video lectures (IP16).

As IP16 reported, participants used OER to complement assigned materials because of the need to engage in personalized learning, which may be impossible with the type of materials contained in the official syllabi. In other words, sometimes students' capacity to learn may not align with the pace and style of teaching in some formal classes; thus, the availability of resources such as OER becomes useful for making learning arrangements that reflect individual student's needs. Clearly, IP10 supported this notion by saying:

There are some things… may be lecturers wouldn't explain that much [properly], so when you go to the net, you check on these sites, or as you tag it, OER [sic] (IP10).

The other key academic task that participants reported using OER for is research. As IP10 alluded, the use of OER, for many students, stems from the need to conduct deeper research into topics of interest. Since OER provide additional channels to information, it stands to reason that access to the resources will provide a broader pool of academic resources for learning about any subject matter, as well as for presenting unique perspectives on assigned academic tasks. Consider the statements below:

It [OER] helps to go deep in research because in the environment [context] of school we have a lot of things to do… [Sic] (IP10).

…Because if you get more information that is different from other students, you get more marks from your lecturer. And then, you tend to be different from other people with your own different type of information [Sic] (IP2)

Related to academic research is the issue of *academic currency*. By academic currency, I mean access to the most up-to-date knowledge on academic topics. Since open resources are modifiable, they can be easily updated with new knowledge and information if necessary. The modifiable feature of open materials makes them more likely to be current, and beneficial to users who are looking for the latest information on issues that interest them. For many students, OER provide optional means of complementing formally assigned materials with the most up-to-date information. In this thesis, many participants reported that using OER to stay up-to-date on academic issues is especially beneficial to them. IP9 made this point by saying:

"... [OER] has also been instrumental, as it were, as I have updates and the current information as to some of those areas I really want to research into and all that… [sic] (IP9).

So far, the results I have presented in this subsection are focused on the complementary application of OER in the completion of assigned academic tasks. Participants in this research reported using OER to prepare for such assigned school tasks as terminal examinations, class tests and assessments, and essay writing. OER constitute

additional learning resources that enable students to conduct deeper research on topics of interest and be up-to-date on such topics.

The second complementary role of OER identified from the analysis is that they generally make the process of learning easier and faster. Such learning may be related to formally assigned tasks, but not necessarily. OER are generally used by students to gain a better grasp of ideas and concepts when required. For example, before or after being presented with those ideas in formal classes, a student who is struggling with the understanding of certain ideas may access certain OER, such as video lectures, to gain a better understanding of the issues. I refer to such learning practices as *surrogate tutoring*. It basically involves using additional channels of teaching, such as video lectures, podcasts of topical issues, and simulations to augment learning. In this thesis, many participants reported consulting certain OER to understand better specific topics or subjects that have not been clearly taught in formal classes, or that they have not fully mastered. Essentially, many participants seemed to perceive certain open materials as additional tutorial platforms for learning about specific topics about which they wish to be more knowledgeable. The following responses capture this point:

Not all courses can be taught in classes, and you can't get materials elsewhere. And you can't go and meet the people who are teaching in classes, [but] you can also get other tutors online [sic] (IP3).

... the lecturer can just come and talk, and you might not really understand, but when you go on the net, you take your time, you read through; video, you watch; audio, you listen; and you take your time, and you get what you want [sic] (IP11).

Evidently, participants benefited from being tutored with such OER materials as academic lecture videos, educational audio podcasts, and other online learning resources. Here is an example of a participant's response indicating use of OER to prepare for courses:

> According to my experience in the university, university is not only about doing with what you are being given in class. They call it university so you have to … in fact, things that are not pertaining to your course, you must know about it. That is university! … After being given the course outline, I go through the course outline. I go through it before the lecturer comes. The reason is for you to make research on your own so that by the time the lecturer comes in class, whatever the lecturer says is not going to be new to you; it will be familiar, and then you will be able to ask questions based on what you have read. What you have read before the lecture will be able to make you understand and ask questions. Even if the lecturer is going wrong, you will get to know that... [sic] (IP19).

Sometimes, there may be an actual shortage of access to assigned learning materials, thus, making the overall learning process tedious. Surely, having timely access to a variety of information and learning resources makes the process of learning easier and quicker. Many participants reported that the existence of OER, particularly as digital materials, makes access to learning materials faster and the learning process easier. They noted that sometimes assigned learning resources, such as textbooks are not always available or *sufficient*, and using OER becomes the only viable option. The quote below expresses this idea profoundly:

...Sometimes when you look for textbooks in the library, you cannot find them. Or let's assume that there are ten books in the library and before you get there, about ten students are already waiting, or maybe you might be number fifty; so it will take time. It may be that you have a test or a project to write on, but because of this [OER], it shortens your queue and your time, and saves more energy... (IP7).

As IP7 suggested, OER serve as alternative sources of learning materials when access to print resources at academic institutions is not possible. Consider the similarity of this notion to the ones expressed below:

...as I said, it has made things very much easier, so I don't have to go to the library to start searching for books and sweat and all that. I can just go online, download stuff, and at least, get a couple of the materials I need from the open media resources and all that… (IP9).

…It [OER] saves time. For my last semester, it was very helpful. We weren't able to complete our syllabus, so I was able to complete my syllabus with the online course lectures. It was very helpful (IP16).

For IP9 and IP16, like many other participants, there is no need for tedious trips to the library when one can easily find all required learning materials online. Irrespective of one's position on students' increasing use of online resources and their diminishing use of print materials from libraries, there is no denying the fact that digital platforms provide additional and faster means of obtaining learning materials.

In sum, participants in this research agreed that OER have an additional or complementary role in their overall learning endeavors. They reported that by providing alternative opportunities for up-to-date research, OER enable the completion of assigned academic tasks. In addition, given the, sometimes, difficult process of accessing formerly assigned learning materials, OER provide an easy and quick alternative for students looking for educational resources to complete many assigned academic tasks.

4.4.2 Ubiquitous access

One very important benefit of digitized learning resources is that they can be accessed ubiquitously, at least by people with access to Internet-enabled devices, such as mobile phones, electronic tablets, and computers. The opening up of learning resources facilitates the expansion of ubiquitous learning because, as McGreal (2012) opined, openness entails technological and legal flexibility in the use of open resources. Online open resources also entail spatial and temporal flexibility. According to McGreal, the open licensing of educational resources frees educators and students from concerns about how, when, where, and how "long the content, video, audio or application can be used" (p. 1). This anytime-anywhere access is reportedly beneficial to students who are looking for flexible options in the use of learning materials. OER are amenable to use in different devices, including mobile or stationary ones. The responses of more than half of the interview participants in this research showed that they liked the anytime-anywhere availability of OER. Many of them reported that they, mostly through their mobile phones, were able to access OER irrespective of time and place. IP3 was clear on this point in the statement below:

With the availability of Internet facility now, you can reach them [OER] anywhere. That's what it is... because of the ability to use it anywhere. Like I said, if I need to download any file or any material [I can], and I can transfer to any other device for easy access (IP3).

Some participants noted that even though online access is not always possible, they found ways of continuing the use of the materials, nonetheless. Consider how IP19 responded:

I can go through it [OER] at any convenient time since the country we are… [it] is not that you [we] have Internet 247… So once the network goes, I try to download as many as possible, and save it on my memory card so that anytime I need it, I [will] have access. And in order to have a backup, at times I do copy it to my laptop. If my phone gets any issue, my laptop will be there to help me out (IP19).

The complete ubiquity of access to learning resources is, of course, unrealistic for many students, particularly those in the region under investigation. Online access to learning resources is not possible at all times for a variety of reasons (e.g., the absence of Internet connection, the high cost of Internet subscription, and the high cost of electronic devices). However, for many students, there is continual access to the Internet, hence, the possibility of access to OER anytime and anywhere. For those with partial Internet access, OER can be downloaded when there is an Internet connection and then used offline at a later time, as IP19 reported in the statement above. Overall, the ability to use OER without spatial and temporal restrictions is beneficial to students.

4.4.3 Networking

The advent of open resources has brought about additional means of interaction among users. OER are particularly useful for academic interactions and peer collaborations. The open nature of OER entails that they can be disseminated freely among users of similar interest, irrespective of their location, thus, engendering opportunities for collaborative application of the resources for various projects. In many cases, open resources do not only facilitate interactions and collaborations among peers in local communities, such as classrooms, schools, or even neighborhoods. They also extend the possibilities of what Wellman et al. (2003) referred to as "networked individualism" (p. 3). Networked individualism relates to "the ways in which people connect, communicate, and exchange information" (Rainie & Wellman, 2012, p. 7). It relates to the connections that occur among people beyond their local communities to a broader globalized community, particularly through the use of online tools. While the availability of Internet connection is crucial for networked individuals, access to open materials reduces or removes the restrictions on the ability to share learning resources within the network and, therefore, pushes the limits of the idea of networked individualism. With open resources, the potential exists for sharing and using of educational resources collaboratively by students in disparate locations around the world.

In this thesis, the "networking" category was used to code responses indicating that using OER is beneficial because they enable participants to interact, connect, or collaborate with others. The responses of more than half of the interview participants showed that being able to freely share OER with friends and peers was important because

such practices stimulated academic interactions. Consider the following participants'

responses on how OER were beneficial:

[OER] helps us to interact with one another… (IP8).

...Like you could go surf the net, you can get more information about things, and

also you can share them, which is fun. Like you can get people to get to know

about the things you know... There are some things you just see online, and you

are wowed! And like you are surprised, and you feel so good when you want to

share it with your friends and maybe [with] some other persons that are close to

you. And they themselves, when they see it, they might like it or may not [sic]

(IP10).

As the above quotes suggest, participants were likely to share OER with peers for the

purpose of knowledge dissemination. Evidently, sharability, a core feature of OER, was a

valuable attribute of OER for many students. This point is clearly discernible from the

response below:

It is actually a benefit because then you get to share with your peers. And they

too, their minds are broadened, and you guys can come together and rub minds

together. You can decide to even make your own article on the net [sic] (IP11).

Clearly, sharing OER with peers is beneficial because it facilitates academic interactions

and collaborations among students. Such interactions and collaboration, as IP11

suggested, could result in the creation of other resources that will be of use to many

people. There are existing online platforms dedicated to assisting and encouraging users

to collaborate in the creation of OER, dScribe, originally developed at the University of Michigan, is one of them (Rogers, 2011). Furthermore, being able to share OER with others seemed to have a "fun" appeal for some participants, as suggested in the response below:

> "Okay. It is actually… the feeling is nice because when I am talking about it, my friends also know what I am talking about. So we are able to share, we are able to answer and say 'okay fine what did you pick in this question? Did you get it correct? What do you think about this? Did you get further research about it and all?' So we both know what we are talking about. It will be boring if I do it alone and the person next to me doesn't know about it, and when I am talking the person just looks like a novice and all. So it is actually nice [sic] (IP17).

Other than the suggestion that sharing OER engenders "good feeling," IP17 highlighted the critical importance of being able to share educational resources. Essentially, sharing OER is useful because students are able to work well together on assignments if they have access to available required resources. In addition, students are able to evaluate selected resources critically for a collaborative assignment, and determine their relevance, if everyone taking part in the assignment can access the resources. As Scanfeld, Scanfeld, and Larsen (2013) suggested, people are more likely to use resources obtained from their personal networks than those found elsewhere.

Information resources and knowledge sharing are fundamental traditions in academia, and OER surely extends the ability for students to partake in the tradition. OER enable users to bypass physical and temporal limitations in interacting and

connecting with people of similar interests across the globe. Although this can be said of other digital learning resources, open resources are especially suited for *unhindered* sharing of knowledge and information among users. In sum, participants in this research reported benefiting from sharing OER because such sharing facilitates interactions and collaboration on academic tasks.

4.4.4 Economizing

One of the most important reasons for using freely accessible digital learning materials is the need to reduce the cost of learning. As Diallo, Thuo, and Wright (2012) indicated, the most important role of OER in education is the reduction of the cost of learning. The prevalence of poverty and the increasing cost of learning materials in developing countries make learning materials especially inaccessible (Armstrong, De Beer, Kawooya, Prabhala, & Schonwetter, 2010). Put another way, even though the high cost of learning materials is not limited to developing countries, students in those regions, particularly those in SSA, are probably less likely able to afford required learning resources than their counterparts in more affluent regions of the world. Thus, the availability of freely accessible educational resources would be especially beneficial to them. This assumption is supported by some of the findings of this thesis. The analysis of data relating to the benefits of using OER revealed that research participants considered free access to the resources to be particularly beneficial. Consider this response:

> ... Because in my last [school] session, I didn't buy many textbooks… I actually
> went online to read. I used audio books, eBooks, and I read a lot online. I
> downloaded many, many books online, and articles too. Some of my lecturers'
> works… instead of going to them to give you a hard copy or buy one, I just go

online, and you see most of them. So I don't get to waste money buying, I just

save [inaudible]. So it is better [sic] (IP20).

Evidently, decreasing the overall cost of education by reducing the amount spent on

learning resources is important to many students. As indicated in the statement below,

notice how some participants reported that they deliberately included the word "free" in

their search terms to ensure only freely available materials were included in search

results.

...Even when I am searching, I normally specify *free articles* [italics are mine] in

order for me not to be going up and down. So once it [the search engine] brings

me the ones that are free and I see there is one I like… It doesn't mean I [am]

really [able to] download what I really need at [all] times, but once I see it is

interesting [I will take it]. Knowledge is … information is knowledge. So any

topic that caught my attention or in my area of interest … [sic] (IP19).

Although it is difficult to provide an accurate estimate, OER constitute a considerable

number of free and open resources online. As IP19 reported, some students would only

select freely available materials. Consider the following similar responses:

… [OER is] a great *investment* [italic is mine] to students because it actually

enables us to learn more… (IP7)

 If there is a book the lecturer recommends, and it is available as an eBook, I think

it is more economical and more convenient just to put on your PC or tablet or

phone, and just keep reading… (IP15)

...it's cheap. Yes, it's not expensive. You don't have to consult someone for a

textbook; you don't have to buy a textbook… (IP3).

Participants were appreciative of the economic benefits of using open digital

resources. However, the notion of OER or any other digital materials being completely

"free" is contested by some participants. Consider the following responses:

So you have to upgrade your cell phone or look for a phone that will be able to

open pdf files… (IP2).

And cyber café too. It still comes to the issue of money. To find something… you

can do something on your phone rather than going to cyber café. They will

basically task you [ask you to pay]. Is just as same as saying if I don't have

money for data, I will not have money to go to cyber café. So if I have money for

data, maybe I should just get data for my phone (IP10).

First of all, I want to say I don't have any challenges because I have a good

device, and the network are usually good these days. So basically, it is usually

sometimes I cannot afford to subscribe [to Internet service]. Cost (IP15).

As the above responses reflect, participants made the argument that OER were not wholly

free because users were still required to pay for Internet subscriptions and purchase

devices that were sometimes too expensive. This view is worthy of consideration given

the economic circumstances of many of the students. However, on the whole, many

participants reported that using open resources was cheaper than purchasing expensive

textbooks and other academic learning materials.

4.4.5 Optionality

Allen and Seaman's (2014) work showed that educators are generally not aware of OER, and are less likely to include the materials in official syllabi. Thus, as the results of this thesis have shown, many participants used OER as optional complements to assigned materials. OER provide alternative means of engaging educational tasks when officially assigned materials are unavailable or inadequate. In addition, because they come in different formats, they provide more options for students looking for different kinds of learning materials. I used the "optionality" category to code participants' responses indicating that OER represent optional and varied channels to learning materials. 15 of the 20 interview participants in this research reported that OER provide a variety of learning options. The following statements highlight this point:

> I am someone that likes consulting many materials when I want to read. So if textbooks are not enough, I just go online and get more information (IP2).

> ...You don't have to consult someone for a textbook; you don't have to buy a textbook. So you have a lot of sources, a lot of options to pick from… (IP3).

As IP2 and IP3 show above, like any other digital learning resource, OER ensure that students have many options to choose from when looking for learning materials. As shown in the review of literature in Chapter 2, several OER repositories have been developed over the years, including MIT open courseware, OER Africa, Wikipedia, Coursera, to mention but a few (see Appendix A for a comprehensive list of OER repositories). These OER repositories provide access to many digitized learning materials on a variety of academic subjects. With OER, the availability of options is not only

limited to the subject areas, but also to the formats of the materials, including audio, video, and text. Many participants in this research reported that having access to a variety of OER formats is beneficial. Participants liked the usefulness of OER in broadening their knowledge on specific issues, and in undertaking certain academic tasks. Take note of the points in the response below:

> Yeah, that's a good question. There is [benefits in using OER] because you don't want to be limited to, should I say, just one thistle - a pot of soup, if I should put it that way. You want to have a variety of different soups so you will be able to tell which one is sweeter. So putting it that way, I will not just want to stick with my lecturer. Even in school, we have different lecturers taking different courses but at the end of the day, they come to talk about just one thing. And talking about that same thing, they say it in different ways, which sometimes confuse students. But if as a student you were to listen to just one person, you will be limited because you will not have the different ideas from different lecturers. So also is the Internet too, if I was listening to just my lecturer, I will be limited because somebody who is listening to my lecturer and also using open educational resources will be far, far better or intelligent than me [sic] (IP20).

The existence of OER in various subjects, formats, and types ensures that students with different learning interests, needs, and styles are supported. The options in learning resources that OER enable extend the accessibility, usability, and ubiquity of the resources. For example, with OER, students have the option of listening to audio podcasts of lectures when watching video lectures is impossible, or reading PDF articles on their mobile phones when there is no access to computers. On the whole, OER provide a

variety of optional materials for students interested in complementing the learning resources they obtain from formal academic courses.

4.4.6 Discussion of the benefits students receive from using OER

Complementing formal learning with OER

One of the main findings of this thesis is that participants benefited from using OER to complement the learning they receive from their schools. They used the resources to supplement assigned learning resources. In other words, research participants used OER as complementary resources within the context of formal academic learning. Essentially, participants considered the use of OER in the completion of academic tasks as beneficial. They used OER to support assigned resources when undertaking such academic tasks as writing exams, essays, or engaging in other scholarly works. The idea that students use OER to complement formal academic learning is consistent with the existing understanding of the use of the resources (Wiley, n.d.; Tsang, Cheung, Lee, & Huang, 2010). As Wiley noted, "students who access OER do so mostly to complement a course they are taking, to enhance personal knowledge, and to plan their course of study" (p. 3). Surely, OER could be useful in broadening one's personal knowledge—that is unrelated to any formal learning, but it is clear that students at institutions of higher education, more often than not, consult OER when they are looking for extra resources to support formally assigned materials.

Increasingly, students engage in self-learning, perhaps because it is becoming easier to access and use digital learning resources than in the past. The opening up of learning resources online has led students to become aware of areas of deficiency in their

knowledge on academic topics; and of the various available opportunities, including the use of open resources, to supplement such knowledge. Some participants in this research confirmed that the use of OER enabled them to broaden their knowledge in any area of interest. However, most of them agreed that they used the resources only as additional resources to undertake the completion of assigned academic tasks, particularly when the use of the most current materials is required.

For many students, staying current on certain academic issues is vital. OER provide the means for students to do so. OER platforms are essential for providing updates on academic topics because of their modifiability features. Take Wikipedia, reportedly the most common OER repository used by participants in this research, for example; the strength of the resource is that it can be quickly updated to reflect current knowledge. Modifiability is one of the key attributes of open resources. The idea is to ensure that users can modify or update the resources as may be required. OER modifiability can be as complex as full language translations or as simple as updating the date of an event. For example, if a teacher who plans to assign an open textbook discovers that certain information in the book is incorrect or needs to be updated, with an openly licensed book, she or he can make the required changes and assign the book instead of abandoning the whole book because of a few errors. Students benefit from the updated materials by receiving the most current information on the book topic.

Students also benefit from using OER to support deeper research into academic topics. As previously mentioned, many participants in this research reported that they used OER when undertaking research on assigned tasks, such as essay writing. OER provide additional channels of information for understanding any topic. For essay

assignments, for example, OER may be useful for the presentation of a unique perspective, as some participants reported. Clearly, the broader availability of resources made accessible through open repositories enables students to gain a better understanding of academic issues and are, thus, able to construct and present ideas that are supported empirically.

Irrespective of the manner in which OER are used by students at institutions of higher education, it is clear that the resources portend significant benefits for users, particularly those in developing countries, with fewer resources to support education and learning (UNESCO, 2002). It is commonly accepted that a gap exists between the quality of formal education in developing countries, such as SSA and those in developed countries. The disparity in the quality of formal education is, among other things, related to the lack of access to quality educational resources. Apart from the high cost of textbooks, many higher educational institutions in developing regions of the world cannot afford to maintain a repository of quality online resources. This usually means that students need to look for alternative means of accessing learning materials. It also means that the quality of education offered to students would be less than optimal. In this thesis, many participants reported that they used OER especially because they were not satisfied with the learning (resources) they received from their schools. OER provided opportunities for those participants to supplement the learning they received from formal institutions. Of course, assigned learning resources can be supplemented by any materials irrespective of licensing designation; however, OER increasingly present more opportunities for students to expand on the knowledge obtainable from formally assigned syllabi. This is because not only are OER increasingly available to users, the nature of the

resources means that they can be utilized in less restrictive ways than other academic resources.

One of the most important ways that OER can be utilized by students to complement academic learning is through the personalization of learning. Personalized learning means tailoring the learning process to meet the specific learning circumstances of individual learners. Participants reported in this thesis that OER were beneficial because they enabled the arrangement of learning to meet their own personal needs. For example, open lectures (both videos and audios) can be used as many times and in many ways as required. Students can use OER at any time of their choosing, pick and choose which areas to focus on, and engage in the repeated use of the resources until they are satisfied.

On the whole, OER's complementary use by students in higher educational institutions is essential to broadening students' knowledge and staying current on certain academic issues. Importantly, this understanding of OER use as complementary in educational institutions (rather than replacement) has far-reaching consequences for the promotion of OER within academic institutions. One of the primary concerns expressed about OER, particularly among education administrators, is that they disrupt the functioning of traditional educational delivery. As Mulder (2011) argued:

Colleges and universities have no reason to view OER as a threat. On the contrary, OER can help institutions provide higher education to rapidly increasing numbers of students and lifelong learners. Traditional colleges and universities, with their experience and reputation, are in a good position to further develop

online teaching, testing, learning communities, and certification. Those that

produce high-quality knowledge, teaching, and students have little to fear, and

much to gain, from Open Educational Resources (Mulder, 2011, p. 8).

Mulder's (2011) objective in the quote above seems to be the alleviation of concern over

the disruptive potential of open resources to traditional educational arrangements. No

doubt, the opening of resources, particularly, university level teaching and learning

materials, has significantly affected pedagogical deliveries and learning practices. For

example, over the years, MOOCs have become increasingly popular with learners of all

types because they are mostly freely offered and are conveniently accessible online with

little or no spatial-temporal restrictions. As Jordan (2014) noted, an often-cited case of

the power of MOOCs' scalability is the Stanford AI MOOC, which attracted enrollment

of 160,000 students globally. The issue, for critics of open educational systems, is that if

it becomes the case that students in large numbers opt for such open learning deliveries as

MOOCs, there may be a significant disruption in the revenue and budgets of many

traditional educational institutions. For faculties, there is the fear that if these kinds of

pedagogical deliveries are allowed to thrive, professors could be replaced and

departments could be dismantled in traditional educational institutions. However, results

of this thesis did not support the assumption that students are looking to replace formal

learning materials with open resources. Instead, they are looking to use OER to

complement the learning resources they received through formal learning channels. There

continues to be the recognition of the significance of traditional pedagogical and learning

practices. Thus, it may be beneficial for education stakeholders to begin to look for ways

to assist students and other learners in harnessing the opportunities provided by open resources within the context of traditional learning institutions.

Ubiquity of access: removing spatial and temporal learning restrictions with OER

Ubiquity of access is one of the essential advantages of any online digital material. Ubiquitous access to OER means having access to the resources at all times, irrespective of spatial and temporal circumstances. It means geographical locations and time zones have little or no effect on access to the resources. Many participants in this research reported that OER were beneficial to learning endeavors because they were accessible anytime and anywhere. This means that although ubiquity is affected by such issues as Internet connectivity and the cost of online access, for many students with access to the Internet, there is no spatial or temporal limitations to the use of OER, particularly if they had access to smart mobile devices.

OER are essential for facilitating ubiquitous learning around the world. As has been made clear in this thesis, being able to access OER ubiquitously was very important for completing academic tasks. Although OER share this feature with all online digital materials, OER are especially important for ubiquitous learning because of their legal and technological flexibility. The multimodal and open nature of OER ensured that students were able to use the resources in desired formats, as well as able to freely share and modify the resources easily. The open nature of OER means that they are available in formats accessible to different kinds of devices. The increasing access to smart mobile devices also extends the chances of using OER and other online digital materials to

support anywhere and anytime learning. In recent years, SSA countries, including

Nigeria, have seen a tremendous increase in the use of mobile phones by all segments of

the population. Many participants in this research reported mobile phones as their

primary access to OER. They noted that mobile access of OER ensured that they could

use the materials at their convenience. Furthermore, being able to access OER saved time

and effort.

     The ubiquity of OER access assumes that users have constant access to the

Internet. That is, they have access to devices that support Internet access, they are able to

afford the cost of Internet subscription, and they have the skills to find OER online.

Unfortunately, this is not the case for many students. As shall be discussed later in this

chapter, many participants reported being challenged by the high cost of Internet

subscriptions and the expensiveness of smart mobile devices. However, they also

reported that even though access to the Internet is not constant, they could download

desired materials when there was Internet access for later use. All the same, OER have

the potential to facilitate the ubiquitous application of learning materials to support

academic tasks. This conclusion is supported by the work of Rory McGreal

(2012). McGreal acknowledged that ubiquitous learning relies on the availability of open

and accessible materials. On the whole, anytime and anywhere learning possibilities are

extendable with open resources because they are amenable to dissemination within (and

of course beyond) the network of student learners.

Networking with OER

Networking represents the ability to link interactively with others. To network, according to the *Oxford American Large Print Dictionary* (2008), means to interact with other people through the exchange of information. The "networking" core category that emerged in this thesis was used to code responses indicating that the use of OER is beneficial because they enable students to interact, connect, or collaborate with peers. Many participants in this research reported that they used OER interactively and collaboratively with peers. With the proliferation of social media, sharing digital resources is increasingly common among young people, including students. Through several online platforms, students engage in the sharing of ideas, opinions, and digital educational resources (Conor & Bingham, 2011). One of the key features of OER is that anyone can share them without violating the copyright of the creator, thus, the resources are especially amenable to dissemination and exchanges among students.

To some students, being able to share learning materials with peers is important because it facilitates better academic interactions. As one participant in this thesis pointed out, if peers can share knowledge they will be able to support each other academically. Being able to share learning resources such as OER engenders the sharing of not only academic ideas but also practical skills. This presupposes that some students engage in more than passive reception of ideas taught in formal classes. They also actively shape their own learning and that of their peers through the exchanging of learning materials, including open resources.

Collaboration and teamwork are important components of higher education. Participants in this research reported that the fact that OER were shareable ensured that they could work collaboratively on academic tasks. Students are now using certain open platforms, including dScribe, a platform that supports a participatory and collaborative model for creating open content, to work with others of like mind to create open materials (Rogers, 2011). One such case in SSA was cited by Prempeh (2013):

> At Kwame Nkrumah University of Science and Technology (KNUST), the introduction of Open Educational Resources (OER) has resulted in collaborative effort among stakeholders in creating quality educational resources for teaching, learning, and research. Among the challenges confronting the creation of electronic learning materials such as OER is the heavy demand on faculty time. In order to address this, KNUST has embraced the idea of student teams working with faculty to co-develop resources with the collaborative aim of supporting OER production. In particular, we have included students from the Department of Communication Design (DeCoDe) within the College of Art & Social Sciences in our OER production. We have matched a health instructor with an OER media specialist (a KNUST non-teaching staff member who is a recent DeCoDe alumnus or alumna) and a team of DeCoDe students to assist with putting the content into an electronic learning resource (Prempeh, 2013, p. 4).

Working together on academic tasks teaches students the value of knowledge sharing and exchanges as important practices in academia. Open resources provide students with the opportunities to make these exchanges freely, through a variety of formats (e.g., video, text, audio, simulations), and without time and space limitations. On

the whole, OER facilitate networking among students and enable them to build and sustain connections through interactions and collaborations on issues of similar interest.

Reducing the cost of higher education through the use of OER

A key benefit of students' use of OER at institutions of higher education is the reduction in the overall cost of education and learning. OER provide students with free (or less expensive) alternatives to expensive textbooks and other learning materials. As this thesis revealed, most participants considered the fact that OER were free to be beneficial. One of the most important reasons, presumably, for using freely accessible digital learning materials is the need to reduce the overall cost of education and learning. As Hilton III, Robinson, Wiley, and Ackerman (2014) noted, textbooks represent a significant portion of the overall cost of higher education. In SSA, including Nigeria, where there are few or no textbook grants from government or other sources, students are left to carry the burden of paying for academic textbooks on their own. OER present an opportunity to reduce or eliminate the cost of textbooks and other learning materials. At the moment, it seems that very few open materials are assigned by educators as part of the teaching curriculum. Part of the reason for this may be related to lack of awareness of available OER.

Despite the lack of assignment of OER by teachers, many of the students that participated in this research used OER to complement assigned reading lists. Inferring from the responses by many participants in this research, some students save a lot of money by using OER. This is in line with the results of a study by Hilton et al. (2014). In a study of the cost of textbooks in the United States, Hilton et al. (2014) found that if OER were assigned by educators for all learning materials, a full-time student could save

over $900 in a year. While the data used to arrive at this conclusion may be different if such a study were conducted in SSA, there is no doubt that students in SSA will save a significant amount of money if OER are entirely assigned as reading materials for students. It will be interesting to see how much students in SSA could save in one year of school if teachers assigned only OER. In any case, based on the responses by participants in this research, some students would prefer the assignment of materials that are open by their teachers. This is because they benefit from using OER, freely, to complement formal learning. Furthermore, the use of OER will certainly increase as more students become aware that there is benefit from using the resources.

The optional use of OER

OER provide optional means of access to learning resources for students, including those at institutions of higher education in SSA. They offer means of additional resources for supporting those formally assigned at school. Participants in this research reported that it was beneficial for them to have OER as optional learning materials. This function of OER pertains to the complementary role of the resources. The notion of *optionality* does not only represent OER as additional resources to formally assigned educational materials; it also represents OER as the constituent of a variety of learning object formats, such as videos, text, and audios, to mention but a few. The multimodal production of OER facilitates better engagement with learning materials. Many participants reported that having learning resources in various types and formats makes the process of learning easier.

Representing OER in multimedia formats could assist in supporting students with diverse learning styles. While many students benefit from text-based content, *visual* learners benefit more from visual content, including lecture videos and interactive simulations. Many participants reported benefiting from using multiple formats to learn about a particular topic. For example, a student might read an article by a particular teacher on a topic, and if available, might also decide to watch a video created by that teacher on the topic. The ability to use learning resources in a variety of formats engenders better assimilation of the topic. Ultimately, the availability of OER in multiple formats not only represents optional means of completing academic tasks; it also enables better assimilation of content. This notion is supported by the findings in the work of Sankey, Birch, and Gardiner (2010). The authors found that students favor multimodal learning. Similar to the results obtained from this thesis, participants in the work of Sankey, Birch, and Gardiner reported that having learning materials in multiple formats assisted their comprehension and retention of the learning material. On the whole, OER present tremendous beneficial learning opportunities for students. The conclusions regarding the benefits of using OER by students are represented in Proposition 3 below:

Proposition 3. *The students who participated in this research received several benefits from using OER. The better the awareness they received about OER, the better their attitudes toward the resources, and consequently, the more their use of the resources.*

4.5   What kinds of challenges do students face in using OER?

The development and use of OER have significantly increased since MIT first openly published its courses online in the early 2000s. At institutions of higher education across the globe, educators and students have used the resources to support pedagogical

initiatives and learning tasks. However, using OER presents several challenges. While the challenges educators face in using OER have been discussed well in the literature (UNESCO, 2002; Walsh, 2011; McGreal et al., 2013; Mtebe & Raisamo, 2014), the challenges students in SSA, including Nigeria, face in using the resources have not been given a great deal of attention through empirical studies. One of the primary objectives of this thesis was to understand the challenges the students who participated in this research encountered in using OER. In analyzing the related data, 62 initial codes were developed. Further analysis revealed the emergence of three core categories representing the challenges of using the resources. The categories are: (a) dealing with the cost of access, (b) experiencing disruptions, and (c) lacking sufficient skill for access. These results are elaborated upon in the next subsection.

4.5.1 Dealing with the cost of access

There are costs associated with using online resources such as OER. For some users, the cost of being online represents a significant challenge to the access of digital materials. It is important to note that the cost of online access varies from place to place. Nevertheless, the cost of online access in SSA is likely more adversely impactful on users because of the prevalence of poverty and other infrastructural challenges (Diallo, Thuo, & Wright, 2012). The responses of 15 interview participants showed that cost is a challenge in the use of OER. On the whole, there were two main sources of financial worries regarding the use of OER reported by participants in this research: the cost of Internet subscription and the cost of purchasing Internet-enabled devices.

The cost of an Internet subscription was a considerable challenge to participants. The following participants' responses highlight this point:

Yes… It is expensive (IP1).

...data is costly, especially on android phones. It is very expensive (IP5).

It costs a lot... Actually, it is a problem because I am a student (IP8).

First of all, I want say I don't have any challenges because I have a good device, and the network are usually good these days. So basically, it is usually sometimes I cannot afford to subscribe [to the Internet]… (IP15).

...Sometimes may be the data – the money to pay for it. I think mainly that's all [sic] (IP17).

Clearly, for many participants, the cost of access to OER was a challenge. As IP8 reported, the burden of Internet subscription cost is higher on students since they do not usually earn income other than that provided by their parents. It is important to note that not all participants believed that the expensive cost of an Internet subscription was a challenge. Unfortunately, this may only be applicable to a small number of students because most of the responses analyzed indicated that most participants considered the cost of being online a challenge. Obviously, the challenge represented by the high cost of Internet access is not limited to OER access, but applicable to all online materials, as some participants stated:

When you talk about surfing the net, the general problem should be the data plans and those stuff. So sometimes when you don't have data, you can't really use them (IP10).

The second challenge related to the cost of accessing OER was that of purchasing Internet-enabled devices, such as smartphones, tablets, and computers. Considering the economic circumstances of many students in the population under investigation, affordability of Internet-enabled devices may be quite challenging. See how one participant described the experience:

> Yeah. Sometimes it is expensive. It depends on the line [service] you are using anyway. But most times it is expensive. Because not everybody has access to BB- that is blackberry, iPhone, and iPad. Some people might just try using their normal phones which might not have broadband or any other things like that (IP20).

As IP20 reported in the statement above, some students preferred to use certain kinds of devices for Internet access because they allowed for efficient data usage. IP10 echoed a similar notion in the response below:

> And also the phone you are using can also be a limitation. For example, like I misplaced my phone not quite long ago and I am now using a smaller phone. [It] can't get you access to the Internet that much. Maybe if you have a system [computer] or something you can always access it. But if it comes to phone, which is much more available to our class, our strata… so basically, you cannot operate or get access to it with smaller phones. It has to be android. The world is growing, you have android phone and phones that are really rich, and you can often access it [sic] (IP10).

On the whole, a good Internet access experience requires certain kinds of devices, which as participants reported, were usually less affordable to students. The cost of devices adds up to the overall cost of access to the Internet and to OER. As noted earlier, even though the cost of access was not necessarily a problem for all students, many participants reported finding it challenging to acquire devices well equipped for accessing online resources.

> Well, considering the fact that I only use wiki, I haven't really experienced any problem. Just sometimes the references, some of them are not exactly what I need. For example, this reference page here [*shows me the page*] some of them… they will refer you to sites where you now have to buy (IP6).

> The major challenge is when you don't get the specific information you need. At times when you go through some of the materials, some are paid for. I don't know if they are OER. Some are paid for. You have to pay for them. And you know the technology in Nigeria (IP3).

As exemplified by the above responses, in addition to the cost of Internet subscription and device purchase, some participants also reported that they needed to pay for access to certain open resource repositories. They said paying subscription fees for sites that collate open resources (which are supposed to be free) represented a challenge to OER access. Note that the cost of access being referred to here is not for the open materials themselves, but for the service of collating the materials online. In other words, even though the actual resources were free, according to participants, payment was required to access the sites. Ordinarily, this should not be a challenge as there are many OER

repositories that are completely free to access. However, as we have seen with the results related to OER awareness, most of the research participants lacked sufficient awareness of existing open repositories. Nevertheless, the cost of online access limited and disrupted the use of OER by participants in this research. In sum, even though OER are supposedly free, there are incidental costs associated with their use. For many students, particularly those in SSA, such costs may be prohibitive.

4.5.2 Experiencing disruptions

Access to the Internet is increasingly becoming a basic necessity. As Haight, Quan-Haase, and Corbett (2014) indicated, the "lack of access to the internet can significantly undermine efforts to obtain employment, access current news and debates, and secure online government services" (p. 504). When we talk about the challenges of using digital resources, such as OER, the issues that naturally come to mind may include lack of awareness of the resources and quality assurance. In order words, consideration is given to how well users are able to locate, assess, and access relevant open materials within the vast maze of content online. However, accessing digital resources also involves being able to remain online long enough to retrieve desired materials. Thus, poor, irregular, or complete lack of access to the Internet would be a challenge for users of any online digital materials. The analysis of data relating to the challenges of using OER showed that participants' uses of OER were *disrupted* because of disconnection from the Internet. The responses of 16 interview participants revealed they regarded these disruptions in the use of OER as a challenge. This point is made clear in the responses below:

There is [network] server… Sometimes I go online, and there won't be [Internet] network. That's just the most [difficult] thing I face… The network problem... I cannot connect to the Internet (IP1).

If I am trying to access these kinds of resources online, the challenge I can face is Internet. The Internet issue… may be the network is bad, that's one big challenge. You might be answering online questions, and it will just stop because the network is bad (IP17).

Network... No service (IP17).

As noted in these responses, the irregularity of Internet service was a major challenge to participants' use of OER. This means that there are periods of time when access to the Internet is unavailable in normally Internet accessible Wi-Fi spots, such as campus rooms. There are also instances of poor Internet connection, whereby access to the network is possible, but it is spotty or too slow to support many regular online activities, including downloading and retrieving digital materials. Many participants reported that irregular and poor Internet connection made it difficult, or sometimes impossible, for them to access OER. Consider the frustration participants expressed in the responses below:

Actually, [the challenge is] the network. Because of the congestion in school, the network in school is not very good... It is very slow (IP8)

Most of the time… first of all, it is always the Internet- the service. Sometimes, it is always slow (IP11).

Evidently, many participants were dissatisfied with the poor state of Internet service delivery. This was compounded, as many of them noted, by the fact that they needed to pay exorbitant subscription fees for Internet service. Take note of how IP19 and IP20 described this experience below:

... Say I have to go and check some videos and everything, it will cost me more since I am the one paying for the data. And you know the way the network services deduct data these days. And even the quality of the network may not even afford you to listen all day long about what you really want to watch... There is low quality of data connection. At times you will pay, instead of lasting you for a month, after two weeks the network may have issues, and what [the data service] you [have] bought has to expire in a particular date… so there is nothing they are refunding back. [Once] it is gone, it is gone. The only message you get is "we are sorry for the poor services that have been on for like a week or so" [sic] (IP19).

Most times, the problem I personally have is that when trying to access these resources, it is slow. The Internet is slow most times. Maybe because many people are on that same site, I don't know...But if you are in your house, you don't have Wi-Fi, and you are using your data, it is difficult because you might not have enough to download. Because you might want to save a page, you don't want to go back and start browsing all over again [sic] (IP20).

Clearly, participants' access to open materials was disrupted by irregular or poor Internet connection. It is worthy of note that even though this experience may differ from place to

place in SSA, many participants in this research were convinced that the poor state of Internet service provision was peculiar to Africa, Nigeria in particular. Take a look at the responses below:

> To me, I think the issue we are having in Africa particularly, and in Nigeria to be specific, is the access to the Internet. Like now, I don't see the reason as a student I can't be in my room and be linked with friends. Do I have to go to a particular place where I will pay a lot of money before I can use the Internet? … (IP19).

> …Difficulties… In Nigeria, we need to work on our Internet and satellite systems. At times, the thing will hang [unresponsive]; at times, it won't go [work] - that is the Internet access- it wouldn't go [work]. At times, in the course of you trying to download, it is going to start fluctuating, particularly in areas where we don't have effective network and all that. So that is some of the challenges actually… (IP9).

Overall, inefficient Internet service has been revealed to disrupt or prevent participants from accessing OER, and any other online material for that matter. The disruption of access to the Internet, and OER in particular, was not limited to inefficient Internet service. Many participants also reported that their access to the resources was also disrupted because of irregular electricity power supply. So even when there is good Internet service, a power failure may also prevent online access, hence, disruption in the use of OER. Electricity is required to power and charge devices, such as computers and smartphones. Consider the responses provided by participants below:

> The situation in Nigeria, the electricity is very bad. Sometimes I do have problem
> when there is no light [electricity] to charge my device (IP5).

> ...I don't really know, the only issue I have… there is… let's say I am online, and
> there is no network… let me say no light [electricity], may be my battery just got
> exhausted… [sic] (IP7)

Clearly, irregularity in power supply made it challenging for students to use OER. On the whole, when using OER, participants were challenged not only by poor or irregular Internet service but also by irregular electricity supply. The other challenge that participants faced in using OER is related to knowledge of online information access.

4.5.3 Lacking sufficient skill to access OER

The rapid advancement and sophistication of online applications and computer programs mean that users require diverse digital skills in order to adopt and use such applications and programs. After gaining online access, possessing the required skills to navigate online spaces is essential for the efficient retrieval of online resources, such as OER. Evidently, digital skills are not equally spread among users, and younger users, particularly students at institutions of higher education, tend to experience far less operational and skill-related problems when accessing OER (Van Deursen & Van Dijk, 2009). Nevertheless, many participants in this research found it challenging to efficiently access certain online resources because they did not possess adequate digital skills to do so. Van Deursen and Van Dijk (2009) mentioned several digital skills required for successful online navigation, including the knowledge of content provided by digital media and the application of proper *information search behavior*. The responses provided

by more than half of interview participants suggested that they lacked the required skills
to apply proper search strategies in finding open resources relevant to their desired topics.
Furthermore, the fact that many of the participants, as noted earlier, did not have
sufficient knowledge of OER repositories compounded the difficulties they encountered
in finding relevant OER. Consider the following responses:

> … But when it comes to the eBook, it is actually hard finding an eBook...It
> actually takes time when you have to keep going from site to site looking for
> where you can actually get it for free (IP6).

> The only challenge I face is… my only challenge is finding the right resource
> (IP16).

The difficulty in locating relevant OER may have cost implications for users. The more
time participants spent browsing, looking for relevant OER, the higher the network data
usage, and the higher the cost of access. IP9 raised a similar concern by saying:

> ...And at times, in the course of you trying to look for a specific website or the
> particular area you are meant to go, you have so many options that you wouldn't
> know which one to click (IP9).

> Evidently, participants sometimes found it difficult to identify the most suitable

materials from the sundry options. It is clear that the challenge of not being able to
efficiently locate useful OER was occasioned by participants' inability to conduct
appropriate keyword searches in popular search engines, which many participants said
they used to find OER. It suffices to emphasize that being able to conduct proper searches

was important given that participants lacked adequate knowledge of OER online repositories.

4.5.4 Discussion of the challenges students face in using OER

Dealing with the cost of OER access

The costs associated with accessing OER are the same as those for accessing any online material. They usually involve the cost of Internet access, including the cost of purchasing devices and that of an Internet subscription. According to Eberhard et al. (2009):

> At least USD 120 has to be paid for a smartphone... A tablet, laptop or desktop computer costs, at least, USD 500. If you have a computer, you must purchase a USB stick for the mobile Internet and buy a subscription, which will cost at least USD 30. A monthly flat-rate subscription for a mobile Internet connection will cost at least USD 20 a month (Eberhard et al., 2009, p. v).

Undoubtedly, the cost described above is more than many students can afford in SSA, including Nigeria. This thesis revealed that being unable to pay for an Internet service subscription and purchase adequate Internet-enabled devices hinders participants' ability to use OER. Apparently, the high cost of Internet access is a global concern for all users. However, SSA students are especially affected because many are from households with the lowest per capita income in the world. As a United Nations Development Programme commissioned report (Chauvin, Mulangu, & Porto, 2012) found, "Sub-Saharan Africa is the poorest region in the world. Average real per capita income in 2010 was $688 (in constant 2000 US$) compared to $1717 in the rest of the developing world" (p. 1).

Furthermore, there is very limited institutional provision of free portable Internet Wi-Fi services on campuses and cafés as it is in many developed countries. It must be noted that even though some progress has been made in Internet service provision in SSA, there is still a significant gap between Internet access by students in the region and their contemporaries in the developed world. This disparity may be hindering equal access to online learning resources, such as OER. As some participants suggested in this thesis, schools, particularly universities and colleges, can do more by working with governments to provide Internet access for their students. Although several universities (including the one from which participants for this thesis were recruited) have started creating campus Wi-Fi hotspots for students' use, more effort is required to ensure better Internet access for students at institutions of higher education in SSA.

Disruptions in access to OER

Continual access to OER requires continual Internet access, adequate Internet-enabled devices, and electricity power. In the analysis of the data relating to the challenges of using OER, one of the key revelation was that participants experienced disruption of access to OER mainly as a result of irregular or poor Internet connection, electricity power outages, and the use of inadequate devices. More than any other issue, the biggest challenge to participants' use of OER was disruptions resulting from poor Internet connections. Like any other digital online materials, Internet service is required for access to OER in online repositories. For many of the students that participated in this research, Internet access was either completely unavailable or irregular. Access to the Internet is probably one of the single most important factors in the struggle for equal access to education. It is generally acknowledged that many developing countries lag behind in the

delivery of quality education and provision of access to learning resources. With the advent of open resources, there is the potential for the delivery of a quality education to a significant segment of the population in SSA. With the availability and growth of free and open pedagogical and learning resources, the Internet provides the required delivery mechanism to get the resources into the hands of users anytime and anywhere. For this reason, adequate access to the Internet is almost as important as the development of OER.

As digital materials, OER can be delivered through non-Internet-based devices by, for example, downloading them onto storage drives and other similar devices; however, the delivery of OER through such mechanisms means that users will not have complete and unfettered access to the multitude of available OER online. While there are instances when the delivery of OER through non-Internet-based storage mechanisms is necessary (for example, areas with no Internet reach), users of OER benefit more by having online access to the resources. Although there has been some progress in recent years, the state of Internet service in SSA is still far from adequate as concluded in the study by ITU (2013):

> It was found in the course of this study that the number of Internet users is still low and tariffs high compared to the rest of the world, particularly in relation to the purchasing power of low-income populations as measured by the minimum wage (ITU, 2013, p. 43).

For some students, even the ability to pay for an Internet service subscription does not preclude disruption to the service. Many participants reported their Internet service to be too slow and, in many cases, completely unavailable. They reported that they were

unable, in many cases, to download certain materials, most likely those with very high data usage, such as high definition videos. On the whole, improvement in the quality of Internet service provision will go a long way in ensuring students' better access to OER.

Disruption of access to OER does not only result from poor Internet service, but also from poor electricity supply, as I have mentioned before. Many participants reported that irregular electricity supply makes it difficult to power devices and remain online. The report commissioned by the World Bank and the International Bank for Reconstruction and development (Eberhard et al., 2009) summed up the state of electricity power generation in SSA:

> sub-Saharan Africa is in the midst of a power crisis marked by insufficient generating capacity, unreliable supplies, high prices, and low rates of popular access to the electricity grid. The region's capacity for generating power is lower than that of any other world region, and growth in that capacity has stagnated. The average price of power in Sub-Saharan Africa is double that of other developing regions, but supply is unreliable. Because new household connections in many countries are not keeping up with population growth, the electrification rate, already low, is actually declining (Eberhard, et al., 2009, p. v).

The report went further to say:

> At 68 gigawatts (GW), the entire generation capacity of the 48 countries of Sub-Saharan Africa is no more than that of Spain. Without South Africa, the total falls to a mere 28 GW, equivalent to the installed capacity of Argentina. As much as 25 percent of these 28 GW of installed capacity are not currently available for

generation owing to a variety of causes, including aging plants and lack of

maintenance (Eberhard et al., 2009, p. v).

Although the report is not clear on the state of electricity generation in individual SSA

countries, it is clear that SSA, in general, are significantly underpowered. This is

reflective of participants' responses on the effects of irregular electricity power on their

use of OER. It must be noted that Nigeria, the country that provided a sample for this

thesis, is notorious for its chronic epileptic electricity power generation. That said, for

many of participants in this research, inadequate access to electricity power hindered

access to online learning resources, including OER.

The disruption to OER access that participants experienced was not limited to

poor Internet and electricity service. Many of them reported that not having certain kind

of devices limited their ability to access open resources. Digital online resources require

Internet-enabled devices, such as computers, smartphones, and electronic tablets for

access. The cost of these devices is beyond the reach of many students in SSA. Mobile

phones are the most common devices with which students access OER. However,

participants in this research reported that certain kinds of mobile phones, usually

expensive, are needed for efficient access to OER. Basically, online navigation is better

with certain mobile devices, which are, in most cases, unaffordable to many students in

SSA. Overall, participants' access to OER were disrupted by poor Internet and electricity

services, as well as inadequate devices.

The issue of insufficient skills for OER access

While online access represents a considerable challenge for many students intending to use OER, particularly at the University of Lagos, many also seem to be hindered by a lack of sufficient skills to access these resources. Although participants did not directly report that they lacked online navigation skills, it was clear from their responses that some of them lacked the skill to apply proper search strategies in finding OER relevant to their desired topics. In many instances, participants reported the difficulty in finding OER online, but given the abundance of these types of resources, it is more likely that they lacked the proper skills to find the resources. Part of this may result from their lack of awareness of OER repositories. Students at institutions of higher education are generally better at using Internet resources than any other demographic (Jones, 2002); however, because the students who participated in this research were limited in their knowledge of OER, they were unable to either directly access the resource from OER repositories or formulate effective keyword searches on search engines to retrieve relevant results. Having quick access to OER is especially important for SSA students given the high cost of Internet service in the region. Quicker access, through effective search strategies and knowledge of OER online repositories, will not only better support students' learning, but will also reduce the overall cost of online access and, consequently, the cost of education. Certainly, students at institutions of higher education in SSA, particularly those at the University of Lagos will be better prepared to use OER effectively if better OER awareness and Web access programs are developed. On the whole, the challenges listed in this section limit the use of OER by the students who participated in this research. These notions are reflected in Proposition 4 below:

Proposal 4. *While the numerous benefits of OER support their increased use, the students who participated in this research were challenged by several issues when attempting to use the resources, thus limiting their overall use of the resources.*

To conclude this chapter, OER are increasingly used by students at institutions of higher education to complement the academic resources they are formally assigned. Evidence from this thesis showed that participants received several benefits from using OER. Their attitudes toward the resources were mostly positive, but sometimes ambivalent. For example, some of them feared that in spite of the many benefits of OER, the resources were also having negative effects on the way they learn. While the students' concerns about OER are real and are perhaps affecting the adoption and use of the resources, such concerns may have arisen from the lack of adequate knowledge of the resources. Furthermore, students face a number of challenges in using OER. Particularly, the students who participated in this research faced such barriers as the high cost of Internet access, irregular electricity, and insufficient skills for accessing online learning materials. One important issue that did not feature much in the response provided by participants in this research is the challenge presented by the predominant use of English language in the production of OER. While this may not have much relevance with the participants of this thesis because they all spoke English, it represents a significant challenge for other students at institutions of higher education in SSA who do not speak English. As Wilson (2008) pointed out, English is not the first or native language of most people in SSA. Thus, even though many OER have been translated from English to other languages spoken in SSA, the fact that the original works are not designed for the

audience in the region may reduce the usability of the resources. In Chapter 5, the

presentation and discussion of results will continue.

Chapter 5

5   Results and discussions: motivations for using OER

5.1   Introduction

This chapter continues the presentation and the discussion of the results of this thesis

(i.e., results of RQ5). Specifically, the chapter presents and discusses the results related to

the factors that motivated participants to use OER. After the presentation of each section

of the results, further discussion will be undertaken to highlight and situate the results

within existing literature. Section 2.9 shows the research questions examined in this

thesis. Appendix G shows the results of the PCA analysis (i.e., the principal components

and their item loadings). On the whole, one main conclusion emerged from the results

presented in this chapter: participants are motivated to use OER for a variety of reasons.

The key objective of this aspect of the thesis—the quantitative aspect—was the

determination of the specific motivation or rationale for the use of OER among students

at institutions of higher education targeted in this thesis. Researchers have long been

interested in the factors that motivate students to engage in certain learning practices

(Ibtesam, 2011; Sogunro, 2015). Since the advent and proliferation of digital

technologies, particularly those designed to support education, researchers have sought to

understand the motivation behind students' use of such resources to facilitate learning

(Ushida, 2005; Yau, Cheng, & Ho, 2015). Fundamentally, motivation relates to the drives

or factors that propel the satisfaction of needs (Maslow, 2012). People are motivated to engage in behaviors that will enable them to resolve personal and communal challenges.

Finding and using information resources, including those for supporting students' learning, are important human information behaviors. The motivation to use a particular type of information resource is essentially dependent on such factors as the experience, the context, the perception, the expectation and, of course, the need of the individual. This thesis is less about *need* (mainly because the need to learn is assumed as the reason students would look for educational materials in the first place) and more about the other factors that propel, encourage, or inspire students to find and use OER. To better understand the use of OER by students, it is important to determine the specific factors that motivate them to do so. To undertake this task in this thesis, I collected data about participants' motivations for using OER through the use of self-administered surveys. In the following section, I present the results of the analysis of the data. However, before that, the factors to consider in the interpretation of PCA results are described.

5.2 The interpretation of a PCA results

In interpreting PCA results, three issues are considered: the pattern of item loadings, the weight of item loadings, and the labeling of the components (Cuadras & Rao, 1993; Vingerhoets & Cornelius, 2001; Kellow, 2006; Brown, 2015). First, I will describe the pattern loadings. When one uses SPSS to conduct a PCA, the output usually contains a pattern matrix and a structure matrix. The two results, usually presented in tables, consist of the item loadings. There have been some debates about which of the matrices should be used in the interpretation of results (Brown, 2015). Loadings in a pattern matrix convey the unique relationship between a factor and an indicator—or, more precisely, a

component and an item. A pattern matrix is interpreted as a partial regression would be interpreted in a standard multiple regression, meaning, the coefficients represent the relationship between the predictor (i.e., component) and the outcome (i.e., loaded items). Alternatively, a structure matrix is obtained by multiplying the pattern matrix by the factor correlation matrix, which is also produced by SPSS when conducting a PCA. Thus, the structure matrix reflects not just the relationship between the component and the items (as it is with a pattern matrix); it also shows the relationship between the component and the shared variance among the items. Loadings in a structure matrix are typically inflated by an overlap in components and, consequently, are usually larger than those in a pattern matrix (Brown, 2015). In any case, a close look at the pattern and structure matrices (Appendices G and H, respectively) derived in this thesis shows that their coefficients (obtained with oblique rotation) are not the same. This is because of the correlation between components (Kellow, 2006).

Having given a brief description of both the pattern and the structure matrix, it is pertinent to point out that in this thesis, I relied on the pattern matrix for the interpretation of the results. Even though there is no consensus about which of the matrices should be used for interpretation, the pattern matrix, as Brown (2015) confirmed, "is by far the more often interpreted" (p. 28). The pattern matrix is useful for interpreting "the variables in terms of components" (Cuadras & Rao, 1993, p. 75). That means that an item or a group of items loaded onto a component can be analyzed and interpreted in relation to the construct of the investigation. Thus, the initial step in the interpretation of the results was the examination of the loading *patterns* in the pattern matrix outputted by SPSS PCA. Appendix G shows the pattern matrix of item loadings in the extracted components. In

all, 13 components were identified as significant in understanding students' motivations in the use of OER.

The second issue to consider in the interpretation of PCA results is the weight (importance) of the items as they relate to the extracted components. That is, one must consider the weight of the items constituting the components. Researchers commonly apply "an *absolute criterion* for deciding to retain variables" (Kellow, 2006, p. 99). The two most common criteria are pattern/structure coefficients greater than .3 or coefficients greater than .4 (Kellow, 2006). In this thesis, I applied a higher threshold by using coefficients greater than .5 to determine the items to be loaded onto the components. For example, in component 1, "OER help me complete my assignments" loaded at .775, surpassing the .05 threshold.

The third important step in interpreting the results of a PCA is the labeling of the extracted components. The labeling of the components is based on the interpretation of the loading patterns (Vingerhoets & Cornelius, 2001). For example, I labeled component 1 "completing academic tasks" because the items that loaded onto the component suggest that students are motivated to use OER for the completion of academic tasks. Table 13 contains the 13 principal components, their labels, and the weight of each of the items that loaded onto the components. In the sections below, starting with the first component, each of the 13 components and their constituent items are presented, and their relevance to understanding the motivations behind students' use of OER is discussed.

Table 13: Labeling the principal components

Components	Labels	Items	Item Weight
Component 1	Completing academic tasks	OER help me complete my assignment s	.775
		OER help me prepare for classes	.731
		OER enable me prepare for tests and exams	.725
		I learn better from using OER	.667
Component 2	Institutions motivate the use of OER	Librarians help me find OER	.740
		My school makes it easy for me to find OER	.713
		I can find OER in the library	.594
Component 3	Institutions and course selection as the motivation for using OER	OER help me decide what school to attend	.743
		OER help me decide what courses to take	.635
Component 4	The case for the environment and provenance of OER	I worry about the environmental impact of using print materials	.687
		Many OER are created by teachers from prestigious and famous schools	.565
Component 5	OER use observation and OER creation	I see others using OER	-.672
		I create OER. I learn by creating	-.521
Component 6	OER in audio-visual formats	OER are available in video format	-.816
		OER are available in audio format	-.659
Component 7	Sharing OER with others	I can share OER with others	-.750
Component 8	Ubiquity of OER	OER are easy to find online	.696
		I can access OER from anywhere	.629
		I remember more of what I learn in OER course lectures	.584
Component 9	The economic benefit of OER	OER are free to use. They reduce the cost of learning	.664
Component 10	OER access on YouTube	OER are on YouTube	.771
Component 11	Networking and Synchronicity	I can use OER along with others at the same time	.824
Component 12	OER localization	Some OER are produced locally	.714
Component 13	Opportunity to learn with others through the use of familiar materials	OER give me the opportunity to learn from other learners	.767
		OER are different from the kind of materials I normally use	-.512

5.3 Presenting the results of the quantitative analysis

5.3.1 Component 1: Completing academic tasks

The first result of the PCA in this thesis (component 1), based on the item loadings, indicates that participants were motivated to use OER because they facilitate the completion of formal academic tasks, such as preparing for class lectures, writing tests and exams, and completing assignments. Table 13 shows the survey items that loaded onto the component. This result is consistent with one of the results of the qualitative component of this thesis, which revealed that participants used OER to complement formal academic learning. The result is also consistent with that of a study conducted by David Wiley (n.d.). Wiley suggested that students mostly use OER to complement the learning they receive from formal classes. An MIT study of the use of its OCW also supported this finding. The study showed that approximately 34% of students use OER to complement a course of study (MIT, 2015). Basically, students are motivated to use OER to support formal academic learning activities.

While the first three items that make up component 1 relate to the complementary use of OER in formal academic learning, the fourth item: "I learn better from using OER" speaks to the expected outcome of using the resources. Essentially, this result suggests that participants were motivated to use OER because they "learn better" by doing so. Given the difficulties students in SSA face in acquiring assigned educational materials, including textbooks, OER provide a good alternative for those looking to expand their knowledge of academic topics as well as improve their grades.

5.3.2 Component 2: Institutions motivate the use of OER

The second result of the PCA in this thesis showed that there is a role for educational institutions in motivating students to use OER. Particularly, libraries and librarians reportedly have important roles in encouraging participants to use the resources. Table 13 shows the items that loaded onto component 2. Put together, the component reveals three aspects of an institutional role in the motivation of OER use among the students who participated in this research. I will start with the second item, which shows that participants were motivated to use OER because their schools made it easy for them. The key points to note here are that some students will use OER if they can find an easy way to do so and that institutions are in a position to ensure easy access to OER for their students. The institution from which data was collected for this thesis has a link from the main page of its website to the MIT OCW website. This makes it easy for students to navigate from the school's website to the repository. It is likely that this may have influenced participants' reporting that the school was providing easy access to OER. Therefore, if that was the case, it is important to apply caution in generalizing this result beyond this one institution because very few institutions in SSA have such links to OER repositories from their website.

The second aspect of this component to consider is the role of libraries in the motivation of students to use OER. This result showed that libraries helped motivate the use of OER among the students who took part in this thesis. This function of the library is related to the overall role of academic institutions in facilitating the use of OER. Institutions, through libraries, can provide access to OER. This can be done, for example, through the provision of Internet-enabled computers for students to access the resources.

It can also be done through the provision of Internet hotspots and hubs to enable students to get online with their personal devices and access the resources in libraries. The third item that loaded onto this component indicates the role of librarians. Librarians' assistance in enabling students' access to OER is beyond the mere provision of devices and online services. It also involves helping students to find the resources online. As this result showed, participants were motivated to use OER when librarians assisted them in finding the resources. Librarians could also help by training students on how to find and retrieve OER from online repositories.

It is important to note that even though these results show that institutions have some roles in encouraging the use of OER among this thesis' participants, the specific ways that such institutional branches as libraries assist students at institutions of higher education in SSA to access the resources is still not completely clear. Therefore, a study on the specific ways that librarians help students find digital materials, including OER, in SSA will be useful in further understanding this aspect of the results. Nonetheless, institutions, particularly through libraries and librarians, do encourage and inspire the use of OER among some students at the University of Lagos.

5.3.3 Component 3: Institution and course selection as the motivation for using OER

The loading of items onto component 3 suggests that some students use OER because they assist in the selection of institutions and courses. As Table 13 shows, participants reported that OER helped them decide what school to attend and which courses to take. This result is supported by existing studies on the use of OER (Hodgkinson-Williams, 2010). Making OER openly available helps institutional recruitment by enabling the right

student to find the right course. Hodgkinson-Williams (2010) reported, "35% of freshmen are aware of MIT's OCW before deciding to attend MIT" (p. 9). Selecting a school to attend or courses to enroll in can be difficult for students. This is because students may not know what a particular course constitutes or be familiar with the teaching style of the instructor. Therefore, having the opportunity to test out course materials or watch an instructor teach a course can help students decide whether they want to enroll in that particular course.

Many institutions offering OER, particularly open lectures, do so as a way of showcasing their courses to the public. Students are able to determine whether to take a course or even apply to an institution by looking at its available open materials. Thus, when institutions such as MIT make their courses open, they are not only assisting learners who use the courses, they are also promoting their own brand and courses. This idea is consistent with findings from studies in OER development (Hodgkinson-Williams, 2010). Institutions benefit from the development of OER since they enable potential applicants to be aware of the range of courses the institutions offer. As Hodgkinson-Williams (2010) insightfully noted, "gaining publicity or reaching the market more quickly may result in an economic advantage" for institutions that engage in the development of OER (p. 9). In the same way, a teacher may benefit from developing OER because it could help raise her profile within her academic network. Peers, students, applicants, and others could become familiar with her work and consider her an authority in her field. On the whole, some students are motivated to use OER because it may help them decide what school to attend or courses in which to enroll.

5.3.4 Component 4: The case for the environment and provenance of OER

Component 4 consists of somewhat incongruous items. As shown in Table 13, the first loading shows that participants were motivated to use OER because they worried about the environmental effects of using print materials; whereas, the second loading shows that they were motivated to use the resources because of their *provenance*—that is because many of the materials are created by teachers from prestigious and famous schools. The two loadings seem unrelated; yet, they are constituents of the same component, signifying some sort of relationship. In any case, it is apparent that participants were motivated to use OER because, as digital materials, they can help prevent the environmental effects of using print materials. Furthermore, this result revealed that participants were, at least, considering ways they could use materials that are less impactful on the environment in the course of their education.

The other result revealed by the items that make up this component is that participants were motivated to use OER because the resources are mostly created by teachers from prestigious and well-known institutions. This is an interesting result, particularly because most of the existing OER are created by top institutions in the United States. For example, institutions such as MIT, Stanford University, Rice University, Carnegie Melon, to mention but a few, have led the way in the production of OER. Although it is not clear if participants *consciously* looked for materials that were created by affiliates of the said institutions, it is, however, apparent that they were encouraged by the participation of such institutions in the development of OER.

There are two issues that come to mind here. First, it may seem presumptuous to assume that when participants referred to *prestigious and famous schools*, they were

referring to the likes of North American institutions mentioned above, and not local

Nigerian institutions. Nonetheless, I came to this conclusion because participants made

references to these universities in the interviews I conducted for this thesis. This is

coupled with the fact that there have not been significant OER contributions from

institutions in SSA (Mulder, 2008), including Nigeria. In any case, it was only logical for

me to infer that the participants were referring to schools in Europe and North America

because such schools have been on the forefront of OER development. The other issue is

that this result suggests that participants were only interested in OER created by the likes

of North American institutions mentioned above, and not by local institutions. This is not

entirely the case, as participants in this research also reported that they were motivated to

use OER because some of them are created locally (see component 12 below). In the

qualitative component of this thesis, many participants also reported the significance of

having locally relevant OER. On the whole, these results suggest that some students at

the University of Lagos are motivated to use OER because they are digital and have less

impact on the environment than print resources. The results also indicate that the students

are motivated to use OER because of their provenance—the fact that many are created at

top institutions in the world.

5.3.5 Component 5: Observing OER use and creating OER

The loading of items in component 5 indicates a negative correlation between the items

(statements) and the motivation for the use of OER. As shown in Table 13, "I see others

using OER" loaded at −.672, while "I create OER. I learn by creating" loaded at −.521.

These results can be interpreted in more than one way. Essentially, participants did not

agree that the items represent a motivational basis for their use of OER. That is, for

example, they did not agree that they were motivated to use OER because they observed others doing so. This could be because they did not usually observe other people using OER, and, therefore, could not attribute their use of the resources to observing others doing so. It could also be that they had indeed observed others using OER, which is more likely the case, but that they did not agree that such observations had any role in their motivation for using the resources.

The other item that loaded onto this component is "I create OER. I learn by creating." This result can also be interpreted in more than one way, particularly because the statement has two parts: (a) participants create OER and (b) participants learn by creating (things, including OER). The negative loading of the item means that the result must be interpreted in reverse as well, meaning that participants did not agree with the statement. It may mean that they did not agree with both parts of the statement (i.e. they neither create OER nor learn by creating), or that they disagree with one part of it. In any case, the negative loading of the item suggests that participants did not agree that they used OER because they created the resources or that they created OER because they learned by creating. On the whole, this result suggests that participants did not usually create OER nor did they consider creating OER a basis of their motivation to use the resources. The result is supported by current understanding in OER research (Mulder, 2008). It is well documented that most of the existing OER are created by educators, particularly those at institutions of higher education in North America and Europe (Mulder, 2008). Students do not currently make a considerable contribution to the production of OER worldwide.

5.3.6 Component 6: The availability of OER in audio-visual formats

The loading of items in component 6 also indicates a negative correlation between the item statements and the motivation for the use of OER. As shown in Table 13, "OER are available in video format" loaded at −.816, while "OER are available in audio format" loaded at −.659. This result suggests that participants were not motivated to use OER because of their availability in audio or video format. The result is surprising, particularly because it contradicts the results of the qualitative component of this thesis, in which participants reported the availability of OER in multiple formats as a considerable benefit of using the resources. The reason for this contradiction is unclear, but there are a number of possibilities. First, it may be that the results are reflective of participants' misunderstanding of the statements (of survey items). The statement is meant to mean that students are motivated to use OER because they are available in audio and video formats. It could be that participants misinterpreted the statements to mean that they are motivated to use OER because the resources are *only* available in audio and video formats.

Second, it could be that participants did not consider the availability of OER in audio-video formats important or even necessary. That is, participants like the fact that the materials exist in multi-formats, but they would still use the resources if they were not available in audio or video formats. In any case, current understanding in the use of OER supports the fact that users like the availability of the resources in multi-formats, including audio and video format (Wiley, n.d.). Results of the qualitative component of this thesis support this fact. On the whole, this result suggests that even though

participants liked audio-visual OER, they were not solely motivated to use the resources as a result.

5.3.7 Component 7: Sharing OER

Another surprising result is shown with the loading in component 7. As Table 13 shows, the item "I can share OER with others" has a negative loading of $-.750$. This result suggests a negative correlation between the item and the motivation for the use of OER by participants. The negative correlation may be a misnomer. That is, it may not necessarily be the case that the motivation for the use of OER will reduce as the sharability of the resources increases. Rather, the result simply suggests that the sharability of OER was not viewed by participants as a considerable rationale for using the resources. Nevertheless, this result is inconsistent with the findings from the qualitative component of this thesis, in which participants reported that the ability to share OER was a considerable benefit for using the resources.

What is becoming clearer with these results is that the presence of benefits in the use OER does not necessarily correspond to the motivation for the use of the resources. Naturally, it is presumable that an expected benefit would serve as an incentive for the use of technology. It appears, at least in the case of the students who participated in this research, that that is not the case. In any case, this result suggests that even though students consider it beneficial to be able to share OER, they will continue to use the resources if that particular benefit is removed. Essentially, sharability of OER is important, but it is not the most important aspect of the resources to students.

Another way to look at this is that given that OER are digital materials, participants might have taken *sharability* only to mean the ability to pass on the materials to others. With OER, sharability also involves the avoidance of copyright violation in the sharing of the resources. Participants might not have taken this into account when responding to the survey question. Students are used to sharing digital educational materials and often take such actions for granted. The point being made here is that participants might have considered sharing OER a non-issue and, therefore, did not see it as something that especially motivates them to use the resources. Alternatively, this result could be interpreted to mean that students are not sharing OER. However, this idea is not supported by the findings from the qualitative component of this thesis. As I mentioned before, participants in the qualitative aspect of this thesis reported that they liked sharing OER. In spite of that, the reality may be that the students do not engage in the sharing of the resources to an extent that they consider significant, hence, this result.

5.3.8 Component 8: Ubiquity of OER

The loading of items in component 8 shows that participants were motivated to use OER because of the ubiquity of the resources. As Table 13 shows, the component consists of the items: "OER are easy to find online," I can access OER from anywhere," and "I remember more of what I learn in OER course lectures." From the first two items, it is clear that participants were motivated to use OER because of the ease with which they could find the resources. This result has a strong consistency with the qualitative results of this thesis, which show that being able to find and retrieve OER easily, anywhere, was beneficial to participants.

As I stated earlier, the ubiquity of digital learning resources is important to contemporary students. The advent of modern transportation, both physically and virtually, means students are more mobile than ever before. In addition, for many of them, having access to digital learning materials, including OER, on the go is essential. The use of mobile technology has significantly extended the ubiquity of OER as students can access the resources on the go through their smartphones, electronic tablets, and computer laptops. The notion of the ubiquity of OER as digital resources has been studied (McGreal, 2012). McGral acknowledged that students benefit from ubiquitous access to OER.

The inclusion of the item: "I remember more of what I learn in OER course lectures" in component 8 suggests some sort of correlation between the item and the other two items that loaded onto the component. At first glance, the relationship between the items may not be apparent. However, the result could be interpreted to mean that participants remembered more of what they learn in OER course lectures because they could access the materials conveniently anywhere. For many students, there is no limitation to how many times the materials can be used because they can easily be accessed anywhere and at any time. Presumably, continual and repetitive use of a learning material engenders a higher rate of remembrance of its content. This proposition speaks to one of the most basic understandings in memory studies, which is that repetition breeds remembering (Jecosy, 1978).

5.3.9 Component 9: The economic benefit of OER

Component 9 relates to the economic benefit of OER. One item: "OER are free to use. They reduce the cost of learning" makes up the component, as shown in Table 13. The

result indicates that participants were motivated to use OER because of their economic

benefits. The result is consistent with the results of the qualitative component of this

thesis, which shows that participants considered OER to be economically beneficial. The

result is also supported by results from other existing OER studies (Hilton et al., 2014).

Clearly, the students who participated in this research were motivated to reduce their

overall cost of learning, and the use of OER provided the means for them to do so.

5.3.10   Component 10: OER access on YouTube

Participants were motivated to use OER because they are accessible on YouTube, as

shown by the item that loaded onto component 10 (Table 13). Ordinarily, this result

would not have been surprising given that many open audio-visual materials are available

on YouTube, and YouTube is one of the most used online platforms among students

(Snyder & Burke, 2008). However, when the result is juxtaposed with that revealed by

component 6 (which suggests that participants were not motivated to use OER

particularly because of their availability in audio-visual formats), it then seems

inconsistent. It appears that the availability of OER in audio-visual formats does not

particularly motivate participants to use the resources, but alternatively, that they are

motivated to use the resources because they are available on YouTube (an audio-video

platform). The seeming inconsistency of the results may stem from participants'

interpretation of the survey items because, clearly, they like the fact that they can access

open audio-visual materials via YouTube.

In any case, these two results could be interpreted to mean that even though

participants were motivated to use OER because of their availability on YouTube, they

were not necessarily inspired to use the resources in other audio and video platforms. One

possible reason for this could be students' familiarity with YouTube, and their limited awareness of other open repositories that could contain open audio-video educational resources. As shown in the qualitative results of this thesis, participants were limited in their knowledge of OER repositories and are, therefore, unlikely to be aware of OER repositories with video and audio content other than YouTube. Conversely, students are familiar with YouTube (Snyder & Burke, 2008), and use the platform to access digital content, including OER, hence, the affirmation by participants that they were motivated to use OER because of their availability on YouTube.

5.3.11   Component 11: Networking and synchronicity

The item that makes up component 11 relates to the notion of *networking* and *synchronicity*. As Table 13 shows, the component is comprised of only one item: "I can use OER along with others at the same time." It shows that participants were motivated to use OER because they could do so along with others at the same time. There are two sub-dimensions to this principal component: (a) networking and (b) synchronicity. The first, networking, is related to the idea that participants considered being able to use OER along with others a motivational factor. Again, this is consistent with the results of the qualitative component of this thesis, which revealed that being able to use OER as a basis for networking with peers is considered beneficial to the participants of this thesis. In its simplest sense, networking refers to the process of interacting with other people to exchange information (*Oxford American Large Print Dictionary*, 2008). This result suggests that some students at institutions of higher education in Nigeria engage in the sharing of academic information through the exchange of OER and that such a possibility motivates them to make use of the resources.

The second sub-dimension of the component, synchronicity, relates to temporality and simultaneity. It relates to the non-interference of time as a hindrance in the use of OER. Basically, this result shows that participants were motivated to use OER because they could do so at the same time with others. For example, two students; say one in Kampala, Uganda, and another in Toronto, Canada; can access the same open resource at the same time. The number of students who can use the same digital open content is theoretically infinite. Although synchronicity of access is not unique to OER (it is a feature of all digital materials, except those restricted through digital rights management), it, however, extends the openness of OER. That is, it fosters the non-restrictiveness of the resources. Thus, participants were not only motivated by the fact that they could use OER as a means of sharing academic knowledge but also because they could do so simultaneously with peers, without restriction in time and space. This result is supported by works in the use of digital resources, including OER (McGreal, 2012).

5.3.12   Component 12: OER localization

OER localization refers to the leveraging of the educational value of the resources through the addition of one's own personal improvements and adaptations (Connolly et al., 2007). The existence of locally produced OER was a motivating factor in participants' use of the resources. As Table 13 shows, one item: "Some OER are produced locally" loaded onto component 12. Clearly, this result suggests that some students at institutions of higher education in Nigeria are more likely to use OER if the materials have local relevance, or if they are produced locally. As I mentioned earlier in the discussion of component 4, even though participants were motivated to use OER produced by prestigious and famous institutions, such as MIT, Stanford, and Rice, they

were also motivated to use OER that have local and cultural relevance. For example, they would be better motivated to use materials created by teachers from local schools if they were useful for completing academic tasks. This result is also consistent with findings in the qualitative component of this thesis, in which participants reported interest in using materials created by local teachers. The result also aligns with common thinking in OER literature (UNESCO, 2002, Mulder, 2008). The UNESCO (2002) report acknowledged the fact that there is a need for developing regions of the world, including SSA, to put measures in place that will facilitate the development of local OER. This is necessary for the diverse representation of OER available for students and other users.

5.3.13 Component 13: Opportunity to learn with others through the use of familiar materials

The loading of items onto component 13 suggests that OER provided participants with the chance to learn from other learners using familiar materials. The two items that loaded onto component 13 are shown in Table 13. There are two parts to this result: the first is that participants were motivated to use OER because they enabled them to learn from other learners (which may mean other students). The second part is that participants used OER because the resources were similar to the materials they normally use. The original statement for this second part proposes that students are motivated to use OER because they are different from the kind of materials they normally use. However, because of the negative loading of the item, the statement must be interpreted in reverse. That is, students are motivated to use OER because the materials are *not* different from what they normally use. The notion of similarity (or lack of difference) does not necessarily mean *exactitude*—that is, it does not mean that the open resources that

participants used were always similar in every respect to the materials they normally use in formal classes. Rather, it means that the open materials they used cover topics and subjects with which they were familiar. It also means that the open resources that participants used were applicable to solving academic tasks with which they were normally faced.

Another interesting thing about this component is the seeming unrelatedness of the items of which it consists. At first glance, the reason these items loaded onto the same component may seem unapparent, particularly with the second item loading negatively. However, a careful look at the items reveals a connection. The results which show that participants were motivated to use OER because they enable them to *learn from other learners* most likely means that participants used the resources collaboratively with peers. It also means that they *learn better* (gain better knowledge) with the materials when used along with peers. To make this point clearer, the kind of academic materials students would use collaboratively with others would likely be something useful in completing familiar academic tasks, something relevant and applicable to formal academic learning. Thus, this result shows that participants were motivated to use OER because they facilitate collaborative engagement with tasks relevant to their formal courses of study.

To summarize the presentation of results of the quantitative component of this thesis, the overarching motivation behind participants' use of OER was the completion of academic tasks. In addition, participants were motivated to use OER because the resources were ubiquitous, were economically beneficial, and could be used without concerns over temporal-spatial limitations. Participants were also encouraged to use the resources for networking and for collaborations involving formal academic tasks. Many

OER are created by reputable sources, are useful to students for selecting institutions to attend and courses in which to enroll, and as a result, are attractive to students. The other factors that motivated the use of OER among the students who participated in this research included institutional measures, such as the development of OER repositories, the strengthening of institutional departments (i.e., libraries) to assist students in finding and retrieving OER, and the provision of technological support (i.e., Internet hotspots) to facilitate easier access to OER. Some factors, such as the creation of OER, the availability of OER in audio-video formats, and the sharability of OER emerged as important in the use of OER, but were not considered direct motivational factors by participants.

5.4   Discussion of students' motivation for using OER

The need to understand the motivation to learn among students is not new (Ibtesam, 2011; Sogunro, 2015). The growing availability and use of digital educational resources has inspired researchers to examine the specific reasons students make use of such resources (Ushida, 2005; Yau, Cheng, & Ho, 2015). This section presents the discussion of the results of the analysis of this thesis' quantitative data. The quantitative aspect of this thesis was intended to determine the specific motivations for the use of OER among participants of this thesis. The results show that participants were motivated to use OER for a variety of reasons. Many of the factors participants reported as motivational in their use of OER are related to the benefits of the resources discussed earlier. These factors are further discussed in this section.

5.4.1 Completing academic tasks with OER

The most significant motivation for participants' use of OER is the support they provide in completing academic tasks, such as preparing for class lectures, writing tests and exams, and completing assignments. This result fits well with one of the results of the qualitative component of this thesis, which revealed that participants mostly used OER to complement the learning materials they received from formal academic sources. The role of OER as complementary resources within formal academic learning is consistent with the observation by Wiley (n.d.). According to the author, students use open resources to supplement the courses they are taking. As we have seen with the responses provided by participants on this issue, some students regard certain OER platforms as surrogate tutorials. That is, they rely on the use of the platforms to learn more about topics in their official syllabi. They consult the platforms to prepare for lectures as well as to obtain a better understanding of issues presented in formal lectures. These conclusions are also supported by the study on the use of OCW conducted by MIT (2015). Specifically, MIT found that approximately 34% of students used OCW to support formal academic tasks while 46% of them used the resources to enhance personal knowledge. On the whole, the students who took part in this thesis were motivated to use OER because the resources assist them in completing academic tasks as well as in obtaining better knowledge of academic topics and subjects.

5.4.2 Institutional support for the use of OER and the role of libraries

Certainly, some students at institutions of higher education in Nigeria are motivated to use OER when there is relevant institutional support. That is the main point of the second result of the PCA in this thesis. Precisely, participants reported that they were motivated

to use OER when their schools provided measures that made it easy for them to do so. Consequently, when institutional departments such as libraries are strengthened and positioned to facilitate the use of OER, students will be motivated to use the resources.

Generally, libraries have an important role in ensuring that information resources, including educational materials, get into the hands of users. They are well positioned to assist in all aspects of OER development and use. As Jensen and West (2015) reported about OER, users often require support in finding quality materials. The authors further reported that they also require assistance in professional development, particularly in the area of copyright and open licensing. Libraries in Nigeria, and in SSA in general, can successfully undertake these roles through such initiatives as the organization of training workshops, seminars, and consultations with students and faculty on how to identify and obtain OER relevant to their disciplines. Libraries can also provide Internet-enabled devices as well as Internet hotspots to enable students to get online and access OER.

Although this thesis' results indicate that participants were motivated to use OER for completing academic tasks, the results also suggest that they lack adequate knowledge of OER repositories as well as sufficient skills to access the resources. Librarians can help in resolving these issues. The key issue is whether libraries and librarians in SSA are well positioned to successfully undertake a leadership role in ensuring that OER are available, and if faculty and students are well trained to access the resources. As things stand, learning institutions, including libraries, are poorly funded in most SSA countries (Nok, 2006). Such poor funding can hinder libraries readiness to assist users looking to find and retrieve educational resources, including OER. In any case, this result suggests

that academic institutions, with the aid of libraries, can provide measures that will encourage the use OER among students.

5.4.3 The role of OER in selecting institution and enrolling in courses

Participants used OER as a means of identifying what school to attend and in which courses to enroll. That is the essence of the result revealed by component 3. This result is substantiated by the work of Hodgkinson-Williams (2010). Hodgkinson-Williams found that 35% of first-year students at MIT were aware of MIT OCW before deciding to attend the institution. Even though it is difficult to draw a causal relation between awareness of MIT OCW and applying to the institution, it is logical to assume that a significant number of potential applicants to MIT examined the open materials in the MIT OCW repository to determine their suitability. For an applicant, such an examination may produce useful information about courses offered at the institution as well as the teaching style of instructors. That kind of information may be useful in deciding whether to apply to the school and enroll for certain courses.

For academic institutions, OER repositories have become important tools for showcasing courses on offer, as I earlier mentioned. Essentially, OER are used to advertise institutional courses (The OECD, 2007; Commonwealth of Learning, 2011). As the results of this thesis suggest, students respond by engaging in *window-shopping for courses* before they actually register. Course materials (including syllabi and actual course content) in various formats are presented as OER in many institutional repositories, and students are able to browse such materials to gain insight into what to expect from taking a particular course. Such a presentation of courses, as Hodgkinson-Williams (2010) noted, may help institutions reach applicants faster and result in

economic advantages. This is important given the growing competition among academic institution for applicants. Websites of higher educational institutions are often used to promote programs and courses. Usually, a brief description is offered to persuade students of the superiority of one school over others with similar programs. With open courses, institutions such as Carnegie Melon, Stanford, Rice, and MIT are taking it one step further by actually presenting complete courses for students to test out or browse through.

For the teachers who open up their materials, there are two benefits, as I previously mentioned. The first is reputation. Teachers involved in the development of OER may come to be seen as authorities in their field and, as a result, attain higher profiles among peers and students. The second potential benefit for teachers who open up their materials is related to the first. The recognition teachers obtain from opening their materials may actually translate to economic advantages. For example, if such teachers make their work commercially available, they may have greater opportunities of reaching their audience owing to name recognition. In addition, such teachers may be called upon, on commercial terms, to provide insights into matters for which they have become recognized. Students would likely want to enroll in courses taught by such teachers, thus, boosting their professional standing. On the whole, this result shows that participants used OER to identify potential institutions to apply to and courses in which to enroll. It also shows how institutions and educators could benefit from opening their courses and other educational resources.

5.4.4 The provenance of OER

One of the key results of this thesis is that the provenance of OER was important to participants. Precisely, the result shows that participants were motivated to use OER because they are often created at prestigious and famous institutions. This result has important ramifications. One of the earliest concerns raised about OER was that they might further entrench the perceived superiority of content developed in certain regions (UNESCO, 2002; The OECD, 2007). In 2002, at the inaugural conference on OER, a representative of Mansoura University, Egypt, remarked that the use of open resources is "…an opportunity we cannot afford missing . . . if (and only if) we also preserve cultural diversity" (UNESCO, 2002, p. 2). Also, consider the concern of the OECD with regard to the dominance of Western countries in the production of OER:

> There is a troublesome imbalance between the provision of OER and its utilization. The vast majority of OER is in English and based on Western culture, and this limits their relevance and risks consigning less developed countries to playing the role of consumers (The OECD, 2007, p. 14).

Clearly, while participants in this research were inspired to use OER, the concerns raised above cannot be ignored. The response to such concerns is clear. Proponents of OER in SSA must ensure that measures are put in place to facilitate the development of quality open materials with cultural relevance to the region. On the whole, the provenance of OER is an important factor in the selection of the resources (Masterman, Wild, White, & Manton, 2011). Ordinarily, students would seek materials that are high in quality and with reputable origins. Institutions of higher education in SSA have not made significant contributions to OER development compared to their Western counterparts. Based on the

results of the qualitative component of this thesis, in which participants reported that they would like to see the growth of local open content, it is my contention that with greater participation of SSA higher educational institutions in the development of OER, more students in the region will be encouraged to use resources created in the region. Furthermore, such participation will promote programs and courses offered at SSA institutions as well as increase the profile of local SSA teachers involved in the development of OER.

5.4.5 The ubiquity of OER

Another motivation identified by participants for using OER has to do with the ease with which the resources are accessed. This is related to the ubiquity of the resources. Some of the results of the qualitative component of this thesis indicated that participants found it beneficial to be able to access OER anytime and anywhere. Without a doubt, people are more likely to use learning materials they can easily find and retrieve. As McGreal (2012) noted:

> …proprietary materials impede ubiquitous sharing of knowledge with the use of technological protection measures such as DRM (digital rights management), prohibitive licensing, and restrictions on format shifting, localization, content sharing and other activities considered essential in ubiquitous learning (McGreal, 2012, p. 1).

The opening of educational resources with open licenses is meant to bypass or limit the restrictions McGreal mentioned in the above quote. OER extend the ubiquity of educational materials and facilitate easy access to the resources in several ways. In

further consideration of this point, the following issues will be briefly discussed: (a) OER as non-rival and non-excludable resources, (b) the openness of OER, and (c) the mobile access of OER.

OER are non-rival and non-excludable

As digital materials, OER are non-rival resources, which means that their ownership and use by one individual is not limited as a result of their ownership and use by another (Efroni, 2011; McGreal et al., 2013). In other words, they are replicable and distributable to as many people as possible without an actual loss of ownership to anyone in particular. Materials with this kind of quality are referred to as non-excludable materials (Deepashree, 2008). Consider the case of a print copy of a textbook, for example. If a copy is given by one individual to another, there exists a case of loss (of ownership by the giver) and gain (of ownership by the receiver). All digital resources, by their nature, are supposedly non-rival and non-excludable. However, copyright and other technological protective measures restrict the non-rival and non-excludable qualities of many digital resources. Nevertheless, many digital resources, including OER, are disseminated widely on the Net and, as such, become available for use anytime and anywhere.

Openness in educational resources extends their ubiquity

The other reason OER extend the ubiquity of educational resources is related to their inherent openness. As I mentioned earlier, even though all digital materials are supposedly non-rival and non-excludable, their dissemination and ownership may be restricted through proprietary technologies and copyright legislation. As a result, access to many quality educational and learning materials is limited to privileged users. For

example, college and university online databases of academic materials are accessible only to faculty and registered students. Of course, such colleges and universities have a cogent economic argument for their decisions. For examples, many institutions are obligated by vendors to restrict access to only a certain number of users (Plum & Bleiler, 2001; Dew, 2002). Regardless of the reasoning behind the restriction of access, many people are prevented from obtaining access to relevant learning materials. With OER, at least in many instances, the restrictions could be eliminated. There is a true sense of non-rival and non-excludability in the ownership and use of open resources because they are digital, free, sharable, and devoid of copyright restrictions. OER and other open resources provide opportunities for academic institutions, particularly those in SSA with less income to spend on developing traditional online databases, to create and maintain *open resource databases* with no restrictions on users. I recognize that even though the materials are free, there are incidental costs, such as those for hosting the databases, assessing and collating the materials, and for maintaining the databases. It may be impossible for many schools in SSA, including Nigeria to afford such costs given how notoriously underfunded many of them are. Nonetheless, such institutions can piggyback on open databases created by more affluent institutions around the world. They can form consortia with other institutions to create and maintain open databases. MIT OCW is one example of such endeavors, with over 170 institutions participating in the consortium. MIT OCW site receives over 2 million visitors per month, with more than half coming from outside North America, including SSA (ocw.mit.edu). In fact, the University of Lagos, the institution from which the sample was collected for this thesis, has a link from its homepage to the MIC OCW site. As at the time of writing, Coursera has over 15

million users, 1470 courses, and 133 partner institutions (from 126 countries) (courser.org). Institutions in SSA are yet to partner with Coursera. There is an opportunity for SSA institutions, particularly higher educational institutions in Nigeria, to collaborate with Coursera and other open databases in developing and maintaining open resources, given that more and more students from the region are using the resources. It is important to note that these *open initiatives* are facilitated by the open nature of open resources. Students and learners all over the world are able to use such open databases as MIT OCW, Coursera, and Open Learning Initiative ubiquitously because they are open, non-rival, and non-excludable.

Mobile access extends OER ubiquity

OER extend the ubiquity of educational resources through mobile accessibility. With smartphones and other mobile devices, students are able to access online digital materials easily on the go and apply them in meeting various learning needs. As Ally and Samaka noted:

> …people in remote locations and developing countries do not have computers to access learning materials. It is true that many do not have desktop or laptop computers to access learning materials, but they have mobile devices and are now obtaining tablets with wireless capability to allow them to access learning materials from anywhere and at any time. These countries are bypassing the wired desktop stage and moving directly to wireless mobile technology (Ally & Samaka, 2013, p. 1).

In April 2015, Pew Research Center reported that currently mobile phones are as

common in some SSA countries as they are in the United States. As shown in Figure 11,

a significant portion of the population now has access to mobile phones.
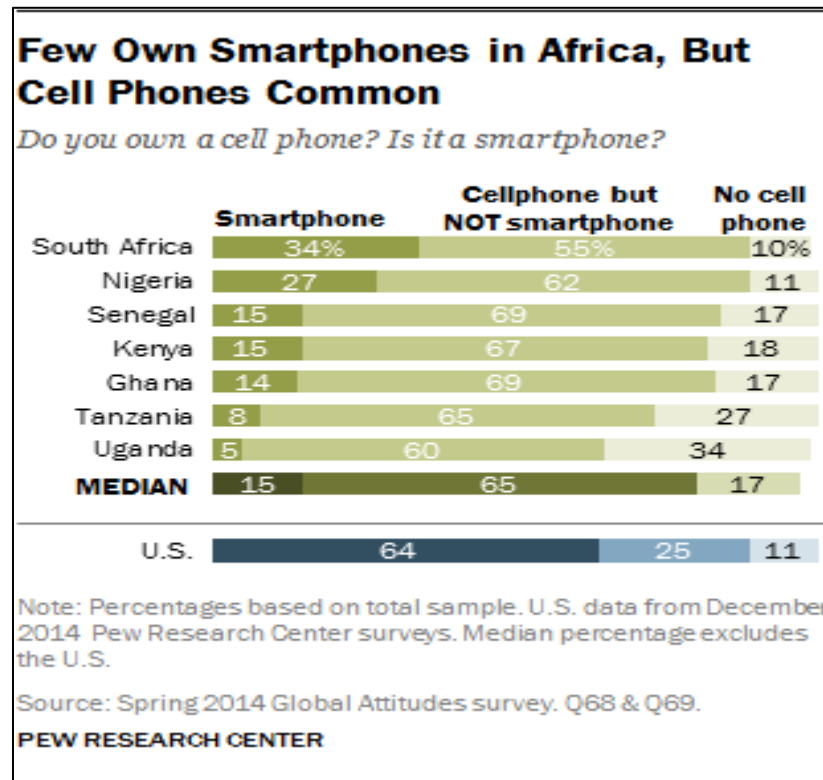
Figure 11. Mobile phone usage in SSA

As in the developed regions of the world, developing countries, including those in SSA,

have seen a tremendous increase in the ownership of smart mobile devices. The Pew

Research Center (2015) report also shows that young people between the ages of 18 and

34 are more likely to own smartphones in SSA. The majority of students who participated

in this research fell into this age category. Thus, the report supports the fact that students

at institutions of higher education in SSA are more likely to own smart mobile devices

than any other group. On the whole, the rise in the use of smart mobile devices among

students in SSA will enable increased access to OER repositories without spatial and temporal restrictions. Access to learning materials in this way not only reduces the learning gap between SSA students and their counterparts in the developed world; it also equalizes the learning opportunities between rural dwellers and urban dwellers in SSA, where institutions of higher education are mostly located. The open nature of OER means that they can be easily disseminated and freely accessible at all times through mobile networks, via smartphones, electronic tablets, and laptop computers.

5.4.6 Using OER for free

The fact that OER are free to use also motivated participants to use the resources (see Section 4.4.4 for a more elaborate discussion on the importance of freely available OER to students). Although the free nature of OER is evidently important to participants, it is a bit surprising that other factors, such as the complementary beneficial role of the resources supersede the resources being free. In other words, it appears that participants gave more consideration to how they could use OER to support learning than the cost of access to the resources. This could be explained by the fact that they seemed to naturally accept that OER cannot be wholly free. There will always likely be incidental costs. For many students, the cost of OER access resulting from Internet subscription is significant. Notwithstanding, participants in this research were motivated to use OER because they are free and, thus, reduce the cost of learning.

5.4.7 Accessing OER on YouTube and other social media platforms

Generally, social media offer different options for access to a variety of digital resources (Alexandra, Connolly, & Scott, 2012). One of the results of this thesis suggests that participants in this research were motivated to use OER because they are accessible on

YouTube. An audio-video platform, YouTube is one of the most used social media sites among students (Snyder & Burke, 2008). This result is important because it highlights the importance of certain social media sites frequented by students in the dissemination and use of OER. Social media such as YouTube can facilitate the access to OER in two significant ways: (a) sharing of the resources and (b) creation of OER metadata.

One of the most significant qualities of OER is their sharability. Open resources with the right licensing designation are pre-approved for use and dissemination by anyone without the risk of copyright violation. For students, sharing of OER with peers would be much easier because of their heavy presence in social media sites. For example, it will be easy for a student to send open lecture video to peers who subscribe to his or her YouTube channel. In addition, social media sites can be used to improve users' experiences with finding and using of OER through the creation of metadata. As Alexandra, Connolly, and Scott (2012) opined, social media can support the use of OER in a way that other digital environments cannot because they offer the opportunities to integrate such functionalities as tags, comments, and ratings to OER. Such functionalities will assist students in navigating available OER as well as in determining the relevance of the resources.

On the whole, with the proliferation of social media, there are possibilities for encouraging the use of OER among students. This thesis shows how one social media site—YouTube—motivates student participants in this research to use OER. However, other social media sites could also be used to create and disseminate OER for the benefit of students. For example, as Butcher, Kanwar, and Uvalic-Trumbic (2015) opined, a site such as Flickr could be used to publish open photographic materials while Twitter and

Facebook could be used to spread awareness about open materials posted on OER online repositories. This could help students at higher educational institutions in SSA to easily find OER, especially since it has been shown in this thesis that participants lacked adequate awareness of OER repositories. To better understand the role of social media in the use of OER among students in SSA, a future research consideration would be the investigation of how students apply social media to find and disseminate OER.

5.4.8 Networking, collaboration, and synchronicity

The examination of the results reflected in components 11 and 13 reveals 3 key learning concepts: networking, collaboration, and synchronicity. Evidently, OER facilitates these learning processes; as a result, students are motivated to use the resources. Results from both the qualitative and quantitative aspects of this thesis reveal that participants applied OER in support of networking (see Section 4.4.3 for a more elaborate discussion on the use of OER to networking). Basically, networking refers to the process of interacting with other people to exchange information (*Oxford American Large print dictionary,* 2008). The students who participated in this research engaged in the sharing of academic information through the exchange of OER. They used such exchanges to support collaborative endeavors intended to solve academic tasks. Often, students are required to work with others as part of formal learning. OER not only enable the exchange of required useful educational resources, but they also ensure that *time* is not a hindrance in the process. OER can be used synchronously and asynchronously. OER, like other digital resources, potentially enable simultaneous use when required. In addition, the resources also enable flexibility to the extent that individual student could use the resources anytime and anywhere. It is also important to acknowledge the roles that social media

could play in the process of using OER to support these learning processes. Social media such as YouTube could provide the platform students require to apply OER to support networking and collaboration with peers. Overall, OER facilitate the exchange of academic resources and support collaboration among students, irrespective of time and the location of students.

5.4.9 The localization of OER

Participants in this research were motivated to use OER with local relevance. This result is strongly supported by the finding in the qualitative aspect of this thesis. This is an important result considering that most of the existing OER are produced in Europe and North America, and not in SSA. The process of producing locally relevant OER is referred to as OER localization. OER localization does not only entails the production of OER relevant to a specific locale, but it also includes the adaptation of existing OER for local use (Ivins, 2011). This adaptation could involve such measures as the complete translation of a book from one language to another, the addition of local examples to a textbook for conceptual illustration, or the mere correction of a historical date in an assigned material. In any case, it is not illogical that students would be more likely to use open materials that have certain local or cultural relevance to them. As Mulder (2008) suggested, it is not enough for developing regions such as SSA to be mere consumers of OER; they must also make a significant contribution to available open materials. This is not only important for the strengthening of the diversity of ideas represented by available open materials, but it is also important to ensure the availability of local open materials that students at institutions of higher education in SSA could use to solve formal academic tasks.

5.4.10 Factors that do not directly motivate students to use OER

Participants reported that the following factors did not necessarily motivate them to use OER:

- observing other people use OER,

- creating OER,

- the availability of OER in audio and visual formats,

- the sharability of OER.

The results of component 5 show that participants were not necessarily motivated to use OER by observing other people using the resources. It also shows that they do not consider their involvement in the creation of OER as a reason to use the resources. It is important to clarify that these factors may contribute to the overall reasons students use OER, even though on their own, they do not constitute direct motivations for the use of the resources. As I explained earlier in this chapter, the reason for this may be because the students who participated in this research did not observe others use OER nor did they engage in the development of the resources. It is possible that, with greater participation of students in the use and development of OER, the factors may be viewed differently by students.

The results also show that the availability of OER in audio and video formats did not particularly motivate participants to use the resources. In addition, the results show that the fact that OER are sharable is not necessarily the reason participants use the resources. Again, it does not mean that these factors are not important; rather, it means that participants did not particularly consider them the reason they use the resources. It

also means that if OER were only available in formats other than audio and video,

participants would have still been motivated to use them. Likewise, if participants could

not share OER, they would still have been motivated to use the resources. As I explained

earlier, it may be that these results occur because participants were limited in their

awareness of the OER concept and repositories. That is, participants may have reported

that sharability of the resources did not motivate them to use the resources because they

did not entirely understand the full extent of the resources' sharability. As for the

availability of OER in audio and video formats not being considered a motivational

factor, that result could have come from the fact that participants lacked awareness of

audio-visual OER repositories. In other words, it seems that participants were making the

point that if OER are not available in audio or video formats, they would still be

motivated to use the resources.

On the whole, the participants in this research are motivated to use OER to

support formal academic learning for a variety of reasons. The results produced in this

aspect of the thesis contribute significantly to the understanding of the reasons students

find and use OER. As Luker (2008) says of these types of studies, even though caution

must be applied in statistically generalizing the results, they can always be generalized

logically. These notions are represented by Proposition 5 below:

Proposition 5. *The students who participated in this research were motivated to use OER*

because of the resources' complementary beneficial role to formal academic learning;

however, inadequate awareness of the resources, as well as several other challenges,

limited the use of the resources.

5.5 Additional results of quantitative data analysis: participant responses to each of the survey items

This section is added as a response to the feedback from one of the thesis examiners. In the section, I present the descriptive statistics[7] of participant responses to each of the survey items. As shown in Appendix I, 27 of the 40 items have a median of 4. The median is a measure of central tendency (or typical response); thus, this result means that participants typically agreed with 27 items on the scale as the motivation for their use of OER. Appendix I also shows the mode of the responses to each of the items. The statement: "I can use my mobile phone to find OER" was strongly agreed to more than any other statement. As shown with the results in Appendix J, 87% of participants agreed or strongly agreed with the statement. The result highlights the importance of mobile devices to the access of OER among participants. As I have previously mentioned, SSA, and particularly Nigeria, has seen a significant growth in the ownership of smart digital devices among its student population in recent years. The result is also supported by the interview responses, in which participants reported primarily using mobile devices for accessing OER. The other statements that participants mostly agreed with are similar to those that loaded onto the 13 components identified with the PCA. Some of such item statements include:

---

[7] One of the thesis examiners suggested that the PCA analysis could be conducted with this type of data in two steps. In the first step, a descriptive analysis is performed to identify the median and frequency of participant responses to each of the survey items (the mean can also be used if the scale is proven to have internal consistency with such techniques as Cronbach alpha). And then in the second step, the items that best reflect the construct of measure, based on the interpretation of the descriptive statistics, are included in the PCA. The purpose of this approach is to reduce the number of items included in the PCA, particularly given that data reduction is the initial aim of the PCA. In this exploratory analysis all the items were included in the PCA, but I will be testing the two step approach in future studies on OER.

- "OER help me prepare for classes."

- "OER help me complete my assignments."

- "OER enable me to prepare for tests and exams."

- "OER complement what I learn in my formal classes."

- "OER are free to use. They reduce the cost of learning."

- "OER are easy to find online."

- "My school makes it easy for me to find OER."

There are also a few discrepancies. Participants were mostly non-committal to the following item statements: "I worry about the environmental impact of using print materials," and "some OER are produced locally." Yet, these items, along with other items, loaded onto the principal components identified with the PCA. Also, the percentage of participants (approximately 40%) that disagreed or strongly disagreed the item statement: "OER help me decide what school to attend" is higher than the percentage of participants (approximately 28%) that agreed or strongly agreed with it. Yet, the statement loaded onto one of the principal components. Thus, instead of the sole reliance on a scree plot test and the coefficient of initial eigenvalues, it probably would have been useful to base the inclusion of items in the PCA on the results of an initial descriptive statistical analysis. Overall, the factors identified with the analysis of the descriptive statistics as the motivation for participants' use of OER are similar to those that loaded onto the principal components. The identification of these reasons may be useful to developers of OER initiatives.

To conclude this chapter, the use of OER among the participants in this research was mostly intended to support formal academic learning. This conclusion is supported by both the qualitative and quantitative data collected and analyzed in this thesis. Overall, the results of this study has shown that there are benefits as well as challenges in the use of OER. In spite of the challenges of using OER in Nigeria, and SSA in general, the students who participated in this research were motivated to use the resources for several reasons, among which are the usefulness of the resources in completing academic tasks, the ubiquity of the resources, and the importance of the resources in supporting academic networking and collaboration.

Chapter 6

6 Conclusion

6.1 Introduction

This thesis was an exploratory study of issues relating to the use of OER by students at the University of Lagos in Nigeria. Specifically, the thesis examined how awareness, attitudes, benefits, challenges, and motivational factors affect the overall use of OER by the students. Examining OER use from the students' perspectives not only contributes significantly to the overall understanding of OER, but it also sheds light on how students use open online digital learning resources. In this chapter, I conclude this thesis by briefly restating some of its major insights and contributions to the knowledge of OER, developing a model for OER use, underlining some of the thesis' implication for practice, briefly describing some of the thesis' limitations, and highlighting some directions for future research.

6.2 Summary of insights

The first issue examined in this thesis was the awareness of OER among participants. The results indicate that the students that participated in this research did not have adequate knowledge of OER. That is, they neither have an adequate understanding of the concept of OER nor know how to find the resources online. They were not aware of all of the special privileges accorded in the use of the resources, which include the ability to freely use, reuse, remix, share, and modify the resources. The implication of this is that the ability of the students to identify and find OER is hindered. This also means that the students may miss out on what they can do with the resources. They may not fully utilize the resources to the extent allowable. For instance, a student may be worried about

modifying certain OERs or commercializing them for fear of copyright violation even though such materials are licensed to allow for such activities. Furthermore, the students may be unwilling to disseminate certain open materials with peers for similar reasons even though, again, such dissemination is sanctioned by the attached license. On the whole, this thesis has shown that the lack of adequate OER awareness means that the student participants in this research cannot efficiently locate and apply the resources to the fullest extent possible. It shows that the awareness of OER, both of the concept and online repositories, affect the use of the resources.

The second key issue examined in this thesis was the attitudes of students at institutions of higher education toward OER. The results indicate that participants were overall positively impressed with OER. In spite of this, the results also show that some of them were ambivalent about the effects of the resources on learning behaviors. While it appears that participants' positive impressions of OER emanated from their perceptions of the benefits of the resources, their ambivalence came from their inadequate awareness of the concept of OER as well as their poor knowledge of the resources' online repositories. As a result, it is logical to assume that with better awareness of OER, there will be increased use of the resources among students at the University of Lagos in Nigeria.

The third issue relating to the use of OER investigated in this thesis was the benefit participants derived from using the resources. The results show that participants derived several benefits in using OER. First, they benefited from OER by using them as complements to the learning resources formally assigned by their schools. The result is that they gain broadened understanding of the issues. Second, they use OER to facilitate

the exchange of academic information. That is, they use the resources to support

academic networking. Being able to share the resources ensures better collaboration on

many academic activities. Third, participants benefited from the ubiquitous availability of

OER. This means that they were able to access the resources anytime and anywhere. It

means they were able to use commonly available devices such as smartphones, electronic

tablets, and laptops to access and retrieve the resources even when they were on the go.

Fourth, participants benefited from the additional option that OER provide for learning.

Participants reported that they were able to use the resources in various formats,

including text, video, and audio. They were also able to access the resources in social

media platforms, such as YouTube. Fifth, participants benefited from OER because the

resources are free. This basically means that some students can reduce the overall cost of

education through the use of OER. It suffices to add that just as student awareness of

OER affects attitude toward the resources, student awareness of OER also affects how

well they can benefit from OER. Essentially, awareness of the benefit of using OER will

encourage students to learn to use the resources more efficiently.

The fourth issue relating to the use of OER investigated in this thesis was the

challenges students face in using the resources. The results show that there are three main

challenges participants face in using OER. The first is the incidental costs related to the

use of the resources. Even though OER are free, because they are only accessible online,

participants needed to pay for such services as Internet subscriptions. For many students,

particularly in Nigeria, this is a challenge. The second issue is the disruption to OER

access that comes from such factors as poor Internet services and intermittent electricity.

The third issue is inadequate skills to access OER. The results show that participants

found it challenging to efficiently find and retrieve OER. They spent more than the necessary time browsing through results of sometimes poorly constructed search terms in popular search engines. This means that they spent more than the necessary Internet bandwidth, and consequently, more money. Better awareness of OER repositories will certainly ameliorate the effects of inadequate search skills.

The fifth and last issue relating to OER examined in this thesis is the motivation for using the resources. The results show that participants were motivated by certain factors to use OER. The factors include the complementarity of OER to formal academic learning, the ubiquity of OER access, the multimodal nature of OER, and the economic value of the resources. These factors suggest that students' motivation for using OER is related to the benefits they derive from using the resources. Furthermore, participants were motivated to use OER when encouraged by their schools, teachers, and librarians. On the whole, while such factors as better awareness, perceived benefit, and positive attitude increased the use of OER among participants, the challenges of using OER identified in this thesis hinder the use of the resources. In the next section, a model that demonstrates these points will be developed.

6.3   Developing a model for OER use

In response to these findings, this section offers a model for understanding the use of OER among participants in this research. The model has two main purposes: (a) to represent the complexity of OER use and (b) to provide a framework for developing effective strategies intended to address the challenges students face in using OER at the University of Lagos, and perhaps at other institutions in SSA. Thus, the model demonstrates a conception of online information use born out of consideration for

students' information needs, experience, and context. The development of the model will begin with a description of some of the extant information behavior models with conceptual influences.

6.3.1 Conceptual influences

Finding and using OER are related to information behaviors. The importance of models and theories in understanding information behaviors, particularly with regard to specific groups, has been of interest to researchers (Fisher, Erdelez, & McKechnie, 2005). Models, which usually consist of the relationships between theoretical propositions, are essentially a framework for thinking about a phenomenon (Wilson, 1999). Information behavior models are useful for explicating as well as for proposing behaviors around information resources. In the past three decades, several models for understanding the use of information resources have been developed, including Ellis' model of information-seeking behavior (Ellis, 1989; Ellis & Haugan, 1997; Ellis, 2005), Choo and Detlor's behavioral model of information seeking on the Web *(*Choo & Detlor, 1999), and Kuhlthau's information search process model *(*Kuhlthau, 2005; see Chapter 2 for a review of the aforementioned models). Some of the key information behavior models from which the current model draws conceptual inspiration are briefly discussed here.

Wilson (1999) developed a general model that integrated different areas of information behavior research. Wilson's model suggests:

> information-seeking behaviour arises as a consequence of a need perceived by an information user, who, in order to satisfy that need, makes demands upon formal or informal information sources or services, which result in success or failure to

find relevant information. If successful, the individual then makes use of the information found and may either fully or partially satisfy the perceived need—or, indeed, fail to satisfy the need and have to reiterate the search process… part of the information seeking behaviour may involve other people through information exchange and that information perceived as useful may be passed to other people, as well as being used by the person himself or herself (Wilson 1999, p. 251).

Wilson's model highlights several points related to information behavior that are assumed in the current model and useful in understanding it: (a) information use arises as a result of perceived need; (b) users consciously seek to satisfy information needs through formal or informal information services; and (c) the effort to find information may be successful or unsuccessful. While Wilson's model provides the basic processes of explicating information behavior, which is useful for understanding how different groups, including students, engage in finding and using information resources, it does not provide a means for understanding specific issues related to the use of OER among the students targeted in this thesis. For example, while Wilson's model could be used to explain the fact that the finding of OER by students sometimes may be unsuccessful, it does not, as the current model does, address the specific reasons for such failures. Thus, the current model may be seen as an expansion of certain aspects of Wilson's model with the objective of facilitating a better understanding of specific OER use issues.

The other extant information behavior model to consider with conceptual influence on the current model is Ingwersen and Jarvelin's (2005) integrated information seeking and retrieval framework (IS&R). The IS&R can be summed up under three main principles:

1. Information behavior encompasses the activities of the creators, facilitators, and users of information objects. As used here, facilitators include human and non-human actors that enable the creation, transmission, finding, using, and exchange of information objects.

2. Information behavior of any particular actor is influenced by past and present experiences, as well as the social, organizational, and cultural environment.

3. The activities of any one individual actor (human or non-human) within the information system may have an influence on the overall system functioning, as well as the other individuals' use of the system.

The IS&R models the activities, interactivity, transformations, and interpretations that are undertaken by actors who participate in the information process from generation to use. These activities, interactivity, transformations, and interpretations affect whether and how information objects, such as OER, are found and used. According to Ingwersen and Jarvelin (2005), examples of human actors whose actions may have effects on the process of finding and using information objects, such as OER, include individual authors (i.e., faculty who create OER), communities of individuals (i.e., institutions of higher education, including MIT and Carnegie Melon that produce and distribute OER), indexers (i.e., individuals who analyze, organize, and store selected OER in repositories), designers of retrieval systems (i.e., search engines, indexing algorithms, websites, and other repositories), aggregators (i.e., individuals who decides the specific open materials made available in repositories), and information seekers (i.e., students looking for OER).

Basically, the IS&R can be explained thusly: the prevailing context, as well as the specific assigned task, play a role in the way users behave in information systems.

Essentially, the strength of the IS&R is in its modeling of information behavior and the process of retrieving information resources. In a general sense, it can be useful in explicating the process of finding and using information objects. To the current model, the IS&R is useful for its emphasis on context. The importance of the current model is its explication of specific aspects of users' context in relation to their use of OER. That is, the current model provides a basis for using the state of individual students' awareness, attitudes, and motivations, for example, to explain their use of OER.

6.3.2 A model for OER use by students

In this thesis, several broad themes were considered in the examination of the finding and using of OER by participants. The themes are awareness, attitudes, benefits, challenges, and motivations. The analysis of data related to these themes revealed several categories. The current model incorporates the themes and categories to explain the use of OER among the students targeted in this thesis. In the sections that follow, using the propositions generated in the discussion sections in chapters 4 and 5 as a prompt, I develop a model that explicates the use of OER by the students.
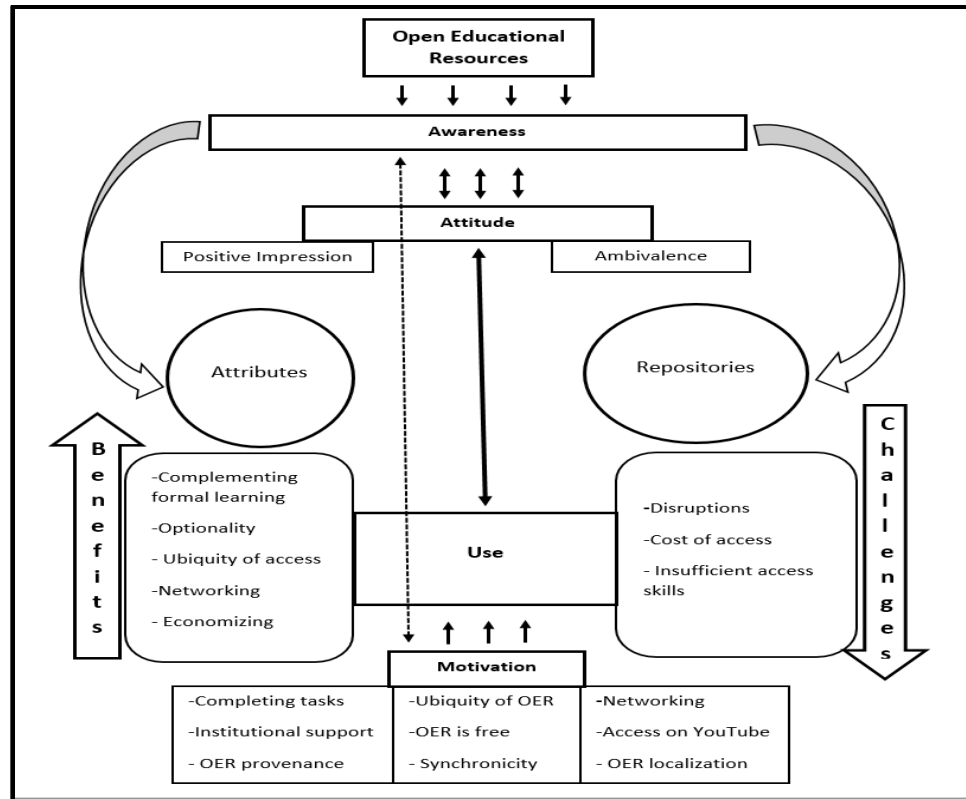
Figure 12. A comprehensive model of student OER use

Awareness

Proposition 1: *The students who participated in this research had limited awareness of OER as well as inadequate knowledge of their online repositories; thus, they were unable to adopt and make efficient use of the resources for completing educational tasks.*

Proposition 1 is a summation of the results relating to participants' awareness of OER. The proposition is illustrated in Figure 12 with the *awareness and use boxes*. The figure portrays a simple relationship between OER awareness and use by illustrating how aspects of the students' OER awareness affect their use of the resources. In essence, the diagram shows that the knowledge of the OER concept and their online repositories affect the use of the resources. As revealed by this thesis' results, participants' use of

OER was hindered because they were unfamiliar with the term *open educational*

resources or its acronym, OER. The lack of familiarity with the OER concept was a

hindrance to participants' use of the resources because it fostered their inability to

identify open repositories. The results also revealed that participants lacked adequate

knowledge of the unique attributes of OER. The assumption is depicted in the diagram

with the *attributes* and *repositories boxes*. The vertical double-headed arrow in the

middle of the diagram from the *awareness box* to the *use box* indicates that the students'

use of OER will improve as their knowledge of the resources improve and vice versa.

Essentially, the better the knowledge of OER, the more frequently and efficiently

students will apply the resources. Inversely, the diagram presupposes that OER use

affects students' knowledge of the resources. That is, frequent and expanded use of OER

will facilitate better knowledge of the resources, particularly how and where to find them.

In the next section, the attitude theme will be incorporated into the model.

Attitude

Proposition 2. *The students who participated in this research were positively impressed*

with OER. However, their limited knowledge of the resources engendered attitudinal

ambivalence about the effects of the resources on learning practices.

Figure 12 also depicts the role of attitude in the use of OER. It provides a simple

illustration of the relationships among awareness, attitude, and OER use. With the

downward arrows from the awareness box to the *attitude box*, the diagram essentially

shows that participants' awareness or knowledge of OER affects their attitudes toward

the resources. The double-headed vertical arrow in the middle of the diagram shows that

both awareness and attitude affect OER usage and vice versa. In other words, not only do

the students' awareness and attitudes affect their use of OER, but their use of the

resources also affects their awareness and attitudes. These results represent a need for

OER proponents, including educational institutions, to not only double down on creating

awareness about the resources but also to make OER repositories easily accessible to

students. Such measures would strengthen students' positive attitudes toward OER and,

consequently, lead to their frequent and effective use of the resources.

The benefits of using OER

Proposition 3. *The students who participants in this* research *received several benefits*

from using OER. The better the awareness they received about OER, the better their

attitudes toward the resources, and consequently, the more their use of the resources.

Figure 12 includes the benefit theme. Basically, it depicts the relationship among

awareness, attitude, and benefits in the use of OER. This relationship is encapsulated in

the statement expressed as Proposition 3. What the *benefit box* added to the model is the

role of OER benefits (i.e., the advantages or gains received from using the resources).

Basically, students use OER because the resources represent certain benefits. As the

results of this thesis have shown, OER were useful to participants in the context of formal

academic learning. Just as awareness affects attitude and use of OER, the fact that OER

have certain benefits to students also affects their attitude as well as the frequency and

efficiency of their use of the resources. The point here is that the benefit theme included

in the diagram shows that awareness, attitudes, and the perceived benefits of using OER

affect the adoption and use of the resources. If students are aware of the benefits of using

OER to support academic work, they will develop a better impression of the resources and, consequently, apply the resources with greater frequency and with more efficiency.

Challenges in the use of OER

Proposal 4. *While the numerous benefits of OER support their increased use, the students who participated in this research were challenged by several issues when attempting to use the resources, thus limiting their overall use of the resources.*

The challenges theme is incorporated into the model as shown in Figure 12. The downward arrow of the *challenges box* indicates that the use of OER can be hindered by certain challenges. For example, as the results of this thesis have shown, participants' use of OER were hindered when their access to the resources were disrupted as a result of poor Internet connection, irregular electricity, and the high cost of electronic devices. Essentially, the frequency and the efficiency with which the students at institutions of higher education targeted in this thesis use OER is hindered by the challenges they face in the process.

Motivations for using OER

Proposition 5. *The students who participated in this research were motivated to use OER because of the resources' complementary beneficial role to formal academic learning; however, inadequate awareness of the resources, as well as several other challenges, limited the use of the resources.*

The *motivation box* in Figure 12 indicates that certain motivational factors facilitated the use of OER among participants. As revealed in the quantitative component of this thesis,

several factors (e.g., the fact that OER complement academic learning, that the resources are ubiquitous, and that the resources support networking) motivated participants to use the resources. The upward arrows from the motivation box to the use box show that the presence of these motivational factors increases the use of OER among the students. Furthermore, the doubled-headed dashed arrow that runs between the awareness and motivation boxes (through the attitude box) depicts a relationship between participants' awareness of OER, their motivation to use the resources, and their attitude toward the resources. Essentially, it shows that awareness of OER benefits, attributes, and repositories may motivate students to use the resources. Inversely, it also shows that the presence of certain motivational factors may inspire the use of OER, which in turn may lead to better awareness of the resources. Also, increased and expanded use of OER (resulting from the presence of certain motivational factors) may lead to better attitude toward the resources.

6.3.3 Discussing the core categories in the model

Figure 12 represents a theoretical model of OER use by the students who participated in this research. The model depicts an interplay of this thesis' themes of awareness, attitudes, benefits, challenges, and motivations in the use of OER among the students. It also depicts the relevance of the core categories that emerged from the thesis in understanding the students' use of OER. A brief discussion of the relevance of the categories as illustrated with the model is provided here.

The model in Figure 12 shows that awareness is relevant in the adoption and use of OER. Precisely, it shows that being aware of the attributes and repositories of OER leads to increased and efficient use of the resources. The core categories related to the attitude

theme are also added to the model. The addition of these categories shows that attitude affects the use of OER. Essentially, having a positive impression of OER increases the use of OER while being ambivalent may serve as a hindrance to the adoption and use of the resources. As earlier noted, the frequent and expanded use of OER will not only increase knowledge of the resources, it will also strengthen students' attitudes toward OER. As the results of this thesis have shown, participants' ambivalence about OER likely emanated from inadequate knowledge of OER.

As with attitude, the core categories relating to the benefits of using OER are incorporated into the model. These categories have been discussed in Chapter 4, but here is a brief highlight of the main points, as a way of explaining the categories' inclusion in the model.

- Complementing formal learning: participants benefited mainly by using the resources to complement assigned academic resources. Specifically, the students at institutions of higher education in Nigeria involved in this research benefited from using OER to complement the learning they received from their schools.

- Optionality: The benefits that the students received from using OER also included access to educational materials in multiple formats. The optionality category not only represents OER as additional resources to be used to complement assigned educational materials, but it also represents OER as the constituent of a variety of learning object formats, such as videos, text, and audios. The multimodal production of OER facilitates better engagement with the learning materials.

- The ubiquity of access: participants were able to use the resources to complete academic tasks without spatial and temporal limitations. They could access the resources ubiquitously through mobile electronic devices, anytime and anywhere.

- Networking: with access to OER, participants were able to engage in the exchange of academic resources. They were able to interact, connect, or collaborate with peers. In other words, they were able to engage in networking.

- Economizing: the other important advantage of using OER is the fact that they are free. For participants in this research, being able to use OER to reduce the overall cost of higher education was considered a significant benefit. OER provided the students with free alternatives to expensive textbooks and other learning materials. Precisely, they were engaged in the process of *economizing* through the use of OER.

Overall, the benefits of OER represented by the core categories incorporated in the model suggests that the students are prompted to use OER when there are benefits of doing so. Essentially, the existence of benefits for the use of OER increases the use of the resources. However, students must be aware of such benefits for them to use the resources efficiently. That is, there is a relationship between the awareness and benefits in relation to the use of OER. The benefit category is also related to attitude. As I noted earlier, when students perceive that there is a benefit for using OER, their positive attitude toward the resources will be strengthened, and they will be less ambivalent about the effects of the resources.

The core categories related to the challenges students face in using OER are also incorporated in the model. Challenges to using OER represent the various factors that

might impede the efficient use of the resources. The analysis of data relating to the challenges of using OER by participants in this research revealed three core categories: (a) dealing with the cost of access, (b) experiencing disruptions, and (c) lacking sufficient skills for access. The results were presented and discussed in Chapter 5. A summary of the discussion is provided below.

One of the key drawbacks of using OER (or any digital resources) by students is cost. In this thesis, the results show that participants found it challenging to pay for Internet service subscriptions and purchase adequate Internet-enabled devices, thus, hindering their ability to use OER. Despite the fact that OER are free, some students are prevented from using the resources and are forced to deal with these associated costs. Not being able to afford adequate Internet-enabled devices and subscribe to the Internet often lead to disruption of access to OER. Disruption of access to OER does not only result from poor Internet service, but also from poor electricity supply. Furthermore, participants were hindered by a lack of sufficient skill to access the resources. Evidently, the students lacked the skill to apply proper search strategies in finding OER relevant to their desired topics. On the whole, the inclusion of the core categories relating to the challenges of using OER in the model is meant to show how such challenges hinder the use of the resources.

Last, several factors motivated participants to use OER. Some of the categories relating to the motivation for using OER are also incorporated into the model. The first represent the support that OER provide to students in completing academic tasks. Participants in this research were encouraged by the availability of OER when undertaking various academic tasks (e.g., writing exams and assignments). The use of

OER to support such academic tasks is enhanced by the fact that the resources are free and ubiquitous. In other words, the students were able to access OER for free, anytime, anywhere. In addition, OER enabled them to participate in networks through the exchange of open academic information. Particularly, participants were motivated to use OER because they are available in multiple formats, and available in popular social media sites, such as YouTube. Furthermore, the students were not only encouraged to use OER that have local relevance; they were also motivated to use OER created under the auspices of reputable institutions.

Other than the above, the prospect of identifying suitable schools and academic courses, based on open courses on offer from different schools, motivated participants to use the resources. Also, the initiatives taken by many institutional departments, such as libraries, inspire the use of OER among the students. All in all, the inclusion of the categories relating to the motivation for using OER is intended to show that participants were encouraged to adopt and use OER when certain factors abound.

In summary, information behavior models, often presented with diagrams, are statements intended to describe information behaviors, such as the finding of information resources. According to Wilson (1999), models often describe actions as well as consequences of actions related to information behavior. The current model presupposes that there is a need for students, particularly those at the University of Lagos, to use OER. The assumption comes from the fact that there is limited access to educational resources for many of the students for a number of reasons, including the fact that education is poorly funded in SSA (World Bank, 2010), educational resources are expensive (Chapman, Evans, Minter, & Mesador, 2013; Jaffe, 2015), and many students in the

region are from households with the lowest per capita income in the world (Chauvin, Mulangu, & Porto, 2012). The model also assumes that in spite of the benefits of using OER, students lack adequate awareness of the resources. Even though they generally have a positive impression of OER, the inadequacy of their knowledge of OER sometimes leads to attitudinal ambivalence about the effects of the resources on learning practices. The lack of adequate awareness is not the only challenge for students intending to use OER. There are other challenges that hinder their use of the resources, including poor Internet connection and the lack of adequate skills for finding OER online. Nevertheless, students are motivated to use OER for the completion of academic tasks. They are motivated not only because of the utility of the resources but also because of the activities of teachers and institutions. For example, institutions of higher education in SSA could, through libraries, encourage students to adopt and use OER by providing Internet access as well as training programs that will assist students in learning how to find the resources online. The model for OER use developed in this chapter will assist in the explication of the issues relating to the use of OER among students at institutions of higher education. It will also be useful in planning and conducting future research on the use of OER.

6.3.4 Applying the comprehensive model of student OER use in future studies

Models provide a road map for exploring social phenomena. As Shafique and Mahmood (2010) point out, they assist investigators in relating more accurately to reality as well as aid the description, prediction, testing, and understanding of complex systems or events. Essentially, models provide useful frameworks for the conduct of empirical research. The

model developed in this exploratory doctoral research will provide the basis for my next research on the use of OER. It will be used to examine the use of OER by different groups at educational institutions in SSA, starting with faculty and students in Nigerian universities and polytechnics.

The model developed in this thesis, among other things, suggests that awareness of OER, as well as attitudes toward the resources, affect the use of OER. This notion will be tested in my next study on OER. Specifically, I will be expanding the investigation of students' OER awareness to include participants from other universities in SSA. In addition, I will be looking at the relationship between students' knowledge of OER and their attitude towards the resources. This is important because, as the results of this thesis have shown, students at the University of Lagos lack adequate awareness of OER as well as have ambivalent attitudes toward the resources. It will be useful to see if these results can be replicated with other groups of OER users in SSA. A mixed methods research design consisting of interviews and survey questionnaires will be used to collect data, and as in this exploratory research, grounded theory procedures and PCA will be used to analyze the data collected. By applying this model, the investigations of OER use among targeted populations will be more efficiently conducted, both methodologically and analytically. Hopefully, the results generated from the research will not only provide an impetus/direction for future research on OER, they will also improve the substantive theory of OER use proposed in this exploratory research.

6.4   Significance of results

6.4.1 Contribution to the discourse on open educational initiatives as an alternative to traditional systems of education

Through the investigation of students at the University of Lagos, this research contributes to the understanding of the use of OER. Students, in general, constitute an important user group whose uses of OER are not fully understood (Thomas et al., 2012). Research on the use of OER by students at the University of Lagos is important for a variety of reasons, including the fact that as part of OER users in SSA, they have not received significant empirical attention. They are also important because, as users of digital learning resources (George et al., 2006; Okiki & Asiru, 2011), they provide an example of the gradual movement from a learning culture that was solely based on print just a few decades ago to one that is increasingly based on digital resources. The development and use of OER is an extension of the digital learning culture. Essentially, the focus on students at the University of Lagos is appropriate because this work is a response to the lack of research focus on student users of OER in SSA. This exploratory doctoral research provides an insight — a glimpse — into a new form of learning — alternate academy — that emphasizes the use of open materials to complement formally assigned learning resources at educational institutions.

The results of this thesis revealed that the use of OER by students at the University of Lagos is merely complementary since the resources are rarely assigned by faculty. In other words, despite the increasing cost of commercial learning materials, the University of Lagos is not assigning OER. Thus, students only use the resources as an alternative to formally assigned commercial academic resources. This is in line with the general state of

OER use in other institutions of higher education (Allen & Seaman, 2014). Although this study did not directly investigate students' valuation of traditional systems of education, the results provide some insights. They suggest that students still value traditional systems of education, despite the growth of such OER derivatives as MOOCs and OER universities. That is, in spite of the argument for OER and other related new forms of learning, students are not yet looking to replace existing traditional systems, but rather to complement them with alternatives that are cheaper and open. Further research is required to examine how students perceive the learning from open educational initiatives compared to those from formal academic courses.

6.4.2 Contribution to the understanding of the basic rationale for students' use of OER

Information seeking scholars predict that the use of information resources is influenced by individual needs. In particular, through the theories of ASK and sense-making, Belkin (1980; 2005) and Devin (2005), respectively, propose that the seeking of information resources, including OER, is aimed at satisfying specific needs. Using Wilson's (2000) definition of information seeking as a premise, online information seeking entails the purposive seeking for information in online platforms as a consequence of the need to satisfy some goal. The results of this thesis support the notion of the presence of a need for information seeking to occur. Participant responses show that they use OER because of the need to support specific academic tasks, including preparing for class lectures, writing exams and tests, and conducting research. Belkin (1980; 2005) used the theory of ASK to show that a need in a person's state of knowledge is an anomaly. In other words, when there is a perception of inadequacy or anomaly in person's state of knowledge, they

may engage in the seeking of relevant information to correct such anomaly. It is clear

from the results of this thesis that students use OER because they have a need to do so.

Participant responses show that they use OER to "broadening" their knowledge as well as

gain "current" understanding of certain academic topics. This idea is also related to

Devin's (2005) notion of a gap in knowledge as a reason for seeking information. Devin

(2005) used the theory of sense-making to explain the rationale behind information

seeking. Devin suggests that people engage in information seeking behavior when they

intend to fill a gap in their knowledge or make sense of their world. The sense-making

theory can explain the relationship between a perception of a gap in a students'

knowledge and the need to find and use OER.

The notion of need/gap can be looked from the broader perspective of the quality of

education and educational resources available to students. Although this thesis did not

specifically focus on students' perceptions of the quality of learning they receive from

their school, it does provide some insight. Particularly, the results suggest that

participants believe there is a deficiency in the learning they receive from their schools as

well as the learning materials available to them. This is in line with claims from leading

education proponents such as UNESCO (2002). UNESCO (2002) suggests that a primary

aim of developing OER is the supplementing of the learning provided by academic

institutions in developing countries. In spite of this, the use of alternative forms of

learning resources in the form of OER and other open educational innovations has not

been embraced by institutions of higher education in SSA, including the University of

Lagos. The results of this thesis do not only highlight this point, they also provide an

impetus for the continuing discussion on ways to remove barriers to formal education posed by the lack of access to educational resources.

6.4.3 Contributions to the understanding of the ways students find OER

The results of this thesis are significant in understanding how participants' find OER. Once a need for information resources is identified, individuals may engage in certain information seeking behavior to satisfy that need. They make decisions about the specific channels to obtain the desired information resources. Diane Sonnenwald (2005) applied the theory of information horizon to explain the relevance of such channels to information seeking. In studying information seeking under the methodology of information horizon, participants are asked to describe the channels they use to access information resources (information horizon), according to Sonnenwald (2005). The aggregate of an individual's potential information channels constitutes their information horizon. This may include other individuals, websites, repositories, etc. Essentially, based on information horizon theory, access to educational materials is dependent on individual's information horizon. The results of this thesis show that students looking for OER consult information channels — popular search engines, peers, teachers, etc. — in their information horizon. Clearly, information horizon theory is useful in explicating access to OER.

Based on the results of this thesis, awareness, attitudes, benefits, and challenges are important considerations in discussing information horizons of students looking for OER. Information horizon theory assumes awareness of relevant information channels. However, as the results of this thesis have shown, students are not always aware of available channels to open materials. Not only is awareness of OER repositories essential,

the ability to navigate through the repositories is also important in considering the use of OER. Thus, while this thesis strengthens the principles of information horizon in explicating the use of OER, it also shows that the theory can be better applied methodological and theoretically when the level of individuals' knowledge of their information horizon is taken into consideration. Furthermore, users' attitudes toward channels in their information horizon is also an important consideration. The way they feel and think about particular channels of information may determine the extent of their use of such channels. As this thesis have also shown, students' attitudes toward OER may be influenced by their knowledge of the resources. Thus, the use of information horizon theory in understanding students' use of OER can be better applied if their attitudes are taken into consideration.

Furthermore, awareness and attitude are not the only important constructs in understanding students' access to OER through the examination of their information horizon. The results of this thesis have shown that awareness of OER and attitudes towards the resources may be affected by the perceptions of benefits and challenges. It is, therefore, important to note that the potential benefits and the challenges of accessing channels to OER are also important considerations in understanding students' information horizon. Basically, the use of information horizon theoretical framework to determine the use of OER must take into account the perceived benefits (i.e., ease of access, cost, specific utility, etc.) as well as the challenges (i.e., cost, disruptions, and access skill) of accessing information channels that were identified by participants in this thesis.

Lastly, the discussion of access to information channels can be looked at from the broader perspective of the digital divide. The existence of a gap between countries or user groups in terms of their access to ICTs is what is referred to as the digital divide (The OECD, 2001). It is the gap that exists between users of digital resources with adequate access and those with inadequate access. The gap between users of OER at institutions of higher education in developed countries and those in developing countries (including those at the University of Lagos) is affected by key themes that emerged in this thesis, particularly: awareness of channels to OER (i.e., open repositories), attitudes toward the resources, and the challenges in the use of the resources. OER represent an opportunity to narrow the gap in access to formal education and educational materials not only between users in developing countries and those in developed countries but also between users in urban areas and those in hard-to-reach rural areas. However, to apply the use of OER in bridging these forms of a divide among students, it is important to understand their information horizon. It is important to understand what they know about channels to the resources, what they think of the resources, and the challenges they face in using them. The results of this thesis provide a glimpse into the answers to these questions, particularly as they relate to students at the University of Lagos. Precisely, the results show that the key factors of awareness, attitude, benefits, challenges, and motivation affect the use of OER as an alternate form of academic learning.

6.4.4 Theoretical propositions: a substantive theory of alternate academy

Based on the results of the thesis, as well as ideas from extant theories and research, I propose a substantive *theory of alternate academy* to explicate the use of OER. The theory intersects the notion of deficiency in traditional systems of education and the use

of alternate forms of learning materials that are free and open to address the deficiency. Specifically, the theory is based on the following principles:

- traditional systems of education are deficient because they are inherently exclusionary;

- open initiatives and resources are alternative practices aimed at addressing the deficiency in traditional systems of education;

- the development and adoption of open initiatives and resources have cognitive, social, economic, technological, legal, and political dimensions, both at the individual and institutional levels; and

- the use of open resources by students are mostly informal, complementary, and goal-directed.

The substantive theory of alternate academy is useful in explicating the use of OER by different learner groups, particularly students at institutions of higher education. It situates the notion of openness within the broader context of formal education and highlights the tension between open practices and commercialized systems of traditional education. It suggests that while open initiatives are increasingly essential in light of the innate exclusionary tendencies of traditional systems of education, they are still mostly used informally, complementarily, and alternatively. Also, it incorporates the cognitive (i.e., the knowledge of OER and application), social (i.e., the idea of knowledge as public good), economic (i.e., the consideration of the economic factors — benefits and challenges — in the use of OER), technological (i.e., the consideration of technology in the development, dissemination and adoption of OER), legal (i.e., the consideration of OER ownership versus use rights), and political (i.e., the consideration of institutional

and government policies in the development, deployment, dissemination, and adoption of OER) dimensions in the use of OER. In the next section, I discuss the possibility of applying the results of this thesis beyond the University of Lagos.

6.5 Generalizing the thesis findings

As I have previously mentioned, the sample for this thesis was collected from a single institution in Nigeria. A key issue is the extent to which results from the sample can be generalized to other students at institutions of higher education in SSA. Clearly, given the sampling procedure applied in this thesis, it will be improper to engage in a blanket generalization of the findings to all institutions of higher education in SSA. Nevertheless, the findings can be logically generalized to institutions in the region. By logical generalization (see Luker, 2008 for further discussion of logical generalization in qualitative research), I mean the generalization of the *general discourse on reality* (i.e., the participants' overall experience) where there is a similarity in circumstances. Consider Luker's (2008) view on this:

> But there is another way in which we can pursue generalization, and that is to "bump up a level of abstraction." By that I mean what does your case tell us at the highest level of abstraction?... It is this level of generality to which I would encourage you to aspire. Once you know – at the most abstract level- what your study is about, consider how it is informed by other studies that think about things in the same level of abstraction… (Luker, 2008, pp. 125-126).

As Luker (2008) suggested, at the highest level of abstraction, a result from a non-random sample may be compared to findings from other studies in other to show that it is

not idiosyncratic and that it is something that answers a larger question or extends to a

broader context. Certainly, this thesis' sample is not statistically representative of all

students at institutions of higher education in SSA, but it may broadly typical of the

students at institutions of higher education in the region. Essentially, findings from this

thesis may be applicable to SSA because of the contextual similarities between students

at the University of Lagos (the institution from which participants were recruited) and

those at other institutions of higher education in SSA. The overall participants'

experience with regards to the use of OER (as electronic learning resources) in this thesis

seems similar to those of their counterparts in SSA, based on the findings from several

existing studies (see Manda, 2005; Amankwah, 2014; Mogase & Kalema, 2015).

To begin with, the majority of students enrolled at institutions of higher education

in SSA (as in many other regions of the world) are between the ages of 18-24 (The

British Council, 2012; The Encyclopedia Britannica, 2014). This observation is

consistent with the age of the participants of this thesis. Out of the 417 participants, 335

were between the ages of 18-22. Globally, higher education students between the ages of

18-24 are recorded as the most frequent users of Internet and online resources (Smith,

Rainie, & Zickuhr, 2011). There is no reason to assume that this observation is different

in SSA. The point here is that students at institutions of higher education in SSA are

similar in their use of Internet resources; therefore, the issues critical to understanding

their use of online resources (including OER) may not be different from the ones

investigated in this thesis. This observation is supported by results from studies on the

use of electronic resources by students at institutions of higher education across SSA

highlighted in the following paragraphs.

ITU (2013) reported "Internet connection in sub-Saharan Africa as being among the most expensive in the world" (p. 1). And because SSA households have the lowest per capita income, it is logical to assume that most students at institutions of higher education in the sub-continent are challenged by the high cost of Internet access (as revealed in this thesis). In Tanzania, Manda (2005) examined the use of electronic resources in 10 institutions across the country, and some of the findings from the study resonate with the challenges highlighted by this thesis with regards to the use of digital resources (which is what OER are). In particular, users face similar issues in the form of slow Internet connectivity, limited access to computers, poor search skills to effectively use electronic resources, and irregular electricity. In Kenya, a study conducted by the Kenya Libraries and Information Services Consortium (KLISC) (2013) found some of the challenges of using electronic resources by students to include lack of awareness of electronic resources, poor Internet connectivity, poor online searching skill, and lack of access to computers.

Furthermore, in South Africa, Mogase and Kalema (2015) found that awareness, reliability of network connections and low bandwidth are critical to students' use of electronic resources at institutions of higher education. In Ghana, some of the issues investigated by Akussah, Asante, and Adu-Sarkodee (2015) include the level of awareness of electronic resources among users. The authors' conclusions suggest that there is a lack of adequate awareness of electronic resources among users at institutions of higher education in the country. Consider the similarity of Amankwah's (2014) findings regarding student users of electronic resources at some institutions of higher education in Ghana to the ones in this thesis:

The findings indicated that students used the electronic resources to: complete assignments, write project work, to update lessons notes, for research, and up-date themselves on new information in their fields of study. Some of the major problems respondents indicated using electronic resources includes: inadequate computers in the library, poor internet connectivity, power outages, insufficient search skills, etc. (Amankwah, 2014, p. ix).

At a general level, the use of OER is the use of electronic learning resources. Thus, based on the above points, it seems that the experience of other students at institutions of higher education in SSA with regards to the use of OER (as electronic learning resources) may not be different from those of participants in this research. Thus, some of the implications of the findings of this thesis may be relevant to other students at institutions of higher education in SSA.

6.6   Implications for practice

This thesis has generated a number of implications that may be of interest to policymakers, educators, and students. It is important to acknowledge that the ideas presented here are by no means exhaustive and may not be applicable in all situations, even in Nigeria. However, they are meant to encourage thinking about how insights from this thesis might, in a general sense, have effects on the adoption and use of OER in Nigeria, and SSA in general. They are also meant to stimulate ideas for the development of initiatives that support student users of OER.

My main objective in this thesis was to address the lack of focus on the issues affecting students' use of OER at the University of Lagos in Nigeria; and thus, provide a

starting point for the study of student OER use in SSA. I have done so by examining and

reporting on some of the key issues. Accordingly, the first practical contribution of this

thesis is that it provided useful empirical data about students' awareness of OER, their

attitudes toward the resources, and their perceptions of the benefits of using the

resources. It also provided much-desired data on the challenges that students face in using

OER as well as the factors that motivate them to do so. This information is important in

light of the fact that empirical research on students' use of OER in SSA is almost non-

existent. The results of this thesis will allow policymakers (both at the government and

institution level), educators, and other proponents of OER to institute effective policies

and practices intended to support student users of the resources. Thus, this thesis

responds to a call for "promoting more effective and inclusive education by designing

OER for the diverse needs of students" (Commonwealth of Learning, 2015, p. 21). Based

on the results of this thesis, as well as insights gained from the review of extant OER

literature (particularly Commonwealth of Learning, 2011; 2015; OER Africa, 2015), I

make recommendations for practical steps that could be taken by institutions and

governments in the facilitation of the adoption and use of OER in the following sections.

6.6.1 Implications for practice in higher education

It is clear that OER and other open innovations related to education, such as MOOCs and

open universities are creating *disruptive* changes in education, particularly in higher

education (Flynn, 2013). The concern for many educators and other skeptics is that

traditional academic institutions, particularly higher educational institutions, may be

displaced by the disruptive influence and rapid growth of open educational innovations.

However, this thesis has shown that opportunities exist for institutions of higher

education in Nigeria, and perhaps in SSA, to take advantage of the changes brought about by OER to develop practical initiatives that will benefit students and ultimately institutions of higher education. The results, as well as the model of OER use developed in the thesis, may assist institutions and other vested interests to understand the core issues in OER use, particularly among students at the University of Lagos in Nigeria. Arguably, the most important step that can be taken by institutions of higher education with regard to taking advantage of the inherent potential of OER is the development of institutional OER policies. The policies usually provide the framework for all activities related to teaching and learning. Institutions of higher education across the globe represent a good number of producers and users of OER. Thus, to promote the development, deployment, and adoption of OER, certain policy guidelines (i.e., specific licensing designation, ownership and intellectual property rights, access, etc.) are required by the institutions. Some of them are briefly discussed next.

OER awareness policies at institutions of higher education

The awareness campaign is a critical aspect of any project geared toward supporting technological adoption and use. By developing OER awareness policies, institutions of higher education in SSA, particularly those in Nigeria can address the issue of awareness raised in this thesis. Essentially, they can facilitate better OER awareness among students by designing and adopting certain policies. For example, an OER policy that seeks to facilitate OER awareness among faculty may be in the form of a mandatory stipulation that faculty must be trained in the pedagogical application (and/or creation) of OER. It may also be in the form of a requirement for first-year students to take a course on the concept of OER as well as on available OER repositories. While institutions can set up ad

hoc groups to undertake these kinds of training, libraries are aptly suited for the purpose. Libraries are traditionally prepared to train users of all types on how to find, use, and create any information resources. In other words, they are well positioned to undertake information literacy programs (Fister, 2013). Furthermore, teachers, particularly of foundation courses, could be required to introduce students to OER. If students are promptly informed about OER resources on entering institutions of higher education, many of them may readily adopt the use of the resources. In addition, as part of an awareness campaign, institutions may require the provision of Web links to popular OER repositories from schools' web pages that are often frequented by students.

OER repositories policies at institutions of higher education

Increasingly, higher educational institutions are creating local repositories for collating learning resources accessible to their students and faculty. Many existing OER repositories, such as Connections, MIT OCW, and Open Learning Initiative, were conceptualized and implemented at institutions of higher education. However, institutions in SSA, including those in Nigeria, have not made as many contributions to the development of local OER repositories as their counterparts in Europe and North America have. Institutions of higher education in SSA could make it part of their policy to maintain local repositories for the collation of locally relevant open resources. Policy instruments could also be used to encourage (or mandate) contributions to the repositories. While it is imperative for institutions in SSA to support contributions to OER repositories with global scope, such as MIT OCW, it is also essential for them to create local open repositories, which are easy enough for staff, faculty, and students to use. Such a system may inspire local authors to license their works as OER, as well as

motivate students to utilize the resources. One of the concerns raised by participants in

this research was the lack of local OER content that directly addresses topics in their

syllabi. The establishment of local OER repositories at institutions of higher education in

Nigeria will address this concern.

Furthermore, as OER Africa (2015) advises, institutions should provide clear policy

on intellectual property rights relating to academic works created by their faculty, staff,

and students. Confusion about ownership of creative works may sometimes prevent

authors, particularly those funded by academic institutions, from openly licensing their

works. Institutional policies should be clear about whether materials created by their

employees and students constitute the intellectual property of the school or that of the

creator, and if (or how) such materials could be disseminated via open repositories. It

should be specific on the type of open license to be applied to materials that are deemed

intellectual property of the institutions. In addition, policies establishing local

institutional repositories should emphasize the use of non-proprietary technologies in the

creation and running of local open repositories. In many cases, supposedly open materials

are rendered inaccessible by proprietary technologies used to create them. Last,

institutions should provide specific guidelines on the evaluative process of OER materials

to be included in their local repositories. This will address concerns about the credibility

of some OER raised by participants in this research.

Including OER in formal curricula

Another important way that institutions of higher education can encourage the use of

OER among students is the inclusion of the resources in official curricula whenever

possible. The results of this thesis have shown that participants mostly used OER to supplement assigned reading materials. In other words, the students do not usually use OER because they were assigned as part of formal syllabi. Including a certain number of OER as part of formal syllabi will ensure students' familiarity with the resources, encourage their use of the resources, and ultimately reduce their overall cost of learning. As Allen and Seaman (2012) opined, educators are well placed to ensure the inclusion of open materials in official syllabi across departments. Thus, institutions need to put in place policies that will ensure that OER are considered for inclusion in academic curricula by faculty and other relevant individuals responsible for designing academic courses. Such policies should include specific guidelines for the evaluation of OER materials to be included in the official course reading lists. Clearly, for many students, the establishment and implementation of such a policy will lead to cost savings. As for institutions, they will not only be facilitating affordable education to their students, they will also be presenting a favorable impression of their schools to the public, particularly would-be students. Potential students may be more inclined to apply to institutions attempting to reduce the cost of education for their students.

Internet access at institutions of higher education

This thesis revealed one of the main challenges of using OER by participants to be the problem of Internet access. There is increased desire for the adoption and use of digital learning resources, including OER among students. Thus, as an important educational infrastructure, access to the Internet has become a necessity. In SSA, compared to many developed countries, the penetration rate of Internet is still very low (Akue-Kpakpo, 2013). Wireless Internet service is the most feasible option for institutions of higher

education intending to provide access to as many users as possible. As Akue-Kpakpo (2013) noted, the future of Internet connection in SSA "lies essentially with GSM 3G because it is the most widespread network in sub-Saharan Africa" (p. 3). 3G or higher wireless Internet service is the most economical, mainly because many students at institutions of higher education in SSA already own GSM compatible mobile devices. Essentially, institutions of higher education in SSA, including those in Nigeria, should undertake initiatives that prioritize the provision of wireless Internet hubs and hotspots around campuses as a way of facilitating access to OER and other digital learning resources. For instance, in addition to the provision of wireless Internet access points on campuses, libraries could be designed to contain an adequate number of Internet-enabled computers.

6.6.2 Implications for governments

Like institutions, governments in SSA have a role to play in ensuring that students at institutions of higher education are adequately supported in their use of OER. Often, governments formulate policies that are adopted and implemented by public institutions. A government policy is a set of principles or guidelines intended to facilitate decision-making in government-controlled institutions, including institutions of higher education. Since 2001, governments around the world have been involved in developing OER policy initiatives (Lewis, 2010; Hoosen, 2012). There are opportunities for governments in SSA, including Nigeria, to take practical steps in facilitating the use of OER among students at institutions of higher education in the region. I will describe some of these below.

Opening publicly funded educational resources

As we have seen with the results of this thesis, for the students that participated in this research, OER provide alternative channels for learning resources. This is particularly important because of the difficulty students experience in accessing textbooks and other learning resources in the region. As I have mentioned, OER is one way of ameliorating the difficulty. Proponents of OER argue that governments can help in this regard by using policy instruments to open publicly funded materials. In other words, they want governments to mandate all publicly funded research projects to be published with open licenses. As mentioned in Chapter 2, one of the key demands of the Cape Town Declaration, a report from the convention on OER conveyed in September 2007 in South Africa, is:

> …governments, school boards, colleges, and universities should make open education a high priority. Ideally, taxpayer-funded educational resources should be open educational resources (Cape Town Declaration, 2007, para. 6).

Clearly, proponents of the Cape Town OER declaration not only want educators and institutions to give OER development greater attention, but they also want governments to institute policies requiring all educational resources funded by the public to be licensed as open resources. This declaration has led to further calls around the world. For example, the Scholarly Publishing and Academic Resources Coalition (SPARC) in August 2015, asked the United States government to "take administrative action to ensure federally funded educational materials are made available as Open Educational Resources (OER) that are free to use, share, and improve" (SPARC, 2015, p. 1). So far, the calls for

opening up government funded educational resources is gaining traction. According to

Hoosen (2012), in South Africa, the Department of Higher Education and Training has:

> …included the development of an ODL policy framework in its strategic plan for
>
> 2010–2014, which will include OER. In addition, there is also a policy decision,
>
> through the process of the Integrated Strategic Planning Framework for Teacher
>
> Education Development, that all educational resources developed through funded
>
> projects have to be released under a CC licence [sic] (Hoosen, 2012).

On the whole, the call for opening up publicly funded educational resources is

very important for the development of OER worldwide. More SSA countries need to

follow the example of South Africa and start the implementation of the Cape Town

declaration. Opening up publicly funded educational resources will facilitate an increase

in the development of local OER content in SSA, thus, closing the existing gap in OER

production between SSA and the developed world.

Designating specific funding for OER initiatives

The results of this thesis revealed that the students who participated in this research were

motivated to use OER when supported by their schools. Such support could come in the

form of the provision of OER access points (i.e., Internet hotspots), training workshops

on finding and using OER, and the development of local institutional repositories. These

efforts require funding. Regrettably, one of the biggest challenges of running institutions

of higher education in SSA is poor funding (World Bank, 2010). The inadequacy of

monetary resources available to academic institutions means that they need to prioritize

programs and projects, and so far OER initiatives are not deemed a priority by most SSA

institutions of higher education, including those in Nigeria. The initial funding for many OER initiatives has been provided by non-governmental organizations (e.g., the Bill and Melinda Gates Foundation, the William and Flora Hewlett Foundation, the Andrew W. Melon Foundation). As Stacey (2013) noted, such funding is usually directed at "establishing exemplars and cannot be relied on for sustaining ongoing operations or generating widespread adoption" (p. 1). For the sustenance of already established OER initiatives and the development of new ones, public funding from governments is required to support those provided from non-government sources. Governments can institute direct measures requiring that a certain percentage of institutional funding be used to facilitate the development and implementation of OER initiatives. Such funding can be directed at specific areas of OER development, such as OER awareness programs, OER development training, and OER repository creation and maintenance.

In addition to directly funding OER initiatives and mandating publicly funded educational resources to be open, governments in SSA can facilitate OER development by ensuring the provision of certain infrastructures that support the overall use of digital learning resources. For example, as the results of this thesis revealed, participants' use of OER were hindered by the irregularity of Internet services and electricity. Students require Internet service to access online resources, including OER. Furthermore, Internet service delivery equipment rely on electricity to function and students require electricity to charge their devices. Thus, governments' support for the provision of efficient Internet service and stable electricity will assist students and other users to have unhindered access to OER and other digital learning resources.

To sum up, participants in this research were motivated to use OER to support various learning initiatives. However, they were challenged by such hindrances as poor Internet and electricity services, the high cost of Internet-enabled devices, and inadequate skills for accessing online resources. SSA governments, including Nigeria, can assist in eliminating these challenges by properly funding OER initiatives at institutions of higher education, by ensuring the adequate provision of infrastructure that supports the development and use of OER, and by using regulatory instruments to ensure that educational resources funded by the public are licensed as open resources.

6.7 Study limitations: the qualitative component

Studies with qualitative components, such as the present one usually consist of certain inherent limitations. In the present section, some of the limitations of the qualitative aspect of this thesis will be discussed.

The first limitation of the qualitative component of this thesis to consider is related to the recruitment of participants. This thesis is broadly contextualized in SSA. It is an attempt to partly address the gap in the understanding of OER use created by the lack of empirical research focus on student users of OER in SSA Thus, an ideal recruitment procedure would involve recruiting participants from multiple institutions in multiple SSA countries. However, as I have previously mentioned, this was not possible given the limited amount of time and resources available for the project. The inclusion of participants from multiple countries would have produced results that are better reflective of students' experiences with OER in SSA. As a result, the results would, perhaps, have had a higher rate of applicability. Nevertheless, it has been shown that the participants in this study are in many ways similar to their counterparts in many other places in SSA.

Therefore, the knowledge gained from this thesis will be useful to many students and other relevant stakeholders interested in using and developing OER.

The second limitation of the qualitative component of this study is also related to sampling. Currently, compared to other languages, English is disproportionately used in the production of OER. This point is important because most students in SSA do not have English as their first or official language[8]. Apart from English, other languages of instruction in SSA schools include French, Spanish, Portuguese, and Afrikaans (Mukama, 2007). This thesis only included participants from an institution that uses English as its language of instruction. Input from students instructed with languages other English would have been useful in better understanding the language related issues in the use of OER. It is important to emphasize that this thesis is exploratory and that the results are only contributions to the foundation of research on OER use among students. It is hoped that it will serve as a catalyst for other studies that will address these limitations. Notwithstanding, the results from the thesis could be useful to students, organizations, and governments in the development of OER initiatives across SSA.

The third limitation of the qualitative component of this study is related to the subjective bias inherent in interpretive research such as this thesis. The notion of subjectivity is an intricate part of qualitative research, and has over the years gained legitimacy among researchers. In spite of this, it seems necessary for me to justify (not just account for) my subjective input in the research process. It is not possible for a

---

[8] All participants in this research speak English as a second language. The University of Lagos's official language of instruction is English.

researcher to bring a completely empty mind to a research project. Credible social

research is invariably an embodiment of the tension between rigorous empirical process

and the deeply held subjective experience of the researcher. It is pertinent to recognize

that research (such as the present project) based on interpretive epistemology, may

produce results that may be colored by subjective biases of the researcher. This could

either be considered a strength or a limitation. As Kaptchuk (2003) indicated,

interpretation can produce either sound judgments or systematic error. Thus, to ensure

reliable results are obtained from the analysis of the qualitative data collected in this

thesis, rigorous grounded theory procedures were adhered to, as comprehensively

described in Chapter 3. The qualitative research design does well by taking certain

evaluative criteria into consideration. Grounded theory studies are evaluated differently

from other quantitative studies. Strauss and Corbin (cited in Binz-Scharf, 2003) noted

useful criteria for evaluating grounded theory studies by asking the following key

questions.

1. Are concepts generated?

2. Are the concepts generated systematically related?

3. Are there many conceptual linkages and are the categories well developed? Do
   they have conceptual density?

4. Are many variations built into the theory?

5. Are the broader conditions that affect the phenomenon under study built into its
   explanation?

6. Do the theoretical findings seem significant and to what extent?

The above list not only provided the basis for making empirical decisions in this thesis, but it also served as a form of an informal checklist for the research process. As I have shown with the description of the methodology in this thesis, the evaluative questions have been answered in the affirmative, considering the complexity of the phenomenon under investigation. In the next section, I will describe the possible limitations of the quantitative component of this thesis.

6.8   Study limitations: the quantitative component

The quantitative component of this thesis focused on the motivations for participants' use of OER. Data were collected using surveys, and the PCA statistical technique was used to analyze the data. In this section, I describe some potential limitations of the methodological choices. Generally, using quantitative techniques in social research has inherent drawbacks. The drawbacks have been widely discussed (see Luker, 2008), therefore, are less of a focus in this discussion. Rather, this discussion focuses on the limitations inherent in the specific data collection procedure and analytic technique applied in this aspect of the thesis. In spite of the significance, the findings from this aspect of the thesis must be applied with caution for the following reasons:

- Self-reported cross-sectional data: The results of this component of study relied on self-reported cross-sectional data and not longitudinal data. Thus, the data may not reflect changing students' circumstances in the use of OER.

- Data from one institution: The data from this thesis, including the quantitative data, were collected from one institution in Nigeria. While this may have been

expedient given the constraint of time and resources, it may also limit the generalizability of the results.

- Identifying principal components: one of the means of identifying principal components in a PCA is the use of eigenvalues. Normally, components with eigenvalues greater than 1 are regarded as principal components. They are interpreted to constitute an acceptable level of variance. However, this way of identifying principal components is inherently problematic. For example, whereas a component with an eigenvalue of 1 is considered accepted, a component with an eigenvalue of .99 is rejected. This may lead to the loss of useful information, particularly in the analysis of social constructs.

While I acknowledge these limitations, I undertook stringent measures (as comprehensively described in the methodology section) to ensure rigor in the methods applied in this thesis. For example, the data were screened for reliability (see Section 3.9.5) to support the validity of the findings. In addition, by combining qualitative and quantitative approaches to this thesis, some of the methodological limitations were offset. Some of this thesis' findings and limitations present opportunities for future research.

6.9   Implications for future research

As an exploratory study, this thesis raises a number of opportunities for additional research. Additional research is required not only for the elaboration of the findings but also for further development of the proposed theoretical model and for validating the emergent conceptual categories. First, there is an opportunity to extend the statistical generalizability of the results of this thesis instead of the logical or analytical generalizability I have sought here. In spite of the fact that a number of new conceptual

categories were generated through in-depth sampling employed in this thesis, there is a need for the extension of sampling beyond the single institution from which data were collected for this thesis. SSA countries, as well as the student population of each country, differ significantly in social, economic, technological, and cultural sense. Therefore, generalizing the results of this thesis must be done with some reservations. More work is required to gain further knowledge on students' use of OER in the whole of SSA. With the availability of required resources, I intend to continue the study of the issues raised here on a more ambitious scale by collecting data from multiple institutions in multiple countries in SSA.

Second, this thesis presents an opportunity for the refinement and validation of the conceptual categories and constructs that emerged from the analysis of data. For example, the notion of the existence of a relationship between students' attitudes and OER use requires further development and refinement. This is important because, as this thesis has shown, despite having positive impressions of OER, many participants indicated concerns about using the resources. They exhibited attitudinal ambivalence toward the resources. In future research, one could attempt to determine the extent to which the strength of students' attitudes affect their use of the resources. In addition, it has been shown that students are motivated to access OER through certain social media. To better understand the role of social media in the use of OER among students in Nigeria, and SSA in general, a future research consideration would be an investigation of how students apply social media to find and disseminate OER. Also, this thesis has shown that libraries motivated the use of OER among the students who participated in this research, but the specific ways they assist students at institutions of higher education in SSA to access the

resources is still not completely clear. Therefore, a study on the specific ways that librarians help students at institutions of higher education in SSA find digital materials, including OER, will be useful in further understanding this aspect of the results.

Third, this thesis could also be extended longitudinally and comparatively. For example, the thesis has shown that participants lacked adequate awareness of OER as well as lacked the adequate skill to access the resources. However, as the data collected in this thesis show, most of the participants, in fact, more than 50% of them, were first- and second-year university students. Future research could take a longitudinal perspective by looking at the progression of OER awareness and access skill among students from, say the first year, to say the final year. A comparative study of undergraduate and graduate students with regard to these issues could be undertaken. This would provide useful information to individuals tasked with designing OER initiatives for different segments of the student population in SSA.

Fourth, the model developed and presented as part of this dissertation could be used to generate a number of questions for further empirical investigation using a broader (and/or different) sample as well as a different methodological design. For example, the following questions could be asked:

- How much awareness does a segment of the student population (e.g., elementary school students, high school students, and long distance education students) have of OER? And how much does their awareness affect the use of the resources?

- What kinds of challenges do a certain segment of the student population (e.g., elementary school students, high school students, and long distance education students) face in using OER?

- What factors motivate a certain segment of the student population (e.g.,
   elementary school students, high school students, and long distance education
   students) to use OER?

To conclude, this chapter provides a summary of the results of this thesis. It discusses the insights and contributions made by this thesis to the understanding of the issues relating to students' use of OER at the University of Lagos in Nigeria. It also proposes a substantive theory of alternate academy – a series of propositions for explicating student use of OER. Furthermore, the chapter discusses how institutions of higher education and governments in SSA, particularly Nigeria, can take advantage of the results of this thesis to provide initiatives that will facilitate the adoption and use of OER among students at institutions of higher education in the region. The limitations of this thesis were also discussed. Finally, the chapter discusses the opportunities for future research presented by the findings and limitations of this thesis.

References

Adeya, C.A. (2001). *Information and communication technologies in Africa: A*

    selective review of studies and projects. London, UK: International Network for

    Scientific Publication.

Akhavan, P., Ghojavand, S., and Abdali, R. (2012). Knowledge sharing and its

    impact on knowledge creation. *Journal of Information & Knowledge*

    Management, 11 (2), 1-12.

Akue-Kpakpo, A. (2013). *Study on international Internet connectivity in sub-*

    Saharan Africa. Retrieved from International Telecommunication Union (ITU)

    Website: http://bit.ly/1noPfDq

Akussah, M., Asante, E. and Adu-Sarkodee, R. (2015). Impact of electronic resources

    and usage in academic libraries in Ghana: Evidence from Koforidua Polytechnic

    & All Nations University College, Ghana. *Journal of Education and Practice*, 6

    (33), 33-38.

Altbach, P.G., and Peterson, P.M. (1999). *Higher education in the 21st century: Global*

    challenge and national response. Annapolis Junction, MD: Institute of International

Education.

Allen, I.E., and Seaman, J. (2014). *Opening the curriculum: Open educational*

resources in U.S. higher education. Retrieved from Babson Survey Research Group

Website: http://bit.ly/1tlMXXU

Ally, M. and Samaka, M. (2013). Open education resources and mobile technology to

narrow the learning divide. *The International of Review of Research in Open and*

Distributed Learning, 14 (2), 1-160.

Alecu, F. (2012). Information technology trends, creative commons licenses.

Economics of Knowledge, 4 (5), 2-7.

Alexandra, L.P. O., Connolly, T., and Scott, P.J. (2012). *Collaborative learning 2.0:*

Open educational resources. Hershey, PA: IGI Global.

Amankwah P.B. (2014). *Use of electronic resources by undergraduate students of the*

Ghana Institute of Management and Public Administration (Master's

Thesis). University of Ghana, Ghana. Retrieved from

http://ugspace.ug.edu.gh/handle/123456789/6989

Aoki, K. (2011). Open educational resources in higher education in Japan: The

current states and challenges. *International Transactions on eLearning and Usability*,

2 (1), 7 – 9.

Applefield, J.A., Huber, R., and Moallam, M. (2000). Constructivism in theory and

practice: Towards a better understanding. *The High School Journal,* 84

(2), 35-53.

Armstrong, C., De Beer, J., Kawooya, D., Prabhala, A., and Schonwetter, T. (2010*).*

Access to knowledge in Africa: The role of copyright. Cape Town, South Africa:

UCT Press

Athabasca University (2015, July 29). Admission, registration and evaluation.

Retrieved from Athabasca University website: http://bit.ly/1ffUW5o

Atkins, D.E., Brown, J.S., and Hammond, A.L. (2007, February). *A review of the open*

educational resources (OER) movement: Achievements, challenges, and new

opportunities. Retrieved from the William and Flora Hewlett Foundation Website:

http://www.hewlett.org/uploads/files/Hewlett_OER_report.pdf

Aware. (2009). In *The Oxford Pocket Dictionary of Current English*. Retrieved from

http://www.encyclopedia.com/topic/aware.aspx#1

Azer, S.A. (2015). Is Wikipedia a reliable learning resource for medical students?

Evaluating respiratory topics. *Advances in Physiology Education, 39 (1)*, 5-14.

Doi: 10.1152/advan.00110.2014

Bailey, A. (2006). *First Philosophy: Fundamental Problems and Readings in*

Philosophy. Toronto, Canada: Broadview Press.

Bailey, C.W. (2007). Open access and libraries. *The Haworth Press*, 32 (3/4),

351- 383.

Bartlett, J.C., and Toms, E.G. (2005). How is information used? Applying task

analysis to understanding information use. *Canadian Journal of Information and*

Library Science, 29 (3), 352-353.

Baruah, B. (2015, November 26). We need to change how we define success in

development. *The Huffington Post*. Retrieved from huff.to/1NdlsGR

Bates, M. J. (2002). Toward an integrated model of information seeking and

searching. *New Review of Information Behaviour Research*, 3, 1-15. Retrieved from

https://pages.gseis.ucla.edu/faculty/bates/articles/info_SeekSearch-i-030329.html

BCcampus (2014, May 14). Open educational resources. Retrieved from

https://bccampus.ca/open-educational-resources-oer-teaching-resources-bccampus/

Belkin, N.J. (1980). Anomalous state of knowledge as basis for information

retrieval. *The Canadian Journal of Information Science*, 5, 133-143. Retrieved from

https://comminfo.rutgers.edu/~tefko/Courses/612/Articles/BelkinAnomolous.pdf

Belkin, N.J. (1990). The cognitive viewpoint in information science. *Journal of*

Information Science, 16 (1), 11-15.

Belkin, N. J. (2005). Anomalous state of knowledge. In K. Fisher, S. Erdelez, & L.

McKechnie (Eds.), *Theories of information behavior* (pp. 44-48). Medford, NJ:

Information Today.

Bergman, S.D. (2014). Open source textbooks: A paradigm derived

from open source software. *Publishing Research Quarterly*, 30 (1), 1-10.

Binz-Scharf, M.C. (2003). *Exploration and exploitation: Toward a theory of*

knowledge sharing in digital government projects (Unpublished doctoral

dissertation). University of St. Gallen, Zurich, Switzerland.

Britannica book of the year (2014). In *Encyclopedia Britannica*. Retrieved from

bit.ly/1Xvk7lp

Brown, A. (2015). *Confirmatory factor analysis for applied research*.

New York, NY: The Guildford Press.

Bryant, A., Charmaz, C. (2007). *Grounded theory research: Methods and practices*. In A.

Bryant and C. Charmaz (Eds.). The sage handbook of grounded theory. London, UK:

Sage Publications.

Bryman, A. (2006). Integrating quantitative and qualitative research: How is it

done? *Qualitative Research*, 6 (1), 97-113.

Budapest Open Access Initiative (2002, February 14). Read the Budapest Open

Access Initiative. Retrieved from http://bit.ly/1oBBlzD

Bueno-de-la-Fuente, G., Robertson, R.J., and Boon, S. (2012). *The roles of*

libraries and information professionals in open educational resources (OER)

initiatives. Retrieved from Centre for Educational Technology, Interoperability and

Standards (CETIS) Website: http://publications.cetis.org.uk/date/2012/08

Butcher, N., Kanwar, A, and Uvalic-Trumbic, S. (2015). *A basic guide to open*

educational resources (OER). Retrieved from UNESCO Website:

http://unesdoc.unesco.org/images/0021/002158/215804e.pdf

Canadian Information Center for International Credentials. (2014, May 14).

Postsecondary education systems in Canada: An overview. Retrieved from

http://bit.ly/TMJwgi

Cape Town Open Education Declaration. (2014, May 21). Cape Town Open

    Education Declaration: Unlocking the promise of open educational

    resources. Retrieved from: http://bit.ly/1jUc0zd

Case, D.O. (2002). *Looking for information: A survey of research on information*

    seeking, needs, and behavior. San Diego, CA: Academic Press.

Chamberlin, L., and Parish, T. (2011). MOOCs: Massive open online courses or massive

    and often obtuse courses? *eLearn Magazine*, 8 (1). Retrieved from

    http://elearnmag.acm.org/featured.cfm?aid=2016017

Chapman, H., Evans, N., Minter, D., and Mesador, R. (2013). *Campus*

    challenge: Reining in the high cost of college textbooks while continuing to provide

    quality educational opportunities. Retrieved from Heartland Community College

    Website: http://bit.ly/1iJCSnu

Charlton, M., Brunsdon, C., Demšar, U., Harris, P., and Fotheringham, A.S. (2010, May).

    Principal components analysis: From global to local. Paper presented at the 13th

    AGILE International Conference on Geographic Information Science (pp. 1-10),

    Guimarães, Portugal.

Charmaz, K. (1983). The grounded theory method: An explication and

interpretation. In R. Emerson (Ed.), *Contemporary field research: A collection*

of readings (pp. 109-126). Boston, MA: Little Brown Company.

Charmaz, K. (2014). *Constructing grounded theory*. London, UK: Sage Publications.

Chauvin, N.D., Mulangu, F., and Porto, G. (2012, February). *Food production and*

consumption trends in sub-Saharan Africa: Prospects for the transformation of the

agricultural sector. Retrieved from United Nations Development Programme

(UNDP) Website: http://bit.ly/1JWT0wX

Check, J.C., and Schutt, R.K. (2012). *Research methods in education.* Los Angeles, CA:

Sage Publications.

Choo, C.W., and Detlor, B. (2000). Information seeking on the Web: An integrated

model of browsing and searching. *First Monday Peer-Reviewed Journal on*

the internet, 5 (2). Retrieved from http://firstmonday.org/article/view/729/638

Choo, C. W. (2002) *Information management for the intelligent organization: The*

art of scanning the environment. Medford, NJ: Information Today.

Commonwealth of Learning (2011). *Guidelines for Open Educational Resources*

(OER) in Higher Education. Retrieved from the United Nations Educational,

Scientific and Cultural Organization (UNESCO) Website: bit.ly/1R8tZzK

Commonwealth of Learning (2015). *Guidelines for Open Educational Resources (OER) in Higher Education*. Retrieved from the United Nations Educational, Scientific and Cultural Organization (UNESCO) Website: bit.ly/1R8tZzK

Coyne, I.T. (1997). Sampling in qualitative research. Purposeful and theoretical Sampling; merging or clear boundaries? *Journal of Advanced Nursing*, 26, 623– 630.

Conor, M., and Bingham, T. (2011). *The new social learning: A guide to transforming organization through social media*. San Francisco, CA: Berrett-Koehler Publishers, Inc.

Conrad, D., Mackintosh, W., McGreal, R., and Witthaus, G. (2013*). Report on the assessment and accreditation of learners using open education resources (OER)*. Retrieved from the Commonwealth of Learning Website: http://oasis.col.org/handle/11599/232

Connolly, T., Wilson, T., and Wolfenden, F. (2007). *Reaching the boundaries of the Global South: Exploring the importance of guidelines for the localization of OERs*. Paper presented at Open Courseware Consortium Conference and OpenED, September 24-25, Logan, Utah.

Corbin, J., and Strauss, A. (2008). *Basics of qualitative research: Techniques and*

procedures for developing grounded theory. Thousand Oaks, CA: Sage Publications,

Inc.

Creative Commons (n.d.). What is creative commons? Retrieved October 24, 2013 from:

http://creativecommons.org/about

Creswell, J.W., and Clark, V.P.L. (2006). *Designing and conducting mixed*

methods research. Thousand Oaks, CA: Sage Publications.

Crotty, M. (1998). *The foundations of social research: Meaning and*

perspective in the research process. London, UK: Sage Publications.

CSIC. (2015, January 1). Ranking Web of Universities. Retrieved from: bit.ly/1jbwd3h

Cuadras, C.M., and Rao, C.R. (1993). *Multivariate analysis: Future directions 2*.

Retrieved from http://bit.ly/1YKoxoe

Czerniewicz, L. (2015). Student practices in copyright culture: Accessing learning

resources. *Taylor & Francis Online*. Doi: 10.1080/17439884.2016.1160928

D'Antoni, S. (2008, February). *Open educational resources: The way forward*. Retrieved

from United Nations Educational, Scientific and Cultural Organization (UNESCO)

Website: http://unesdoc.unesco.org/images/0015/001579/157987e.pdf

Davey, J., Gugiu, P.C., and Coryn, C.L.S. (2010). Quantitative Methods for Estimating

the Reliability of Qualitative Data. *Journal of MultiDisciplinary Evaluation*, 6 (13),

140-162.

Deepashree (2008*). Principles of economics*. Retrieved January from bit.ly/1KbLn6X

Denzin, N.K., and Lincoln, Y.S. (2008). *Strategies of qualitative inquiry*. Thousand

Oaks, CA: Sage Publications.

Denzin, N.K., and Lincoln, Y.S. (2011). *Handbook of qualitative research*. Thousand

Oaks, CA: Sage Publications.

Devin, B. (2005). What methodology does to theory: Sense-making methodology as

exemplar. In K. Fisher, S. Erdelez, & L. McKechnie (Eds.), *Theories of

information behavior* (pp. 25-30). Medford, NJ: Information Today.

Dew, S.H. (2002). Designed to serve from a distance: Developing library Web pages to

support distance education. In B.I. Dewey (Ed.), *Library user education: Powerful

learning, powerful partnerships* (pp. 240-245). London, UK: The Scarecrow Press.

Dhanarajan, G., and Porter, D. (2013). *Open educational resources: An Asian

perspective*. Retrieved from the Commonwealth of Learning Website:

https://www.col.org/resources/open-educational-resources-asian-perspective

Diallo, B., Thuo, C.W., and Wright, C.R. (2013). *Approaches to the production and use of OERs: The African Virtual University experience*. Retrieved from the Commonwealth of Learning Website: http://bit.ly/1b2nxTm

Dlamini, S.N. (2008). *New directions in African education: Challenges and possibilities*. Retrieved from: http://bit.ly/1MPsBN8

Dunlosky, J., Rawson, K.A., Marsh, E.J., Nathan, M.J., and Willingham, D.T. (2013). Improving students' learning with effective learning techniques: Promising directions from cognitive and educational psychology. *Psychological Science in the Public Interest,* 14 (1), 4– 58.

Dwyer, S.C., and Buckle, J.L. (2009). The space between: On being an insider-outsider in qualitative research. *International Journal of Qualitative Methods*, 8(1).

Eberhard, A., Foster, V., Briceño-Garmendia, C., Ouedraogo, F., Camos, D., and Shkaratan, M. (2009). *Underpowered: The state of the power sector in sub-Saharan Africa: Africa infrastructure country diagnostics*. Retrieved from the World Bank Website: http://bit.ly/1RqykS1

Efroni, Z. (2011). *Access- right: The future of digital copyright law*. Retrieved from: bit.ly/1ZTNm1F

Ellis, D. (1989). A behavioral model approach to information retrieval system design.

   Journal of Documentation, 45 (3), 171 – 212.

Ellis, D., and Haugan, M. (1997). Modelling the information seeking patterns of

   engineers and research scientists in industrial environment. *Journal of*

   documentation, 53 (4), 384-403.

Ellis, D. (2005). Ellis's model of information-seeking behavior. In K. Fisher, S. Erdelez,

   & L. McKechnie (Eds.) (2005). *Theories of information behavior* (pp. 138-142).

   Medford, NJ: Information Today.

Erdelez, S. (1999). Information encountering: It's more than just bumping into

   information. *Bulletin of the American Society for Information Science and*

   Technology, 25 (3), 26-29.

Epistemology. (2004). *In Collins Students Dictionary*. Glasgow, UK: Harper Collins

   Publishers.

Fazio, R.H., and Olson, M. A. (2003). *The sage handbook of social psychology*.

   London, UK: Sage Publications.

Fazio, R.A, and Olson, M.A. (2003). Attitudes, foundations, functions, and

   consequences. In M.A. Hoggs and J. Cooper (Eds). *The Sage Handbook of Social*

Psychology. London, UK: Sage Publications.

Fisher, K., Erdelez, S., & McKechnie, L. (Eds.) (2005). *Theories of information*

behavior. Medford, NJ: Information Today.

Fink, A.S. (2000). The role of the researcher in the qualitative research process: A

potential barrier to archiving qualitative data. *Forum of Qualitative Social Research*.

1, (3). Retrieved from

http://www.qualitative-research.net/index.php/fqs/article/view/1021

Fister, B. (2013). The library's role in learning: Information literacy revisited. *Library*

Issues, 33 (4). Retrieved from

http://www.libraryissues.com/pub/PDF3304Mar2013.pdf

Flynn, J.T. (2013). MOOCs disruptive innovation and the future of higher education.

Technological Innovation & Educational Ministry, 10 (1), 149-162.

Foster, A., and Ford, N. (2003). Serendipity and information seeking: An empirical study.

Journal of Documentation, 59 (3), 321 – 340.

http://dx.doi.org/10.1108/00220410310472518

Gakindi, M.W. (2010). *Information access needs of satellite campuses in Kenya*

–Can OER close the gap? The case of Moi University Nairobi campus (Master's

Thesis). Tallinn University, Estonia.

Garcia-Penalvo, F.J., Figuerola, C., and Merlo, J.A. (2010). Open knowledge:

Challenges and facts. *Online Information Review*, 34 (4), 520-539.

Gagnon, M. (2009). *Knowledge dissemination and exchange of knowledge*. Retrieved

from the Canadian Institute of Health Research Website:

http: http://www.cihr-irsc.gc.ca/e/41953.html

Gakibayo, A., Ikoja-Odongo, J. R., and Okello-Obura, C. (2013, February). Electronic

information resources utilization by students in Mbarara University Library.

Library Philosophy and Practice. Retrieved from:

http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=2055&context=libphilprac

George, C.A., Bright, A., Hurlbert, T., Linke, E.C., St. Clair, G., and Stein, J. (2006).

Scholarly use of information: Graduate students' information seeking

behaviour. *Information Research, 11 (4).* Retrieved from

http://www.informationr.net/ir/11-4/paper272.html

Glaser, G.B. (1992). *Basics of grounded theory analysis. Emerging vs. forcing*.

Mill Valley, CA: Sociological Press.

Glennie, J., Harley, K., Butcher, N., and Wyk, T. (2012). *Open educational*

resources and change in higher education: Reflections from practice. Retrieved

from the Commonwealth of Learning Website: http://oasis.col.org/handle/11599/80

Gorsuch, R. L. (1983). *Factor analysis*. Hillsdale, NJ: Lawrence Erlbaum Associates,

Inc.

Gostin, L.O. (1991). Ethical principles for the conduct of human subject research:

Population-based research and ethics. *Med. & Health Car*e, 19 (3-4), 191-201.

Guest, G., Bunce, A., and Johnson, L. (2006). How many interviews are

enough?: An experiment with data saturation and variability. *Field Methods,*

18 (1), 59–82.

Haßler, B., and Jackson, A.M. (2010). Bridging the bandwidth gap: Open

educational resources and the digital divide. *IEEE Transactions on Learning*

Technologies, 3 (2), 110-115.

http://doi.ieeecomputersociety.org/10.1109/TLT.2010.8

Haight, M., Quan-Haase A., and Corbett, B.A. (2014). Revisiting the digital

divide in Canada: The impact of demographic factors on access to the internet, level

of online activity, and social networking site usage. *Information, Communication &*

Society, 17 (4), 503–519.

Harmon, E. (2013, November 16). Lawrence Lessig. Retrieved from

  http://bit.ly/1npaGH1

Hart, K., and Oosthuizen, T. (2012*). An overview of the strategic positioning of

  the only dedicated ODL university in South Africa*. In Proceedings of the

  Regional Symposium on Open Educational Resources: An Asian

  perspective on policy and practices (pp. 25-30), Penang, Malaysia.

Hedesstrom, T., and Whitley, E.A. (2000, July 3-5). *What is meant by tacit knowledge?*

  Towards a better understanding of the shape of actions. Paper presented at the 8th

  European Conference on Information Systems, Vienna, Austria.

Henry, C., Sharma, M., Lapenu, C., and Zeller, M. (2003). Microfinance poverty

  assessment tool. *World Bank eLibrary, 255*. http://dx.doi.org/10.1596/0-8213-5674-7

Hernandez, C.N. (2009). Theoretical coding in grounded theory. *Grounded*

  Theory Review, 8 (3). Retrieved from http://bit.ly/1f0X4za

Hilton III, J.L., Robinson, T.J., Wiley, D., and Ackerman, D.J. (2014). Cost-savings

  achieved in two semesters through the adoption of open educational resources. *The*

  International Review of Research in Open Distributed Learning, 15, (2). Retrieved

  from http://www.irrodl.org/index.php/irrodl/article/view/1700

Hodgkinson-Williams, C. (2010). *Benefits and challenges of OER for higher education institutions*. Paper presented at the Open Educational Resources (OER) Workshop for Heads of Commonwealth Universities, Cape Town, South Africa. Vancouver: Canada: Commonwealth of Learning.

Holloway, P. (2000, January). Sharing knowledge – and other unnatural acts. *Knowledge Management Magazine*. Retrieved from http://bit.ly/1rNSKro

Hoosen, S. (2012). *Survey on governments' open educational resources (OER) policies*. Retrieved from the United Nations Education Scientific and Cultural Organization Website: http://bit.ly/1kWKbJh

Hu, E., Li, Y., Li, J., and Huang, W. (2015). Open educational resources (OER) usage and barriers: A study from Zhejiang University, China. *Educational Technology Research and Development*, 63 (6), 957-974.

Hughes, H. (2012). An expanded critical incident approach for exploring information use and learning. *Library and Information Research,* 36 (112), 72-95.

Hussein, M. E., Hirst, S., Salyers, V., and Osuji, J. (2014). Using grounded theory as a method of inquiry: Advantages and disadvantages. *The Qualitative*

Report, 19 (13), 1-15.

Ibtesam, H. (2011). Factors influencing college students' motivation to learn from

students' perspective. *General Education Journals*, 132, (2).

Ingwersen, P., and Jarvelin, K. (2005). *The turn: Integration of information seeking*

and retrieval in context (The information retrieval series). Secaucus, NJ: Springer-

Verlag New York, Inc.

Hailey, D., Grimshaw, J., Eccles, M., Mitton, C., Adair, C.E., McKenzie, E., … Jobin, L.

(2008). *Effective dissemination of findings from research: A compilation*

of essays. Retrieved from the Institute of Health Economics Website:

http://bit.ly/1VOfNRm

Intersubjectivity (2008). In *International Encyclopedia of the Social Sciences*. Retrieved

from: http://www.encyclopedia.com/topic/Intersubjectivity.aspx

International Telecommunication Union. (2013). *Study on international Internet*

connectivity in sub-Saharan Africa. Received from http://bit.ly/1ISbn4C

Ivins, T. (2011). *Localization of open educational resources (OER) in Nepal: Strategies*

of Himalayan knowledge-workers (Doctoral Dissertation). All Theses and

Dissertations (Paper 2616). Retrieved from: http://bit.ly/1MDYtUZ

Jaffe, E. (2015, September 9). Rising textbook costs add to affordability challenges of

    student life. *The Brown Daily Herald.* Retrieved from: http://bit.ly/1JYySG3

Jecosy, L.L. (1978). On interpreting the effects of repetition: Solving a problem versus

    remembering a solution. *Journal of Verbal Learning and Verbal Behaviour*, I7, 649-

    667.

Jensen, K., and West, Q. (2015). Open educational resources and the higher education

    environment: A leadership opportunity for libraries. *College & Research Libraries*

    News, 76 (4) 215-218

Jimes, C., Weiss, S., and Keep, R. (2013). Addressing the local in localization: A

    case study of open textbook adoption by three South African teachers.

    Journal of Asynchronous Learning Networks, 17 (2), 73-86.

Johnsrud, L.K., Harada, V.H., and Tabata, L.N. (2005). *Faculty attitude, adoption, and*

    application of technology in higher education: Implications for distance policy.

    Retrieved from ERIC database: ED540265.

Jonas, K., Broemer, P., and Diehi, M. (2000). Ambivalence and attitudes. *European*

    Review of Social Psychology, 11 (1), 35-74.

Jones, S. (2002). *The Internet goes to college: How students are living in*

the future with today's technology. Retrieved from the Pew Internet & American

Life Project Website*: http://pewrsr.ch/23xF7Kz*

Jordan, K. (2014). Initial trends in enrolment and completion of massive open online

courses. *The International Review of Research in Open and Distance Learning*,

15 (1). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/1651

Kaptchuk, T. (2003). Effect of interpretive bias on research evidence. *BMJ*,

326 (7404): 1453–1455.

Kellow, J.T. (2006). Using principal components analysis in program evaluation: Some

practical considerations. *Journal of Multidisciplinary Education, 5,* 89-107.

Kenya Libraries and Information Services Consortium (2013). *Monitoring and evaluation*

of electronic resources in academic and research institutions in Kenya. Retrieved

from the International Network for the Availability of Scientific Publications

(INASP) Website: bit.ly/1XyPXxE

Kim, Y.J., Chun, J.U., and Song, J., (2009). Investigating the role of attitude in

technology acceptance from an attitude strength perspective. *International Journal*

of Information Management, 29 (1), 67-77.

Kirkpatrick, K.L. (2006). Open courseware: An MIT thing. *Searcher: The Magazine for*

Database Professionals, 14 (10), 53- 58.

Klenke, K. (2008). *Qualitative research in the study of leadership*. Bingley, UK: Emerald

Group Publishing Limited.

Kuhlthau, C. (2005). Information search process. In K. Fisher, S. Erdelez, & L. McKechnie

(Eds.), *Theories of information behavior* (pp. 230-234). Medford, NJ:

Information Today.

Lafrenière, D., Menuz, V., Hurlimann,T., and Godard, B. (2013). Knowledge

dissemination interventions: A literature review. *Sage Open,* 1 (14).

Lakhan, S.E., and Jhunjhunwala, K. (2008). Open source software in education.

Educause Quarterly, 2, 32-40.

Leal, E.A., Miranda, G.J., and Carmo, C.R.S. (2013). Self-determination theory: An

analysis of student motivation in an accounting degree program. *Revista

Contabilidade & Finanças*, 24 (62), 162-173.

Lee, A. (1991). Integrating positivist and interpretive approaches to organizational

research. *Organizational Science*, 2 (4), 342-365.

Lewis, J.A (2010). *Government open source policies*. Retrieved from the Center

for Strategic and International Studies (CSIS) Website: http://bit.ly/1P0Dtyl

Liu, W. (2015). A historical overview of uses and gratifications theory. *Cross-Cultural Communication*, Vol. 11(9), 71-78 DOI: 10.3968/7415

Lodico, M.G., Voegtle, K.H., and Spaulding, D.T., (2006). *Methods in educational research: From theory to practice.* San Francisco, CA: Jossey-Bass

Luker, K. (2008). *Salsa dancing into the social sciences: Research in an age of info-glut.* Cambridge, MA: Harvard University Press

Makotsi, R. (2005). *Sharing resources: How library networks can help reach education goals.* Retrieved from the United Nations Educational, Scientific and Cultural Organization (UNESCO) Website (Catalog No. 201325). London, UK: Book Aid International.

Malloy, T., Jensen, G.C., Regan, A., and Reddick, M. (2002). Open courseware and shared knowledge in higher education. *Behavior Research Methods, Instruments, & Computers*, *34 (2), 200-203.*

Manda, P. A. (2005). Electronic resource usage in academic and research institutions in Tanzania. *Information Development*, 21 (4), 269-282.

Mansourian, Y. (2006). Adoption of grounded theory in LIS research. *New Library World*, 107 (9/10), 386-402.

Marsden, P.V., and Wright, J.D. (2010). *Handbook of survey research.* Bingly, UK:

Emerald Publishing Group Limited.

Maslow, A. H. (2012). *A human theory of motivation*. Retrieved from:

http://bit.ly/1OzANbV

Massachusetts Institute of Technology. (2015, December 12). Site statistics. Retrieved

from: bit.ly/1OSVpf7

Masterman, L., Wild, J., White, D. and Manton, M. (2011, December 8-9). The impact of

OER on teaching and learning in UK universities: Implications for Learning Design.

In L. Cameron and J. Dalziel (Eds). *Proceedings of the 6th International LAMS &*

Learning Design Conference: Learning design for a changing world (pp. 135-

144). Sydney: LAMS Foundation.

McGreal, R. (2012). *The need for Open Educational Resources for ubiquitous learning*.

Paper presented at the Pervasive Computing (PerCom) Conference 2012, Lugano,

Switzerland.

McGreal, R., Kinuthia, W., Marshall, S., and McNamara, T. (Eds.) (2013).

Perspectives on open and distance learning: Open educational Resources.

Innovation, Research and Practice. Retrieved from Athabasca University Website:

http://auspace.athabascau.ca/handle/2149/3472

McKenzie, P.J., Burkell, J., Wong, L., Whippey, C., Trosow, S.E., and McNally, M.

(2012). User–generated online content 1: Overview, current state and

context. *First Monday*, 17 (6). Retrieved from

http://firstmonday.org/article/view/3912/3266

McMullen, K. (2011). *Postsecondary education among underrepresented*

and minority groups. Retrieved from Statistics Canada Website:

http://bit.ly/1e2L9xD

Metros, S., and Bennett, K. (2002). Learning objects in higher education. *Educause, 2002*

(9). Retrieved from https://net.educause.edu/ir/library/pdf/erb0219.pdf

Mey, D. M. (1992). *The cognitive paradigm*. Chicago, IL: The University of Chicago

Press.

Mimiko, N. O. (2012). *Globalization: The Politics of Global Economic Relations and*

International Business. Durham, N.C: Carolina Academic Press.

Minges, M., Briceño-Garmendia, C., Williams, M., Ampah, M., Camos, D., and

Shkratan, M. (2008). *Information and communications technology in sub-*

Saharan Africa: A sector review. Retrieved from the European Union Africa

Infrastructure Trust Fund Website: http://bit.ly/1tdb8Wa

Mogase, R.C., and Kalema, B.M. (2015). E-resources usage in South African higher

institutions of learning. Paper presented at the Computer Science & Education

(ICCSE) 10th International Conference, Cambridge, London (pp. 261-266).

Doi: 10.1109/ICCSE.2015.7250253.

Morgin, P. (1977). Expected utility theory. In J. Davis, W. Hands, and U. Maki (Eds.),

Handbook of Economic Methodology (pp. 342-350). London, UK: Edward Elgar.

Retrieved from http://bit.ly/1LquQJk

Morville, P. (2005). *Ambient findability: What we find changes who we become*.

Sebastopol, CA: O'Reily Media Inc.

Mruck, k., and Breuer, F. (2003). Subjectivity and reflectivity in qualitative research.

Forum Qualitative Social Research, 4 (2). Retrieved from

http://www.qualitative-research.net/index.php/fqs/article/view/696

Mtebe, J.S., and Raisamo, R. (2014). Challenges and instructors' intention to adopt and

use open educational resources in higher education in Tanzania. *The International*

of Review of Research in Open and Distributed Learning, 15 (1). Retrieved from

http://www.irrodl.org/index.php/irrodl/article/view/1687/2771

Mukama, E. (2007). Rethinking languages of instruction in African schools. *Policy and*

    Practice: A Development Education Review, 4 (Spring), 53-564,

Mulder, J. (2008). *Knowledge dissemination in sub-Saharan Africa: What role for*

    open educational resources (OER)? (Master's Thesis). University of Amsterdam,

    Netherlands. Retrieved from *http://bit.ly/1aS4OgB*

Mulder, A., (2011). Open educational resources and the role of the university.

    EDUCAUSE Review, 46 (5). Retrieved from http://bit.ly/1snlc5L

Muijis, D. (2011). *Doing quantitative research in education with SPSS*. London, UK:

    Sage Publications.

Murphy, E. (1997). *Constructivism: From philosophy to practice*. Retrieved from ERIC

    Database (ED444966).

Mwenda, K.K., and Muuka, G.N. (2009). *The challenge of change in Africa's higher*

    education in the 21st century. Retrieved from: http://bit.ly/1kFUlx5

Neal, D.M., Campbell, A.J., Williams, L.Y., Liu, Y., and Nussbaumer, D. (2011). "I did

    not realize so many options are available": Cognitive authority, emerging adults, and

    e-mental health. *Library & Information Science Research,* 33, 25–33.

Network. (2008). In *Oxford American Large print dictionary*. Retrieved from

http://bit.ly/25150bN

Nok, G. (2006). The challenges of computerizing a University Library in Nigeria: The

case of Kashim Ibrahim Library, Ahmadu Bello University, Zaria. *Library*

Philosophy and Practice, 8 (2). Retrieved from http://unllib.unl.edu/LPP/nok.pdf

Nonaka, I. (1994). A dynamic theory of organizational knowledge creation.

Organization Science, 5 (1), 14-37.

Nonaka, I., Umemoto, K., and Senoo, D. (1996). From information processing to

knowledge creation: A paradigm shift in Business Management. *Technology*

in Society, 18 (2), 203-218.

Ngalande, R (2010).*The use of open education resources at the University of*

Malawi (UNIMA), Kamuzu College of Nursing. Retrieved from OER Africa Website:

http://bit.ly/1XfWU9s

Ngimwa, P., and 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.

Okiki, O.C., and Asiru, S.M. (2011). Use of electronic information sources by

postgraduate students in Nigeria: Influencing Factors. *Library Philosophy*

and Practice, 500. Retrieved from http://bit.ly/1YsdVve

Okonkwo, C.A. (2012). A needs assessment of ODL educators to determine their

effective use of open educational resources. *International Review of*

Research in Open and Distance Learning, 13 (4), 293-312. Retrieved from

http://www.irrodl.org/index.php/irrodl/article/view/1316/2325

Olakulehin, F.K., and Singh, G. (2013). Widening access through openness in

higher education in the developing world: A Bourdieusian field analysis of

experiences from the National Open University of Nigeria. *Open Praxis*, 5 (1),

31–40.

Open Education Week. (2014, March 20). What is open education? Retrieved from

http://bit.ly/TfvW4R

OER Africa. (2014, April 22). The OER value proposition. Retrieved from

http://bit.ly/QxPRKF

OER Africa. (2015, n.d.). Policy changes needed for institutions. Retrieved from

bit.ly/21Gki3S

OER University. (2014, May 21). How it works. Retrieved from: http://bit.ly/1kEpSMU

Open Educational Consortium. (2014, May 25). About the OCW Consortium. Retrieved

from http://bit.ly/RszyOW

Onaifo, D., and Rasmussen, D. (2013). Increasing libraries' content findability on

the web with search engine optimization. *Library Hi Tech*, 31 (1), 87 – 108.

Osborne, J. W., and Costello, A.B. (2004). Sample size and subject to item ratio

in principal components analysis. *Practical Assessment, Research &*

Evaluation, 9 (11). Retrieved from http://pareonline.net/getvn.asp?v=9&n=11

Ozoemelem, O.A. (2009). Use of electronic resources by postgraduate students

of the department of Library and Information Science of Delta State

University, Abraka, Nigeria. *Library Philosophy and Practice, 301*. Retrieved from

http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1306&context=libphilprac

Panke, S., and Seufert, T. (2013). What's educational about open educational

resources? Different theoretical lenses for conceptualizing learning with OER.

E-Learning and Digital Media, 10 (2), 116-134.

Panel on Research Ethics. (n.d.). *Scope of Research Ethics Review*. Retrieved from the

Government of Canada Website: http://bit.ly/1gilGMn

Patel, M.X., Doku, V., and Tennakoon, L. (2003). Challenges in recruitment of

research participants. *Advances in Psychiatric Treatment*, 9, 229-238.

Peterson, M.W., Rowat, J., Kreiter, C., and Mandel (2004). Medical students' use of

information resources: Is the digital age dawning? *Acad Med.*, 79 (1), 89-95.

Petrides, L., and Jimes, C. (2008). Building open educational resources from the

ground up: South Africa's free high school science texts. *Journal of*

Interactive Media in Education. http://doi.org/10.5334/2008-7

Petrides, L., Jimes, C., Middleton-Detzner, C., and Holly, H. (2010). OER as a

model for enhanced teaching and learning. In *Open ED Proceedings*,

Barcelona: UOC, OU, BYU.

Pew Research Center. (2015). *Cell phones in Africa: Communication lifeline*.

Retrieved from http://pewrsr.ch/1JKv6kO

Pigato, M.A. (2001). *Information and communication technology, poverty, and*

development in sub-Saharan Africa and South Asia. Retrieved from the World Bank

Website: http://www.worldbank.org/afr/wps/wp20.htm

Phipps, S. (2012). *Open source strategies for enterprises*. Sebastopol, CA: O'Reilly

Media.

Plonsky, L. (2015). *Advancing quantitative methods in second language research*.

Retrieved from bit.ly/1SdJ3P5

Plum, T., and Bleiler, R. (2001). *User authentication*. Retrieved from bit.ly/1nzjCeJ

Prabhala, A. (2010). *Copyright and open educational resources*. Retrieved from:

http://bit.ly/1ep2Ecy

Prempeh, B. (2013). Scaling OER production with student volunteers at Kwame

Nkrumah University of Science and Technology. *African Health OER Network*,

4 (1).

Quan-Haase, A., and Martin, K. (2011). Rethinking tradition: The loss of serendipity and

the impact of technology on the historical research process. *American Society for*

Information Science and Technology, 48 (1), 1-2.

Rainie, L., and Wellman, B. (2012). *Networked: The new social operating system*.

Retrieved from: bit.ly/200hU79

Ray, K. and Day, J. (1998). Student attitudes towards electronic information resources.

Information Research, 4 (2). Retrieved from

http://www.informationr.net/ir/4-2/paper54.html

Rejas-Muslera, R.J., Cuadrado, J.J., Abran, A., and Sicilia, M.A. (2008).

Information economy philosophy in universal education. The open

educational resources (OER): Technical, socioeconomics and legal aspects.

In Professional Communication Conference, IEEE International (pp.1-5), Montreal,

QC.

Reagle, J. (2004). Open content communities. *A Journal of Media and Culture*, 7 (3).

Retrieved from http://journal.media-culture.org.au/0406/06_Reagle.rft.php

Reagle, J. (n.d.). The notions of openness. Retrieved from: http://bit.ly/1kcnL2z

Resnik, D.B. (2015, December 1).*What is ethics in research & why is it important?*

Retrieved from the National Institute of Environmental Health Sciences Website:

http://1.usa.gov/1pBulRk

Rieger, O.Y. (2009). Search engine use behavior by students and faculty: User

perceptions and implications for future research. *First Monday, 14 (7)*. Retrieved

from http://firstmonday.org/article/view/2716/2385

Rolfe, V. (2012). Open educational resources: Staff attitudes and awareness. *Research in

Learning Technology*. Doi: 10.3402/rlt.v20i0/14395

Rolfe, V. (2015, January 27). Students as evaluators of open educational resources.

eLearning Papers, 40. Retrieved from http://bit.ly/1QX0wbV

Rodgers, E. (2011). Measuring our impact: The Open.Michigan Initiative. In Proceedings

of OpenCourseWare Consortium Global 2011: Celebrating 10 Years of

OpenCourseWare, May 4-6, 2011, Cambridge, Massachusetts: University of

Michigan.

Ropohl, G. (1999). Philosophy of socio-technical systems. *Society for Philosophy and*

Technology, 4 (3). Retrieved from

http://scholar.lib.vt.edu/ejournals/SPT/v4_n3html/ROPOHL

Rowell, J.L. (2015). *Student perceptions: Teaching and learning with open educational*

resources. Retrieved from ProQuest Dissertations (3727487).

Rubin, V.L., Burkell, J., and Quan-Haase, A. (2011). Facets of serendipity in everyday

chance encounters: A grounded theory approach to blog analysis. *Information*

Research, 16 (3). Retrieved from http://www.informationr.net/ir/16-3/paper488.html

Sample. (n.d). In *Merriam-Webster Online*. Retrieved from: bit.ly/1S18kvJ

Sankey, M., Birch, D., and Gardiner, M. (2010). *Engaging students through multimodal*

*learning environments: The journey continues***.** In ASCILITE 27th Annual

Conference of the Australasian Society for Computers in Learning in Tertiary

Education: Curriculum, Technology and Transformation for an Unknown Future, 5-

8 Dec (pp. 852-863), Sydney, Australia: *Ascilite.*

Scanfeld, D., Scanfeld, V., and Larson, E.L. (2013). Dissemination of health

information through social networks: Twitter and antibiotics. *American Journal of Infection Control, 38 (3)*, 182-188. http://dx.doi.org/10.1016/j.ajic.2009.11.004

Schensul, S.L., Schensul, J.J., and LeCompte, M.D. (1999). *Essential ethnographic methods: Observations, interviews, and questionnaires*. Walnut Creek, CA: AltaMira Press.

Scholarly Publishing and Academic Resources Coalition. (2015, August 4). SPARC calls on White House to open up access to federally funded educational resources. Retrieved from http://bit.ly/1RihJM6

Scholarly Publishing and Academic Resources Coalition. (2014, March 13). SPARC Webcast: Libraries leading the way on open educational resources. Retrieved from https://vimeo.com/89353357

Shafique, F., and Mahmood, K. (2010). Model development as a research tool: An example of PAK-NISEA, *Library Philosophy and Practice.* Retrieved from: http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1440&context=libphilprac

Shamoo, A.E., and Resnik, D.B. (2015). *Conducting responsible research*. New York, NY: Oxford University Press.

Sharratt, M., and Usoro, A. (2003). Understanding Knowledge-Sharing in Online

Communities of Practice. *Electronic Journal on Knowledge Management,* 1

(2), 187-196.

Smith, A., Rainie, L., and Zickuhr, K. (2011, July 19). College students and technology.

Retrieved from http://pewrsr.ch/1yHd3Ho

Sobh, T. (2008). *Advances in computer and information sciences and engineering*.

Retrieved from http://bit.ly/22uJCYE

Sonnenwald, D. (2005). Information horizons. In K. Fisher, S. Erdelez, & L. McKechnie

(Eds.), *Theories of information behavior* (pp. 191-197). Medford: NJ:

Information Today.

South African Institute for Distance Education. (2013, May 21). OER Africa. Retrieved

from http://bit.ly/1w7Rmzm

Spinellis, D. (2003). *Code reading: The open source perspective. Volume 1.* Boston, MA:

Pearson Education Inc.

Sivathaasan, N., Murugathas, K., and Chandrasekar, K. (2014). Attitude towards the

usage of electronic information resources in medical library, University of Jaffna,

Sri Lanka. *Information and Knowledge Management,* 4 (1). Retrieved from

http://www.iiste.org/Journals/index.php/IKM/article/viewFile/10383/10748

Snyder, S.L., and Burke, S.C. (2008). Students' perceptions of YouTube usage in the

college classroom. *International Journal of Instructional Technology and Distance*

Learning, 5(11). Retrieved from http://itdl.org/Journal/Nov_08/article02.htm

Sogunro, O.A. (2015). Motivating factors for adult learners in higher education.

International Journal of Higher Education, 4, (1), 22-37.

Stacey, P. (2010). Government support for open educational resources: Policy, funding,

and strategies. *The International Review of Research in Open and Distributed*

Learning, 14 (2). Retrieved from

http://www.irrodl.org/index.php/irrodl/article/view/1537

Stanford University. (2014). *Open Education - The classroom,*

philosophical underpinnings, English beginnings, the American experience,

controversies questions and criticisms. Retrieved from Stanford University Website:

http://bit.ly/1n5emNL

St. Laurent, A.M. (2004). *Understanding open source and free software licensing:*

Guide to navigating licensing issues in existing & new software. Sebastopol, CA:

O'Reilly Media, Inc.

Statistics Canada. (2010). *Survey methods and practices* (catalogue no. 12-587-X).

Retrieved from Statistics Canada Website: http://bit.ly/1jRpGLY

Stenberg, G. (2012). *A gender perspective on rehabilitation for patients with neck and back pain in primary health care* (Doctoral thesis, Umeå University, Umeå, Sweden). Retrieved from http://bit.ly/1glnNTv

Sugar, W., Crawley, F., and Fine, B. (2004). Examining teachers' decisions to adopt new technology. *Educational Technology and Society,* 7 (4), 201-213.

Tavakol, M., and Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2, 53-55.

Tennis, J. T. (2008). Epistemology, theory, and methodology in knowledge organization: Toward a classification, metatheory, and research framework. *Knowledge Organization*, 35 (2/3), 102-112.

Thakrar, J., and Zinn, D. (2009). Harnessing open educational resources to the challenges of teacher education in Sub-Saharan Africa. *International Review of Research in Open and Distance Learning,* 10 (4). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/705

The British Council. (2012). *The shape of things to come: Higher education global trends and emerging opportunities to 2020*. Retrieved from the British Council Website:

bit.ly/1ZwyQCc

The Organization for Economic Co-operation and Development. (2001).

Understanding the Digital Divide. Retrieved from: http://bit.ly/OovWNq

The Organization for Economic Co-operation and Development. (2007). *Giving*

knowledge for free: The emergence of open educational resources. Retrieved from

https://www.oecd.org/edu/ceri/38654317.pdf

The Organization for Economic Co-operation and Development. (2007).

Participative Web: User-created content. Retrieved from

http://www.oecd.org/internet/ieconomy/38393115.pdf

The Organization for Economic Co-operation and Development. (2012).

Education at a glance: The OECD indicators. Retrieved from

http://bit.ly/1e375J6

The United Nations Educational, Scientific and Cultural Organization. (2002).

Forum on the impact of open courseware for higher education in developing

countries. Retrieved from

http://unesdoc.unesco.org/images/0012/001285/128515e.pdf

The United Nations Educational, Scientific and Cultural Organization. (2012).

UNESCO World OER Congress releases 2012 Paris OER Declaration.

Retrieved from http://bit.ly/1nLFdKV

Thomas, A., Campbell, L.M., Barker, P., and Hawksey, M. (Eds). (2012). *Into the wild:*

Technology for open educational resources. Retrieved from

http://publications.cetis.org.uk/wp-content/uploads/2012/12/into_the_wild_print.pdf

Tjondronegoro, D., Song, W., and Docherty, M. (2013). User-centered study on quality

of mobile video services. In D. Tjondronegoro (Ed.). *Tools for Mobile Multimedia*

Programming and Development (pp. 18-51). Hershey, PA: IGI Global.

Torres, P.L., Siqueira, L.M.M., and Matos, E.L. (2013). Social network as a means of

sharing open educational resources in Higher Education. *Rev. Diálogo Educ.,*

Curitiba, 13 (38), 183-201.

Tsang, P., Cheung, S.K.S., Lee, V.S.K., and Huang, R. (2010). *Hybrid learning.*

Retrieved from: http://bit.ly/1HVFpUz

Ukachi, N.B., Onuoha, U.D., and Nwachukwu, V.N. (2014). Students' attitudes as a

determining factor to electronic information resources use in university libraries in

South-West, Nigeria. *Journal of Library & Information Technology*, 34, (4),

333-341.

United Nations Statistics Division. (2012). *Composition of macro*

  geographical (continental) regions, geographical sub-regions, and selected

  economic and other groupings. Retrieved from the United Nations Website:

  http://unstats.un.org/unsd/methods/m49/m49regin.htm

Universities in Nigeria (2015). 4ICU. Retrieved from http://www.4icu.org/ng/

University of Lagos. (2010, October 3). Internal and external advertisement for vacant

  positions**.** Retrieved from the University of Lagos website: http://bit.ly/1T5MxRJ

University of Lagos. (2009, August 11). A brief history of the University of Lagos (1).

  Retrieved from the University of Lagos from the University of Lagos website:

  http://bit.ly/1LD3a5h

Unwin, D., Foote, K., Tate, N., and DiBiase, C. (2012). *Teaching Geographic*

  Information Science and Technology in Higher Education. Oxford, UK: Wiley-

  Blackwell.

Urquhart, C., Light, A., Thomas, R., Barker, A., Yeoman, A., Cooper, J.,

  Armstrong, C., Fenton, R., Lonsdale, R. and Spink, S. (2003). Critical incident

  technique and explicitation interviewing in studies of information behavior.

  Journal of Library & Information Science Research, 25, 63-88.

Ushida, E. (2005). The role of students' attitudes and motivation in second language

  learning in online language courses. *Calico Journal*, 23 (1), 49-78.

Van Deursen, A.J.A.M., and Van Dijk, J.A.G.M (2009). Using the Internet: Skill related

  problems in users' online behavior. *Interacting with Computers, 21 (5-6),* 493-402.

   Doi: 10.1016/j.intcom.2009.06.005

Vaughan, G.M., and Hogg, M.A. (1995). *Social psychology: An introduction*.

   London, UK: Prentice Hall/Harvester Wheats.

Venkatesh, V., Morris, M.G., Davis, G.B., and Davis, F.D. (2003). User acceptance of

   information technology: Toward a unified view. *MIS Quarterly,* 27 (3), 425-

   478.

Vingerhoets, A.J.J.M., and Cornelius, R.R. (2001). *Adult crying: A biopsychosocial*

   approach. Retrieved from: http://bit.ly/1ShVEjp

Walsh, T. (2011). Open courseware initiatives and the challenge of sustainability.

   Educause Review, 46 (4), 62-63.

Weiler, A. (2005). Information-seeking behavior in generation Y students:

   Motivation, critical thinking, and learning theory. *The Journal of Academic*

   Librarianship, 31 (1), 46–53.

Wellman, B., Quan-Haase, A., Boase, J., Chen, W., Hampton, K., Isla de Diaz, K., and

   Miyata, K. (2003). The Social affordances of the Internet for networked

   individualism. *Journal of Computer-Mediated Communication, 8 (3)*.

   Doi: 10.1111/j.1083-6101.2003.tb00216.x

Wiley, D. (2007a). The learning objects literature. Retrieved from: http://bit.ly/RswS3O

Wiley, D. (2007b). *On the sustainability of open educational resource initiatives in*

   higher education. Retrieved from the Organization for Economic Co-operation and

   Development (OECD) Website: https: http://bit.ly/1h52dWQ

Wiley, D. (n.d). *Expert meeting on open educational resources*. Retrieved from the

   Organization for Economic Co-operation and Development (OECD) Website:

   http://bit.ly/1HnqmBm

Wilson, T.D. (1981). On user studies and information needs. *Journal of*

   Documentation, 37(1), 3-15.

Wilson, T.D. (1999). Models in information behaviour research. *Journal of*

   Documentation, 55 (3), 249 – 270.

Wilson, T.D. (2000). Human information behavior. *Informing Science*, 3(2), 49-55.

Wilson, T. (2008). New ways of mediating learning: Investigating the implications

   of adopting open educational resources for tertiary education at an institution

in the United Kingdom as compared to one in South Africa. *International Review of Research in Open and Distance Learning,* 9 (1). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/485

World Resources Institute. (2007). *The next 4 billion: Introduction and Market Overview.* Retrieved from: http://bit.ly/1ijZK5I

Wolfenden, F., Buckler, A., and 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.* http://doi.org/10.5334/2012-03

World Bank. (2010). *Financing higher education in Africa.* Retrieved from http://bit.ly/1iSQNqt

Woolf, N. (2014). Using quotation names for coding: An illustration from grounded theory. Retrieved from: http://bit.ly/1Hx25vU

Wright, C.R., and Reju, S.A. (2012). Developing and deploying OERs in sub-Saharan Africa: Building on the present. *The international Review of Research in Open and Distance Learning, 13 (2),* 181-220.

Xiao, L., and Askin, N. (2014). Academic opinions of Wikipedia and Open Access

publishing. *Online Information Review*, 38 (3), 332 – 347.

Yau, K., Cheng, A. L.F., and Ho, W.M. (2015). Identify the motivational factors to affect

the higher education students to learn using technology. *The Turkish Online Journal*

of Educational Technology, 14 (2). Retrieved from

http://www.tojet.net/articles/v14i2/14212.pdf

Young, P. (2009). Open access dissemination challenges: A case study. *OCLC Systems &*

Services: International digital library perspectives, 25 (2), 93 – 104.

http://dx.doi.org/10.1108/10650750910961893

Yuan, L., MacNeill, S., and Kraan, W. (2008). *Open educational resources –*

opportunities and challenges for higher education. Retrieved from the Centre for

Educational Technology, Interoperability and Standards Website:

http://publications.cetis.org.uk/date/2008/09

Appendices

Appendix A: List of leading open educational resources initiatives

OER Initiatives	Description / Objectives	Institutional Affiliation/Country
MIT OCW Initiative	Initiative that makes the materials used in the teaching of almost all of MIT's subjects available on the Web as OER. There are currently more than 2,200 open courses available in the repository.	MIT, United States
OER Africa	Provides access to information for learning about OER, support the creation and adaptation of OER, and support higher education institutions across Africa in the development and use of OER to enhance teaching and learning	SAIDE, South Africa
Open Learning Initiative (OLI)	OLI provides courses and materials openly and freely so that anyone can learn. The courses are often used by teachers to support classroom instruction, but they are also designed to support the individual learner who does not have the benefit of an instructor. OLI system provides immediate feedback on a concept a student did not understand. In many cases, the system provides randomized versions of the assignment so a student can re-study and re-attempt the homework.	Carnegie Mellon University (CMU), United States

Coursera	Coursera is an education platform that partners with top universities and organizations worldwide, to offer OER courses online. Coursera also provides immediate feedback on a concept a student did not understand. In many cases, it can also provide randomized versions of the assignment so a student can re-study and re-attempt the homework.	Stanford University, United States
Connexions	Connexions is an environment for collaboratively developing, freely sharing, and rapidly publishing scholarly content on the Web. It contains educational materials for everyone, and it is organized in small modules that are easily connected into larger courses.	Rice University, United States
JHSPH Open Courseware	This project provides course materials used in the teaching of actual courses freely and openly available on the Web.	John Hopkins, United States
Japan Open Courseware Consortium (JOCW)	JOCW is a consortium of Japanese universities that provide OCW contents and activities in Japan.	Consortium of Universities in Japan
TUFTS Open Courseware	Provides OER for faculty, students, and self-learners around the world.	Tufts University, United States

USU Open Courseware	Provides free, searchable, access to USU's course materials, as OER for educators, students, and self-learners around the world.	Utah State University, United States
Multimedia Educational Resource for Learning and Online Teaching (MERLOT)	MERLOT is a free and open resource designed primarily for faculty and students of higher education. MERLOT is a collaborative project by California State University and other institutions and corporate organizations.	California State University, United States
OER Commons	OER Commons is a dynamic digital content hub, offering a collection of OER courses and support. OER Commons also provide training for users of all kinds, as well as provide tools for creating content.	Rice University, United States
Open Course Library	Offers a collection of high quality OER courses that can be downloaded and used for teaching. The course materials are created through Washington State Board for Community & Technical Colleges (SBCTC) grant, and the SBCTC Open Licensing Policy requires that all materials created through optional grants carry an open license.	SBCTC, United States
OpenStax College	OpenStax College offers students free textbooks that meet scope and sequence requirements for most	Rice University, United States

	courses. The books are peer-reviewed texts written by professional content developers. OpenStax College is an initiative of Rice University and supported by several philanthropic foundations.	
BCcampus Open Textbook Project	Provides flexible and affordable access to higher education resources in British Columbia (B.C.) by making available 40 openly-licensed textbooks. These books are available for use by B.C. faculty, and the digital versions are free of charge to students.	Canada
China Open Resource for Education (CORE)	The CORE was launched by China to enhance higher education in China, promote open sharing of educational resources, and share Chinese open courseware globally.	China

Appendix B: Survey: motivation for using open educational resources (OER)

Open educational resources are free and open electronic resources disseminated with open licenses. Examples include articles on Wikipedia, materials from MIT open courseware, free and open textbooks from Openstax College, and open materials from OER Africa.

Please answer the questions below as accurately as possible.

Demographic Questions

- What is your gender? (Male or female)…………………….

- Please select your age range? **A.**17-22 **B**. 23-28 **C**. 29-34 **D**. 35-40 **E**. over 40

- What is the name of your school?..

- What is your current level of studies? (E.g. undergraduate)..................................

- What year of study are you? (E.g. first year)…………………………………..

- Do you use OER? (Yes or No). *If you are not sure, please check what OER is before answering. You may know it as something different*……………………….

- Please circle the type of OER you have used in the past: 1. textbooks, 2. articles, 3. lectures, 4. practice exams, tests, and quizzes, 5. others (please specify)………

- How often have you used OER?...

If you use OER, for the questions below please answer the questions by circling the most correct option from the Likert-type scale.

I use OER because…

(1) Strongly Disagree (2) Disagree (3) Neutral (4) Agree (1) Strongly Agree

1. I can modify/change/remix them

2. I can share them with others

3. they are digital content

4. they are paperless

5. I worry about the environmental impact of using print materials

6. I can discuss them with others

7. I see others using them

8. I can use them along with others at the same time. Distance or time is not a problem

9. they are available in video format

10. they are available in audio format

11. they are easy to find online

12. I can access them from anywhere

13. I can use my mobile phone to find them

14. I can find them in the library

15. the librarians help me to find them

16. my school makes it easy for me to find them

17. my teachers encourage me to do so

18. some of them are produced locally

19. there are so many of them available

20. I want to encourage their use

21. they are on YouTube

22. many are created by teachers from prestigious/famous schools

23. I learn better from using them

24. they are different from the kind of materials I normally use

25. I create OER. I learn by creating

26. They are available in video format. I am a visual learner

27. They are available in audio format. I learn better when I listen

28. They are free to use. They reduce the cost of learning

29. it gives me the opportunity to learn from other teachers

30. it gives me an opportunity to learn from other learners

31. they offer different perspective from what I learn in my school

32. they complement what I learn in my formal classes

33. I remember more of what I learn in OER course lectures

34. I have control over the use of the course lectures (personalized learning)

35. they enable me to learn at my own pace

36. They help me decide what courses to take

37. They help me prepare for classes

38. They help me complete my assignments

39. They enable me prepare for tests and exams

40. They help me decide what school to attend

This research has two other parts: simulated task and interview. In the simulated task, you will be asked to find open educational resources of your choice online, and then asked to fill out a follow up questionnaire. In the interview, you and the researcher will have the

opportunity to talk about issues related to how you find and use open educational

resources. If you want to be part of this process, please answer the questions below:

- Name:…………………………………………………………………….

- Contact information (phone and/or email address)…………………………

Please select one from the following option (s):

- I want to be contacted for the interview.

Appendix C: Semi-structured interview guide

1. <u>Demographic information:</u> (name, gender, institution, and level of education)

2. <u>Experience with electronic resources</u>: Have you used electronic learning resources or taken online courses in the past?

3. <u>Awareness</u>: What do you know about open educational resources (OER)? (*It is possible that the resources are known by a different name to the respondent. Examples of OER may be provided as a prompt.*)

4. <u>Awareness</u>: What do you know about OER features/types/availability/access/usefulness

   Prompt: I am interested in knowing what the respondent knows about the features of OER, the different formats, how widely available they are, and their usefulness.

5. Have you used OER in the past? If yes, please describe the circumstances/experience for me. For example, when was the last time you used the resource (s)? What type of OER did you use (textbooks, Wikipedia, lecture notes, practice tests and exams, etc.)? How useful was the material (s) you used?

6. <u>Change agent</u>: Describe the first time you used OER. Was there a particular person/system/institution that facilitated your first use of OER?

7. <u>Attitude</u>: What do you think of the growing availability and use of OER? How important are the resources to learning and education in your opinion?

8. <u>Motivation and benefits</u>: Tell me about the reasons you use OER. Does the use of OER hold any benefit for you? If so, what are they? Does the prestige/reputation of the institution or individual creating OER play any role in your decision to use them?

9. <u>Challenges</u>: Based on your experience, are there challenges/problems in your use of OER? If so, what are they?

10. <u>Devices/channels/sources</u>: What device do normally use to access OER? What online sources do you use? (Example: *institutional or school website, YouTube; aggregating sites, such as OER commons, etc. may be mentioned to prompt the respondent).*

11. <u>Locality</u>: Does it matter where and who created the material? If yes, would you prefer locally created OER? What is your opinion on most of the available OER being created in Europe and North America?

Appendix D: Communalities

		Communalities	
	Survey Items	Initial	Extraction
1	I can modify, change, remix OER	1.000	.548
2	I can share OER with others	1.000	.556
3	OER are digital content	1.000	.577
4	OER are paperless	1.000	.556
5	I worry about the environmental impact of using print materials	1.000	.628
6	I can discuss OER with OER	1.000	.503
7	I see others using OER	1.000	.581
8	I can use OER along with others at the same time	1.000	.716
9	OER are available in video format	1.000	.641
10	OER are available in audio format	1.000	.671
11	OER are easy to find online	1.000	.636
12	I can access OER from anywhere	1.000	.604
13	I can use my mobile phone to find OER	1.000	.509
14	I can find OER in the library	1.000	.649
15	Librarians help me find OER	1.000	.567
16	My school makes it easy for me to find OER	1.000	.631
17	My teachers encourage me to use OER	1.000	.539
18	Some OER are produced locally	1.000	.556
19	There are so many OER available	1.000	.565
20	I want to encourage the use of OER	1.000	.528
21	OER are on YouTube	1.000	.635
22	Many OER are created by teachers from prestigious and famous schools	1.000	.589
23	I learn better from using OER	1.000	.582
24	OER are different from the kind of materials I normally use	1.000	.612
25	I create OER. I learn by creating	1.000	.569
26	OER are available in video format. I am a visual learner	1.000	.565

27	OER are available in audio format. I learn better when I listen	1.000	.542
28	OER are free to use. They reduce the cost of learning	1.000	.484
29	OER give me the opportunity to learn from other teachers	1.000	.237
30	OER give me the opportunity to learn from other learners	1.000	.668
31	OER offer different perspective from what I learn in my school	1.000	.596
32	OER complement what I learn in my formal classes	1.000	.501
33	I remember more of what I learn in OER course lectures	1.000	.457
34	I have control over the use of the course lectures (personalized learning)	1.000	.504
35	OER enable me to learn at my own pace	1.000	.480
36	OER help me decide what courses to take	1.000	.615
37	OER help me prepare for classes	1.000	.679
38	OER help me complete my assignments	1.000	.690
39	OER enable me prepare for tests and exams	1.000	.606
40	OER help me decide what school to attend	1.000	.600

358

Appendix E: Item statistics

	Survey Items	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
1	I can modify, change, remix OER	142.0073	405.205	.237	.208	.769
2	I can share OER with others	141.1244	396.960	.163	.087	.773
3	OER are digital content	141.5341	399.594	.410	.331	.765
4	OER are paperless	141.8293	401.717	.297	.243	.767
5	I worry about the environmental impact of using print materials	142.1854	410.181	.098	.207	.772
6	I can discuss OER with OER	141.2463	398.431	.424	.341	.764
7	I see others using OER	141.4488	389.691	.167	.113	.776
8	I can use OER along with others at the same time	141.1122	396.276	.170	.171	.773
9	OER are available in video format	141.3805	394.109	.189	.155	.772
10	OER are available in audio format	141.6073	396.440	.430	.372	.763
11	OER are easy to find online	141.1829	397.739	.450	.414	.763
12	I can access OER from anywhere	141.2195	397.634	.420	.434	.764
13	I can use my mobile phone to find OER	140.8585	397.506	.467	.398	.763
14	I can find OER in the library	141.7488	400.458	.299	.385	.766
15	Librarians help me find OER	142.3854	406.071	.119	.223	.773
16	My school makes it easy for me to find OER	141.9854	401.501	.281	.389	.767
17	My teachers encourage me to use OER	141.4780	396.979	.408	.378	.764
18	Some OER are produced locally	141.8805	400.091	.173	.135	.771
19	There are so many OER available	141.3927	395.848	.456	.340	.763
20	I want to encourage the use of OER	141.2073	393.964	.547	.439	.761
21	OER are on YouTube	141.4854	396.651	.197	.118	.770
22	Many OER are created by teachers from prestigious and famous schools	141.4390	397.763	.420	.314	.764
23	I learn better from using OER	141.1976	393.963	.526	.465	.761

24	OER are different from the kind of materials I normally use	141.5683	400.119	.134	.155	.774
25	I create OER. I learn by creating	142.3122	404.103	.255	.269	.768
26	OER are available in video format. I am a visual learner	141.7634	395.105	.472	.360	.762
27	OER are available in audio format. I learn better when I listen	141.6951	401.186	.350	.325	.766
28	OER are free to use. They reduce the cost of learning	141.1073	385.304	.146	.071	.783
29	OER give me the opportunity to learn from other teachers	140.9098	394.253	.146	.073	.776
30	OER give me the opportunity to learn from other learners	140.9122	386.706	.215	.161	.772
31	OER offer different perspective from what I learn in my school	141.2585	405.679	.247	.217	.769
32	OER complement what I learn in my formal classes	140.9683	400.305	.443	.336	.765
33	I remember more of what I learn in OER course lectures	141.4634	401.672	.109	.083	.776
34	I have control over the use of the course lectures (personalized learning)	141.5073	399.405	.445	.334	.764
35	OER enable me to learn at my own pace	140.9098	392.830	.163	.097	.775
36	OER help me decide what courses to take	141.8268	395.635	.428	.408	.763
37	OER help me prepare for classes	141.2220	394.246	.510	.556	.761
38	OER help me complete my assignments	140.9829	393.014	.558	.579	.760
39	OER enable me prepare for tests and exams	141.0000	396.328	.514	.478	.762
40	OER help me decide what school to attend	142.2707	404.462	.210	.289	.769

Appendix F: Total variance explained

Components	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	7.098	17.746	17.746	7.098	17.746	17.746	5.131
2	2.159	5.398	23.143	2.159	5.398	23.143	2.471
3	1.785	4.463	27.606	1.785	4.463	27.606	2.509
4	1.536	3.841	31.447	1.536	3.841	31.447	1.823
5	1.413	3.533	34.980	1.413	3.533	34.980	1.735
6	1.308	3.270	38.250	1.308	3.270	38.250	2.471
7	1.197	2.992	41.241	1.197	2.992	41.241	2.274
8	1.190	2.975	44.216	1.190	2.975	44.216	3.009
9	1.099	2.747	46.963	1.099	2.747	46.963	1.364
10	1.094	2.736	49.699	1.094	2.736	49.699	1.416
11	1.070	2.675	52.373	1.070	2.675	52.373	1.751
12	1.020	2.551	54.925	1.020	2.551	54.925	1.614
13	1.003	2.508	57.433	1.003	2.508	57.433	1.381
14	.958	2.396	59.828				
15	.949	2.372	62.200				
16	.941	2.352	64.552				
17	.918	2.296	66.848				
18	.892	2.231	69.079				
19	.858	2.145	71.224				
20	.844	2.109	73.333				
21	.809	2.023	75.356				
22	.751	1.876	77.232				
23	.745	1.862	79.094				

24	.728	1.821	80.915				
25	.682	1.706	82.621				
26	.655	1.639	84.260				
27	.605	1.512	85.772				
28	.592	1.480	87.252				
29	.557	1.394	88.646				
30	.534	1.335	89.981				
31	.477	1.194	91.175				
32	.470	1.175	92.349				
33	.455	1.137	93.486				
34	.435	1.088	94.574				
35	.422	1.055	95.629				
36	.400	.999	96.629				
37	.378	.945	97.574				
38	.360	.901	98.475				
39	.334	.836	99.310				
40	.276	.690	100.000				

Appendix G: Pattern matrix

	Survey Items	Components												
		1	2	3	4	5	6	7	8	9	10	11	12	13
1	OER help me complete my assignments	.775												
2	OER help me prepare for classes	.731												
3	OER enable me prepare for tests and exams	.725												
4	I learn better from using OER	.667												
5	I want to encourage the use of OER													
6	OER complement what I learn in my formal classes													
7	My teachers encourage me to use OER													
8	I can use my mobile phone to find OER													
9	Librarians help me find OER		.740											
10	My school makes it easy for me to find OER		.713											
11	I can find OER in the library		.594											
12	OER give me the opportunity to learn from other teachers													
13	OER help me decide what school to attend			.743										
14	OER help me decide what courses to take			.635										
15	I have control over the use of the course lectures (personalized learning)													
16	I worry about the environmental impact of using print materials				.687									
17	Many OER are created by teachers from prestigious and famous schools				.565									
18	I see others using OER					-.672								
19	I create OER. I learn by creating					-.521								
20	I can modify, change, remix OER													
21	OER are available in video format						-.816							
22	OER are available in audio format						-.659							

#	Statement													
23	I can share OER with others							-.750						
24	OER are digital content													
25	OER offer different perspective from what I learn in my school													
26	OER are easy to find online								.696					
27	I can access OER from anywhere								.629					
28	I remember more of what I learn in OER course lectures								.584					
29	I can discuss OER with OER													
30	OER are free to use. They reduce the cost of learning									.664				
31	OER are paperless													
32	OER are available in audio format. I learn better when I listen													
33	OER are on YouTube										.771			
34	OER enable me to learn at my own pace													
35	I can use OER along with others at the same time											.824		
36	OER are available in video format. I am a visual learner													
37	Some OER are produced locally												.714	
38	There are so many OER available													
39	OER give me the opportunity to learn from other learners													.767
40	OER are different from the kind of materials I normally use													-.512

Extraction Method: Principal Component Analysis.

PCA output: Pattern Matrix

Rotation Method: Oblimin with Kaiser Normalization. Rotation converged in 39 iterations.

Appendix H: Structure matrix

	Survey Items	Components												
		1	2	3	4	5	6	7	8	9	10	11	12	13
1	OER help me complete my assignments	.809												
2	OER help me prepare for classes	.756												
3	OER enable me prepare for tests and exams	.755												
4	I learn better from using OER	.730												
5	I want to encourage the use of OER	.577												
6	I can use my mobile phone to find OER	.522												
7	OER complement what I learn in my formal classes													
8	My teachers encourage me to use OER													
9	My school makes it easy for me to find OER		.737											
10	Librarians help me find OER		.709											
11	I can find OER in the library		.638											
12	OER help me decide what school to attend			.737										
13	OER help me decide what courses to take			.689										
14	I have control over the use of the course lectures (personalized learning)													
15	I worry about the environmental impact of using print materials				.657									
16	Many OER are created by teachers from prestigious and famous schools				.612									
17	OER give me the opportunity to learn from other teachers													
18	I see others using OER					-.633								
19	I create OER. I learn by creating					-.561								
20	I can modify, change, remix OER					-.514								
21	OER are available in video format						-.767							
22	OER are available in audio format						-.706							
23	I can share OER with others							-.700						
24	OER are digital content							-.564						
25	OER offer different perspective from what I learn in my school													
26	OER are easy to find online								.737					

27	I can access OER from anywhere									.696						
28	I remember more of what I learn in OER course lectures									.523						
29	I can discuss OER with OER															
30	OER are free to use. They reduce the cost of learning										.657					
31	OER are paperless															
32	OER are on YouTube											.770				
33	I can use OER along with others at the same time												.797			
34	OER are available in video format. I am a visual learner															
35	OER are available in audio format. I learn better when I listen															
36	Some OER are produced locally														.696	
37	OER enable me to learn at my own pace															
38	There are so many OER available															
39	OER give me the opportunity to learn from other learners															.747
40	OER are different from the kind of materials I normally use															

Appendix I: Description of participant responses to each survey item

Items	N	Mode	Median
I can modify, change, remix OER	416	3.00	3
I can share OER with others	417	4.00	4
OER are digital content	416	4.00	4
OER are paperless	417	4.00	3
I worry about the environmental impact of using print materials	416	3.00	3
I can discuss OER with others	417	4.00	4
I see others using OER	416	4.00	4
I can use OER along with others at the same time	417	4.00	4
OER are available in video format	416	4.00	4
OER are available in audio format	417	4.00	4
OER are easy to find online	417	4.00	4
I can access OER from anywhere	417	4.00	4
I can use my mobile phone to find OER	417	5.00	4
I can find OER in the library	416	4.00	3
Librarians help me find OER	417	3.00	3
My school makes it easy for me to find OER	417	4.00	3
My teachers encourage me to use OER	417	4.00	4
Some OER are produced locally	417	3.00	3

There are so many OER available	417	4.00	4
I want to encourage the use of OER	417	4.00	4
OER are on YouTube	417	3.00	3
Many OER are created by teachers from prestigious and famous schools	417	4.00	4
I learn better from using OER	417	4.00	4
OER are different from the kind of materials I normally use	417	4.00	4
I create OER. I learn by creating	417	3.00	3
OER are available in video format. I am a visual learner	417	3.00	3
OER are available in audio format. I learn better when I listen	417	3.00	3
OER are free to use. They reduce the cost of learning	417	4.00	4
OER give me the opportunity to learn from other teachers	417	4.00	4
OER give me the opportunity to learn from other learners	417	4.00	4
OER offer different perspective from what I learn in my school	417	4.00	4
OER complement what I learn in my formal classes	417	4.00	4
I remember more of what I learn in OER course lectures	417	3.00	4
I have control over the use of the course lectures (personalized learning)	417	4.00	4

OER enable me to learn at my own pace	417	4.00	4
OER help me decide what courses to take	417	3.00	3
OER help me prepare for classes	417	4.00	4
OER help me complete my assignments	417	4.00	4
OER enable me prepare for tests and exams	417	4.00	4
OER help me decide what school to attend	416	3.00	3

Appendix J: Frequency of participant responses to each survey item

I can modify, change, remix OER

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	34	8.2	8.2	8.2
	Disagree	70	16.8	16.8	25.0
	Neutral	173	41.5	41.6	66.6
	Agree	104	24.9	25.0	91.6
	Strongly Agree	35	8.4	8.4	100.0
	Total	416	99.8	100.0	
Missing	System	1	.2		
Total		417	100.0		

I can share OER with others

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	18	4.3	4.3	4.3
	Disagree	23	5.5	5.5	9.8
	Neutral	57	13.7	13.7	23.5
	Agree	224	53.7	53.7	77.2
	Strongly Agree	95	22.8	22.8	100.0
	Total	417	100.0	100.0	

OER are digital content

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	17	4.1	4.1	4.1
	Disagree	33	7.9	7.9	12.0
	Neutral	132	31.7	31.7	43.8
	Agree	176	42.2	42.3	86.1
	Strongly Agree	58	13.9	13.9	100.0
	Total	416	99.8	100.0	
Missing	System	1	.2		
Total		417	100.0		

OER are paperless

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	35	8.4	8.4	8.4
	Disagree	61	14.6	14.6	23.0
	Neutral	134	32.1	32.1	55.2
	Agree	135	32.4	32.4	87.5
	Strongly Agree	52	12.5	12.5	100.0
	Total	417	100.0	100.0	

I worry about the environmental impact of using print materials

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	59	14.1	14.2	14.2
	Disagree	82	19.7	19.7	33.9
	Neutral	157	37.6	37.7	71.6
	Agree	75	18.0	18.0	89.7
	Strongly Agree	43	10.3	10.3	100.0
	Total	416	99.8	100.0	
Missing	System	1	.2		
Total		417	100.0		

I can discuss OER with OER

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	18	4.3	4.3	4.3
	Disagree	21	5.0	5.0	9.4
	Neutral	67	16.1	16.1	25.4
	Agree	211	50.6	50.6	76.0
	Strongly Agree	100	24.0	24.0	100.0
	Total	417	100.0	100.0	

I see others using OER

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	36	8.6	8.7	8.7
	Disagree	51	12.2	12.3	20.9
	Neutral	78	18.7	18.8	39.7
	Agree	164	39.3	39.4	79.1
	Strongly Agree	87	20.9	20.9	100.0
	Total	416	99.8	100.0	
Missing	System	1	.2		
Total		417	100.0		

I can use OER along with others at the same time

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	11	2.6	2.6	2.6
	Disagree	32	7.7	7.7	10.3
	Neutral	73	17.5	17.5	27.8
	Agree	184	44.1	44.1	71.9
	Strongly Agree	117	28.1	28.1	100.0
	Total	417	100.0	100.0	

OER are available in video format

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	19	4.6	4.6	4.6
	Disagree	40	9.6	9.6	14.2
	Neutral	109	26.1	26.2	40.4
	Agree	160	38.4	38.5	78.8
	Strongly Agree	88	21.1	21.2	100.0
	Total	416	99.8	100.0	
Missing	System	1	.2		
Total		417	100.0		

OER are available in audio format

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	25	6.0	6.0	6.0
	Disagree	43	10.3	10.3	16.3
	Neutral	130	31.2	31.2	47.5
	Agree	143	34.3	34.3	81.8
	Strongly Agree	76	18.2	18.2	100.0
	Total	417	100.0	100.0	

OER are easy to find online

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	13	3.1	3.1	3.1
	Disagree	28	6.7	6.7	9.8
	Neutral	56	13.4	13.4	23.3
	Agree	207	49.6	49.6	72.9
	Strongly Agree	113	27.1	27.1	100.0
	Total	417	100.0	100.0	

I can access OER from anywhere

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	13	3.1	3.1	3.1
	Disagree	33	7.9	7.9	11.0
	Neutral	79	18.9	18.9	30.0
	Agree	161	38.6	38.6	68.6
	Strongly Agree	131	31.4	31.4	100.0
	Total	417	100.0	100.0	

I can use my mobile phone to find OER

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	15	3.6	3.6	3.6
	Disagree	10	2.4	2.4	6.0
	Neutral	28	6.7	6.7	12.7
	Agree	172	41.2	41.2	54.0
	Strongly Agree	192	46.0	46.0	100.0
	Total	417	100.0	100.0	

I can find OER in the library

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	33	7.9	7.9	7.9
	Disagree	72	17.3	17.3	25.2
	Neutral	111	26.6	26.7	51.9
	Agree	123	29.5	29.6	81.5
	Strongly Agree	77	18.5	18.5	100.0
	Total	416	99.8	100.0	
Missing	System	1	.2		
Total		417	100.0		

Librarians help me find OER

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	72	17.3	17.3	17.3
	Disagree	116	27.8	27.8	45.1
	Neutral	142	34.1	34.1	79.1
	Agree	55	13.2	13.2	92.3
	Strongly Agree	32	7.7	7.7	100.0
	Total	417	100.0	100.0	

My school makes it easy for me to find OER

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	54	12.9	12.9	12.9
	Disagree	70	16.8	16.8	29.7
	Neutral	117	28.1	28.1	57.8
	Agree	135	32.4	32.4	90.2
	Strongly Agree	41	9.8	9.8	100.0
	Total	417	100.0	100.0	

My teachers encourage me to use OER

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	18	4.3	4.3	4.3
	Disagree	56	13.4	13.4	17.7
	Neutral	91	21.8	21.8	39.6
	Agree	158	37.9	37.9	77.5
	Strongly Agree	94	22.5	22.5	100.0
	Total	417	100.0	100.0	

Some OER are produced locally

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	28	6.7	6.7	6.7
	Disagree	72	17.3	17.3	24.0
	Neutral	182	43.6	43.6	67.6
	Agree	92	22.1	22.1	89.7
	Strongly Agree	43	10.3	10.3	100.0
	Total	417	100.0	100.0	

There are so many OER available

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	19	4.6	4.6	4.6
	Disagree	33	7.9	7.9	12.5
	Neutral	99	23.7	23.7	36.2
	Agree	166	39.8	39.8	76.0
	Strongly Agree	100	24.0	24.0	100.0
	Total	417	100.0	100.0	

I want to encourage the use of OER

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	13	3.1	3.1	3.1
	Disagree	22	5.3	5.3	8.4
	Neutral	87	20.9	20.9	29.3
	Agree	177	42.4	42.4	71.7
	Strongly Agree	118	28.3	28.3	100.0
	Total	417	100.0	100.0	

OER are on YouTube

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	13	3.1	3.1	3.1
	Disagree	40	9.6	9.6	12.7
	Neutral	158	37.9	37.9	50.6
	Agree	145	34.8	34.8	85.4
	Strongly Agree	61	14.6	14.6	100.0
	Total	417	100.0	100.0	

Many OER are created by teachers from prestigious and famous schools

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	20	4.8	4.8	4.8
	Disagree	29	7.0	7.0	11.8
	Neutral	114	27.3	27.3	39.1
	Agree	168	40.3	40.3	79.4
	Strongly Agree	86	20.6	20.6	100.0
	Total	417	100.0	100.0	

I learn better from using OER

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	19	4.6	4.6	4.6
	Disagree	16	3.8	3.8	8.4
	Neutral	81	19.4	19.4	27.8
	Agree	179	42.9	42.9	70.7
	Strongly Agree	122	29.3	29.3	100.0
	Total	417	100.0	100.0	

OER are different from the kind of materials I normally use

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	18	4.3	4.3	4.3
	Disagree	43	10.3	10.3	14.6
	Neutral	145	34.8	34.8	49.4
	Agree	163	39.1	39.1	88.5
	Strongly Agree	48	11.5	11.5	100.0
	Total	417	100.0	100.0	

I create OER. I learn by creating

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	40	9.6	9.6	9.6
	Disagree	137	32.9	32.9	42.4
	Neutral	152	36.5	36.5	78.9
	Agree	51	12.2	12.2	91.1
	Strongly Agree	37	8.9	8.9	100.0
	Total	417	100.0	100.0	

OER are available in video format. I am a visual learner

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	28	6.7	6.7	6.7
	Disagree	51	12.2	12.2	18.9
	Neutral	147	35.3	35.3	54.2
	Agree	137	32.9	32.9	87.1
	Strongly Agree	54	12.9	12.9	100.0
	Total	417	100.0	100.0	

OER are available in audio format. I learn better when I listen

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	20	4.8	4.8	4.8
	Disagree	44	10.6	10.6	15.3
	Neutral	152	36.5	36.5	51.8
	Agree	150	36.0	36.0	87.8
	Strongly Agree	51	12.2	12.2	100.0
	Total	417	100.0	100.0	

OER are free to use. They reduce the cost of learning

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	29	7.0	7.0	7.0
	Disagree	30	7.2	7.2	14.1
	Neutral	67	16.1	16.1	30.2
	Agree	171	41.0	41.0	71.2
	Strongly Agree	120	28.8	28.8	100.0
	Total	417	100.0	100.0	

OER give me the opportunity to learn from other teachers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	8	1.9	1.9	1.9
	Disagree	5	1.2	1.2	3.1
	Neutral	68	16.3	16.3	19.4
	Agree	210	50.4	50.4	69.8
	Strongly Agree	126	30.2	30.2	100.0
	Total	417	100.0	100.0	

OER give me the opportunity to learn from other learners

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	9	2.2	2.2	2.2
	Disagree	8	1.9	1.9	4.1
	Neutral	57	13.7	13.7	17.7
	Agree	223	53.5	53.5	71.2
	Strongly Agree	120	28.8	28.8	100.0
	Total	417	100.0	100.0	

OER offer different perspective from what I learn in my school

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	9	2.2	2.2	2.2
	Disagree	30	7.2	7.2	9.4
	Neutral	87	20.9	20.9	30.2
	Agree	187	44.8	44.8	75.1
	Strongly Agree	104	24.9	24.9	100.0
	Total	417	100.0	100.0	

OER complement what I learn in my formal classes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	10	2.4	2.4	2.4
	Disagree	8	1.9	1.9	4.3
	Neutral	43	10.3	10.3	14.6
	Agree	216	51.8	51.8	66.4
	Strongly Agree	140	33.6	33.6	100.0
	Total	417	100.0	100.0	

I remember more of what I learn in OER course lectures

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	16	3.8	3.8	3.8
	Disagree	16	3.8	3.8	7.7
	Neutral	171	41.0	41.0	48.7
	Agree	157	37.6	37.6	86.3
	Strongly Agree	57	13.7	13.7	100.0
	Total	417	100.0	100.0	

I have control over the use of the course lectures (personalized learning)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	9	2.2	2.2	2.2
	Disagree	30	7.2	7.2	9.4
	Neutral	149	35.7	35.7	45.1
	Agree	166	39.8	39.8	84.9
	Strongly Agree	63	15.1	15.1	100.0
	Total	417	100.0	100.0	

OER enable me to learn at my own pace

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	15	3.6	3.6	3.6
	Disagree	10	2.4	2.4	6.0
	Neutral	57	13.7	13.7	19.7
	Agree	204	48.9	48.9	68.6
	Strongly Agree	131	31.4	31.4	100.0
	Total	417	100.0	100.0	

OER help me decide what courses to take

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	29	7.0	7.0	7.0
	Disagree	70	16.8	16.8	23.7
	Neutral	139	33.3	33.3	57.1
	Agree	113	27.1	27.1	84.2
	Strongly Agree	66	15.8	15.8	100.0
	Total	417	100.0	100.0	

OER help me prepare for classes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	15	3.6	3.6	3.6
	Disagree	24	5.8	5.8	9.4
	Neutral	82	19.7	19.7	29.0
	Agree	175	42.0	42.0	71.0
	Strongly Agree	121	29.0	29.0	100.0
	Total	417	100.0	100.0	

OER help me complete my assignments

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	16	3.8	3.8	3.8
	Disagree	16	3.8	3.8	7.7
	Neutral	40	9.6	9.6	17.3
	Agree	177	42.4	42.4	59.7
	Strongly Agree	168	40.3	40.3	100.0
	Total	417	100.0	100.0	

OER enable me prepare for tests and exams

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	13	3.1	3.1	3.1
	Disagree	11	2.6	2.6	5.8
	Neutral	53	12.7	12.7	18.5
	Agree	189	45.3	45.3	63.8
	Strongly Agree	151	36.2	36.2	100.0
	Total	417	100.0	100.0	

OER help me decide what school to attend

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	72	17.3	17.3	17.3
	Disagree	94	22.5	22.6	39.9
	Neutral	132	31.7	31.7	71.6
	Agree	77	18.5	18.5	90.1
	Strongly Agree	41	9.8	9.9	100.0
	Total	416	99.8	100.0	
Missing	System	1	.2		
Total		417	100.0		

Appendix K: Information letter (survey participants)

Date: June 10, 2014

Project title: Alternate Academy: investigating the use of open educational resources

Researcher: Daniel Onaifo, PhD Candidate

Faculty of Information and Media Studies

University of Western Ontario, London, Ontario, Canada

The purpose of this information letter is to provide you with the required information to make an informed decision on participating in this research.

Purpose of this study

You are being invited to participate in a research study looking at how students find and use open educational resources. It is my intention in this study to examine how open educational resources are sought and used at institutions of higher education in sub-Saharan Africa.

Who is eligible to participate?

You are eligible if you are a student in an institution of higher education in Nigeria.

Research procedures for this study

If you agree to participate, you may be asked to take part in an activity that involves finding and using open educational resources, and then asked to complete a follow-up post work/search questionnaire that may last approximately 30 minutes. You may also be

asked to complete a survey that asks questions about your motives of using open

educational resources, as well as the benefit you derive from using the resources. You can

complete the questionnaire/survey at a time and location of your convenience.

Voluntary Participation

Participation in this study is voluntary. You may refuse to participate, refuse to answer

any questions or withdraw from the study at any time.

Inquiries and risks

You are free to ask questions about the study or the questionnaire at any time by

contacting the researcher. While your participation is appreciated, please be advised that

you may withdraw at any time. Participation in the present study does not hinder your

ability to participate in other concurrent studies or in future studies. You do not waive

any legal rights by signing this consent form.

Benefits from the study

There are no known benefits to you from participating in this study, except perhaps more

awareness about open educational resources. However, your participation will help to

gain better understanding of open educational resources and knowledge sharing.

Materials of the study

If you agree to participate, please complete the questionnaire and return it to the

researcher. There is no need to sign them or make self-identification when submitting

them (except you want to be contacted for the interview or activity part of the study). If

you chose not to participate in the study, you do not need to return the

survey/questionnaire.

Confidentiality of information

Information that is collected during the study will be stored securely in the researcher's office and will be destroyed 2 years after the study is completed. If the results of the study are published, your name will not be used and no information that discloses your identity will be released or published without your specific consent to the disclosure. We will strive to ensure the confidentiality of your research-related records. Absolute confidentiality cannot be guaranteed as we may have to disclose certain information under certain laws.

Compensation

You will not be compensated for your participation in this study, but you will be given a chance to enter into a draw to win an electronic tablet and or a smartphone.

Consent to Participate

You consent to participating in the present study by signing the attached consent form.

Contact

If you have questions about this study, please contact the researcher by email.

If you have questions about the conduct of this study or your rights as a research participant you may contact:

Office of Research Ethics

The University of Western Ontario

Appendix L: Information letter (interview participants)

Date: June 10, 2014

Project Title: Alternate Academy: Investigating the use of open educational resources

Researcher: Daniel Onaifo, PhD Candidate

Faculty of Information and Media Studies, University of Western Ontario

London, Ontario, Canada

The purpose of this information letter is to provide you with the required information to make an informed decision on participating in this research.

Purpose of this study

You are being invited to participate in a research study looking at how students find and use open educational resources. It is my intention in this study to examine how open educational resources are sought and used in institutions of higher education.

Who is eligible to participate?

You are eligible if you are a student in an institution higher education in Nigeria.

Research procedures for this study

If you agree to participate, you may be interviewed by the researcher on your awareness about open educational resources, your attitude toward the resources, and the challenges of using the resources.

Voluntary participation

Participation in this study is voluntary. You may refuse to participate, refuse to answer

any questions or withdraw from the study at any time.

Inquiries and risks

You are free to ask questions about the study or the questionnaire at any time by

contacting the researcher. While your participation is appreciated, please be advised that

you may withdraw at any time. Participation in the present study does not hinder your

ability to participate in other concurrent studies or in future studies. You do not waive

any legal rights by signing this consent form.

Benefits from the study

There are no known benefits to you from participating in this study, except perhaps more

awareness about open educational resources. However, your participation will help to

gain better understanding of open educational resources and knowledge sharing.

Materials of the study

If you agree to participate, please complete the questionnaire and return it to the

researcher. There is no need to sign them or make self-identification when submitting

them (except you want to be contacted for other aspects of the study). If you chose not to

participate in the study, you do not need to return the questionnaire.

Confidentiality of information

Information that is collected during the study will be stored securely in the researcher's

office and will be destroyed 2 years after the study is completed. If the results of the

study are published, your name will not be used and no information that discloses your

identity will be released or published without your specific consent to the disclosure. We will strive to ensure the confidentiality of your research-related records. Absolute confidentiality cannot be guaranteed as we may have to disclose certain information under certain laws.

Compensation

You will not be compensated for your participation in this study, but you will be given a chance to enter into a draw to win an electronic tablet and or a smart phone.

Consent to Participate

You consent to participating in the present study by signing the attached consent form.

Contact

If you have questions about this study, please contact the researcher by email.

If you have questions about the conduct of this study or your rights as a research participant you may contact:

Office of Research Ethics

The University of Western Ontario

Appendix M: Consent form

Date: June 10, 2014

Project Title: Alternate Academy: Investigating the use of open educational resources

Researcher: Daniel Onaifo, PhD Candidate

Faculty of Information and Media Studies, University of Western Ontario

London, Ontario, Canada

I have read the Information Letter, have had the nature of the study explained to me and I agree to participate in the study. All questions have been answered to my satisfaction.

_____

Name (please print)

_____   _____

Participant's signature   Date

_____

Name of person obtaining informed consent

_____   _____

Signature of person obtaining informed consent   Date

Appendix N: Curriculum Vitae

Name: Daniel Onaifo

Post-secondary   York University
Education and   Toronto, Ontario, Canada
Degrees: 2005-2007 Hons. B.A.

                     University of Toronto
                     Toronto, Ontario, Canada
                     2008-2010 M.A.

                     Western University
                     London, Ontario, Canada
                     2011- Present Ph.D. Candidate

Related Work Teaching Assistant
Experience   Western University
                     London, Ontario, Canada
                     2011-2015

Publications:

Onaifo, D., and Rasmussen, D. (2013). Increasing libraries' content findability on the web with search engine optimization. *Library Hi Tech*, 33 (1), 87-108.

Onaifo, D., and Quan-Haase, A. (2015). Potentials and limitations of cyber knowledge brokers as knowledge providers. In M. Khosrow-Pour (Ed.), *Encyclopedia of Information Science and Technology, Third Edition* (pp. 4672-4681). Hershey: PA