Open Educational Resources Differentiation

A cross-country study on differentiation in access, use and sharing of (Open) Educational Resources at universities in Kenya, Ghana and South Africa

Judith Pete

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Judith Adhiambo Pete
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Declaration

I declare that the materials in this thesis have not been used in any other university for an academic award. The thesis is as a result of my personal reflection, experiences and research. I have used the American Psychological Association (APA) style for citations and referencing. Every contribution to and in this thesis from others had been correctly attributed, cited and referenced.

Judith Adhiambo Pete
20th June 2019

Signature:

Dedication

I dedicate this PhD dissertation to the late Prof. Fred Mulder, former Emeritus UNESCO/ICDE Chair in OER at the Open University of the Netherlands.

Abstract

The academic literature on open educational resources (OER) and practices in higher education has grown substantially over the past decade. OER is seen to offer endless possibilities for Sub-Saharan African universities by reducing costs of education, improving quality of education, as well as increasing access to quality education for all, among others. Sub-Saharan African universities though, are notably underrepresented in the literature, especially on differentiations, be it on access to or use and sharing of OER. This thesis synthesizes research carried out to develop a representative view of OER in three Sub-Saharan countries: Kenya, Ghana and South Africa. The study, which formed part of the Research on Open Educational Resources for Development (ROER4D) project, explores differentiation in terms of (i) digital proficiency; (ii) level of use of OER; (iii) awareness of licensing; and (iv) the perceived value of OER. This thesis examines a deliberate selection of twelve universities across the three countries with randomly sampled students and lecturers. Separate questionnaires for students and the lecturers were used, which generated a response from a total of 2249 students and 106 lecturers. Major findings are: (i) that there is a significant digital differentiation among lecturers and students in terms of their proficiency, devices used and internet accessibility; and (ii) that the awareness and appreciation of the OER concept and open licensing is generally low, but from the actual variety and types of processing by respondents of educational resources which may not be open, there is a preparedness towards openness in the future in all the three countries. Therefore, the universities can use these findings in considering how to restructure their educational policies to incorporate OER in teaching and learning to enhance the quality of education.

Samenvatting

De wetenschappelijke literatuur m.b.t. het gebruik van open educational resources (OER) en praktijken in het hoger onderwijs is substantieel gegroeid in de laatste periode van tien jaar. OER lijkt grote mogelijkheden te bieden voor de universiteiten in Sub-Sahara Afrika, waarbij kosten reductie voor onderwijs, kwaliteitsverbetering van de leermaterialen en het onderwijs en een grotere toegankelijkheid van het onderwijs worden genoemd. Universiteiten in Sub-Sahara Afrika zijn echter ondervertegenwoordigd in de literatuur, vooral als het gaat om de onderlinge verschillen zoals o.a. de toegankelijkheid van OER of het gebruik en het delen van OER. Dit proefschrift komt voort uit een studie die tot doel had een representatief overzicht te ontwikkelen m.b.t. OER in drie Sub-Sahara landen: Kenya, Ghana en Zuid-Afrika. In dit proefschrift wordt een OER beeld gepresenteerd voor Sub-Sahara Afrika, op basis van een grootschalig onderzoek in de drie genoemde landen: Kenya, Ghana en Zuid-Afrika. De studie, die onderdeel uitmaakte van het bredere 'Research on Open Educational Resources for Development project, was gericht op de differentiatie tussen de landen op het gebied van (i) het niveau van gebruik van OER (ii) bekendheid met licentiering van leermaterialen en (iii) de waarde die wordt gehecht aan OER. In dit proefschrift wordt verslag gedaan van een studie onder een gerichte selectie van 12 universiteiten in de drie landen, waarbij de respondenten (studenten en docenten) met een random steekproef uit de populaties van deze instellingen zijn geselecteerd. Zowel voor de studenten als de docenten zijn vragenlijsten gebruikt die speciaal voor deze groepen zijn ontwikkeld. In totaal is een response ontvangen van 2249 studenten en 106 docenten. De belangrijkste bevindingen zijn: (i) er is sprake van grote verschillen in digitale vaardigheden tussen studenten en docenten, de beschikbaarheid van computer apparatuur en het internet; en (ii) de bekendheid met en waardering van het OER concept en open licentiering is over het algemeen laag. Uit de variatie in gebruik en in de wijze van gebruik door respondenten van OER en ER die niet open zijn blijkt een bereidheid de concepten te omarmen in alle drie de landen. Universiteiten kunnen deze bevindingen gebruiken in hun overwegingen hoe hun onderwijsbeleid te herstructureren en OER hierin te integreren t.b.v. het onderwijs en de leerervaring en zodoende de kwaliteit van het onderwijs te verhogen.

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List of Abbreviations and Acronyms

AUG	African Union Agenda for the year 2063
CC	Creative Commons
COL	Common Wealth of Learning
ER	Educational Resources
GDP	Gross Domestic Product
GFDL	Free Documentation License
GC	Global Coordinator
GO-GN	Global OER Graduate Network
ICT	Information and Communications Technology
KICD	Kenya Institute of Curriculum Development
KNUST	Kwame Nkurumah University of Science and Technology
LC	Local Coordinator
MICT	Ministry of Information and Communications Technology
MIT	Massachusetts Institute of Technology
MOE	Ministry of Education
MOOCs	Massive Open Online Courses
NAB	National Accreditation Board of Ghana
ODeL	Open Distance and e-Learning
OEC	Open Education Consortium, formerly Open CourseWare Consortium
OEP	Open Education Practice
OER	Open Educational Resources
(O)ER	(Open) Educational Resources

ROER4D	Research on Open Educational Resources for Development in Post-Secondary Education in Global South
RQs	Research Questions
SDGs	Sustainable Development Goals
SDG4	Sustainable Development Goal number four (4)
SSA	Sub-Saharan Africa
TESSA	Teacher Education in Sub-Saharan Africa
UCT	University of Cape Town
UG	University of Ghana
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNISA	University of South Africa

Prologue

I completed my primary education in 1994 and being an orphan, I was forced to stay home for one year due to lack of school fees to join high school. I subsequently benefited from a government bursary and other well-wishers' support and managed to complete my high school education in 1999. However, I could not immediately continue with post-secondary education. Fortunately, after two years, I received sponsorship from Rev. Prof. Pierli Francesco, a Comboni missionary priest. This enabled me to join Tangaza University College in 2001. While at the university, I kept wondering how education could be made more accessible and affordable to all especially the orphans and the marginalized in society.

There were very few books in our library for compulsory courses which made studies very difficult. Most of us relied on class notes given by lecturers. I learnt how to use a computer and liked it very much. I then wondered how computers could be used to promote access to education for pupils in the village, especially girls, who had no idea of how to proceed with their education.

In 2007, I wrote my MA thesis on the use of Information Communication Technologies (ICT) as strategy by micro-finance institutions in Kenya. During my research, I accessed through the web and learnt a lot about OER and realized that it could be a path to achieving education for all. The more I researched about OER, the more it struck me. For instance, I accessed a lot of relevant topics and content from Khan Academy and noticed that OER could offer a great potential for Africa; but if nothing was done, OER might also widen the gap between Africa and the North. I could see a lot of potential if we could all use OER in our teaching. I started to check on other OERs and came across OpenLearn, OpenCourseWare (OCW), and Merlot, among others. In Africa, I also came across Teacher Education in Sub-Saharan Africa (TESSA), which had also initiatives that promote OER usage. I shared this pertinent information with some of my colleagues, but they were not interested.

In 2009, I started teaching at Tanganza College. We have a blended approach for in-person and online distance education supported by the Moodle content management system. Students come in person quarterly for consolidation of learning plus end of semester examinations. For most of the semester, the lectures and assignments are conducted online.

There is lots of competition among students to access print books in our library. Also, since most of students do not live near the campus, it is difficult for them to come to the library regularly to borrow books or study. It would be too expensive to ask students to buy their own copies of the books. For that reason, I do not use many books in my teaching. I prefer to teach electronically. For in-person classes, I use PowerPoint slides that are dispalyed using overhead projectors. For online classes, I teach using slides, notes, video, and audio that I learnt how to use through the Khan Academy.

My first encounter with OER was with the Khan Academy in the year 2007. I discovered it when looking for materials to enrich my courses in fundamentals of accounting and financial management. The lessons were very simple and clear. I liked the drawings and the explanations. I also liked the fact that it was free. I referred my students to the website. Topics we used included the lessons on compound interest, profit calculation, cash account management, and cash flow management.

I also adapted some of the the Khan Academy videos. I teach on multiple campuses run by our institution. We have the University Mtaani (means University in the Slums) in Huruma in Nairobi. One of our campuses uses English as the main language of instruction. The other uses Kiswahili. I added a translation in Kiswahili as audio only. I also added practical examples of business management concepts for owners of small business enterprises. Many students at the University Mataani do not have laptops, but use their mobile phones. These students listened to the audio on their phones and liked it very much. Consequently, they asked me to continue with this mode of teaching every year. Each year, there are more students that need my attention in this regard.

Other OER collections that I have used to teach in my business planning and management classes have included OpenLearn and Merlot. I feel this has enhanced the quality of my own teaching. With OER, I am able to undertake a wider search for materials and to compare with other institutions' approaches. I can then contextualize these approaches to respond to local needs that will benefit the community. This is the approach I have been using in my own teaching for about eight years now.

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Chapter 1

General introduction

1.0 Introduction

This chapter addresses the introduction to OER and OER in Africa, the research problem and studies that have addressed the problem. It also captures the significance of the study, study objectives as well as the research questions.

1.1 OER and OER in Africa

Open Educational Resources (OER) refer to a whole range of information that is available on the internet and other online networks for education. It is referred to as 'open' because anyone can create and upload, and 'free' because accessing these resources entail no payment of money for their use. UNESCO has been a key player in advocating the huge potential of OER within its mission of *"Education for All"*, in particular for the Global South (UNESCO, 2012). UNESCO was in fact the first to use the term OER, defining them as "teaching, learning or research materials that are in the public domain or released with an intellectual property license that allows for free use, adaptation, and distribution" (UNESCO, 2002,p. 24). The UNESCO Paris Declaration of 2012 followed, supporting OER for development and recommending that educational materials developed with public funds be made available under open licenses (UNESCO, 2012; Mulder, 2013). Additionally, because OER are open, they can be translated into different languages and localised to meet the needs of different countries, regions, institutions and learners (Kanwar & Uvalić-Trumbić, 2011).

Open Educational Resources (OER) have been defined multiple ways across the literature. Wiley (2007), noted that the term OER was initially coined at a United Nations Educational, Scientific and Cultural Organization (UNESCO) meeting in 2002 and the definition captured critical concepts of OER like , open provision of educational resources for consultation, use and adaptation by a community of users for non-commercial purposes; made freely available over the Web or the Internet; and their principal use is by teachers and educational institutions to support course development, but they can also be used directly by students and other researchers.

In a similar way OER are defined as "digitized materials offered freely and openly for educators, students and self-learners to use and re-use for teaching, learning and research" (Schuller, 2008,p.15). This definition focuses on online public collections, such as the Khan Academy and OpenCourseWare (OCW) from the Massachusetts Institute of Technology (MIT). Some authors include Massive Open Online Courses (MOOCs) as falling under the OER umbrella (Casey & Griffins, 2013); others believe MOOCs to be distinct from OER, but a progressive step in the evolution of OER (Boga & McGreal, 2014; Obiageli Agbu, Mulder, de Vries, Tenebe, & Caine, 2016).

OER differentiation is another term that is vital in this study. It is defined as the existing inequalities in the use of OER in society, that involves not only unequal access to (O) ER, but goes further to include the inequalities that exist between groups of people in their ability and capability to actually create, use or re-use, repurpose, and holistically utilize (O)ER for individual and common good (Pete, Mulder, & Oliveira Neto, 2017).

The concept of open is very unspecific depending on a user's need. To some users, it means free from fees; to others, without admission barriers and some take it to have a large freedom with respect to choice of content. These are all seen by writers in education as an historical form of open education (Peter & Deimann, 2013). More recently, the open source movement which started in the 1970s, and gained momentum in the late 1990s, as a way to openly develop and share software, has influenced developments in open education (Owusu-Mensah & Denkyi, 2015). The open source movement has created opportunities for collaboration among developers and the creation of support communities over the web (Agudo-peregrina, Iglesias-pradas, Conde-gonzález, & Hernández-garcía, 2014).

In practice, there are many claims regarding what 'open' really means, with many people thinking materials that are free, public, and digital are OER even when they are not openly licensed (Wiley, 2016; Mulder, 2015). To improve clarity, this thesis therefore will refer to Educational Resources (ER) as educational resources that are freely available, OER for only ER which are clearly free and openly licensed, and (O)ER where the meaning is unclear from the context and could be either ER or OER.

Many countries across the globe have now adopted various policies to reduce the OER differentiation and to encourage the access and use of OER, (Hodgkinson-Williams, 2013). For example, the United States has increased public access to OER like open source materials from OpenCourseWare (OCW), Merlot etc. In Brazil there are several initiatives such as Veduca, Teacher's Portal (Portal do Professor), International Database of Educational Resources, SENAI, SEBRAE, UNICAMP, FGV (Education institutions) and in Africa, TESSA, African Virtual University (AVU) and OER Africa, among others.

In 2001, the Massachusetts Institute of Technology (MIT) made undergraduate and postgraduate materials freely available as OER through its Open CourseWare program (Abelson, 2008; Siemens, Victoria, Newton, Armstrong, & Colahan, 2008; Adams, Liyanagunawardena, Rassool, & Williams, 2013). In 2006, the Open Universities in the UK and in the Netherlands were the first in the world to launch their OER initiatives through OpenLearn and OpenER respectively. Both related to a small fraction of the full course base, targeting lifelong learners. They offered a new, easily accessible portal to higher education, and aimed to widen participation in higher education (Mulder, 2014; Schuwer & Mulder, 2009). Bliss and Smith (2017) suggests that the beginning of open education can also be linked to the founding of the Open University (OU) in the UK in 1969. Lane (2009), attests to the same link, suggesting that this event signaled the real beginning of open education, with the removal of entry requirements, though students still paid fees. All these were good moves towards embracing open education resources, which is congurent with the fundamental traditional African values of sharing (Mosha, 2000).

Thanks to the Information Age and all that it offers, it is possible to revive the principles of free and open sharing of knowledge by means of OER. Since OER can be reproduced at virtually no cost, they can be effectively used to reach vast numbers of learners, while supporting quality enhancements. As well, since they can be reused, revised, remixed,

redistributed, and retained, OER can be adapted to different learning environments (Wiley, 2016).

A study by Regmi (2017) on globalization, societies and education found that access to higher education for the relevant age group in most African countries remains at 5%, the lowest regional average in the world, just one-fifth of the global average of about 25%. Summer and Iloh (2013) noted that the average percentage of staff with PhDs in public higher education institutions in Africa is estimated to be less than 20%. Therefore, use of OER will hopefully increase student enrollment at universities as a result of reduced costs of education, there will be more study seats, improved quality of education and increased access to quality educational resources.

With respect to developing countries like Kenya, Ghana and South Africa, OER are not being widely used by educational organizations (Pete et al., 2017;Omollo, Rahman, & Yebuah, 2012;Cox, 2013). This may indicate that the educational materials from developed countries may not attend to the needs of people from developing countries that have different preconditions. In the recent past though, universities and middle level colleges in Sub-Saharan Africa have increasingly been adopting various OER in learning in a bid to widen access to education and to improve the quality of learning, beating barriers to education for all (Blakemore, 2013; Ngugi, 2011).

Within Africa, this growth in the culture of open education may be viewed in relation to the fundamental traditional African value of sharing and provision of knowledge without payment. For instance, elderly men and women share their practical wisdom and indigenous knowledge with the younger generation specifically for purposes of continuity and cultural enrichment (Mosha, 2000). Such an activity was often free and open (Mosweunyane, 2013). Over the past century, this culture of open sharing declined in modern forms of education in Africa with the rise of institutional education in exchange for tuition costs. However, towards the end of the 20th century and the beginning of the 21st century, the rise of technology and OER renewed the culture of free and open sharing of knowledge on the African continent (Pete et al., 2017).

It seems to some extent that institutional education, largely introduced in Africa by the Global North, which also coincided with Industrial Revolution, generally did away with the principle of free and open sharing of knowledge.

1.2 The Research Problem

In order to increase the quality of education in Africa, there is need to integrate OER and ICT in teaching and learning in universities so that students, lecturers and researchers can easily access, use, re-use, re-purpose, create and share them freely. Currently, there exists a lot of differentiation in accessing, using and sharing of these resources in most of the universities in Sub-Saharan Africa that hinders provision and acquisition of quality education (Isaacs, Hollow, Akoh, & Harper-Merrett, 2013). If things remain as they are, then achieving quality education which has a direct impact on social, economic,

environmental and political growth in any country may be thwarted; hence widening the existing inequalities between universities in the Global North and Global South.

This thesis investigates the existing differences in awareness, access, and use of OER (referred to OER differentiation) across a sample of African universities to add to the understanding of the African problems as a first step towards educational solutions. It focuses on the inequalities that exist between students and lecturers in their ability and capability to create, use or re-use, repurpose, and holistically utilize for individual and common good. This study was carried out in three countries in Africa: Kenya, Ghana and South Africa.

Underperformance of university graduates at work places is a matter of concern in most of Sub-Saharan countries. This relates to the earlier remarks that OER from the Global North may not suit the needs of the Global South, (Hatakka, 2009) and in general this may be true for transplanting curricula from one culture to the other (Rikers, 2017a). Hence quality issues start at the national curriculum level down to the level of individual learning materials. Wright and Reju (2012) suggest that quality of education is improved when educators and learners can easily access resources that they were unable to access due to cost and/or copyright laws. They also propose that OER could benefit instructors who do not have teaching experience and knowledge of the subject matter that they are teaching. Laster (2016), points out that instructors can use these resources to improve the quality of existing courses or develop new courses by adapting existing courses. Wiley (2016), states that OER can be reproduced at virtually no cost; they can be used effectively to reach vast numbers of learners, while supporting quality enhancements.

1.3 Studies that have addressed the problem

Even though the academic literature on OER and Open Education practices (OEP) in higher education has grown substantially over the past decade, the Sub-Saharan African universities are notably underrepresented in the literature, especially in relation to access to, or use and sharing of, OER.

Differences still exist in use and sharing of educational resources among lecturers and students in universities in Africa. With respect to developing countries like Kenya, Ghana and South Africa, OER is not being widely used by educational organizations as anticipated (Pete et al., 2017; Omollo et al., 2012; Cox, 2013). This calls for awareness creation and advocacy on its potential benefits in improving quality of learning materials as well as increasing access to these materials.

The ECDL Foundation (2011) states that digital proficiency has a great role to play in the so-called 21st century competences; it has an ever-increasing bearing on how we work, communicate with one another, interact with government, purchase goods and services, and consume and create media. As technology becomes progressively integrated into our daily lives, those without these skills will experience greater difficulty in participating in this range of essential activities. There is also dire need to develop solutions that

bridge the gap realized on digital divide between the technologically proficient and the technologically deficient (Ng'inja, 2006).

Writing from South Africa, Paskevicius and Hodgkinson-Williams, (2018), explored students' perception on value of OER suggested that the awareness of OER and open licensing could enhance sharing, collaboration, and help sustain high impact resources that could improve quality of teaching and learning at universities. Another study by Buckler, Perryman, and Seal, (2014) explored TESSA and TESS-India projects to see how OER localization contributes to equal knowledge partnerships to enhance education quality.

Further, the possibilities of OER are extended in the sense that educational resources are digital hence they can easily be stored and disseminated through the internet. This has made it possible for the public to share digital content through a public portals or repositories. For this purpose the Creative Commons (CC) licensing has been developed (Green, 2017) and has now made it simple and legal to keep one's copyright and legally share educational resources across the globe.

OER therefore is seen to replace many of the costs relating to content used in academic courses which then pushes governments, educators and other stakeholders to view education as a way of sharing knowledge and ideas as opposed to the top-down view of knowledge transfer (Bliss & Smith, 2017; Green, 2017).

Therefore, it is reasonable enough to argue that OER can greatly benefit Africa since it plays a potentially transformative role in supporting the African Union Agenda 2063, as well as the Sustainable Development Goal number four (SDG4) (Paskevicius et al., 2018). This is doable because OER can be used to enhance access to learning for those living in hard-to-reach areas (Adala, 2016); as well as addressing issues of cost, quality and inclusivity that has for a long time posed a big challenge to African students. Rikers, (2017a) and McGreal, (2017), attest to this notion and noted that, OER are free of licensing restrictions that inhibit quality improvements and because they are openly available, OER can facilitate both internal and external collaborations among instructors and institutions, both locally and internationally, while ensuring equitable access to knowledge and learning. With such enriched notions from different scholars, OER qualify to bridge the gap of poor quality education in universities in Africa, especially in Kenya, Ghana and South Africa.

Irrespective of all these positive realities on the potential of OER, there still exist differences among the users (lecturers and students) in universities in Africa (Pete et al., 2017). This is a gap that requires studies like this to help in narrowing this gap in usage as the quality of education improves by using OER (Atchoarena, 2011; Rikers, 2017). More research is needed into the lived experiences of OER users and potential users in the global South. This would help create insights into how they access and negotiate online learning environments within various structural constraints. Further, while the attempts of Northern countries to assist the South in improving education

are laudable, more needs to be done to support Southern educators to create their own online resources in appropriate languages (King, Pegrum, & Forsey, 2018).

While other authors talk about the possibilities of OER for Africa, this thesis clearly shows the potential OER offers for African universities through the assessment of differentiation in terms of internet access and connectivity, potential motivators and barriers to use, access and sharing of educational resources.

1.4 The significance of the study

This study may be of benefit to the leaders of public and private universities. The chancellors, vice-chancellors, presidents, provosts and vice provosts of education.

For the educational institutions (universities), this study has unveiled the gaps to fill in terms of faculty becoming more digitally proficient, more aware of open licensing, and more eager to make more effective use of existing materials for courses they teach. It also identifies opportunities to offer tutorials for students on digital proficiency and information literacy so that they are more aware of resources out there that can be beneficial for their own learning.

For UNESCO and governments of Kenya, Ghana and South Africa, the study findings may be used to develop an appropriate policy framework for the education sector. This may help in developing solutions that may bridge the "digital divide" between the technologically proficient and the technologically deficient (Ng'inja, 2006). As such, the hard to reach populations such as nomadic communities, citizens living in the countryside and persons living with disabilities could easily access quality education.

Projects such as TESSA, OER Africa, Africa Virtual University can use the study to develop support programmes that enhances inclusion and integration of ICT and OER in teaching and learning. This will hopefully boost the quality of education in the region hence increase competent graduates produced.

The academicians and OER researchers can also use the findings to inform other studies that may be undertaken in the same area.

1.5 Study Objective

The purpose of this study is to investigate the existing differences in the use of OER in Sub-Saharan universities, that involve not only unequal access to OER, but goes further to include the differences that exist between students and lecturers in their ability and capability to create, use or re-use, repurpose, and holistically utilize them for individual and common good.

1.6 The Research Questions

In order to achieve the intended goal of the study, research questions were developed. The overarching research questions (RQs) and the respective hypothesis that guided the entire process of this thesis include:

1. What is the state of connectivity and digital proficiency among lecturers and students in Kenya, Ghana & South Africa higher education?

2. What kind and level of use, re-use, creation, and sharing of educational resources (ER) is common among lecturers and students (but for the latter not including re-use and creation) in Kenya, Ghana & South Africa higher education?

3. What is the level of awareness of licensing related to open educational resources (OER) among lecturers and students in Kenya, Ghana & South Africa higher education?

4. How do lecturers and students perceive the value of openness in educational resources (ER), its implementation opportunities, and its institutional context (the latter item only for the lecturers) in Kenya, Ghana & South Africa higher education?

It is important to note that RQ1 relates to digital differentiation, RQ2 to ER differentiation, and RQ3 and RQ4 to OER differentiation. Similarly, RQs 1 and 3 are identical for the lecturers and the students, while in RQs 2 and 4 the lecturer's version contains extra elements that indeed apply only to them. In RQ2, for example, the 'use' and 'sharing' of educational resources (ER) with students has been completed with 're-use' and 'creation' for the lecturers. And RQ4 addresses the perception of ER among both populations in various respects, but 'the institutional context' is only included for the lecturers.

2

Chapter 2

Literature review

2.0 Introduction

The previous chapter introduced OER and OER in Africa, the research problem to be dealt with in this thesis and studies that have addressed the problem. It also captured the significance of the study, study objectives as well as the research questions. This chapter explores the historical development of OER, starting with its definition and current literature around OER and Internet access, digital proficiency issues, motivators and barriers to OER use, internet access, as well as openness in the context of teaching and learning in universities in Africa. It also offers an overview of higher learning education in Kenya, Ghana and South Africa.

It is important to note that academic literature on open educational resources (OER) and practices in higher education has grown substantially over the past decade. OER is seen to offer endless possibilities for Sub-Saharan African universities by reducing costs of education, improving quality of education, as well as increasing access to quality education for all, among others. Sub-Saharan African universities though, are notably underrepresented in the literature, especially on differentiations, be it on access to or use and sharing of OER.

2.1 From Open Distance Learning in Africa to OER

There are few studies of different types of OER and open licenses, which specifically address issues on access, use, creation and sharing among African universities. Moreover, most of these studies do not specifically focus on OER but on distance education and massive open online courses. This paper explores the OER differentiations that exist between universities in Sub-Saharan African lecturers and students, with regards to access, digital literacy, use, creation, sharing, motivations and barriers.

Mulder (2015) noted that in the mid twentieth century the predecessor of the current University of South Africa (UNISA) was given a new role as a distance education university to increase access to education to geographically dispersed students through paper and electronic learning materials. This for example, relates to a small fraction of the full course base, targeted lifelong learners, offered a new easily accessible portal to higher education, and aimed to widen participation in higher education (Mulder, 2014; Schuwer & Mulder, 2009).

The real break-through, however, came with the start of the Open University in the UK around 1970. Several authors (Larreamendy-Joerns & Leinhardt, 2006; Adams, Liyanagunawardena, Rassool, & Williams, 2013) attest to the fact that by the year 2001, the Massachusetts Institute of Technology (MIT) made undergraduate and postgraduate materials freely available as Open CourseWare (OCW), course resources that are made freely available online. By 2006, the Open Universities in the UK and in the Netherlands were the first in the world to launch their OER initiatives through OpenLearn and OpenER respectively.

During the next four decades, these successful initiatives were followed up in many countries in Europe and around the world, leading to major operations reaching out to many learners who were not being served by the regular university system. This does not definitely apply to OpenLearn and Opener initiatives, since it relates to the foundation and growth of distance learning in a number of universities.

Commercial organizations, such as Lumen Learning, use free materials to teach educational organizations to use these materials for their own courses. Mulder (2015), and Pete, Mulder, & Oliveira Neto, (2017) refer to OER as a whole range of information that is available on the internet and other online networks for education. It is referred to as 'open' because anyone create and upload, and 'free' because accessing these resources entail no payment of money.

By the year 2007, it was the International Council for Open and Distance Education (ICDE) which emphasized the possible 'golden combination' of open, flexible and distance learning with OER for massive educational opportunities that were much needed in developing countries (Nkuyubwatsi, 2016; Nyerere, Gravenir, & Mse, 2012; OER CONGRESS, 2017). Mulder and Rikers (2008) stated that it was the ICDE that first echoed that the new modes of learning and teaching were also relevant for emerging economies as well as for matured knowledge-based societies. Important to note is the combined power of the 'classical' Open Universities model and the new 'digital openness' which was elaborated in 2011 at the European Association of Distance Teaching Universities (EADTU) Conference (Mulder, 2011). These reports and conferences have led to a better understanding of what open education resources are about and what it could offer to learners and societies at large (Obiageli Agbu et al., 2016).

David Wiley (2016, p.4) succinctly sums up the 'open' characteristic of OER: "'open' stands for free access plus, however, some formal rights and permissions to be granted to the users". In this case, Creative Commons are the most common type of open licenses used for OER. De Langen (2017) focuses on the characteristics and business model considerations of openness. Whether openness is defined as the free (re)usage of resources, or the free entry in courses, there always is a discussion on who pays for the resources used in these offerings. He further notes that different business models use openness differently: For instance, openness plays different roles in the business models of the different organizations. King et al., (2018) reviewed a number of organizations offering MOOCs and OER. Their success, as measured by sustainability, is dependent on the fit between value offerings and the objectives of the stakeholders.

King, Pegrum, and Forsey, (2018) noted the fact that industry OER scholars such as Koller (2012) and John et al., (2014) have highlighted the potential for learners in the Global South to benefit from OER offered by prestigious universities in the North. Nyerere et al., (2012) also attests to the fact that prior to the emergence of distance learning providers in Africa, many African students obtained various qualifications through Open and Distance Education providers in Europe and North America.

One of the first distance education universities that emerged in the African continent is the University of South Africa (UNISA) Cox & Trotter, (2016); Chetty & Hart, (2014), which has been offering correspondence courses since 1946. UNISA's success has spurred the establishment of other ODeL providers in the African continent. Examples of these are the open universities in Nigeria, Tanzania, and Zimbabwe, which started out as providers of residential programmes and have now diversified into providing ODeL as well (Juma, 2003). Kenya and Ghana are also emerging with their several attempts to incorporate OER and ICT in education (Adala, 2016; Pete, Mulder, & Oliveira Neto, 2017; Omollo, Rahman, & Yebuah, 2012).

The African Virtual University (AVU) has been a champion in implementing internet-based and satellite-linked distance educational programmes in selected courses for Francophone and Anglophone Africa (Nyerere et al., 2012). AVU also provides training to staff in institutions offering ODeL programmes as an additional mandate of late. In the recent past, we notice that the concept of the open university has received an innovative, digital infusion during the past decade with the well documented global Open Educational Resources (OER) movement (Mulder, 2015). It was not until the 1990s with the entry of the Internet that the power of communication and interaction became widely available for education. Yet, it took more than a decade of hesitant search and experimentation to come to the point of a significant change towards a rich, full, and widespread exploitation of the Internet for educational purposes (Allen, 2014). This increased demand has seen ODeL fast becoming an accepted and indispensable part of the mainstream educational platforms in both developed and developing countries, with particular emphasis in the latter (UNESCO, 2012).

In a nutshell, at the end of the first decade and beginning of second, we have witnessed emerging efforts to develop and establish national OER approaches in several countries across the world, which are aimed at breaking down the barrier to OER mainstreaming (Mulder & Rikers, 2008). In the lead was India, which was the first country in the world to adopt OER in its report to the nation in 2007, and with its launch of the National E-content and Curriculum Initiative (Kumar, 2009).

It was later followed by the Netherlands in 2009, with their Wikiwijs program, aiming at mainstreaming OER in all education sectors from primary through university education (Schuwer, Kreijns, & Vermeulen, 2014). In 2011, the US department of labour and education initiated a four year program in which among other activities OER was developed for community colleges and basic career training (Plotkin, 2019; Whitehouse.gov, 2014).

Later, other countries such as Brazil, China, Indonesia, Japan, Korea, Poland, South Africa, Turkey, UK and Vietnam have basically introduced specific measures and subsidies that stimulate OER (Mulder et al., 2008). Projects incorporating locally produced or reused MOOCs and OER into university courses have been successfully instituted in India (Chatterjee, 2014; Kamat & Keleher, 2013).

In order to understand OER use in Africa, motivations and barriers are key factors to internalize in order to lay a firm foundation for its use. Prior (2011) noted lack of institutional awareness and support as well as issues to do with copyright as outright barriers that hinder use of OER.

There is a lot which is not addressed in the current literature on OER in the three countries of this study; regarding motivations, barriers, digital literacy and proficiency and internet access. These are detailed in this study with a unique approach to internet access focusing on dimensions like cost, speed and stability.

2.2 Motivations for OER Use

Sigalov and Skuratov (2012) noted that OER may be created to motivate other changes within education. In China and Russia, the OER play a role in standardization of the quality of education, making educational materials available for remote parts of the country. In Africa, organizations work together in Africa Virtual University and OER Africa, to improve education by offering OER and stimulating others to develop more materials. Expectations were that OER would lower the costs of education (Wiley, Green, & Soares, 2012; Miao, Mishra, & McGreal, 2016) because they could replace textbooks for students and support teachers in making their own materials. King et al., (2018) reviewed a number of organizations offering either MOOCs or OER. Their success, as measured by sustainability, is dependent on the fit between value offerings and the objectives of the stakeholders.

Despite the numerous interacting structural barriers to OER uptake detailed above, there is evidence to suggest that the uptake of OER and involvement in open education practices in the Global South is possible. OER is helping countries progress toward SDG 4 (McGreal, 2017). The fact that some OER have been successfully tested in South Asia, Sub-Saharan Africa, and China, suggests that qualified endorsement is warranted.

OER can be reused within different contexts (Adams et al., 2013), which has cost benefits especially for resource producers from global south (Mulligan, 2016); however, the initial expense of OER production can lead Southern countries to become net consumers of such resources (Leeds, 2013).

Richter and McPherson (2012) present an OER adaptation model, and resources have been successfully remixed in the Teacher Education in Sub-Saharan Africa (TESSA) programme (Connolly, Wilson, & Wolfenden, 2007), and at UNISA in South Africa (Mallinson & Krull, 2015).

King et al. (2018) have reported how OER can be broadly be used in various fields. They reported that OER in Southern contexts have been designed or are proposed in agriculture (Hassen, 2013), computer science (Boga & McGreal, 2014), disaster management (William, Elzie, Sebuwufu, Kiguli, & Bazeyo, 2013), financial literacy (Siddike & Youji Kohda, 2016), healthcare (de Ruijter, Ferreira, 2008; Liyanagunawardena & Aboshady, 2017; Omollo et al., 2012), library and information systems (Pujar & Bansode, 2014;

Tadasad & Pujar, 2016), medicine (Aboshady et al., 2015; Liyanagunawardena & Williams, 2015), and teacher training (Fyle, 2015). A Nigerian university, the National University of Nigeria, has also invested in online learning platforms using OCW from MIT (Omonhinmin, Olopade, Afolabi, & Atayero, 2014).

The use of OER in Africa is a promising and practical strategy to address the challenge of widening access to, and thus increasing participation in, higher education. It is increasingly being seen as an educational delivery model that is cost-effective without sacrificing quality (Mtebe, 2015; Nyerere et al., 2012). On the African continent, where resources are scarce and higher education provision is poor, OER and Open Education Practices are timely, viable and cost-effective means of expanding the provision of education with less worry on setting up the infrastructure. As it holds the promise of economies of scale and expanded geographical reach, it is not surprising that many African governments are starting to explore this potential (Wright & Reju, 2012b).

Additionally, there is a growing need for continued skills upgrading and retraining, and technological advances have made it possible to teach more and more subjects in the open. The new and advanced technologies have served to push knowledge acquisition into the domain of the individual. The flexibility of open, distance, and e-learning methodologies is the key factor in their emergence as the primary mode for lifelong learning that may benefit Africa.

Therefore, it is prudent to report that integrating OER in teaching and learning in universities has the potential to meet at least some of the growing demand for education in the 21st century. Prominent among developments assisting the spread of OER use include the rapid increase in mobile ICT use worldwide (Omollo et al., 2012; Pete et al., 2017) and opportunities for blended learning models which incorporate OER content.

The current literature also has limited information about barriers to the use of OER. A study by Mtebe and Raisamo (2014) identified lack of access to computers and the Internet, low Internet bandwidth, absence of policies, and lack of skills to create and/ or use OER are the main barriers to the use of OER in Tanzanian universities. Cox, (2013),connotes lack of institutional support. To this effect, barriers are a key variable to this study and have been discussed in totality.

Determination of barriers that hinders the OER use among students and lecturers at universities is a vital step to promoting its uptake. Few studies have addressed barriers to OER use in Africa, but none have given a focus to Kenya, Ghana. This study therefore provides an in-depth analysis on the barriers that hinder students and lecturers at universities in Sub-Saharan Africa to effectively and efficiently use, re-use, create and share educational resources.

2.3 Barriers to OER Use

Usage of OER is not simple and can be costly, depending on the amount of work necessary to integrate the materials in the curriculum (Miao et al., 2016). This cost may

be why few users of OER also create OER. A survey of Chinese university students found almost 80% had accessed some form of OER over the course of their studies (Hu et al., 2015), although production is limited to a small number of institutions due to its cost implications (Xu, Zhang, & Zheng, 2014).

Even though OER holds promises for Sub-Saharan Africa, a number of obstacles have to be addressed before it can be fully utilized. There are a number of technological constraints that hinder OER use. King et al., (2018) and Ayenachew & Woldegiyorgis, (2015) report about some caution around the wholesale adoption of OER within African higher learning institutions due to further concerns of Northern academic elitism and issues of access, required literacies and cultural barriers. McAndrew, (2010a) suggests that much of the research shows the 20th century top-down development thinking in the global North. The existing dominant mode of OER/ MOOC and production needs rethinking, and Southern voices, those of both learners and educators, need to be heard (King et al., 2018). With further research into Southern learner and educator experiences, OER could create more learning opportunities which harness the educational potential of ICTs and the Internet.

Infrastructures outside of major cities remain inadequate. Connectivity beyond major capital cities poses a potential problem in creating a national OER platform that can enhance integration of ICT and OER in education (Adala, 2016; Pete et al., 2017). Another challenge is the lack of a trained cadre of professionals to support the implementation of OER at universities. A study conducted in Zimbabwe showed that a majority of the lecturers (97.5%) facilitating ODeL have no experience in distance education (Mpofu et al., 2012). Effective use of OER and information technologies demands that teaching staff be properly trained in using open education as a delivery mode for Africa.

Cultural differences among learners should be an important consideration for OER producers (Chen & Panda, 2013; Adams et al., 2013), and critics claim much existing content is inappropriate outside the global North (Wildavsky, 2015).

This knowledge gap can, however, be resolved through mediation and creation of various ties and connections between the university and the student. The students' main support can be achieved through strong connection with their individual tutors (Macintyre & Macdonald, 2011). This could also be enhanced through provision of stable internet connectivity, which still remains one of the major challenges in Africa, especially in rural areas (Pete et al., 2017).

The absence of clearly defined national OER policies in most African countries poses another challenge. Policies are needed to provide a framework for the development of OER through distance education (Nkuyubwatsi, 2016). With the exception of South Africa, few African countries have clearly defined national policies to guide the development of distance education in their respective countries (Cox, 2016).

The knowledge gap between the North and South is evident in Sub-Saharan Africa. Here, OER has been mainly used to widen access to basic education and to maintain and improve quality in the conventional education system, particularly through in-service training of teachers (UNESCO, 2003). There is a growing attempt by countries in the South to adopt OER strategies in order to widen access to education and training in universities.

Cox and Trotter, (2016) discuss the challenges to OER adoption in South African universities, and highlighted the importance of institutional culture in promoting or restricting OER production by academic staff. Barriers to OER reuse in HEIs include copyright restrictions (Ncube, 2011) and lack of open access to scholarly publications (Anderson, 2011). North-South knowledge partnerships have been developed between Malaysia and Australia Olwig & Valentin, (2015), and throughout Africa (Escher, 2014). King et al., (2018), Pete & Mulder, (2018) and Pete et al., (2017) all point out access to stable internet connections, ICT literacy, lack of institutional support and flow of knowledge from North to South as major barriers. Lack of computers, low internet bandwidth and awareness of intellectual property rights and copyright (Mtebe & Raisamo, 2014) are key barriers.

Contextualizing OER content to local conditions is another important issue of concern. Local consultation is important when designing OER (Kanwar, 2010) and the use of generic resources can lead to higher participant dropout rates (Richter & Mcpherson, 2012). Many writers argue that some forms of OER like MOOCs are designed for consumption, not for adaptation (Czerniewicz, Deacon, Small & Walji, 2014), and more consideration of local conditions and needs would benefit learners from global south (Castillo, Lee, & Wagner, 2015; Calonge & Shah, 2016; Nkuyubwatsi, 2014).

The literature on barriers described here, needs improvement to portray inclusiveness and specification. This study elaborates upon specific barriers that exist among rural versus urban universities and technical versus comprehensive universities in Africa.

2.4 Digital Literacy and Proficiency as an Enabler of OER

Digital literacy and proficiency is another key aspect that needs attention. For effective use and efficient delivery of OER materials, digital proficiency and digital literacy is key (Goodfellow, 2011). ICT knowledge and its use is therefore the foundation in the utilization of educational resources for teaching, learning and research. The literature surveyed in this study did not show the differentiations that exists between the students and lecturers at the universities in Sub-Saharan Africa; dimensions that are clearly tackled in this study.

Effective use of OER requires digital literacy. Digital literacy can be understood according to Martin (2009,p.19), as "the awareness attitude and ability of individuals to appropriately use digital tools and facilities to identify, access, manage, integrate, evaluate, analyze and synthesize digital resources, construct new knowledge, create media

expressions, and communicate with others in the context of specific life situations, in order to enable constructive social action, and to reflect upon this process."

King et al., (2018) reported that many learners from the global south need basic computer literacy to use a keyboard, screen, and mouse. This fact was also reported by Calonge et al., (2016), particularly those living with disabilities (Altinay et al., 2016; Adala, 2016), and participants need skills to use the online tools required (Chen & Panda, 2013; Adams, Liyanagunawardena, Rassool, & Williams, 2013a; Warusavitarana, 2014). Mobile ICTs have the advantage of being familiar to many users, without learners needing to understand the workings of a desktop computer (Boga & McGreal, 2014), while managing large amounts of information (Liyanagunawardena & Williams, 2015). Face-to-face workshops for OER users (Hu & Huang, 2015) could aid literacy development.

King et al., (2018) also identified that learners from the Global South may have difficulty using online collaborative tools within courses. This is also reported by Warusavitarana et al., (2014). A study in Kenya by Pete et al., (2017) on OER differentiations between urban and rural universities, a general observation noted a significant part of the lecturers at Kenyan universities who do not yet have the required ICT competencies, where as majority of the students only scored intermediate digital competency, which is a concern after so many years of implementing the National ICT Policy of 2006.

Reach does not always equal accessibility Nti, (2015), and many learners in the global South still struggle to utilise the necessary ICTs via a regular, stable Internet connection (King et al., 2018). The current literature generalized the issues around digital literacy and proficiency that is a basic foundation for any OER use and creation. This study further clarifies the differentiations in digital proficiencies among the lecturers and students in rural versus urban universities, as well those in technical versus comprehensive higher learning institutions. Another very important variable discussed in this study is the internet accessability as a key enabler to OER use in Sub-Saharan Africa (Mtebe & Raisamo, 2014; Pete et al., 2017). The dimensions of internet access is disagregated according to specifications on cost, speed and stability, which make this study unique.

2.5 Internet Access as an Enabler of OER

As the vast majority of OER are distributed online, internet access is a key factor in being able to use and share OER. Learners and researchers from the Global South, especially from Sub-Saharan Africa countries support the increasing focus on mobile ICTs for learning (mobile learning, or m-learning). M-learning can significantly increase access to OER (Castillo et al., 2015; Godwin-Jones, 2014; Moreno & Traxler, 2016; Wildavsky, 2015; Gómez et al., 2014). This is seen practically working and implemented in Tanzania through NESAP-ICT (Boga & Mcgreal, 2014; Mtebe, 2015) and in Rwanda through the SpecialEDU program that also incorporates the use of social media especially Facebook, WhatsApp and Twitter (Wildavsky, 2015; Nkuyubwatsi, 2016; Mariana, 2016).

Stable internet connectivity is a factor that can enhance the access, use and re-use, as well as sustainability of OER. Where the connection is not stable, it is considered a barrier to the uptake of OER. King, Pegrum, & Forsey, (2018) note that an obvious barrier to open online learning is the inability of learners in the Global South to access the internet, particularly due to infrastructure limitations. This has been underlined by several other authors like Chadaj, (2014); Alcorn, Christensen, & Kapur, (2015); Godwin-Jones, (2014); Literat, (2016); Mariana, et al, (2016); Shin, (2015); Wilson & Gruzd, (2014).

Several other studies have also underlined internet access as a barrier to use and development of OER. Such studies are listed per country by King et al., (2018) as: in Bangladesh and Sri Lanka (Hatakka, 2009); Cuba, Guatemala, and Peru (Garrote, Pettersson, & Christie, 2011); Egypt (Aboshady et al., 2015); India (Chatterjee, 2014a; Perryman & Seal, 2016); Liberia (Madaio, Grinter, & Zegura, 2017); Mexico and Thailand (Gómez et al., 2014); Nigeria (Omonhinmin et al., 2014); Rwanda (Nkuyubwatsi, 2014); Kenya (Pete et al., 2017) and Tanzania (Mtebe & Raisamo, 2014). Regional studies on Kenya are reported by Adala, (2016); Nyerere et al., (2012) and Pete et al., (2017).

Regional imbalances (Rural vs urban settings) also prove as an inhibiting factor to accessing the internet. In Kenya, several studies (Agudo-peregrina et al., 2014; Hodgkinson-Williams, Arinto, Cartmill, & King, 2017 & Pete et al., 2017) underline the fact that as a result of the poverty, most of the learners in rural environments cannot afford internet connectivity at home, and hence the children rely on what is being provided elsewhere for free or relatively cheaply i.e. public libraries/universities and work place (King et al., 2018). Authors with similar concerns are Alcorn, Christensen, and Kapur, (2015) and Quinn and Robinson, (2012). Furthermore access can be restricted by factors such as intermittent power supply and limited transport to locations with computers (Adams et al., 2013a).

Liyanagunawardena et al., (2015) reports a clear gender divide, with women often facing structural, gendered, "offline" barriers to access. This finding is supported by Buckler et al., (2014). People living with disabilities in the Global South also face considerable accessibility barriers (Altinay et al., 2016; Adala, 2016).

Larson, & Murray, 2008; Nkuyubwatsi, 2013) reported that a key access barrier in Sub-Saharan Africa countries is the large amount of data required to download the required learning content and materials. Most OER sites require a bandwidth far higher than that available to many Southern learners, and the gap is growing (Escher, 2014; Jackson, 2010). Solutions to access to internet are suggested by King et al., (2018) that local learning hubs as noted by Escher et al., (2014) and Godwin-Jones, (2014) or access to hubs as mentioned by Oyo and Kalema, (2014) basically provide physical spaces with internet-connected computers for learners and other users to access online resources. Other ways of improving access include the use of low-resolution video content Adams et al., (2013b), audio files and transcripts (Jackson, et al, 2010; Richter & McPherson, 2012), promoting off-peak bandwidth usage Bliss and Smith, (2017), leveraging cloud-

based technology Issa et al., (2013), and making resources downloadable for use offline (Castillo et al., 2015). Nyerere et al., (2012) reported on the need to incorporate ICT in education at all levels to improve access to quality education and hence responding to the challenges of globalization.

In the entire thesis, the term '(O)ER differentiation' has been used a number of times. It is defined as the existing inequalities in the use of (O)ER in society, that involves not only unequal access to (O)ER, but goes further to include the inequalities that exist between groups of people in their ability and capability to actually create, use or re-use, repurpose, and holistically utilize (O)ER for individual and common good (ROER4D, 2017). In this respect (O)ER differentiation generally is an important issue, and there is a need to get a better picture of whether and how introductions of OER have been aligned with a reduction of the (O)ER differentiation between those who do have access to and use OER and those who don't, especially in Sub-Saharan Africa.

The studies undertaken on internet access are very important but not specifically for Africa. This study has given an in-depth analysis on how important access to internet is primary both for the students and lecturers in universities (Pete et al., 2017; Pete & Mulder, 2018). Cost, speed and stability of internet are key factors for Africa that if not tackled comprehensively, then OER use, creation and sharing may not meet the required global standards. The Sub-Saharan university management needs to see to it that stable, affordable and faster internet infrastructure is situated in the learning institutions both in rural based and urban universities as well as at technical and comprehensive higher education institutions; hence enhancing inclusivity and equity in promoting OER use and practices.

To enhance the understandability of the Africa education ecosystem, this study has analyzed the higher educational landscape for the three countries under study. The university landscape for Kenya, Ghana and South Africa has been relayed to provide a clear understanding and direction of this study, where key the underlying variables are tackled in totality.

2.6 Higher Education in Kenya, Ghana and South Africa

Recently, we have witnessed rapid expansion of higher education institutions in Kenya. This can be attributed to increased demand for higher education, partly as a result of increased awareness of the positive benefits of education (Aslam & Khan, 2014). Education, learning, and acquisition of knowledge and skills have never been of more central importance than they are today (Nyerere et al., 2012). It is becoming increasingly clear that our ability to cope with rapid changes will become the primary measure of success at both macro and micro levels (Khan, 1997). Africa Nazarene University, Kenyatta University and University of Nairobi are excellent examples of institutions that have adopted various educational technologies and OER in their teaching and learning, though in blended format (Mtebe & Raphael, 2017).

The first Kenyan Government policy to address ODeL in higher education was the Act of Parliament of 1966, which established the Board of Adult Education. The latest government initiative, as contained in Sessional Paper No. 1 of 2005 (Republic of Kenya, 2005), recommends the establishment of an open university and the use of ODeL in human resource development at all levels. The practice of ODeL in the country has been at all levels of education and has been provided by different institutions each governed by their own institutional policies (Adala, 2016).

Kenya adopted a National ICT Policy in January 2006. This policy aims at ensuring the availability of accessible, efficient, reliable, and affordable ICT services. The relevant objective in this section on information technology states that government will encourage the use of ICT in schools, colleges, universities, and other educational institutions in the country so as to improve the quality of teaching and learning. According to Farrell, (2008), the related strategies are to promote the development of e-learning resources; facilitate public-private partnerships to mobilize resources in order to support e-learning initiatives; promote the development of an integrated e-learning curriculum to support ICT in education; and promote distance education and virtual institutions, particularly in higher education and training, among others. Equally, the Kenya Education Sector Support Program (KESSP), developed in 2005 by the Ministry of Education, prioritizes mainstreaming ICTs into the teaching and learning process.

Ghana has been active in a number of open, distance, and e-learning consortia and projects. As a member state of the African Virtual University, in 2014, Laweh Open University College was established as the first Open University in Ghana. An initiative to launch the Open Universities of Ghana agency is currently under review with the National Council for Tertiary Education (MOE, 2017). Within the realm of OER, at the university level, two of Ghana's public universities (KNUST and University of Ghana) were founding members of the African Health Open Educational Resources Network. The Colleges of Health Sciences at the Kwame Nkrumah University of Science and Technology (KNUST) and University of Ghana produced open educational resources in medicine, dentistry, and public health as part of their role with the network (Okudzeto, Lal, & Sedegah, 2017; Omollo et al., 2012).

South Africa is more advanced in the realms of OER and ICT integration in education. The University of Cape Town (UCT), University of South Africa (UNISA), North West University (NWU), and University of Western Cape (UWC) are excellent examples on institutions that have practically adopted OER for teaching and learning. To be specific, UCT launched its OER directory, UCT OpenContent (UCT OC) way back in 2010 and an institutional repository (OpenUCT) in 2014, which to date has 300 OERs and over 3000 downloads (Cox, 2016). At UNISA, the instructors use Sakai system to distribute resources and facilitate interaction between students and instructors while mobile technology is used to facilitate communication with learners (Venter, Rensburg, & Davis, 2012). With such a background, the choice of the three countries to represent Africa is justified.

In a nutshell and alongside providing an adequate ICT and OER infrastructure, Kenya Ghana and South Africa are becoming more engaged in educational innovations as we see occurring worldwide in online and open learning. Its benefits for society and in better addressing the urgency and diversity of learners' needs have been discussed by (Daniel, 2009). More recently, Rikers, (2017) and Rikers, (2017b) have developed the so-called Iron Triangle scan through which they conclude that, for example, OER can be qualified as a 'no-regret' option for governments. Online learning, on the contrary, is a much more diffuse concept where at best we can speak of a 'desirable' option, which may accommodate students from hard to reach populations and poor backgrounds. This is relevant, realizing that for developing countries like Kenya, Ghana and South Africa, the big challenge in the 'ICT and OER in education journey' is to balance educational ambitions and perspectives with economic realities and opportunities.

Therefore, the countries in Sub-Saharan Africa have to make deliberate and sensible choices from a variety of potential educational innovations. It also makes a study like this thesis to acknowledge the first empirical OER study in Kenya, Ghana and South Africa on such a large scale - important since it can contribute to a better Sub-Saharan Africa OER picture. A picture which gives insight into the connectivity and digital proficiency among students and lecturers, as well as into the differentiation in students' and lecturers' access to (Open) Educational Resources, and in the ways that they are using, sharing, and appreciating these resources.

3

Chapter 3

Research methodology

3.0 Introduction

This chapter explores research method, research design, target population, data collection instruments, demographic information, instrument validity, role of the researcher, ethical consideration as well as the dimensions of the research instruments.

Survey method was employed to obtain the data from the three countries. The local coordinators from the twelve universities were used to obtain data as clarified in chapters four and five.

Practical examples drawn from the three countries of this thesis include: South Africa: the University of Cape Town (UCT), University of South Africa (UNISA), North West University (NWU), and University of Western Cape (UWC); in Ghana, Kwame Nkurumah University of Science and Technology (KNUST) and University of Ghana; and Kenya, Africa Nazarene University, Kenyatta University and University of Nairobi are examples of institutions that have adopted various educational technologies in their teaching (Mtebe & Raphael, 2017).

3.1 Research Design

Purposive sampling technique was used, where questionnaires were distributed through email in coordination with university ICT departments. The responses were gathered in 2016, in a rolling series of 2 month-periods at each institution in different universities in the three countries. In order to test student's and lecturer's questionnaires before their large-scale use, a pilot study was carried out. It became evident that both the student and lecturer populations are generally not very knowledgeable nor understanding of the OER concept. It turned out that even with the explanation of OER in the information part of the questionnaire, some responses were overall incontestably inconsistent (Pete et al., 2017). This could only be understood with our assumption that respondents had not really internalized the OER concept, in particular the associated open licensing approach.

Hence, one could easily generate an unintended validity failure in the results for the questions concerned. With such experience, a decision was reached to change the reference from OER to ER in the questions connected to this failure. As a consequence, we had to slightly adapt the wording of our original research questions, in which we had not (yet) been anticipating this possible 'perception eclipse'.

This has resulted in the set of RQs presented above (Chapter 1.6). RQ2, for example, shows the difference by using the term ER instead of OER. And we rephrased RQ3 and RQ4 a little so that we could or simply had to stick to OER, whatever the results would be. The phenomenon described here is not to blame on the respondents being from Sub-Saharan Africa. And our survey certainly is not the only OER study which is bothered by this outcome. It can easily happen with a concept like OER which in its abstraction appears to be difficult to fully grasp. We have noted it explicitly, and have taken measures to circumvent its consequences as much as possible.

Chapter 3

The questionnaires contain 4 items on RQ1 and 2 items on RQ3. For RQ2 the lecturers' version addresses 5 items, the students' version 3. And, RQ4 is being covered by 7 items (for the lecturers), and by 6 items (for the students).

The research has an exploratory character and is based on the quantitative descriptive data provided by the two questionnaires. The sampled lecturers and students were invited to fill in the questionnaires available on SurveyMonkey. Some used the online SurveyMonkey, but the majority used the printed version of the questionnaires, which were later keyed into the SurveyMonkey by the local coordinators at the participating universities in each of the three countries. Respondents were offered incentives in the form of flash disks.

3.2 Target Population and data collection plan

Three countries in Africa were chosen as there was some evidence of OER activity being undertaken in these countries prior to the commencement of the ROER4D project. These were Kenya, Ghana and South Africa; where a selection of eleven universities with randomly sampled students and lecturers was done. Sampling consisted in collating the course modules being delivered in a particular semester in each of the four selected universities. Out of this list, 30 modules for each university were randomised.

From the randomised set, the local coordinators at the four participating universities were to identify at least 10 courses or modules with more than 30 students, while its lecturers were willing to cooperate with the data collection procedures. The aim was to sample at least 200 students and 10 lecturers from each university. The participants were invited based on the random selection from the data selection plan. Distinct questionnaires for students and the lecturers have been used, which generated a response from in total 2249 students and 106 lecturers.

3.3 Data Collection Instrument

Questionnaires were developed, one for the lecturers and the other for the students. The lecturer's questionnaire had 30 items (questions), while the student's had 26 questions. These survey questions addressed themes like: personal demographics, infrastructure access, institutional environment, lecturer/ student attitudes and open licensing. The questionnaires were distributed using "SurveyMonkey"; which is an online cloud-based survey service that helps to create, distribute, gather, and even analyze professional online surveys and survey data. The level of sampling consisted in collating the course modules being delivered in a particular semester in each of the 12 participating universities. The survey responses were correlated for analysis with respondents' answers to the key questions of the survey.

3.4 Demographic Information

The participants were invited based on the random selection from the data selection plan. The sample contains 106 lecturers (66% male, 34% female), and 2249 students

(72% male, 28% female). The male/female distribution is representative both for the lecturers and the students in Africa (Wainaina, 2011), but note the interesting exception at 'Tangaza University College' in Kenya, where the majority of the students is female: 62% (which is a representative share). This is because Tangaza University's mission is to promote women's education and the majority of the students are sponsored by the Catholic Church.

With regards to age, majority of the lecturers are between the age bracket of 30-49 (61%). Those within 50-59 are (20%) and those at 60 and above constitute 19%. For the students, majority (81%) are within 17-30 years bracket. Clearly most of the lecturers about (60%) have a moderate teaching experience, ranging from 4 to 10 years. Only a small fraction (5%) is very experienced (with more than 20 years). This represents the regular picture of teaching in higher learning institutions.

When it comes to lecturers' highest educational qualifications, we count the quality you would like to see in a questionnaire like this: 42 Doctorates, 53 Masters, and 11 Bachelors. With respect to their current positions we observe an anticipated variety in the following frequency order: lecturer (80), researcher (22), senior lecturer (17), junior lecturer (11), associate professor (15), administrator (10), director (14), and manager (13). We can also report a broad spectrum in the areas of teaching among the lecturers. This is the ranking order, ignoring scores lower than 5: Religious Studies (35), Social Science (62), Applied Science, Technology, and Engineering (22), Science (15), Education Studies (26), Arts (11), Economics, Business & Management, and Accounting (14), Health & Social Care (8), and Psychology and Philosophy (6). This spectrum naturally is also reflected in the students' areas of study as well.

3.5 Instrument Validity study

In order to test both questionnaires before their large-scale use, a pilot study was carried out. It became evident that both the student and lecturer populations are generally not very knowledgeable nor understanding the concept of OER. It turned out that even with the explanation of OER in the information part of the questionnaire, some responses were overall incontestably inconsistent (Pete et al., 2017). This could only be understood with our assumption that respondents had not really internalized the OER concept, in particular the associated open licensing approach. With such experience, a decision was reached to change the reference from OER to ER in the questions connected to this failure.

As a consequence, we had to slightly adapt the wording of our original research questions, in which we had not (yet) been anticipating this possible 'perception eclipse'. This has resulted in the set of RQs presented above. RQ2, for example, shows the difference by using the term ER instead of OER. RQ3 and RQ4 was also rephrased a little so that we could or simply had to stick to OER, whatever the results would be.

The phenomenon described here is not to blame on the respondents being from Sub-Saharan Africa. And our survey certainly is not the only OER study which is bothered

by the perception eclipse. It can easily happen with a concept like OER which in its abstraction appears to be difficult to fully grasp. We have noted it explicitly, and have taken measures to circumvent its consequences as much as possible.

3.6 Role of the Researcher

The researcher played a very critical role in the entire research process. With the support from the Global Coordinator and personal networks, she identified the four participating universities in the three countries, which were purposely selected as rural vs urban, as well as technical vs comprehensive. She also identified four local coordinators per country, who were trained on the data collection procedure. The local coordinators then assisted in collecting data and keyed them in the surveymonkey. This was later analyzed by the global statistician.

3.7 Ethical considerations

The survey was properly planned taking into consideration on chances that could aid misleading results. A consent note was provided to those who needed it and the respondents were at liberty to undertake the survey or not and hence all the ethical issues were taken into consideration. Universities in Kenya and Ghana used hard copies of the questionnaires, which were later keyed into the survey monkey by the local coordinators in various institutions. South Africa respondents used the online survey monkey.

With respect to ethical clearance, each county had their own policies. In South Africa,the process was more rigorous as compered to other two countires. The local coordinator had to seek clearance from the University of Cape Town since it was the project's host institution and later had to seek actual permission from the human resource department in order to have access to staff and students. It was only after the clearance from UCT that other universities in South Africa ethical clearance requests were submitted. In Kenya and Ghana, the ethical clearance process was undertaken by the local coordinators within their respective institutions. This worked out quite well since they were also the instructors to the courses selected.

3.8 Dimensions of the research instruments

The prior literature referred to in the review for this study has not tackled the underlying OER dimensions which are vital to promoting OER uptake in the universities in Sub-Saharan Africa. The study therefore addresses four main dimensions that are very important for African universities agenda for ICT and OER integration in teaching and learning. These are: motivation, barriers, digital literacy and internet access.

3.8.1 Motivation
Motivation is key factor when it comes to use, creation and sharing of open educational resources in Sub-Saharan African countries. Both lecturers and students stated that the potential motivators to use of OER are bringing down the cost of education, access to

improved quality of materials, help offered to other educators or students, lowering the cost of course development and enhancing institutional reputation.

3.8.2 Barriers
These were viewed as the potential inhibitors to the use and re-use of educational resources. From the study, lecturers and students noted the lack of access to internet, lack of time, inadequate training, lack of software and hardware, worries about the quality of materials, lack of institutional support and lack of reward systems and compensation schedules as some of the barriers to the use and re-use of OER.

3.8.3 Digital Literacy
Effective and efficient use of OER requires digital literacy in order to be aware of the appropriate use of digital tools. King et al., (2018) reported that many learners from the global south need basic computer literacies to use a keyboard, screen, and mouse. There is a significant digital literacy differentiation between lecturers and students at universities in Africa, as will be shown in the following chapter.

3.8.4 Internet Access
Internet access is seen as an enabler to the use of educational resources. There are very few studies that have addressed it with regards to cost, speed and stability. This study has provided an elaborate analysis on the three elements to internet access and suggest that cost implications, speed of the internet and stability of connection has a direct relationship to OER use in most of the African higher learning institutions. As will be shown in the next chapter, the lecturers and students prefer cheaper, faster and stable internet connections for them to use, re-use, create and share educational resources.

Although these variables could be present in other literatures, they have not been discussed specifically for Kenya, Ghana and South Africa as will be shown in the following chapters.

Chapter 4

Country survey, Kenya

4.0 Introduction

This chapter is a slightly reversed version of an article which was co-authored and published in Open Praxis in June 2017: http://openpraxis.org/index.php/OpenPraxis/article/view/574. It captures a survey study undertaken in four universities in Kenya. The universities were public and private and were either based in the urban or rural location. These were:

- Tangaza University College *[private, urban]*
- Great Lakes University *[private, rural]*
- Jomo Kenyatta University of Agriculture and Technology *[public, urban]*
- Maseno University *[public, rural]*

The chapter also explores the Kenyan university landscape, sharing in an African culture, open in OER, role of UNESCO and defining OER differentiation. An exploration of digital literacy as well as its relations to OER differentiation is well captured too.

4.1 The Kenyan university landscape

Situated in Eastern Africa, Kenya has a population of around 47.4 million people occupying a total land area of 569,295 square kilometers. 26% of the total population, is urban. After independence, Buchmann (1999) points out, Kenyans have expressed deeper faith and high hopes in education. The government promoted education as one of the key issues to social, political and economic development. Rikers (2017) underlines that, although there has been international support for African countries to establish an educational infrastructure, successes mainly apply to the primary school level, while moreover access still requires full attention. In Kenya, for instance, access to primary education is still an issue, especially for girls and children with a disability, and in its divide between rural and urban areas and among various ethnical/cultural groups.

Kenya has 22 public universities, 14 chartered private universities, and 13 universities with a Letter of Interim Authority (4ICU web ranking, 2016). Most of Kenyan universities take part in a library consortium that subscribes to digital academic databases such as JSTOR and EBSCOHost. It is not clear, however, how much lecturers and students are trained to use these valuable resources. Among the universities in Kenya, University of Nairobi gets ranked as the number one in the Webometrics Assessment because of their visibility on the internet. This university has managed to create a repository of publications by lecturers and theses of students. But overall universities are lagging behind in this kind of operation. Most universities in Kenya are beginning to establish online academic courses. Often they follow a mixed or hybrid method to learning with a minimum of contact hours and various sources made available through the internet. There is no doubt that these models will increase accessibility to tertiary level education, but they also call for improved IT literacy across all age groups and enhanced internet connectivity and accessibility throughout the country.

4.2 Sharing in African culture

In the African traditional setting, the elderly men and women share their practical wisdom and indigenous knowledge with the younger generation for purposes of continuity and cultural enrichment. This exercise by nature is free and open, with no exchange of payment for services (Mosha, 2000). This culture of open sharing, however, is virtually absent in modern forms of education in Africa. Institutional education, largely introduced in Africa by the Global North, which also coincided with the Industrial Revolution, generally overruled the principle of free sharing of knowledge. However, since the last two decades of far-reaching digitization of knowledge and content in a broad sense, having led to Open Access of knowledge and to Open Educational Resources (OER), it seems plausible to restore the traditional African principle of free and open sharing.

4.3 About 'Open' in OER

According to (UNESCO/COL, 2012), OER are, "teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions." Because of this 'open' view on educational resources, OER bear the huge potential of a simultaneous improvement on the access to education and the quality as well as the efficiency of education (Daniel, 2009; Arthor, 2013). This could be seen as an attractive perspective to all countries around the globe, but it holds a fortiori for countries in the Global South.

Since we are witnessing a lot of confusion and claims regarding what 'open' means, Wiley has recently restated clearly that 'open' is not identical to 'free' (of charge) access. 'Open', he underlines, stands for free access indeed plus, however, some formal rights and permissions to be granted to the users. These can be adopted from an overall scheme called 'open licensing', offered for example by Creative Commons (Wiley, 2016). In Wiley's terminology, 'open licensing' provides users with free and perpetual permission to engage in five 'R' activities: reuse, revise, remix, redistribute, later completed with retain (Wiley, 2007, 2014).

The relevance is evident: this really goes beyond providers just giving access to their online content (mostly under various restrictions, even in the case of 'no cost'). And, the other way around, it is offering a fair regulation and conditioning of the 'jungle' where people wrongfully feel free to take from the internet whatever they want for whatever use or purpose. With this notion in mind and with our observation that such clarity quite frequently is lacking, we will refer to (O)ER rather than OER except when its meaning is evident from the context. This is leaving space for presenting results, interpretations and conclusions regarding Educational Resources in general, not being 'Open', which is useful in its own right.

4.4 UNESCO's role

UNESCO has been and will continue to be a key player in persistently advocating the huge potential of OER within its mission of *"Education for All"*, in particular for the Global South. It has done so since it coined the term 'Open Educational Resources' in 2002 (UNESCO, 2002). And it culminated a decade later in the World OER Congress in Paris, organized by UNESCO and the Commonwealth of Learning, with the 2012 Paris OER Declaration (UNESCO/COL, 2012). The declaration was followed up by an OER program dedicated to policy development and teacher training. Around the summer of 2016 it was decided to start a process towards mainstreaming OER in all education around the world that might eventually lead to an official OER Recommendation, which is a stronger instrument than the earlier Declaration (UNESCO, 2016). However, the worldwide collection of OER may not be equally accessible to all globally. And the same may hold for various populations even within one country for more country-specific OER. This situation is technically referred to as OER differentiation. Simply stated this represents the gap between the centre and the periphery, between the literate (computer-literate and traditional-literate) and the illiterate, between the urban and the rural, between the haves and the have-nots, in their opportunities and capabilities to access and use OER.

4.5 (O)ER differentiation defined

In this paper, (O)ER differentiation is more precisely defined as the existing inequalities in the use of (O)ER in society, that involves not only unequal access to (O)ER, but goes further to include the inequalities that exist between groups of people in their ability and capability to actually create, use or re-use, repurpose, and holistically utilize (O)ER for individual and common good (Pete et al., 2017).

4.6 Digital literacy

Many countries across the globe have gained interest in OER and set up pilot studies, introduced stimulation programs, developed specific measures, or even designed a comprehensive strategy to mainstream OER (Orr, 2015; Hodgkinson-Wiliams, 2013). In this respect (O)ER differentiation generally is an important issue, and there is a need to get a better picture of whether and how introductions of OER have been aligned with a reduction of the (O)ER differentiation between those who do have access to and use OER and those who don't, especially in Sub-Saharan Africa. It has been noted (Lane, 2009) that in addition to digital differentiation which concerns physical access to new technologies in the ICT domain (like internet), there is another gap. This gap, called 'usability differentiation', is referring to the technology being too complex to use or requiring high-order skills and competencies in specific cases. We then talk about digital literacy, which according to Martin (2009; p.11) is *the awareness, attitude and ability of individuals to appropriately use digital tools and facilities to identify, access, manage, integrate, evaluate, analyse and synthesize digital resources, construct new knowledge, create media expressions, and communicate with others in the context of specific life situations, in order to enable constructive social action, and to reflect upon this process."*

Chapter 4

4.7 Digital and (O)ER differentiation

With the definition of digital literacy at hand, it is important to distinguish between the broad and general digital differentiation (often called the digital divide), regarding the access to and use of ICT, and the differentiation with respect to (Open) Educational Resources which is specifically related to the educational process. Accordingly, we can allocate different levels of digital proficiency and of (O)ER proficiency to the key actors in education, students and lecturers. In this paper the focus is on Kenya as a country in the Global South, in Africa in particular, where we could expect a digital and (O)ER differentiation pattern among its university students and lecturers which will deviate from countries in the Global North. We want to understand the specific context, the culture, and the higher education system in Kenya better in order to contribute to education that really meets the needs of the local people. The recognition and measuring or perception of the digital and (O)ER differentiation may lead scholars, policy makers, and the public to better understand the potential of OER to improve everyday life for those who are on the margins of society and to achieve greater social equity and empowerment (Pete et al., 2017).

4.8 Overview of the chapter

The chapter represents a quantitative survey study among Kenyan university students and lecturers. In the next section the context for the study will be described as related to the fact that it is part of a bigger project and, additionally, with respect to the country, its university landscape and the state of affairs in ICT in education and in OER. This is to be followed by the research questions, and a section on the methodology applied. The main body of the paper is a comprehensive section containing per research question a set of results and findings. The paper closes with some major reflections, conclusions, and recommendations.

4.9 Methodology

4.9.1 The 'perception eclipse'

In order to test both questionnaires before their large-scale use, we have run a pilot. Most importantly, it became evident that both the student and lecturer populations we are targeting are generally not very knowledgeable nor understanding of the OER concept. It turned out that even with the explanation of what OER stands for in the information part of the questionnaire, some responses were overall incontestably inconsistent. This could only be understood with our assumption that respondents had not really internalized the OER concept, in particularly the associated use of open licensing (as discussed in the Introduction section). Which - one could say - was eclipsing their perceptions and would generate an unintended validity failure in the results for the questions concerned. We therefore decided to change the reference from OER to ER in the questions connected to this failure. As a consequence, we had to get back to the basis and also slightly adapt the wording of our original research questions, in which we had not (yet) been anticipating this possible 'perception eclipse'.

This has resulted in the set of RQs presented here:

1. What is the state of connectivity and digital proficiency among lecturers and students in Kenya?

2. What kind and level of use, re-use, creation, and sharing of educational resources (ER) is common among lecturers and students (but for the latter not including re-use and creation) in Kenya?

3. What is the level of awareness of licensing related to open educational resources (OER) among lecturers and students in Kenya?

4. How do lecturers and students perceive the value of openness in educational resources (ER), its implementation opportunities, and its institutional context (the latter item only for the lecturers) in Kenya?

Where, RQ2, for example, shows the difference by using the term ER instead of OER. And we rephrased RQs 3 and 4 a little so that we could or simply had to stick to OER, whatever the results would be. The phenomenon described here is not to blame on the respondents being from the Global South or from Sub-Saharan Africa. And our survey certainly is not the first or only OER study which is bothered by the perception eclipse. With a concept like OER which in its abstraction appears to be difficult to fully grasp, this can happen. We have noted it explicitly, and have taken measures to circumvent it as much as possible.

4.9.2 The questionnaires

The lecturers' questionnaire includes 30 items, the students' version 26. Both questionnaires contain 4 items on RQ1 and 2 items on RQ3. For RQ2 the lecturers' version addresses 5 items, the students' version 3. And, RQ4 is being covered by 7 items (for the lecturers), and by 6 items (for the students). The remaining items (12, respectively 11) are either demographic or not relevant for this study. The items in the questionnaires offer multiple choice answers from which the respondents should tick the relevant ones. Some of the questions can have more than one answer.

The research has an exploratory character and is wholly based on the quantitative descriptive data provided by the two questionnaires. There is no qualitative part such as additional in-depth interviews of representatives of the two populations studied. The sampled lecturers and students were invited to fill in the questionnaires available on SurveyMonkey. Some used the online SurveyMonkey, but the majority used the printed version of the questionnaires, which were later keyed into the SurveyMonkey by the local coordinators at the participating universities. Respondents were offered incentives in the form of flash disks.

4.9.3 Sampling of universities and participants

Data have been collected from four universities in Kenya which were purposively selected. They are representing the overall Kenyan university variety. First of all this applies to the classification as private or public, where the public ones are funded by the government. Secondly, there is equal representation of the universities in urban areas - in this case basically being located in Nairobi - and in rural areas. These are the ones:

- *[private,urban]* Tangaza University College
- *[public, urban]* Jomo Kenyatta University of Agriculture and Technology
- *[public,rural]* Maseno University
- *[private, rural]* Great Lakes University.

The second level of sampling consisted in collating the course modules being delivered in a particular semester in each of the four universities. Of this list, 30 modules for each university were randomised. From the randomised set, the local coordinators at the four participating universities were to identify at least 10 modules with more than 30 students, while its lecturers were willing to cooperate with the data collection. The aim was to sample at least 200 students and 10 lecturers from each university. The participants were invited based on the random selection from the data selection plan. The sample contains 43 lecturers (60% male, 40% female), and 798 students (54% male, 46% female). The male/female distribution is representative both for the lecturers and the students in Kenya (Wainaina, 2011), but note the interesting exception at 'Tangaza' where the majority of the students is female: 62% (which is a representative share). This is because Tangaza University's mission is to promote women's education and the majority of the students is sponsored by the Catholic Church.

4.10 Findings and discussion

In this section we report on the major outcomes for both the lecturers' and the students' questionnaire, arranged along the four pairs of research questions.

> L-RQ1: What is the state of connectivity and digital proficiency among lecturers?

> S-RQ1: What is the state of connectivity and digital proficiency among students?

Since the use of (O)ER presupposes certain proficiency in the use of computers, the participants' digital proficiency is an important item in the questionnaires. Figures 1 and 2 show how the students at rural and urban universities score their digital proficiency. What one would expect is indeed that the 'advanced' share is larger at urban than at rural universities: 16% versus 2%. But it seems a bit surprising that this also holds for the 'basic' share: 52% versus 20%, and that - as a consequence - the 'intermediate' share is much larger at the rural universities: 78% versus 32%. An explanation for these remarkable scores could be that students at urban universities are more modest about their digital skills. But it could also be due to the fact that as a result of decreased prices on hardware and software, computers are currently being used quite readily by students at rural universities. The Kenyan education system requires all newly enrolled university

students to have basic computer skills (KICD, 2016; MICT, 2016). It could be that the rural-based students take this more seriously than their colleagues at urban universities where this rule is not being strictly practiced.

Figure 1 Digital Proficiency rural-based students

Digital Proficiency - Rural Students

2%
20%
78%

■ Basic Digital Literacy
■ Intermediate Digital Competence
■ Advanced Digital Expertise
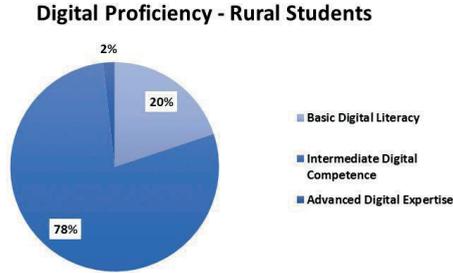
Figure 2 Digital proficiency urban-based students

Digital Proficiency - Urban Students

16%
32%
52%

■ Basic Digital Literacy
■ Intermediate Digital Competence
■ Advanced Digital Expertise
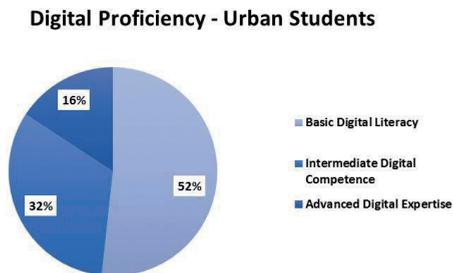
Figure 3 Digital proficiency rural-based lecturers

Digital Proficiency - Rural Lecturers

0%
32%
68%

■ Basic Digital Literacy
■ Intermediate Digital Competence
■ Advanced Digital Expertise
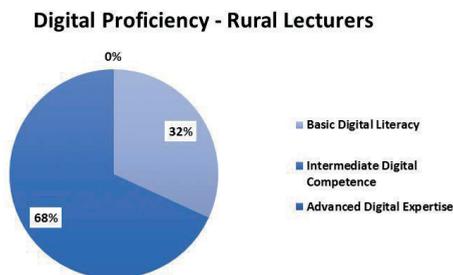
Figure 4 Digital proficiency urban-based lecturers

Digital Proficiency - Urban Lecturers

28%
24%
48%

■ Basic Digital Literacy
■ Intermediate Digital Competence
■ Advanced Digital Expertise
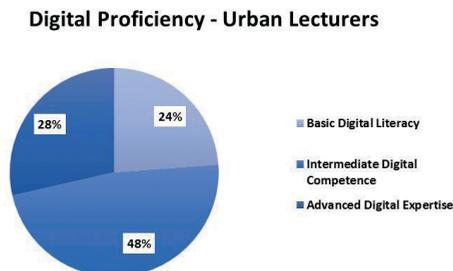
In Figures 3 and 4 we can see that the majority of the lecturers at both urban and rural universities score their digital proficiency at an intermediate level. A big difference, however, is that none of the rural university lecturers rate themselves at an advanced level while their urban-based colleagues score 28% to be advanced. From Figures 3 and 4 it can be concluded that the lecturers at the urban universities rate themselves more digitally proficient than the students, whereas at the rural universities this is the opposite. Generally, we can observe that a significant part of the lecturers at Kenyan universities do not yet have the required ICT competencies, which is a concern after so many years of implementing the National ICT Policy since 2006, and is in line with official reporting (ICT Authority, 2014).

Let us now move to the location where respondents access the internet and to the devices that they use. From Figures 5 and 6 it can be concluded that both students and lecturers score highest for their internet access at their school, university, or workplace. The lower scores show a slightly different pattern for students as compared to lecturers. For example, 'Home' is number 2 in the ranking of the lecturers, but a clearly lower number 5 for the students. Conversely, 'Family member or friend's home' is ranked number 3 for the students, but not more than number 6 for the lecturers. The 'Public library' is in the top- 3 for both students and lecturers. Most prominent for the students is that for almost 90% they rely on public services (the top-2 = 53%), low rate commercial public provision (internet café + wi-fi hotspot = 22%), or family/friends (14%). What this underlines is that as a result of the poverty in Kenya, most of the families cannot afford internet connectivity at home, and hence the children rely on what is elsewhere being provided for free or relatively cheap (Aguyo, 2010).

Figure 5 Student's location of internet access
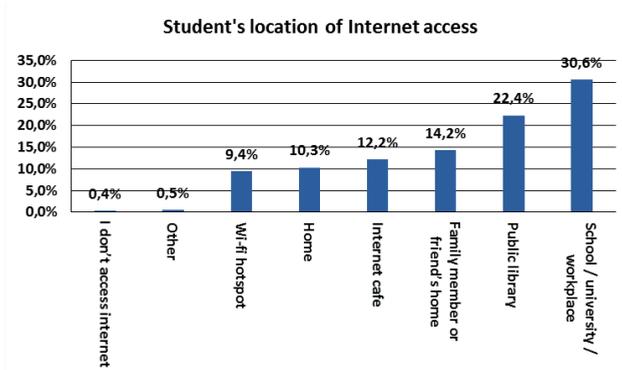
Figure 6 Lecturer's location of internet access

Lecturer's location of Internet access
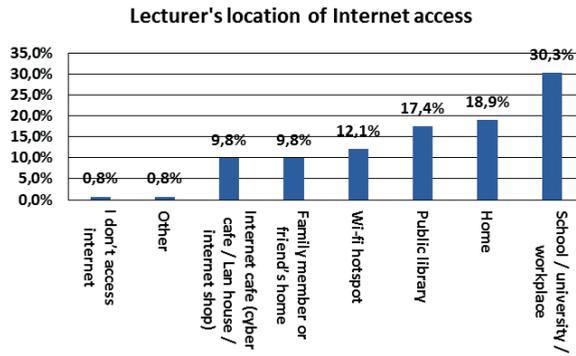
As regards the devices used, Figures 7 and 8 show slightly different patterns for the students and the lecturers in their top-2 preferences. For the lecturers, numbers 1 and 2 are a laptop and a desktop computer respectively, for the students this is just the other way around. Upon closer inspection this difference in students' preferences appears to be due to the rural-based students who by 60% are in favour of a desktop computer, with only 23% for a laptop (plus 17% for mobile and close to 0% for a tablet). In the urban universities the popularity among students of a desktop computer is down to 26%, with a higher 31% for a laptop (plus 26% for mobile and 16% for a tablet). As a result the pattern for the urban students closely resembles the lecturer's pattern. The very high score for desktop computers among rural-based students suggests that they are selecting the cheaper option in their use of desktop computers at their educational institutions (see also Laaria, 2013; Aguyo, 2010).

Figure 7 Devices used by students

Student's devices for Internet access
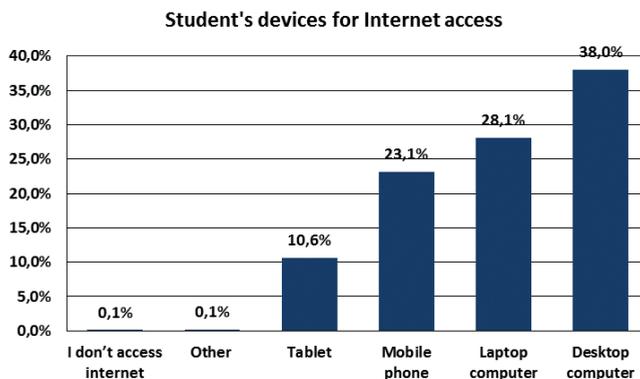
Figure 8 Devices used by lecturers
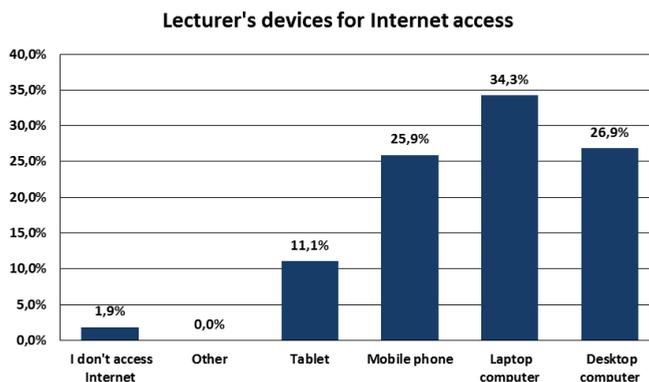
The last item addressed under the first research questions is the level of satisfaction that students and lecturers express having with the internet connection where they most frequently access it. This relates to three aspects, namely cost, speed, and stability. Table 1 collects the results for both groups and gives an impression of a rather even distribution for both the students and the lecturers.

Table 1 Level of satisfaction with the internet connection of students and lecturers

Level of satisfaction with the internet connection (in percentages)					
	Students			Lecturers		
	Cost	Speed	Stability	Cost	Speed	Stability
Very dissatisfied	16	21	21	25	33	34
Dissatisfied	26	35	33	20	16	18
Unsure	3	4	9	9	7	11
Satisfied	33	28	25	30	39	28
Very satisfied	21	11	10	16	5	9
N/A	1	1	1	--	--	--
Total	*100*	*100*	*100*	*100*	*100*	*100*

Adding the percentages for 'very dissatisfied' and 'dissatisfied' as well as for 'very satisfied' and 'satisfied' results in the following totals:

- for the students: 42 vs. 54% (cost), 56 vs. 39% (speed), and 54 vs. 35% (stability)

- for the lecturers: 45 vs. 46% (cost), 49 vs. 44% (speed), and 52 vs. 37% (stability).

The impression of a fair balance between the two outer pair summed qualifications is partly underlined by these figures. In the case of 'stability', however, the balance dips to a more negative appreciation, as it does for 'speed' (but in particular for the students). On closer examination the picture appears to be very diverse as can be seen in Figures 9 and10 and 11 and12 where we separate between 'rural' from 'urban'. For both students and lecturers the dissatisfaction at the rural universities is very pronounced (for all three: cost, speed, and stability) while at the urban universities the overall appreciation is quite positive. It can be concluded that there is a substantial digital divide or differentiation between rural and urban universities, in terms of internet access and accessibility.

This very unfortunate inequality is a serious challenge for Kenya, since the 2010 Kenyan constitution and Kenya's Vision 2030 (Vision 2030, 2007) clearly stipulate the need for new forms of open and online learning in order to provide access to education for marginalized and hard-to-reach populations (KICD, 2016; ICT Authority, 2014). This will only remain a dream that never can be achieved if this challenge is not tackled with proper and persistent government initiatives.

Figure 9 Internet connection rural-based students
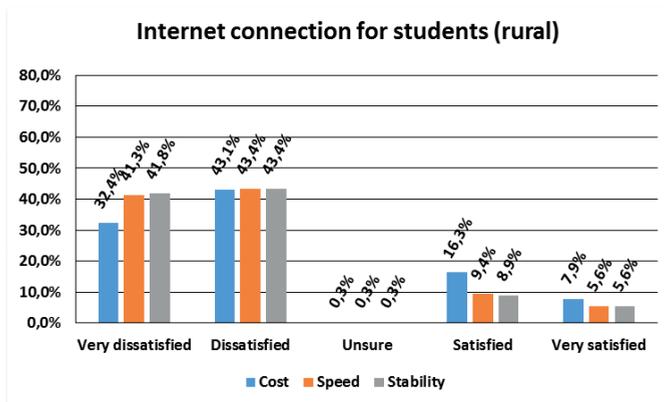
Figure 10 Internet connection urban-based students

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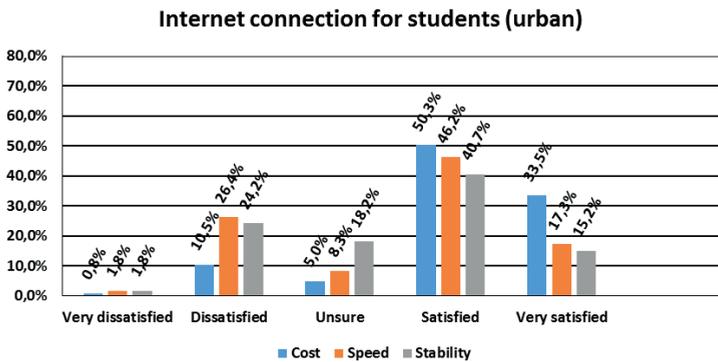
Figure 11 Internet connection rural-based lecturers

Internet connection for lecturers (rural)
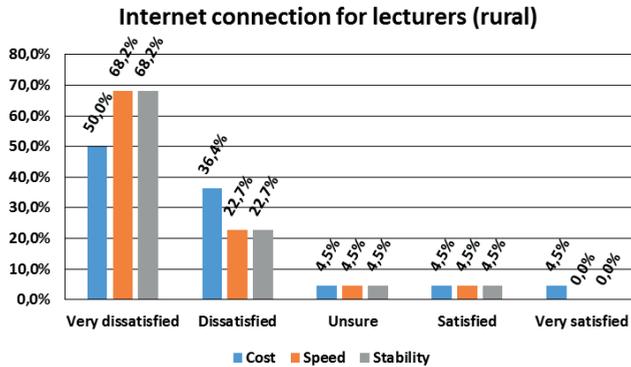
Figure 12 Internet connection urban-based lecturers

Internet connection for lecturers (urban)
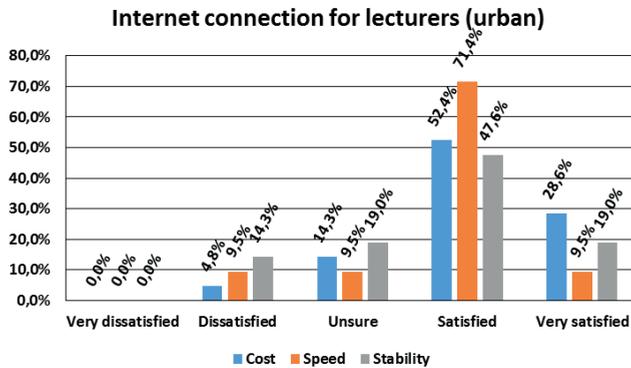
- L-RQ2: What kind and level of use, re-use, creation, and sharing of educational resources (ER) is common among lecturers?

- S-RQ2: What kind and level of use, and sharing of educational resources (ER) is common among students?

Continuing with this second pair of research questions, we first of all consider the processing and behaviour of both lecturers and students with respect to different categories of educational resources. We have decided indeed to start with surveying their actual practice rather than getting directly to the OER proposition, based upon the argument of the perception eclipse discussed in the Methodology section.

Figure 13 Spectrum of processing of educational resources (ER) by the lecturers

Spectrum of processing of educational resources (ER) by the Lecturers

- Office documents (like Word, Powerpoint, Excel) and PDF ■ Images, audio, video
- E-Books, lecture notes, quizzes, tutorials ■ Textbooks, whole courses, MOOCs, data sets
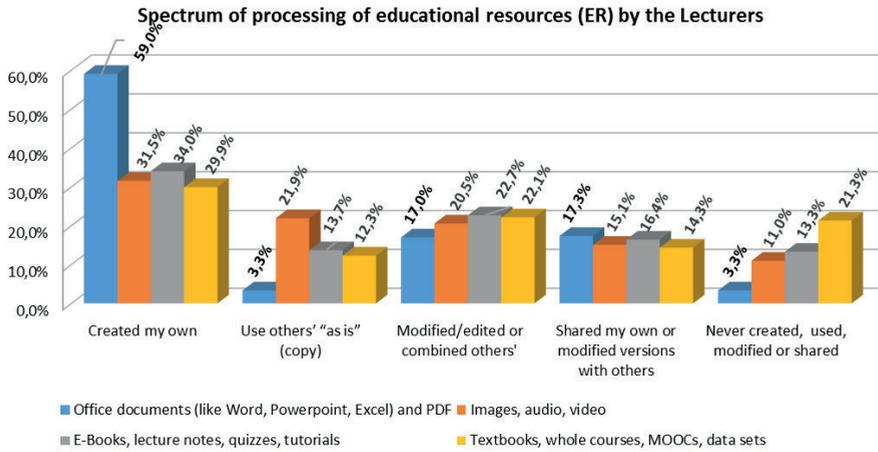
Figure 14 Spectrum of processing of educational resources (ER) by the students

Spectrum of processing of educational resources (ER) by the students

- Office documents (like Word, Powerpoint, Excel) and PDF ■ Images, audio, video
- e-Books, lecture notes, quizzes, tutorials ■ Textbooks, whole courses, MOOCs, data sets
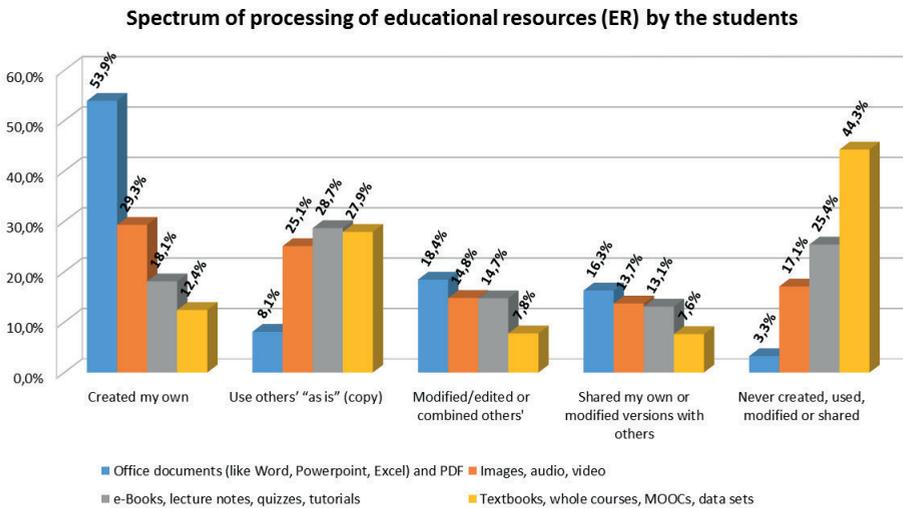
Figures 9a and 9b show interesting patterns for both the lecturers and the students in their processing of four ER categories:

a.   Office documents (like Word, Powerpoint, Excel) and PDF

b.   Images, audio, video

c.   e-Books, lecture notes, quizzes, tutorials

d.   Textbooks, whole courses, MOOCs, data sets.

Along the spectrum of five different modes of processing the three in the middle are the most relevant for this paper, representing respectively the 'use' (mode 2), 're-use' (mode 3), and 'sharing' (mode 4) of ER, referred to in the above research questions. In their response both lecturers and students seem to show an attitude and behaviour of embracing those key attributes of openness in educational resources. A measure for this can be found in the sum of the scores for modes 2, 3, and 4, averaged over the four ER categories, which amounts to:

- for the lecturers: 50% as compared to 38% for mode 1 ('create') and 12% for mode 5

- for the students: 49% as compared to 33% for mode 1 ('create') and 18% for mode 5

This 'preparedness for openness' may apply merely on pragmatic grounds and without a solid understanding of the OER concept, but one could say that the result counts and that this could comprehend a promise towards real appreciation of what OER and open licensing can offer. Figures 9a and 9b provide more specific information as well, such as the observation that for the lecturers mode 1 ('create') has the largest share of all modes for each of the four ER categories. This holds for the students as well, except in case of ER category (d), where - quite understandable - the 'no activity' mode 5 scores higher. It is - by the way - remarkable indeed that the 'create' mode 1 overall has such a high score also for the students. This can only be explained on the assumption that students consider their assignments, reports, essays, project outcomes and the like as contributions in terms of educational (!) resources.

Following up for just the lecturers on this general item on their processing and behaviour with respect to different ER categories, we show their response to the question from what sources they would feel free to use resources for their teaching in Figure 10. At first glance the picture seems to present overall relatively responsible lecturers with a top-3 of preferences 'on the right side' in terms of adopting regulations. The three options 'fair use' (23%), 'acknowledgement' (20%), and 'open licensing' (16%) add up to 59%. This, however, still leaves 41% in an actually unregulated, shady area. Moreover, there are serious doubts on the validity of the top-3 response, given the lack of knowledge and understanding of the option of 'open licensing' (which becomes apparent in the next sub-section) which actually also might apply to the other two options. So, it's fair to say that most of the lecturers seem to take too much liberty in their use of others' ER.

Figure 15 Sources from which lecturers would feel free to use ER for their teaching

Sources from which lecturers would feel free to use
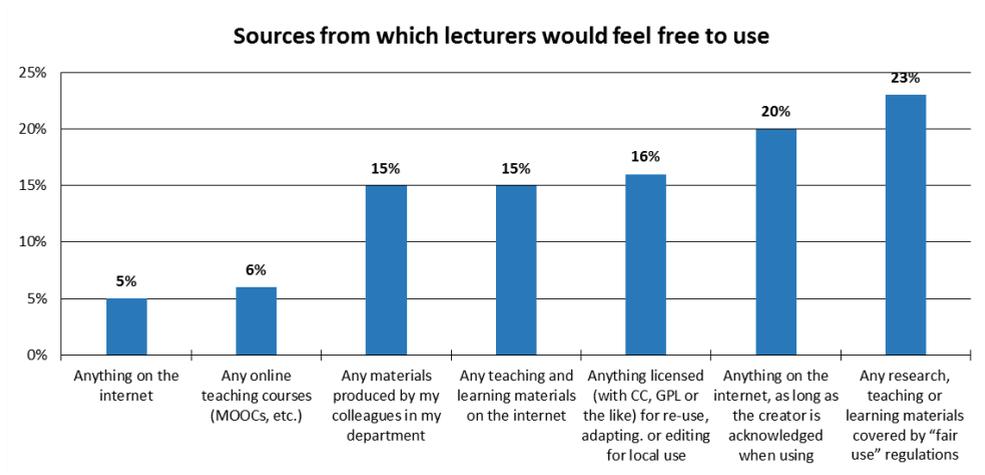
Table 2 shows the top-5 (out of 13 options) of activities that lecturers say to undertake if they use educational resources from others. We see a broad variety of use. In all cases except for the last one in the top-5 (which is plain use) three of the five 'Rs' in Wiley's terminology (reuse, revise, and remix - referred to in the Introduction section) are typical for the lecturers' activities as indicated. Again, what it shows is that the lecturers' operational behaviour is quite close to the open philosophy, albeit not properly regulated overall.

Table 2 Lecturers' activities undertaken when using educational resources from others

USE of ER: lecturers' activities (top-5 in percentages)	
Summarize the essential ideas	16
Integrate the content with other content in order to develop a module or new unit	13
Change the content or add locally relevant information, examples and scenarios	13
Transform the content by adding an interpretation, reflection or practice	12
Copy the content and use it unaltered	9

Similar to Table 2, in the next table the top-5 (out of 11 options) is presented for activities that students say they undertake when using educational resources from others. A distinction is made between students from rural and from urban universities where indeed we see differences. Number 1 is not the same for the two categories, while the rural-based students - deviating from their urban-based colleagues - score two rather basic activities at numbers 3 and 4. Again, except for the latter two, all indicated activities can be qualified as associated with the open philosophy, although perhaps without bothering too much about proper licensing. Note that all lecturers' top-5 activities from Table 2 return in the list of activities for the students in Table 3, albeit not necessarily in the same positions.

Table 3 Students' activities undertaken when using educational resources from others

USE of ER: students' activities (top-5 in percentages)		
	Rural	*Urban*
Summarize the essential ideas	---	17
Transform the content by adding an interpretation, reflection or practice	27	14
Change the content or add locally relevant information, examples and scenarios	24	12
Copy the content and use it unaltered	11	---
Convert the content from one form to another	10	---
Implement changes to update the resource	---	12
Integrate the content with other content in order to develop a module or new unit	9	11

In Tables 4 and 5 one can get an impression of the top-5 (out of around 10 options) of the modes of operation used for sharing of educational resources, according to the lecturers and the students (both rural-based and urban-based) respectively. The absolute number 1 is 'personal email' for all three categories. Number 2 for the students is - quite logically - 'never shared educational resources', while 'institutional learning management systems' ranks number 2 for the lecturers. The remaining modes of sharing in the top-5 show differences: 'image/video sharing services' and 'cloud-based storage' are both in the top-5 for the students, but not for the lecturers, which - one could say - shows a generational divide. For the lecturers the top-5 is completed with websites, blogs, and repositories. The high response on this item, in both the lecturers' and students' questionnaires, underlines the strong engagement with sharing, even though this may be based more on practical grounds than on embracing the fundamental sharing principle.

Table 4 Lecturers' modes of sharing of educational resources

SHARING of ER: lecturers' modes (top-5 in percentages)	
Personal email	36
Institutional learning management systems	18
Departmental websites	11
Personal websites or blogs	10
Institutional repositories	9

Table 5 Students' modes of sharing of educational resources

SHARING of ER: students' modes (top-5 in percentages)	Rural	Urban
Personal email	42	36
Never shared educational resources	11	22
Image / video sharing services (e.g. Flickr, SlideShare, YouTube)	11	8
Institutional learning management systems	9	---
Cloud-based storage (e.g. Google Drive, Dropbox, OneDrive)	9	12
Departmental websites	---	7

Table 6 is the last one to present outcomes under the second research questions. It shows the activities that lecturers say that they undertake when creating educational resources from different sources. We see a set of in itself plausible activities, but also the low scores on 'share new content on a public platform …' and on 'use licenses to express the rights …'. This takes us right to the next sub-section.

Table 6 Lecturers' activities undertaken when creating educational resources from different sources

CREATION of ER: lecturers' activities (in percentages)	
Check accuracy of content	20
Check grammar & spelling	18
Add references and acknowledgements	15
Keep a copy on my personal computer	13
Improve appearance	13
Remove contextual information (e.g. dates)	7
Share new content on a public platform (e.g. SlideShare, institutional repository)	4
Use licenses to express the rights others have to my educational resources	4
Change file format to one that can be edited	4
Never created educational resources	0
N/A	2

- L-RQ3: What is the level of awareness of licensing related to open educational resources (OER) among lecturers?

- S-RQ3: What is the level of awareness of licensing related to open educational resources (OER) among students?

As has become apparent in the preceding sub-sections, a very relevant issue in this study is the awareness of and possible commitment to open licensing among lecturers and students. In Figures 16 and 17 responses are collected according to the question of whether lecturers and students respectively have used any licenses to express the rights others have to use the materials they have processed (created, edited, modified, or combined).

Figure 16 Lecturers' assignment of licenses
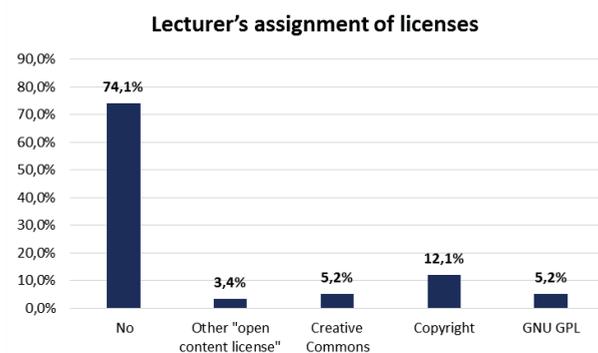
Figure 17 Students' assignment of licenses
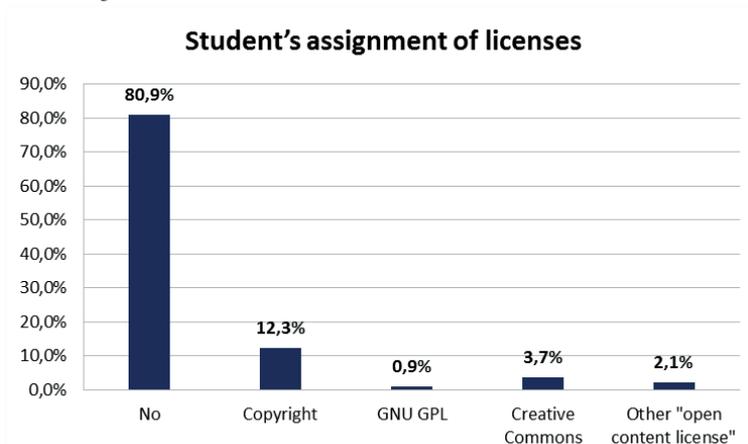
The dominant option in both figures is that no license is assigned: 74% for the lecturers, and 81% for the students. Traditional copyright assignment scores 12% (lecturers) and 12% (students), and various open licensing schemes rate in total 14% (lecturers) and 7% (students). Between rural and urban universities the differences are negligible. The pattern of behaviour in the two figures may be unsurprising with the many arguments at hand to not assign licenses: 'see no need', 'feel no wish', 'have no drive', 'too time-consuming', 'who cares?', et cetera. In a way we could call it a pleasant surprise that students score at all for licensing (even 19% in total).

Responses to the reverse question, whether lecturers and students themselves have ever used OER that are available in the public domain or have an open license (e.g. Creative Commons) can be seen in Table 7. Again, there is not much difference between rural-based and urban-based lecturers, but for the students there is distinction. Table 7 leads to a view that for all categories a fair share qualifies as 'Yes', but yet about 60% on the average responds with 'No' or 'Don't know'. From the combined data in the figures and the table we conclude that overall the awareness and appreciation of open licensing, let alone commitment to this approach, is not very high. More positively judged, however, it is not absent either, which may provide a fruitful basis to further embrace open licensing policy.

Table 7 Use of OER with an open license or in the public domain by lecturers and students

Use of OER with an Open License or in the Public Domain (in percentages)

	Lecturers		Students	
	Rural	*Urban*	*Rural*	*Urban*
Yes	41	43	45	35
No	27	28	25	20
Don't know whether the resource I have used is in the public domain or has an open license	32	29	30	45

- • L-RQ4: How do lecturers perceive the value of openness in educational resources, its implementation opportunities, and its institutional context?

- • S-RQ4: How do students perceive the value of openness in educational resources, and its implementation opportunities?

In this sub-section we finally are getting to the point of addressing the OER concept per se and gaining insight into the appreciation among lecturers and students of openness in educational resources in various aspects. The response the treatment and presentation that is deserved is provided but at the same time it is best to be cautious and in some cases even reserved in the conclusions, which is important to report to the research community.

The results show a sometimes doubt-raising pattern which will be further clarified in the sequence. One cause could be the perception eclipse that easily may have interfered with the response in this indeed 'getting-to-OER' part of the survey. Another reason could be fatigue with the respondents when filling out the last couple of questions in the overall laborious questionnaire. And of course it could be a combination of these two aspects. We start with Table 8 with identifying potential motivators for the use and reuse of ER which actually might be considered to represent a stimulating opportunity to convert to OER.

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Table 8 Potential motivators for the use and reuse of ER among lecturers and students

Potential motivators for the use and reuse of ER > from 'very unimportant' to 'very important' < (average on a 5 pt. Likert scale)	Lecturers	Students
Bringing down costs for students	4.7	4.4
Helping other educators/students	4.6	4.4
Bringing down costs for course development for the institution	4.6	4.2
Knowing that other educators/students may use my materials, improves the quality of my materials	4.6	4.2
Following normal practice in my discipline	4.5	(4.0)
Enhancing my reputation amongst my peers	4.2	(3.9)

Table 8 shows a fairly even picture. The top-4 motivators (two regarding cost, and two regarding benefits for or from other educators/students) are consistently rated close to 'very important' (4.6-4.7) by the lecturers and no more than 0.2-0.4 less by the students. The bottom-2 motivators, regarding 'normal practice' and 'reputation', score lower, where we might even consider the students' score as not really applicable (that's why we use parentheses in those entries).

Table 9 presents the potential barriers for the use and reuse of ER. Where the ER motivators can be viewed as stimuli for a conversion to OER, the ER barriers likewise can be inhibitors in a development process towards OER.

Table 9 Potential barriers for the use and reuse of ER among lecturers and students

Potential barriers for the use and reuse of ER > from 'not at all' to 'extremely' (average on a 5 pt. Likert scale) <	Lecturers	Students
Lack of access to the internet	3.6	3.7
Lack of time	3.6	3.4
Lack of training	3.6	3.4
Lack of hardware	3.5	3.4
Lack of software	3.3	3.4
I worry about the quality of OER	3.3	3.4
Lack of support	3.3	3.3
Lack of knowledge about alternative intellectual property systems (e.g. Creative Commons)	3.2	3.4
Lack of skills	3.2	3.3
Lack of interest	3.2	3.1
No reward system for devoting time and energy	3.1	(3.1)
No compensation for use/reuse of the resource	3.1	(3.0)

Table 9 shows substantially lower scores as compared to Table 8, around a full 1.0 for almost all entries. The top-4, bottom-3 and intermediate-5 are all the same for the lecturers and the students, although - different from the motivators - lecturers do not consistently rate the barriers higher than students. Almost all barriers are expressed in terms of 'lack of …', except for 'quality worries' and the two lowest scoring barriers: 'no reward system' and 'no compensation', which again are more lecturers' aspects (so once more the entries are put for the students in parentheses).

Table 10 is really about OER, presenting the level of agreement that lecturers indicate to have with a series of statements about OER as applied to their educational institution.

Table 10 Lecturers' opinions on OER in their educational institution

Lecturers' opinions on OER in their educational institution > from 'strongly disagree' to 'strongly agree' (average on a 5 pt. Likert scale) <	
Policies adopted by my institution support the use of OER	3.6
My institution has reliable infrastructure to store and preserve access to teaching and learning materials (OER)	3.6
The OER initiative in my institution provides equal access to educational materials to anyone	3.6
The OER initiative in my institution is able to sustain the maintenance through internal funding and/or external contributions	3.4
There are ways for handling and utilizing OER in my institution as the main or supplemental materials to support our courses	3.4
The instructors' attitudes in my institution are positive towards OER	3.4
The OER initiative in my institution encourages the development and adaptation of teaching and learning materials in a variety of languages and cultural contexts	3.2
In my institution the instructors have OER support services they need to develop their courses	3.2
My institution has a valid model of OER quality assurance	3.2
My institution has reliable procedures to accredit online studies from other educational institutions (portability of university credit)	3.2

The top-3 in Table 10 has a score of 3.6, the bottom-4 of 3.2, and in between there is three times a 3.4. All ratings therefore are on the positive side, and a closer inspection tells us that the three judgments 'strongly disagree', 'disagree' and 'neither agree or disagree' sum up to no more than 30-40% for all statements. Clearly, any educational institution wherever in the world, be it in the Global South or in the Global North, would relish such a relatively positive and optimistic picture among its lecturers. But we have serious doubts with respect to these outcomes. They seem to be really unrealistic and hard to believe. This goes back to the earlier warning to be cautious or even reserved in drawing conclusions. We have no firm explanation at hand for this relatively positive picture among the lecturers, but - as has been said - it could be due to the perception eclipse or fatigue with the respondents, or even an expression of loyalty with their educational institution.

We end this sub-section considering three specific attributes that can be associated to OER: usefulness, playfulness, and ease of use, as perceived by both the lecturers and the

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students. And the very last item is the lecturers' and students' intention to use OER. Note that for all four items - correctly - only those are included whose response is 'Yes' to the item of having used OER with an open license or in the public domain (Table 7). Therefore the number of respondents is reduced, for the lecturers from 43 to a fairly low 18, and for the students from 798 to a still considerable 316. These sample sizes imply that the validity and reliability of the outcomes will be weak for the lecturers but much stronger for the students.

Figure 18 Perceived usefulness of OER - lecturers
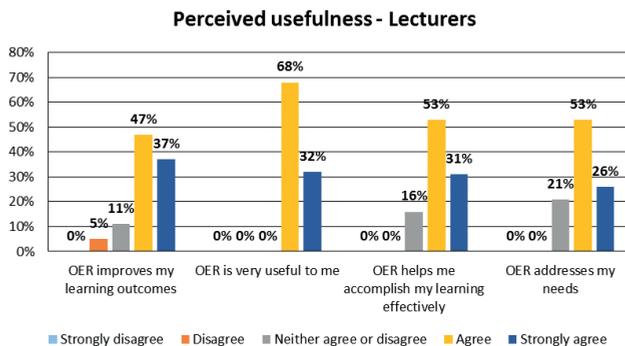
Figure 19 Perceived usefulness of OER - students
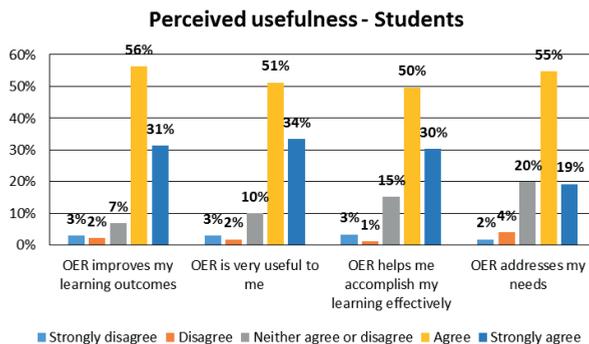
Figure 20 Perceived playfulness of OER - lecturers
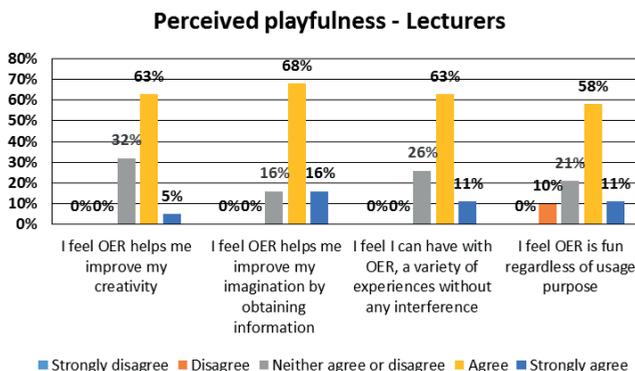
Figure 21 Perceived playfulness of OER – students

Perceived playfulness - Students
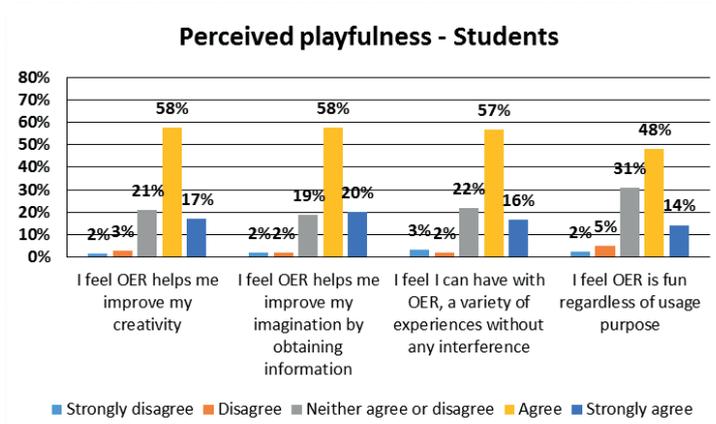
Figure 21 Perceived ease of use of OER - lecturers

Perceived ease of use of OER - Lecturers
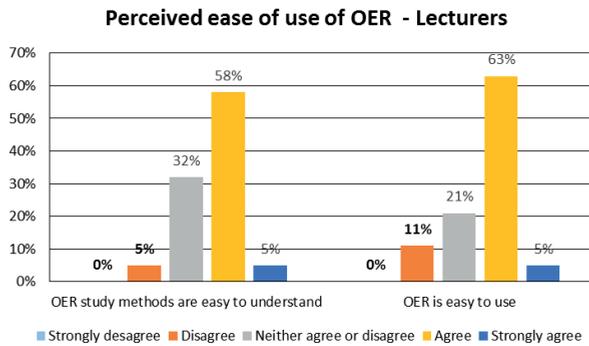
Figure 22 Perceived ease of use of OER - students

Perceived ease of use of OER - Students
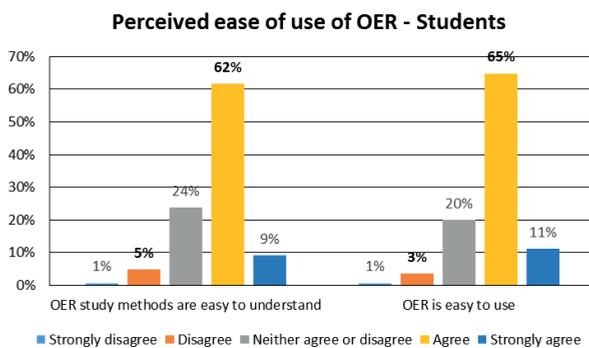
Figures 18/19, 20/21, and 22/23 all show the same pattern, very much on the positive side. The perceived usefulness of OER is highly rated, typically around 80% for 'agree' + 'strongly agree', by both students and lecturers (but note that the four statements relate in particular to students). The same holds for the perceived playfulness of OER, although slightly less with scores, typically around 70% for 'agree' + 'strongly agree', by

both students and lecturers. And again, the perceived ease of use of OER is scoring high, but there is a small difference between the students (around 75%) and the lecturers (around 65%). As with the lecturers' opinions on OER, these very positive judgments on the three attributes: usefulness, playfulness, and ease of use, make us suspicious about these outcomes and reserved about drawing conclusions. It could be explained along the argumentation given before, but also by the possibility that responses are more of a 'wish' than an 'as-is' character (even though the questions are clearly stated).

Finally, in Figures 24/25 we see the intentions of the lecturers and the students to use OER. High scores, around 80-90% for 'agree' + 'strongly agree', by both lecturers and students for three of the four statements: 'I am willing to participate in other OER opportunities', 'OER should be implemented in several courses', and 'I will recommend OER to other learners'. That looks very promising, while the lower scores on 'I prefer OER to traditional learning' (37% for the lecturers and 58% for the students) do not really alter this positive perspective since that can easily be understood. Of course, for this issue the lecturers' responses are most relevant. Having underlined that with the low number of respondents (18) we can question the validity and reliability of these outcomes, and taking into account the reservations expressed before, we cannot do much better than say that if this picture would be representative it could spearhead the implementation of Kenya's Vision 2030.

Figure 23 Lecturer's intention to use OER

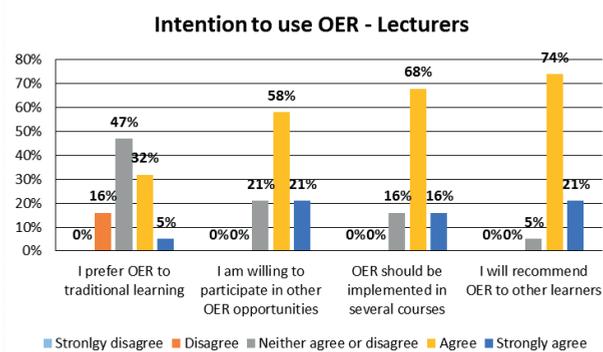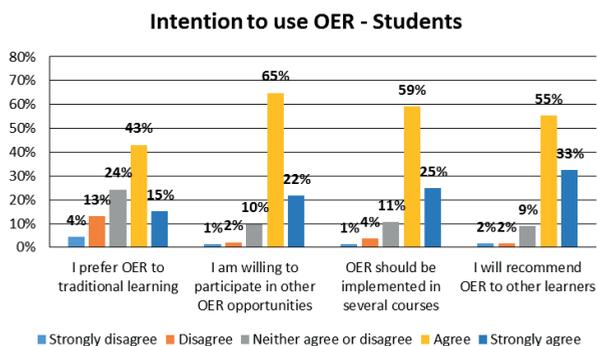**Figure 24** Student's intention to use OER

4.11 Key Findings

Even though Kenya reviewed its ICT Policy way back in March 2006, which was inspired by the need to align it with the New Constitutional dispensation and the Vision 2030 that seeks to transform the country into a leading information and knowledge hub of the region, an interesting outcome is obtained with regards to student's and lecturer's digital proficiency, internet connectivity, access and use of open education resources.

4.11.1 Digital Proficiency
Digital proficiency shows various patterns of differentiation. Students at the urban universities rate themselves clearly more 'advanced' than their colleagues at the rural universities but also - remarkably - with a 2.5 times larger merely 'basic' share. None of the lecturers at the rural universities score themselves as 'advanced' while their urban-based colleagues show a more than 25% 'advanced' status. Finally, urban universities lecturers rate themselves more digitally proficient than their students, whereas - interestingly - at the rural universities this is the opposite.

4.11.2 Location of Internet Access
The locations for accessing internet are quite diverse. Number 1 for both students and lecturers (over 30%) is their school, university, or workplace, while the public library is in both their top-3. Clear differences are the high ranking for 'home' among lecturers versus 'family member or friend's home' for students. A significant share also goes to the options 'internet café' and 'wi-fi hotspot', for both students and lecturers (added to more than 20%).

4.11.3 Devices for internet access
For the devices used we see a difference where laptop and desktop computers form the top-2 for the lecturers while for the students this is just the other way around. The latter is largely due to the rural-based students who by 60% prefer a desktop computer versus just about 25% of the urban-based students. For both lecturers and students mobile and tablets are ranked No 3 (around 25%) and No 4 (over 10%).

4.11.4 Internet Connectivity Cost, Speed & Stability
With respect to the level of satisfaction with the internet connection a partly alarming outcome emerges. No matter whether this relates to cost, speed, or stability, at the rural universities the dissatisfaction is very pronounced: around 80% for the students, and over 85% for the lecturers. At the urban universities the overall appreciation is reverse: a very high level of satisfaction (over 80%) regarding cost for both students and lecturers, reduced to lower levels for speed and stability (but still over 55% at the lowest). Yes, there is a substantial digital differentiation in terms of internet access and accessibility between rural and urban universities.

4.11.5 Open Licensing
Open licensing does not receive proper attention. This appears from the question on the application of licenses, on the one hand to be assigned by respondents for their own materials to others, and on the other hand by respondents using open educational

resources from others. The response to question 1: *What is the state of connectivity and digital proficiency among lecturers and students in Kenya?* shows that the open licensing share is small: under 15% for the lecturers and half of that percentage for the students, with negligible differences between 'rural' and 'urban'. The response to question 2: *What kind and level of use, re-use, creation and sharing of educational resources is common among lecturers and students in Kenya?* Is that about 60% on the average does not use OER or doesn't know what license applies to the materials. It seems fair to say that the awareness and appreciation of open licensing is not very high.

4.11.6 Categories of Educational Resources (ER)

It is very important to note that this paper primarily focuses on providing a picture of the processing and behaviour of respondents with respect to different categories of educational resources (ER) without explicitly referring to the open philosophy with OER. Indeed insightful spectra for both the lecturers and the students with five different modes of processing are a result of our questionnaires. The processing applies to a wide variety of resources, from office software documents, audio, video, quizzes, and tutorials through lecture notes, e-books, online courses and data sets. Three of the five processing modes actually relate to openness in educational resources, representing the 'use', 're-use', and 'sharing' of ER. In practice, and interestingly enough, both lecturers and students appear to act quite frequently with an attitude and behaviour of embracing those key OER attributes.

4.11.7 Sources for ER used

On the question from what sources lecturers would feel free to use resources for their teaching, the top-3 is 'on the right side' in terms of adopting regulations: there is mention of 'fair use', 'acknowledgement', and 'open licensing', adding up to a share of almost 60%. Still, however, more than 40% is taking place in a typically unregulated fashion. Moreover, legitimate doubts may arise on the validity and reliability of the overall response, taking into account the low level of awareness and appreciation of open licensing as indicated above. A conclusion maybe that most of the lecturers seem to take too much liberty in their use of others resources.

4.11.8 Preparedness for 'openness'

The 'preparedness for openness' combined with 'too much liberty' is confirmed in the other reported outcomes, specific - for both lecturers and students - on ER use as well as on ER sharing, and also - only for the lecturers - on ER creation from different sources. In other words, one could say that both the lecturers' and students' operational behaviour are quite close to the open philosophy, be it perhaps without bothering too much about proper licensing. And there is a strong commitment to sharing of educational resources, although this may be based more on practical grounds than on adopting the fundamental sharing principle.

4.11.9 Perception Eclipse

When it comes to the 'real' OER part, the outcomes are sometimes questionable. Various potential reasons are suggested, one of which being the perception eclipse (*explained in chapter 4.9*) regarding the OER concept and its open licensing connection. However,

the caution and reservation in our conclusions do not really apply to our exploration of potential motivators and barriers for the use and reuse of ER. The top-4 motivators (two regarding cost, and two regarding benefits for or from other educators/students) are all rated close to 'very important' by the lecturers and just a little less by the students. Almost all barriers are expressed in terms of 'lack of …'. The top-4, being the same for lecturers and students, is lack of access to the internet, time, training, and hardware respectively, and scores close to the classification next under 'extreme'. It may be fair to say that the motivator and barrier sets, formulated for ER, will also represent the stimuli and inhibitors for furthering OER.

We have serious reasons to doubt the validity and reliability of the outcomes on the level of agreement that lecturers indicate for a series of statements about OER as applied to their educational institution. The picture among the lecturers seems way too positive and optimistic to be realistic and credible. Similarly, we have reservations with respect to the appreciation that is reported for the usefulness, playfulness, and ease of use of OER, as perceived by the lecturers and students. all judged to be very high.

Lecturers (and students) both appear to have strong intentions to participate in OER initiatives, advocate OER-based courses, and recommend OER to others. Very high scores for the lecturers suggest a promising future for OER adoption, although conditioned by a very low number of respondents (18) and the reservations expressed before.

In conclusion we take note for the perception eclipse in survey studies like ours. The decision to change the reference from OER to ER in a collection of data on the actual processing and behaviour of respondents with respect to different categories of educational resources, has worked out well. It generates outcomes showing that - even without a really internalized OER concept and lacking proper appreciation of open licensing - both lecturers and students in practice act positively in line with some essential assets of the open philosophy. That is indeed what counts, maybe even more than gathering their perceptions of the value of openness in educational resources where they easily are lost in 'conceptual abstraction'. So our attempt to avoid the perception eclipse seems to be quite adequate. The stakeholders in Kenya like government agencies, university management, UNESCO, among other should take advantage of this positive perception and consider implementing OER in teaching and learning at Kenyan universities.

Chapter 4

Chapter 5

Country survey: Ghana

5.0 Introduction

This chapter is a revised version of an article published in Open Praxis in December 2018, https://openpraxis.org/index.php/OpenPraxis/article/view/917/503. It captures a survey study undertaken in four universities in Ghana. The universities were categorized as technical and comprehensive. The selected universities were:

- University of Ghana / UG (public, comprehensive)
- University of Cape Coast / UCC (public, comprehensive)
- Kwame Nkrumah University of Science and Technology / KNUST (public, technical)
- Catholic Institute of Business and Technology / CIBT (private, technical).

The chapter also reports on a study of Ghanaian university students and lecturers. First, we present an overview of the university landscape and the major developments in the areas of information and communications technology (ICT) in education and OER in Ghana. Then we elaborate on the research questions and on the methodology of the study. The core of the paper is an in-depth analysis with the major results and findings for four research questions. The closing section summarizes the conclusions and recommendations.

5.1 Context

Ghana is a coastal country in West Africa with a population of 28.21 million people occupying a total land area of 238.5 square kilometers (Hilbert, 2016). Over half (55.3%) of the total population is urban (CIA, World FactBook, 2017). Ghana is considered an emerging economy, with strong economic growth. In 2011, Ghana graduated from low income status to lower middle income status as classified by the World Bank (World Development Indicators, 2017). In 2015, Ghana became a member of the Organization of Economic Co-operation and Development (OECD) (Okudzeto et al., 2017). Ghana spends 6.2% of its GDP on education. From that education budget, 18% goes toward tertiary education (CIA, World Factbook, 2017); The World Bank, 2017). The Government of Ghana funds 77.3% of tertiary education in the country (World Bank et al., 2017). Nationally, Ghana has 10 public universities, 81 private tertiary institutions offering degrees, and 1 regionally-owned West Africa tertiary institution (NAB 2017). The majority of the university students are enrolled in public institutions, though the share in private institutions has been growing. For the 2014-2015 academic year, total tertiary enrolment was 320,746, with 248,507 in public institutions (77.5%) and 72,239 private (22.5%) (MOE, 2010). The national enrolment in tertiary education is 13%, with a national target to increase this share to 25% by 2020 (MOE, 2015, NAB, 2017) The National Education Strategic Plan for 2010-2020 includes an ICT component, calling for the expansion of ICT for instruction at all levels, from primary to tertiary education (MOE, 2010, 2014a, 2014b, 2015).

Ghana adopted two national ICT in Education policies – one in 2008 and another in 2015 (Jowi, 2013). Both policies embody the principle of ICT as a means and an end. ICT is presented as a means to improve access to and quality of education and an end in teaching 21st century skills for workplaces with integrated ICT (Tagoe, 2014).

For over a decade, Ghana has pursued a vision of becoming a tech leader for West Africa. Ghana currently has 16 tech hubs, which is among the highest in the region. The other two countries studied in the OER differentiation series score also high in this respect: South Africa with 54 tech hubs and Kenya with 27 (Dahir, 2016). This strategy has grown and strengthened the local ICT workforce and provided talent for ICT initiatives across industries, including education (Tagoe, 2014).

Ghana has been active in a number of open, distance, and e-learning consortia and projects. Ghana is a member state of the African Virtual University. In 2014, Laweh Open University College was established as the first Open University in Ghana and the second in West Africa. An initiative to launch the Open Universities of Ghana agency is currently under review with the National Council for Tertiary Education (MOE, 2017). Within the realm of OER, at the university level, two of Ghana's public universities were founding members of the African Health Open Educational Resources Network. This network was launched in 2008 and supported through 2012 by a grant from the William and Flora Hewlett Foundation. The Colleges of Health Sciences at the Kwame Nkrumah University of Science and Technology (KNUST) and University of Ghana produced open educational resources in medicine, dentistry, and public health as part of their role with the network (Okudzeto et al., 2017)(Omollo et al., 2012).

5.2 Methodology

This methodology is consistent throughout the three studies in the series. Much of the methodology description below is excerpted from the previous paper on Kenya. The excerpts are indicated by italics. The text that is not in italics is paraphrased.

These are the research questions (RQs):

1. What is the state of connectivity and digital proficiency among lecturers and students in Ghana?

2. What kind and level of use, re-use, creation, and sharing of educational resources (ER) is common among lecturers and students (but for the latter not including re-use and creation) in Ghana?

3. What is the level of awareness of licensing related to open educational resources (OER) among lecturers and students in Ghana?

4. How do lecturers and students perceive the value of openness in educational resources (ER), its implementation opportunities, and its institutional context (the latter item only for the lecturers) in Ghana?

Note that RQ1 relates to digital differentiation, RQ2 to ER differentiation, and RQ3 and RQ4 to OER differentiation.

Surveys were distributed through email in coordination with university ICT departments. Survey responses were gathered from Month 1 – Month 2, 2017.

We have collected data from four universities in Ghana, which represent two types of universities: those that provide comprehensive studies and those that are technical or technology-focused. In order to incorporate further diversity we have included one private university versus three public universities.

The random sampling of the lecturers and students was done on the basis of the courses delivered in those four universities in a chosen semester. Out of the full list for each university 30 courses were randomized. From each set of 30, the local university coordinators were asked to identify at least 10 courses with more than 30 enrolled students and with lecturers who were willing to support the data collection.

The target was to get responses from a minimum of 200 students and 10 lecturers from each of the four universities. In the end, we generated a sample of 818 students (405 at technical universities and 413 at comprehensive universities) and 38 lecturers (20 at technical and 18 at comprehensive universities). In the sample, the median age of the lecturers is 42.5, with a range of 27 - 68 years old. For the students, the median age in the sample is 25 with a range of 18 - 39 years old. With regards to gender, majority of the respondents were male. For lecturers, the sample was 81% male versus 19% female, while for students the sample was 57% male versus 43% female.

For educational qualifications, 39% of lecturers have a PhD as their highest degree, 41% had Masters degree as their highest, and 19% had a Bachelors degree as their highest. The majority of the lecturers had been teaching in their respective universities for less than five years as lecturers, senior lecturers, assistant lecturers, or researchers. A very small percentage (approximately 4%) worked as administrators and consultants. The lecturers came from diverse disciplines, including applied science and technology, economics and business studies, history and geography, social sciences, religious studies, and education. The disciplines represented by students in the sample included applied science and technology, religious studies, education, and social sciences.

5.3 Findings and discussions

In our reporting here we limit the discussion to a selection of the most relevant outcomes of the two questionnaires. In the first paper in the series on Kenya, we focused on differences between universities in rural and urban areas. In this paper for Ghana, we focus the discussion on differences that emerged between technical and comprehensive universities. The results and findings are presented under the headings of the four research questions.

- RQ1: What is the state of connectivity and digital proficiency among lecturers and students in Ghana?

Since the use of (O)ER presupposes certain proficiency in the use of computers, the participants' digital proficiency is an important item in the questionnaires. Figures 1 and 2 (lecturers) and 3 and 4 (students) show how the respondents at technical and comprehensive universities self-assess their digital proficiency. The 'advanced' share is larger at comprehensive than at technical universities: 22% versus 15% (lecturers) and 12% versus 5% (students). However, the 'intermediate' share is larger at technical than at comprehensive universities: 80% versus 61% (lecturers) and 68% versus 52% (students). When it comes to the 'basic' share, there is a reversal, with a higher percentage of basic competence at comprehensive universities as compared to technical universities: 17% versus 5% (lecturers) and 36% versus 27% (students).

Though the advanced share is higher at comprehensive universities, the overall technical competence ('advanced' plus 'intermediate') is rated higher at the technical universities with 95% of lecturers and 73% of students as compared to 73% of lecturers and 64% of students at comprehensive universities. The difference in the advanced share may be explained by the idea that lecturers and students at the technical institutions are more aware of the ICT industry broadly and may be self-critical in terms of how advanced their own digital competence is relative to the industry. Alternatively, it may reflect a difference in actual competence.
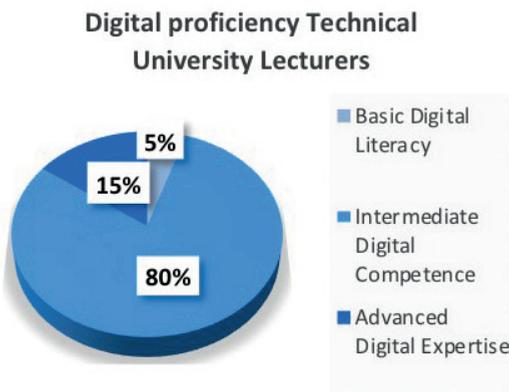
Figure 25 Lecturers (Technical)

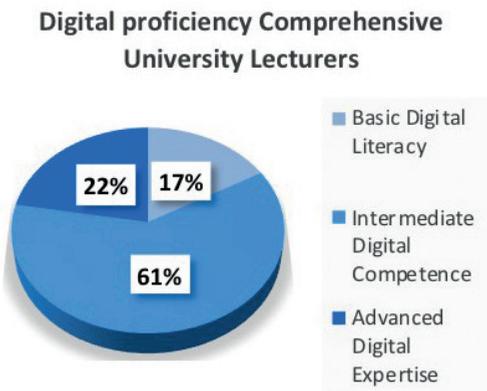**Figure 26** Lecturers (Comprehensive)

Figure 27 Students (Technical)
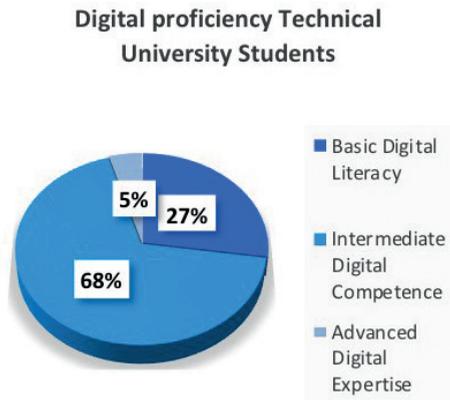
Figure 28 Students (Comprehensive)
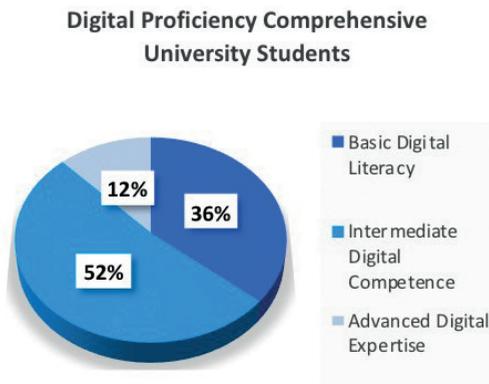
From Figures 25-28 we can conclude that the lecturers at both comprehensive and technical universities rate themselves more digitally proficient than their students, which is what one would prefer in the context of knowledge transfer for digital skills from lecturers to students. There is certainly room for improvement, however, observing that only 22% (comprehensive) and 15% (technical) of lecturers see themselves at the 'advanced' level of digital expertise.

With respect to digital literacy among lecturers Grimus and Ebner (2014) confirm the low prevalence in a similar study in Ghana. They noted that few instructors used the world wide web for preparation of their lessons and less than a third were familiar with basic internet skills.

Let us now move to Figures 29 and 30 regarding the location of internet access. The sample reveals that students and lecturers have different behaviors in terms of the locations where they access the internet. This was a multiple response question, where respondents were asked to select all that apply. For lecturers the most frequent way

to access internet is outside of their workplaces: around 42% of the lecturers' access internet at wi-fi hotspots, internet cafés, and/or at shopping malls. This is in contrast to the students, where roughly 30% access internet at school, university or workplace. For lecturers, the least common method of access is public libraries. For students, the least frequent is family member's or friend's home.

This finding reveals higher than expected internet access from home for both students and lecturers. Previous sources on internet usage and locations found that, about 2.7% of households in Ghana had a working internet connection with 19.7% using internet overall (Stork, Calandro, & Gillwald, 2013). When asked about where they used the internet in the last 12 months, 61% of respondents said they used mobile phones, 35% said they used it at work, 51% said they used it at a place of education, while 58% said they used it at internet cafes. Similarly, though Ghana was one of the first countries to be connected to the underwater cables for the internet, internet usage across population grew slowly. A 2011 source estimated 5.3 users per 100 inhabitants (Fosu, 2011).

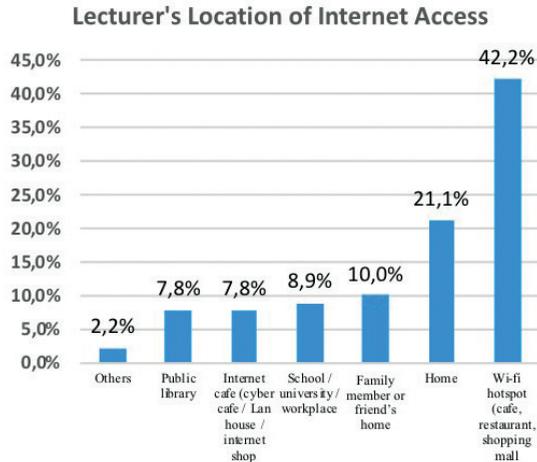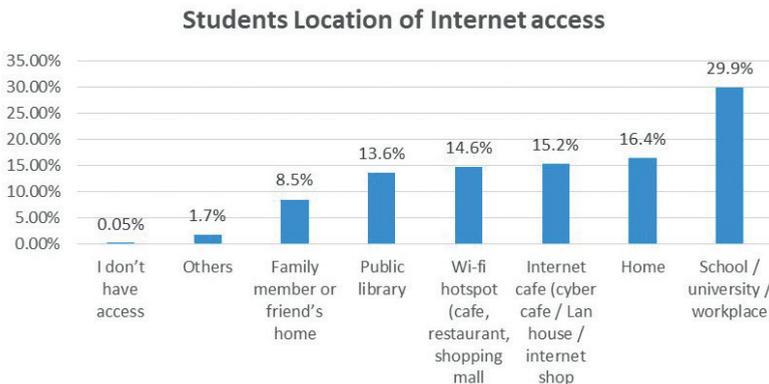**Figure 29** Lecturers' location of internet access

Figure 30 Students' location of internet access

Regarding the devices used to access the internet, Figures 31 and 32 show similar patterns for students and lecturers. This was another multiple-response-select-all question. For the lecturers, the ranking from most frequent to least is laptop computers, mobile phones, desktop computers, and tablets respectively. For the students, the pattern is the same although the proportions vary. This finding of mobile phones as a substantial method of access on par with that of laptops is consistent with other studies.

A 2015 study touted "mobile phones were the most used device to access the web all the time in Ghana" (Frimpong & Vaccari, 2015 p 395). Though laptops were more frequently used than phones in our sample, the slight edge of laptops may simply be because those respondents have multiple device options and computer ownership is believed to be higher among lecturers and students than in the general population. A 2010 study of medical students at KNUST and UG found that 67% of those at KNUST and 89% at UG owned their own personal computer and an additional 24% at KNUST and 5% at UG shared a computer with another student (Adanu et al., 2010).

Figure 31 Devices used by lecturers
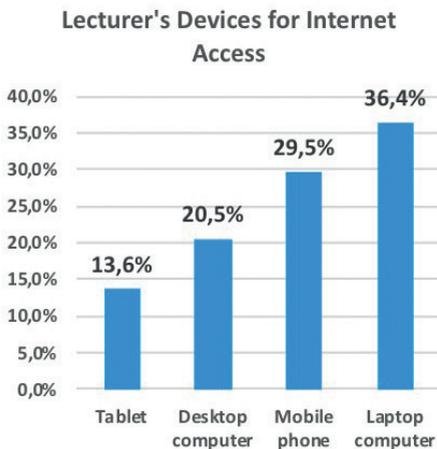
Figure 32 Devices used by students
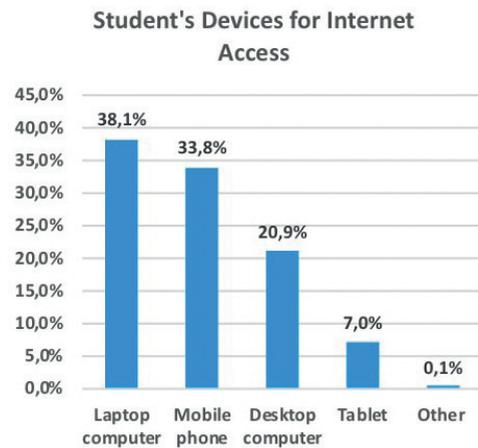
The high (number 2) ranking for the usage of mobile phones in our study suggests opportunities to integrate mobile phones into innovative teaching and learning approaches. Grimus, Ebner, and Holzinger (2012, p. 42), connote that, "while computer-labs and desktop-computers are scarce in schools in developing countries, mobile networks, mobile phones and now smart-phones have the potential to question new approaches to learning and teaching." Teachers and students are starting to take advantage of the opportunities of mobile phones for learning (Grimus & Ebner, 2014).

A report by Meeker and Wu (2013) stated that 75% of web users used mobile phones compared with 71% using desktop computers. Grimus and Ebner (2014) propose that mobile penetration compensates for the lack of fixed ICT infrastructure and offers the chance to provide on- and off-line content for learning and knowledge-creation via mobile devices.

Our findings in Ghana show a fruitful ground for an extension of mobile learning at universities, while also noting that it would require a major shift in thinking and attitudes among both lecturers and students. The government is in a position to further stimulate this promising development with specific policies and incentives.

The last topic addressed under this research question is the level of satisfaction that students and lecturers at technical and comprehensive universities express to have with the internet connection where they most frequently access it. This relates to three aspects: cost, speed, and stability. Respondents could only select one option in each of the three categories. In Figures 33 and 34 we see very diverse pictures where we compare 'technical' with 'comprehensive'. For both students and lecturers, the dissatisfaction at the technical universities is very pronounced (for all three: cost, speed, and stability) while at the comprehensive universities the overall satisfaction is positive. There is a substantial digital divide or differentiation between technical and comprehensive universities in terms of internet access and accessibility. Whereas most of the lecturers at technical universities are very dissatisfied, some of their counterparts at comprehensive universities are 'unsure' of their levels of satisfaction.

Gyamfi and Gyaase (2014) affirm the difficulties related to internet access and slow speed of connectivity within and outside the learning environment, which poses a challenge to implementing blended learning in higher learning institutions in Ghana. The current weak internet connection hinders innovations in teaching and learning.

Figure 33 Internet Connection Technical Students
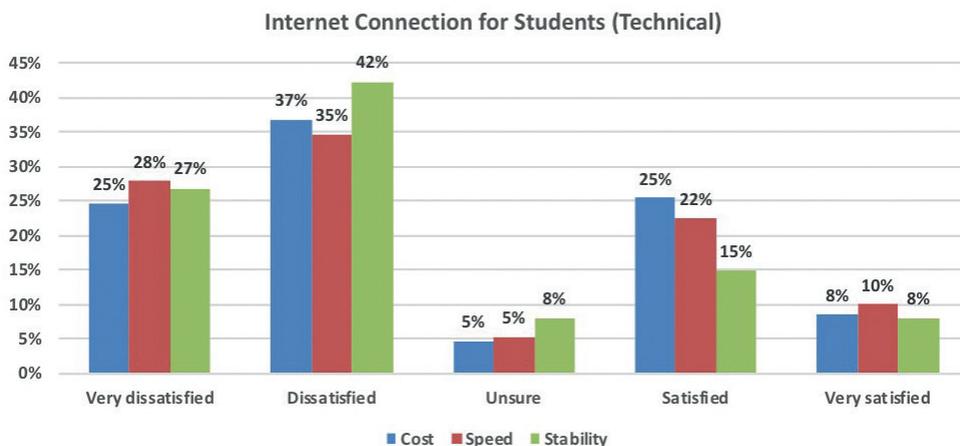
Figure 34 Internet Connection Comprehensive Students
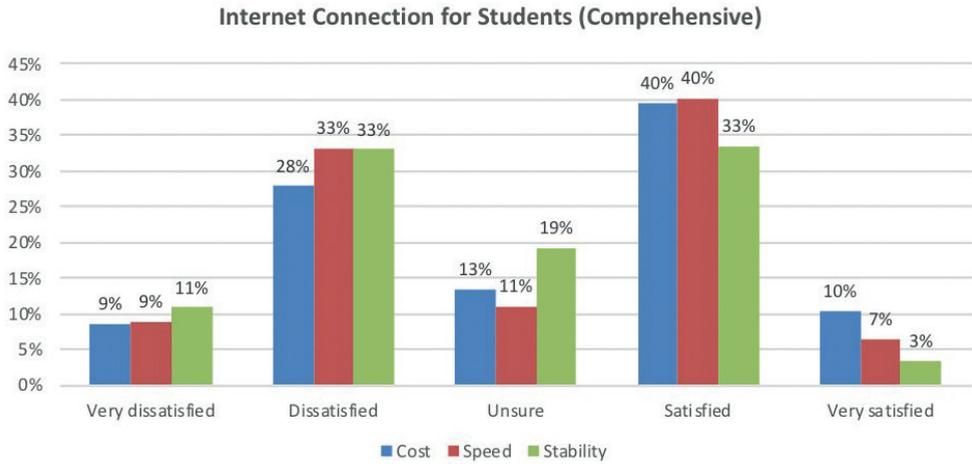
• RQ2: What kind and level of use, re-use, creation, and sharing of educational resources (ER) is common among lecturers / students in Ghana?

Here we consider the processing behaviour of both lecturers and students with respect to different categories of educational resources.

Figures 35 and 36 show interesting patterns for the lecturers and the students in their processing of four ER categories:

a. Office documents (like Word, Powerpoint, Excel) and PDF
b. Images, audio, video
c. e-Books, lecture notes, quizzes, tutorials
d. Textbooks, whole courses, massive open online courses (MOOCs), data sets

This was another multiple-response-select-all question.

Figure 35 Spectrum of processing of educational resources (ER) by the lecturers
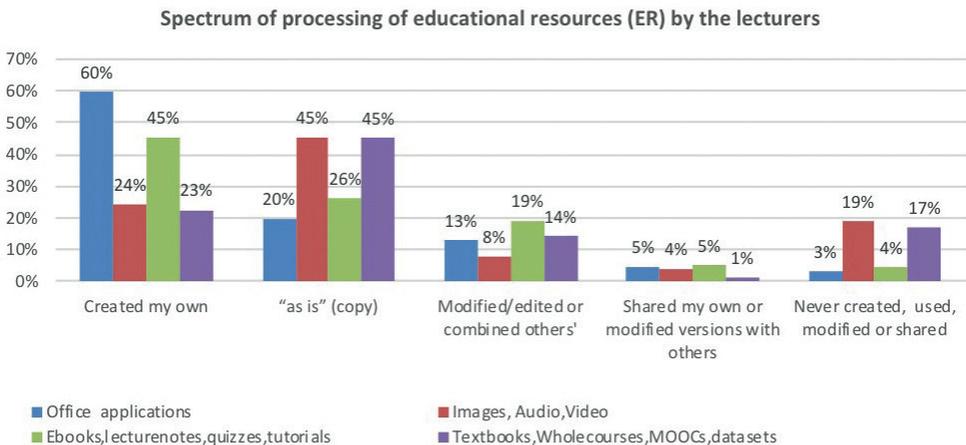
Figure 36 Spectrum of processing of educational resources (ER) by the students
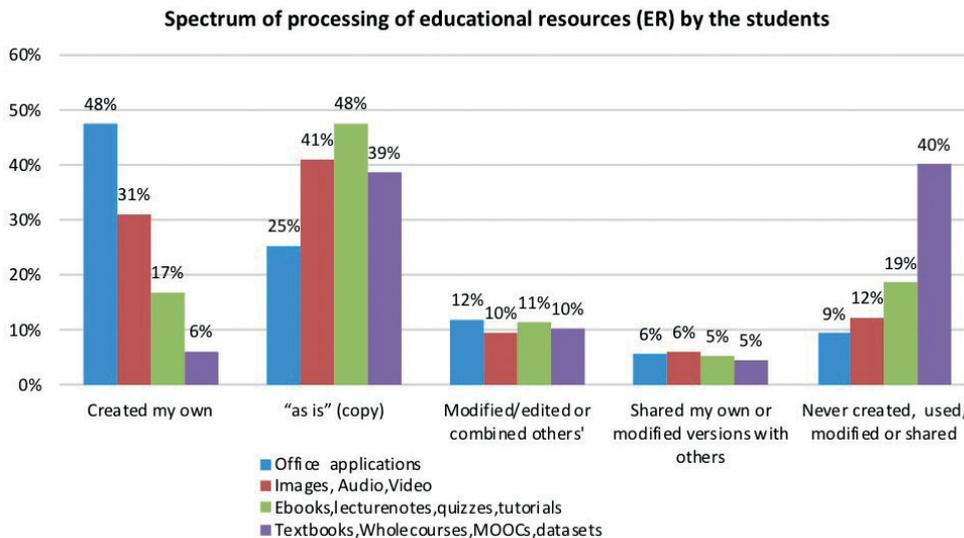
In the spectrum of five different modes of processing, the three in the middle are the most relevant for this paper, representing respectively the 'use' (mode 2), 're-use' (mode 3), and 'sharing' (mode 4) of ER. In their responses, both lecturers and students show an attitude and behaviour of embracing key attributes of openness in educational resources. A measure for this can be found in the sum of the scores for modes 2, 3, and 4, averaged over the four ER categories, which amounts to:

- for the lecturers: 51% as compared to 38% for mode 1 ('create') and 11% for mode 5 ('never created or used')

- for the students: 54% as compared to 26% for mode 1 ('create') and 20% for mode 5 ('never created or used').

These results are similar to the outcomes of the Kenya study and both countries exhibit a preparedness for openness. This may apply merely on pragmatic grounds and without a solid understanding of the OER concept as we have pointed out earlier in this paper. But it could also comprehend a promise towards real appreciation of what OER and open licensing can offer.

Next, in Figure 37 we show the lecturers' responses about types sources they would feel free to use resources for their teaching. This was another multiple-response-select-all question.

Figure 37 Sources from which lecturers would feel free to use ER for their teaching
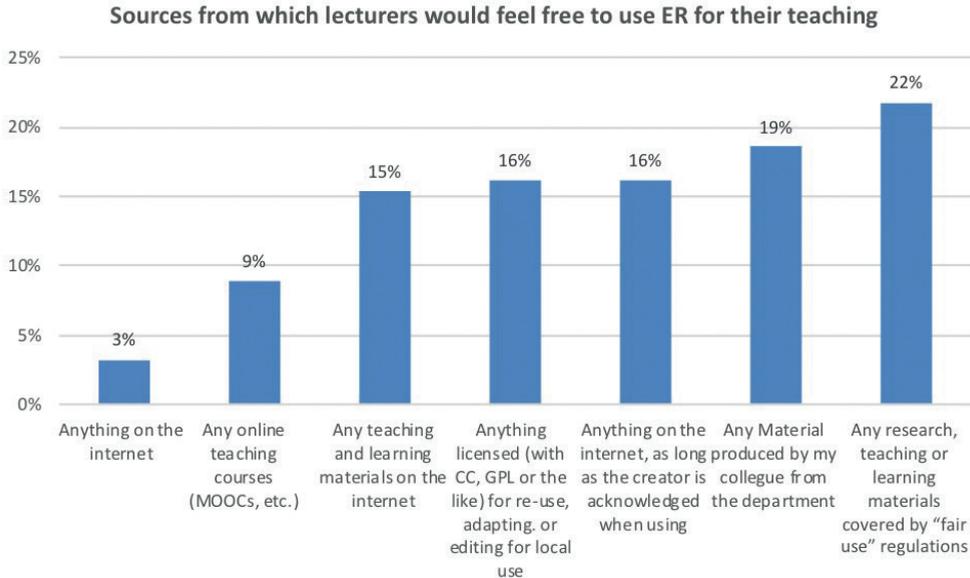
At first glance, this picture seems to present overall relatively responsible lecturers in terms of copyright considerations: 'fair use' (22%), 'acknowledgement' (16%), and 'open licensing' (16%), which sums to 54%. In the Kenya study, we found a similar sum (59%). In both countries, however, we see a large share (46% in Ghana, and 41% in Kenya) for an unregulated, blurry area. Moreover, we have serious doubts about the validity of the high scores on the right hand side of Figure 37, realizing the lack of knowledge and understanding of the option of 'open licensing' which actually also might apply to the other two options. It seems that most of the lecturers take great liberty in their use of others' ER.

Table 11 shows the top 5 out of 13 possible options of activities that lecturers say to undertake if they use educational resources from others. This was a multiple-response-select-all question. Here, we see a broad variety of use. Again, it shows that the lecturers' operational behavior is parallels the open philosophy.

Table 11 Lecturer's activities undertaken when using educational resources created by others

Use of ER: lecturers' activities (top-5 in percentages)	
Change the content or add locally relevant information, examples and scenarios	19%
Integrate the content with other content in order to develop a module or new unit	19%
Transform the content by adding an interpretation, reflection or practice	16%
Summarize the essential ideas	16%
Combine the content with new media	7%

Similarly, in Table 12 the top 5 out of 11 possible options is presented for activities that students say to undertake when using educational resources created by others. The sample reveals differences in behavior between students from technical and from comprehensive universities. The most frequent activity differs between the two. For students at comprehensive universities, it is summarizing the essential ideas, whereas for their technical counterparts it is integrating the content with other content (which is ranked 4 for the comprehensive students). Note that almost all lecturer's top-5 activities from Table 11 return in the list of activities for the students in Tables 12 and 13, albeit not necessarily in the same positions.

Table 12 Students' activities undertaken when using educational resources from others - Technical

	Technical University
Integrate the content with other content in order to develop a module or new unit	19%
Transform the content by adding an interpretation, reflection or practice	15%
Copy the content and use it unaltered	13%
Change the content or add locally relevant information, examples and scenarios	13%
Summarize the essential ideas	12%

Table 13 Students' activities undertaken when using educational resources from others - Comprehensive

Use of ER: student's activities (top-5 in percentages)	Comprehensive University
Summarize the essential ideas	20%
Change the content or add locally relevant information, examples and scenarios	14%
Transform the content by adding an interpretation, reflection or practice	13%
Integrate the content with other content in order to develop a module or new unit	8%
Combine the content with new media	8%

- RQ3: What is the level of awareness of licensing related to open educational resources (OER) among lecturers and students in Ghana?
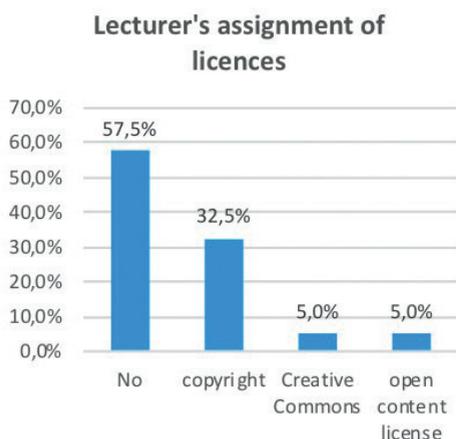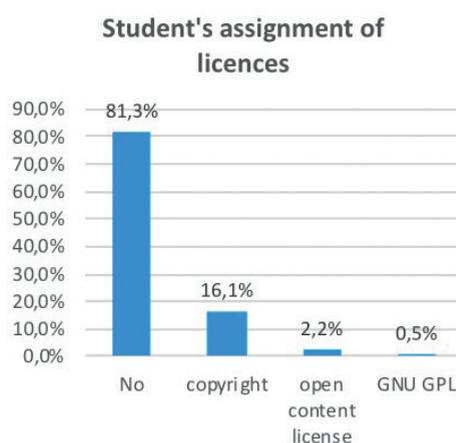
Figure 38 Lecturers' assignment of Licenses

Figure 39 Students' assignment of Licenses

In Figures 38 and 39responses have been collected to the question whether lecturers, respectively students have used any licenses to express the rights others have to use the materials they have processed (created, edited, modified, or combined). The dominant option in both figures is that no license is assigned: 57.5% for the lecturers, and 81.3% for the students. Traditional copyright assignment scores 32.5% (lecturers) and 16% (students), and various open licensing schemes rate in total 10% (lecturers) and 2.7% (students).

The pattern of behaviour in the two figures clearly shows that both the lecturers and students are not really aware of the licensing in use for ER. According to a survey by McAndrew (2010) on redefining "openness", it was noted that awareness of licensing remains low and few academics engaged in other methods of teaching seek out materials on the basis that they are OER.

The response to the reverse question, whether lecturers and students themselves have ever used OER that are available in the public domain or have an open license, shows a fair share with 'Yes', but yet about 52% of both lecturers and students responded with 'No' or 'Don't know'. We conclude that overall the awareness and appreciation of open licensing, let alone commitment to this approach, is low. However, it is not absent either, which may provide a fruitful basis to further embrace open licensing policy.

- RQ4: How do lecturers and students perceive the value of openness in educational resources, its implementation opportunities, and its institutional context?

In this research question, we are addressing the OER concept per se, giving the response the deserved treatment, but at the same time being cautious and in some cases even reserved in our conclusions when the results are raising doubts. One cause for this could be the perception eclipse that easily may have interfered with the response in this 'getting-to-OER' part of the survey. Another reason could be fatigue with the respondents when filling out the final questions in the long questionnaire. We start in Table 14 with the top 4 out of 6 options of identified potential motivators for the use and reuse of ER which actually might be considered to represent a stimulating gate to convert to OER. Lecturers and students had the same top 4, but with different ratings, which is why it has been consolidated into a table for both groups.

Table 14 Potential motivators for the use and reuse of ER among lecturers and students

Potential motivators for the use and reuse of ER (top-4) > from 'very unimportant' to 'very important' < (mean on a 5 point Likert scale)	Lecturers	Students
Bringing down costs for students	5.2	4.8
Helping other educators/students	5.0	4.4
Bringing down costs for course development for the institution	5.0	4.2
Knowing that other educators/students may use my materials, improves the quality of my materials	4.7	4.0

The table shows an even picture with all four motivators rated close to 'very important' (5.2-4.7) by the lecturers and 4.8-4.0 by the students. The other two motivators, regarding 'normal practice' and 'reputation' (not shown), score lower.

Table 15 presents the top 6 out of 12 options of potential barriers for the use and reuse of ER. Lecturers and students had the same top 4, but with different ratings. Where the ER motivators can be viewed as stimuli for a conversion to OER, the ER barriers likewise can be inhibitors in a development process towards OER in Ghana.

Table 15 Potential barriers for the use and reuse of ER among lecturers and students

Potential barriers for the use and reuse of ER (top-6) > from 'not at all' to 'extremely' < (mean on a 5 point Likert scale)	Lecturers	Students
Lack of access to the internet	4.6	4.0
Lack of time	3.8	3.7
Lack of training	3.6	3.4
Lack of hardware	3.5	3.3
Lack of software	3.2	3.3
I worry about the quality of OER	3.0	3.2

This table shows substantially lower scores as compared to Table 14. Almost all barriers are expressed in terms of 'lack of …', except for 'quality worries', and the two lowest scoring barriers: 'no reward system' and 'no compensation' (at 2.8, not shown).

Table 16 summarizes the top 5 out of 10 statements about OER as applied to their educational institution for which the lecturers indicate their level of agreement.

Table 16 Lecturer's opinions on OER in their educational institution

Lecturers' opinions on OER in their educational institution (top-5) > from 'strongly disagree' to 'strongly agree' (mean on a 5 point Likert scale) <	
Policies adopted by my institution support the use of OER	4.0
My institution has reliable infrastructure to store and preserve access to teaching and learning materials (OER)	3.8
The OER initiative in my institution provides equal access to educational materials to anyone	3.6
The OER initiative in my institution is able to sustain the maintenance through internal funding and/or external contributions	3.0
There are ways for handling and utilizing OER in my institution as the main or supplemental materials to support our courses	3.0

The highest scored response in Table 16 has a score of 4.0, and even the bottom-5 (referring to 'instructors attitudes', 'diversity', 'support services', 'quality assurance', 'credentialing') have scores of 3.0. We see overall positive ratings among all 10 options. This shows a relatively positive and optimistic picture among its lecturers, which may be unrealistic. We have no firm explanation for this relatively positive picture among

the lecturers, but, again, it could be due to the perception eclipse or fatigue with the respondents, or even an expression of loyalty with their educational institution.

5.4 Key Findings

Ghana is one of the countries in Sub-Saharan Africa that first embraced global developments with regards to online learning through the adoption of two national ICT in education policies, in 2008 and 2015. Ghana has been very active in a number of open, distance and e-Learning consortia and projects, including African Virtual University and the African Health Open Educational Resources Network. For a decade Ghana has pursued a vision of becoming a tech leader for West Africa and beyond. It has currently embraced 16 digital innovation hubs, which is an indication of promoting online and open learning as key in expanding access to and quality of education.

By spending more than 6.2% of its GDP in education, Ghana views education as a crucial driver for social, political and economic development. There are also promising initiatives to create a better ICT environment and infrastructure as seen in its National Education Strategic Plan of 2010-2020, which calls for the expansion of ICT for instruction at all educational levels.

However, gaps in access to ICT and to higher education exists and there is significant digital differentiation, as demonstrated the findings from sample that included lectures and students at public and private comprehensive universities and technical universities. Our major conclusions and recommendations aresummarized below:

5.4.1 Digital Proficiency
There is a significant digital proficiency differentiation between lecturers and students at technical and comprehensive universities in Ghana, irrespective of the adoption of national ICT in education policies in 2008 and 2015; as well as setting up a national education strategic plan for 2010-2020. This therefore calls for a boost from the government and other stakeholders.

5.4.2 Internet Access
There is substantial digital differentiation in terms of internet accessibility and an extremely low level of satisfaction with the internet connection at the technical universities as compared to the comprehensive universities. This poses a serious challenge to realizing the national education strategic plan for 2010-2020.

5.4.3 Open Licensing
Overall awareness and appreciation of open licensing is low and therefore a hindrance in the adoption of the OER philosophy and especially the 2008 and 2015 Ghanaian ICT Policies.

5.4.4 Summary
In summary, it is vital to note that the decision to change reference from OER to ER in collecting data on the actual processing and behaviour of respondents with respect to

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different ER categories rather than gathering their perceptions of the value of openness in ER, has worked out well. We call upon the OER research community to be equally specific and cautious with respect to the outcomes of similar empirical OER studies, in particular when a perception eclipse may exist.

6

Chapter 6

Cross-country comparison
Kenya, Ghana and South Africa

6.0 Introduction

This chapter focuses on the variables comparison in the three countries of study, thus Kenya, Ghana and South Africa. It begins by a clear view on the context of OER in these countries, methodology of the study and the participating universities per countries with their respective data from lecturers and students. It ends with a discussion of the findings in relation to the study variables.

6.1 Context

Africa despite being a late entrant, has witnessed a number of enhanced OER initiatives Butcher (2010) and now home-grown projects such as OER Africa, Africa Virtual University and some open practices exist that promote and support the creation and use of OER. Externally funded initiatives such as the TESSA project are already making an immense contribution to teaching and learning on the continent by providing access to quality educational resources that would otherwise be unaffordable (Thakrar, Zinn, & Wolfenden, 2009; Ngugi, 2011). The higher education landscape in universities is undergoing significant change as a result of technological innovations and use of various open educational resources that has advanced significantly over the past few decades (Mtebe & Raphael, 2017).

OER, as earlier defined means *"teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions"* (UNESCO/COL, 2012). It now seems like a 'common' practice globally to find technology enhanced learning in many universities, especially in Africa, where the practice was not holistically embraced for more than a decade. In the recent past, universities and colleges in Sub-Saharan Africa have increasingly being adopting various technology enhanced learning in a bid to widen access to education and to improve the quality of learning.

Practical examples of such institutions are in South Africa where, the University of Cape Town (UCT), University of South Africa (UNISA), North West University (NWU), and University of Western Cape (UWC); in Ghana, Kwame Nkurumah University of Science and Technology (KNUST) and University of Ghana; and Kenya, Africa Nazarene University, Kenyatta University and University of Nairobi are excellent examples of institutions that have adopted various educational technologies in their teaching (Mtebe & Raphael, 2017). Interestingly, UCT in South Africa launched its OER directory, UCT OpenContent (UCT OC) way back in 2010 and an institutional repository (OpenUCT) in 2014, which to date has active 300 OERs and over 3000 downloads (Cox, 2016). At UNISA, the instructors use Sakai system to distribute resources and facilitate interaction between students and instructors while mobile technology is used to facilitate communicate with learners (Venter et al., 2012). These shows how Africa is coming up in digitally enabled learning that could assist in enhancing quality of education in higher learning institutions.

A lot of research has been carried out about OER and OEP and Higher Learning Institutions but very little has been written on the differentiations, albeit on access to or use and sharing of OER in the Sub-Saharan African Universities. As OER is a phenomenon that is now over 15 years, one would think that its benefits and values should have been long embraced to help solve educational challenges that African universities face in the contemporary society. Despite article 26 of the United Nations way back in 1948, 'Universal declaration of human rights', that in deed championed equally accessible and merit-based higher education, critically the level of education tends to be an exclusive privilege in many countries especially in the Sub-Saharan Africa (Nkuyubwatsi, 2016).

The growing demand for higher education access according to UNESCO (2012) and UNESCO & Commonwealth of Learning (2011), does not basically match the development rate of the physical infrastructures needed to accommodate all people willing to attain higher education. In a bid to respond to these challenges, Canada's International Development Research Centre (IDRC) funded a large overarching global initiative referred to as Research on Open Education for Development (ROER4D), in which out of the 54 countries in Africa, Kenya, Ghana and South Africa were the three countries in the Sub-Saharan Africa (SSA) selected to participate in the global large-scale study carried out to get a fair 'OER picture' for the Global South, which covered South America, South East Asia and Sub-Saharan Africa. This informed the choice of the three countries. The three countries are also all signatories to the UNESCO's 2012 Paris Declaration on Open Education Resources licensed under Creative Commons open licenses.

Improving access to education in Sub-Saharan Africa (SSA) is central to prospects for alleviating poverty and achieving the Sustainable Development Goals (SDGs) and the Africa Union Agenda of 2063 targets that relate to quality education for all (Lewin, 2009; Queremos, 2014; Robinson, 2004). The appropriate use of OER in higher education can widen access, reduce the costs, and improve the quality of education in Sub-Saharan countries. Wright and Reju, (2012) connote that quality of education is improved when instructors and learners can easily access resources that they were unable to access due to cost and/or copyright laws. They also added that OER could benefit instructors who do not have teaching experience and knowledge of the subject matter that they are teaching. Additionally, instructors can use these resources to improve the quality of existing courses or develop new courses by adapting existing courses (Laster, 2016). Ngugi, (2011), maintains that to meet the ever-growing demand for relevant higher education, pedagogy has to become more flexible and appropriate to new cohorts of learners.

6.2 Methodology

Surveys were distributed in Kenya, Ghana and South Africa through email in coordination with university ICT departments. Survey responses were gathered from Month 1 – Month 2, 2016 in different universities in the three countries.

These are the research questions (RQs):

1. What is the state of connectivity and digital proficiency among lecturers and students in Kenya, Ghana & South Africa?

2. What kind and level of use, re-use, creation, and sharing of educational resources (ER) is common among lecturers and students (but for the latter not including re-use and creation) in Kenya, Ghana & South Africa?

3. What is the level of awareness of licensing related to open educational resources (OER) among lecturers and students in Kenya, Ghana & South Africa?

4. How do lecturers and students perceive the value of openness in educational resources (ER), its implementation opportunities, and its institutional context (the latter item only for the lecturers) in Kenya, Ghana & South Africa?

Note that RQ1 relates to digital differentiation, RQ2 to ER differentiation, and RQ3 and RQ4 to OER differentiation.

In order to test both questionnaires before their large-scale use a pilot study was carried out in all the participating universities in the three countries. It became evident that both the student and lecturer populations are generally not very knowledgeable nor understanding of the OER concept. It turned out that even with the explanation of OER in the information part of the questionnaire, some responses were overall incontestably inconsistent (Pete et al., 2017). This could only be understood with our assumption that respondents had not really internalized the OER concept, in particular the associated open licensing approach. This - one could generate an unintended validity failure in the results for the questions concerned. With such experience, a decision was reached to change the reference from OER to ER in the questions connected to this failure.

As a consequence, we had to slightly adapt the wording of our original research questions, in which we had not (yet) been anticipating this possible 'perception eclipse'. This has resulted in the set of RQs presented above. RQ2, for example, shows the difference by using the term ER instead of OER. And we rephrased RQ3 and RQ4 a little so that we could or simply had to stick to OER, whatever the results would be. The phenomenon described here is not to blame on the respondents being from Sub-Saharan Africa. And our survey certainly is not the only OER study which is bothered by the perception eclipse. It can easily happen with a concept like OER which in its abstraction appears to be difficult to fully grasp. We have noted it explicitly, and have taken measures to circumvent its consequences as much as possible.

The lecturers' questionnaire includes 30 items, the students' version 26. Both questionnaires contain 4 items on RQ1 and 2 items on RQ3. For RQ2 the lecturers' version addresses 5 items, the students' version 3. And, RQ4 is being covered by 7 items (for the lecturers), and by 6 items (for the students). The remaining items (12, respectively 11) are either demographic or not relevant for this study. The items in the questionnaires offer multiple choice answers from which the respondents should tick the relevant ones. Some of the questions can have more than one answer.

The research has an exploratory character and is based on the quantitative descriptive data provided by the two questionnaires. There is no qualitative part such as additional in-depth interviews. The sampled lecturers and students were invited to fill in the questionnaires available on SurveyMonkey. Some used the online SurveyMonkey, but the majority used the printed version of the questionnaires, which were later keyed into the SurveyMonkey by the local coordinators at the participating universities in each of the three countries. Respondents were offered incentives in the form of flash disks.

6.3 Country Universities and Number of Participants

Country	University
Kenya	Great Lakes University
Lecturers =43	Jomo Kenyatta University of Agriculture and Technology
Students =798	Maseno University
	Tangaza University College
	Catholic Institute of Business and Technology
Ghana	Kwame Nkurumah University of Science and Technology
Lecturers =42	University of Cape Coast
Students =830	University of Ghana
South Africa	University of Cape Town
Lecturers =25	University of Pretoria
Students =621	University of South Africa

The table above shows the selected universities in Kenya, Ghana and South Africa. It also captures the participant's number. In Kenya, there were 43 lecturers and seven hundred and ninety eight students who successful participated in the survey. Ghana has 42 lecturers and 830 who also participated in the survey. Whereas, Kenya and Ghana used selected 10 course modules with at least 30 students in a class, the South Africa's local coordinator randomly send out the questions using email addresses to collect responses. In return, only twenty five lecturers and six hundred and twenty one students responded to the survey.

6.4 Findings and discussions

6.4.1 Level of use:
The rationale for and institutional support of OER is strong, and grows stronger and more widespread by the day (Bissell, 2009; Mulder, 2015). The open education movement has captured the interest of teachers, learners, administrators, advocates, and foundations, inspiring a global movement that believes that knowledge can and should be free and open, and that our educational systems can and should evolve to both utilize and support OER (Indicators OECD, 2007). In Sub-Saharan African countries, the availability, stability, speed, cost and limitations on internet connectivity are major factors in the extent to which students and lecturers engage in digitally based OER, that could enhance downloading for users and uploading for those sharing the OERs (Hodgkinson-Williams, Arinto, Cartmill, & King, 2017; Dutra de Oliveira Neto, Pete, & Cartmill; 2017; Pete et al., 2017).

In rural-based learning institutions, access to uninterrupted electricity, lack of internet connectivity and low bandwidth cannot be taken for granted (Pete et al., 2017; Wright & Reju, 2012). The ROER4D cross-regional survey Dutra, Neto, Pete, & Cartmill, (2017), provides an overall sense of the use of OER by educators in the Global South. The survey was administered to 295 randomly selected educators at 28 Higher Education Institutions in nine countries across South America, Sub-Saharan Africa, and South and Southeast Asia (Hodgkinson-Williams et al., 2017). The survey showed that more than half (51%) of the educators stated that they had used OER at least once; one-quarter (25%) said they had never used OER; and slightly fewer than a quarter (24%) said they were not sure whether they had used OER. The African instructors surveyed revealed a range of 35-53% OER use by country (Ghana 53%, Kenya 44% & South Africa 35%), with 'unsure' rate of about 30% each.

The contrast here is that South Africa, which is the most economically developed (GDP of $ 13200 per capita; Ghana $ 4300 & Kenya $ 3200) country among the three had the lowest rate of instructor use of OER. Hodgkinson-Williams et al. (2017), explains that national GDP per capita rates do not seem to promote OER use; comparatively, the opposite phenomenon seems true; thus low 'developed' economically, more use of OER. Mtebe & Raisamo, (2014); Hatakka, (2009); Mtebe & Raphael, (2017; Hodgkinson, (2013), relates the differences to increased demand for higher education in the developing countries and notes that economic variances in developing countries is not a barrier to uptake of OER since they are open and can be accessed freely. The findings of Pete et al., (2017), on OER differentiation in the three countries also support this insight as depicted in figure 40, where majority of the respondents (students and lecturers) from Ghana and Kenya prefers OER to traditional learning; Kenya and South Africa more counts on willing to participate in future OER opportunities and all the three countries supports the implementation of OER in several courses in the higher learning institutions. For South Africa, it seems not all the respondents answered all the questions.In this figure, we are discussing OER hence small sample not all had used OER.

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Figure 40 Intension to Use OER by Lecturers and Students

	Ghana		Kenya		South Africa		Response count	
Answer Options	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
I prefer OER to traditional learning								
Strongly disagree	9	5%	14	4%	3	2%	26	4%
Disagree	17	9%	42	12%	36	22%	95	14%
Neither agree or disagree	103	52%	80	24%	79	48%	262	37%
Agree	65	33%	146	43%	38	23%	249	36%
Strongly agree	6	3%	55	16%	8	5%	69	10%
Total	200	100%	337	100%	164	100%	701	100%
I am willing to participate in other OER Opportunities								
Strongly disagree	2	1%	4	1%	3	2%	9	1%
Disagree	8	4%	7	2%	9	6%	24	3%
Neither agree or disagree	85	43%	31	9%	44	28%	160	23%
Agree	91	46%	216	64%	88	56%	395	57%
Strongly agree	14	7%	79	23%	14	9%	107	15%
Total	200	100%	337	100%	158	100%	695	100%
OER should be implemented in several courses								
Strongly disagree	2	1%	4	1%	2	1%	8	1%
Disagree	11	6%	12	4%	9	6%	32	5%
Neither agree or disagree	88	44%	35	10%	57	36%	180	26%
Agree	81	41%	198	59%	79	49%	358	51%
Strongly agree	18	9%	88	26%	13	8%	119	17%
Total	200	100%	337	100%	160	100%	697	100%

With regards to using ERs, institutions for higher learning or individual users need an infrastructure that enables efficiency. We surveyed the devices that students and lecturers use to access internet (figure 41). It is evident that majority of the users access the internet through, laptops, mobile phones and desktops. Tablets were the least device used in our category for Kenya and Ghana (both lecturers and students) while it is ranked third in South Africa for both lecturers and students. Another difference observed among the students is that majority of students in South African universities do not use desktops. Mobile phones and laptops are the most used devices among them. Chigona, Kankwenda, & Manjoo (2008), points out the amazing 58% annual growth rate of mobile phone users among students in South Africa compared to Asia, Hodgkinson-Williams et al. (2017) explains that students with higher income use OER more as compared to those with low income hence requires an efficient device. Shava et al. (2015) talks of perceived usefulness and ease of use of smart phones as motivator to access internet everywhere. Desmet & Parente (2017) in their innovative marketing survey among South Africa students indicates that, the South African student market, largely representing the youth, adopts products that promote interaction between peers in the same manner as other regional and international markets.

Figure 41 Devices for internet Access by Lecturers and Students
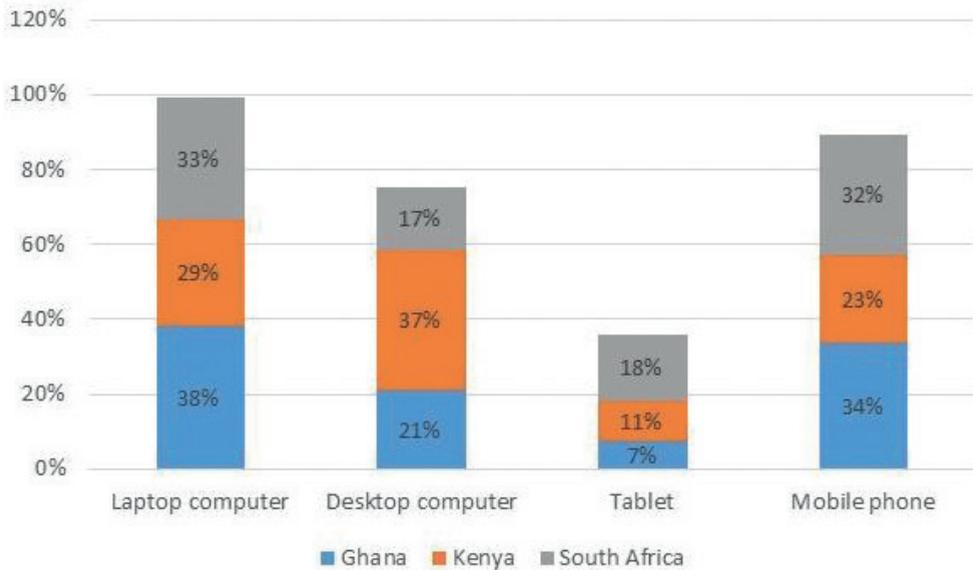
Therefore, high ranking for the usage of mobile phones in our study suggests opportunities to integrate mobile phones into innovative teaching and learning approaches for African higher learning institutions. Grimus, Ebner, & Holzinger (2012), connote that, while computer-labs and desktop-computers are still scarce in schools in developing countries, mobile networks, mobile phones and now smart-phones have the potential to question new approaches to learning and teaching. Teachers and students are starting to take advantage of the opportunities of mobile phones for learning and research (Grimus & Ebner, 2014). The mobile phone is an anytime and anywhere tool, thus boosting the tendency to do things discreetly as well as openly (Desmet & Parente, 2017). The cell phone has become one of the most important communication, social, business and entertainment devices of the 21st century (Chigona et al., 2008).

Internet connection is a key factor in the access and use of digitized educational resources. A question was posed to lecturers and students; to what extent are you satisfied with internet connection where you most frequently access it? Relating it to cost, speed and stability, majority of respondents expressed dissatisfaction. We can see (figure 42) higher counts in '*very dissatisfied and dissatisfied*' in all the three countries. Chigona et al., (2008), connotes that the reliability, affordability and stability of the network are motivators to its frequent usage; further, internet has also removed a geographical boundary, which means students have an abundance of information at their disposal accessed at their convenience. For South Africa, the sample is not the same because some respondents might have skipped the question.

Therefore, cost, speed and stability should be enhanced to ensure learning and researches are promoted through the access to digitized educational resources and OERs.

Figure 42 Satisfaction with connectivity cost, speed & stability (Lecturers and Students)

Answer Options	Ghana		Kenya		South Africa		Response count	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Cost								
Very dissatisfied	145	17%	141	17%	53	8%	339	14%
Dissatisfied	270	32%	220	26%	128	20%	618	26%
Unsure	75	9%	25	3%	93	14%	193	8%
Satisfied	277	32%	278	33%	230	36%	785	33%
Very satisfied	79	9%	172	20%	106	16%	357	15%
N/A	9	1%	6	1%	37	6%	52	2%
Total	855	100%	842	100%	647	100%	2,344	100%
Speed								
Very dissatisfied	160	19%	184	22%	53	8%	397	17%
Dissatisfied	283	33%	282	33%	128	20%	693	30%
Unsure	70	8%	37	4%	93	14%	200	9%
Satisfied	272	32%	238	28%	230	36%	740	32%
Very satisfied	68	8%	93	11%	106	16%	267	11%
N/A	2	0%	8	1%	37	6%	47	2%
Total	855	100%	842	100%	647	100%	2,344	100%
Stability								
Very dissatisfied	163	19%	186	22%	43	7%	392	17%
Dissatisfied	315	37%	274	33%	141	22%	730	31%
Unsure	111	13%	78	9%	92	14%	281	12%
Satisfied	212	25%	208	25%	287	45%	707	30%
Very satisfied	48	6%	86	10%	81	13%	215	9%
N/A	6	1%	10	1%	0	0%	16	1%
Total	855	100%	842	100%	644	100%	2,341	100%

Contribution to the body of knowledge online is still a big challenge in Africa. Most users are seen as 'consumers' rather than contributors. Welch, (2010), clearly vindicates the unwillingness of most African educators to freely share their resources.

A question was asked; *what kind of education resources do you create, re-use, modify and share?* These were categorized as word, excel & power point resources in figure 43 and whole course, MOOCs and data sets in figure 44.

Figure 43 Engagement with Word, PowerPoint & Excel (Lecturers and Students)

Answer Options	Ghana		Kenya		South Africa		Response count	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Word document or equivalent								
Created my own	563	56%	738	56%	544	42%	1,845	51%
Use others' "as is" (copy)	202	20%	86	7%	221	17%	509	14%
Modified/edited or comb	124	12%	243	18%	261	20%	628	17%
Shared my own or modifie	64	6%	226	17%	246	19%	536	15%
Never created, used, mod	60	6%	28	2%	17	1%	105	3%
Total	1,013	100%	1,321	100%	1,289	100%	3,623	100%
Powerpoint or equivalent								
Created my own	502	51%	736	57%	471	40%	1,709	50%
Use others' "as is" (copy)	228	23%	67	5%	262	22%	557	16%
Modified/edited or comb	124	13%	238	18%	219	19%	581	17%
Shared my own or modifie	51	5%	218	17%	181	16%	450	13%
Never created, used, mod	80	8%	34	3%	32	3%	146	4%
Total	985	100%	1293	100%	1165	100%	3,443	100%
Excel spreedsheet or equivalent								
Created my own	480	51%	703	55%	429	40%	1,612	49%
Use others' "as is" (copy)	215	23%	72	6%	223	21%	510	15%
Modified/edited or comb	92	10%	240	19%	208	19%	540	16%
Shared my own or modifie	47	5%	209	16%	157	15%	413	13%
Never created, used, mod	106	11%	56	4%	56	5%	218	7%
Total	940	100%	1280	100%	1073	100%	3,293	100%

It is evident that majority of the respondents have created, used as is and modified word, power point and excel spreadsheets, though there is a considerable reduction levels of sharing of the same resources, notably in Ghana, as compared to Kenya and South Africa. Pirkkalainen, Jokinen, & Pawlowski, (2013), relates it to lack of institutional support, language and culture as well as quality concerns among users. Further, teachers' motivation to share and collaborate in digitally enabled environments decreases when they perceive higher language and cultural barriers. According to OECD research, the motives for sharing might be varied, ranging from group to personal reputational gain, publicity, financial rewards and so on. Mulder, (2013) asserts career advancement, networking and economic factors like GDP as key motivators for sharing. This could then explain the high sharing tendency in South Africa. Culture is also seen to play a crucial role in the knowledge sharing activities of teachers and students (Welch, 2010).

Figure 44 Engagement with Whole course, MOOCS & Data sets

Answer Options	Ghana		Kenya		South Africa		Response count	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Whole Courses								
Created my own	66	7%	100	11%	51	8%	217	9%
Use others' "as is" (copy)	362	41%	239	27%	320	47%	921	38%
Modified/edited or comb	108	12%	58	6%	82	12%	248	10%
Shared my own or modifi	45	5%	49	5%	49	7%	143	6%
Never created, used, mod	302	34%	449	50%	173	26%	924	38%
Total	883	100%	895	100%	675	100%	2,453	100%
Massive Open Online Courses (MOOCs)								
Created my own	33	4%	85	10%	30	5%	148	6%
Use others' "as is" (copy)	282	33%	235	27%	176	27%	693	29%
Modified/edited or comb	70	8%	38	4%	43	7%	151	6%
Shared my own or modifi	27	3%	22	3%	19	3%	68	3%
Never created, used, mod	447	52%	491	56%	377	58%	1,315	55%
Total	859	100%	871	100%	645	100%	2,375	100%
Data Sets								
Created my own	79	9%	237	22%	102	14%	418	15%
Use others' "as is" (copy)	295	33%	264	24%	219	29%	778	28%
Modified/edited or comb	87	10%	135	12%	94	13%	316	12%
Shared my own or modifi	36	4%	110	10%	51	7%	197	7%
Never created, used, mod	400	45%	342	31%	285	38%	1,027	38%
Total	897	100%	1088	100%	751	100%	2,736	100%

A considerate differentiation is noted on whole courses, MOOCs and Data sets. It could be that these resources are not known to many respondents. The highly pronounced barriers to knowledge sharing by organizations and institutions, for instance, relates on how reward contributions and the lack of opportunities for sharing in terms of availability and allocation of time or established physical and online networks for sharing (Pirkkalainen et al., 2013). Use of MOOCs is relatively new in most African countries. Wildavsky, (2015), states that the evolution of MOOCs in developing world has not reached its expectations with the big three: for-profits Udacity and Coursera educational organizations, and the nonprofit Harvard-Massachusetts Institute of Technology collaboration EdX. Percy & Van Belle, (2012) underlines lack of sharing to discovery, relevance, context and individual resources among African users.

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The differences observed in the three countries in terms of OER use, internet connectivity and devices for accessing internet depict how African countries are not the same, hence similar approach to the implementation of OER cannot apply in each case.

6.4.2 Awareness of licensing:

An open license is a standardized way to grant permission and to state restrictions to accessing, using, re-purposing, re-using or re-distributing creative work (whether sound, text, image, multimedia, etc) (UNESCO & Commonwealth of Learning, 2011). Percy et al, 2012) connotes that open license if an enabler to uptake of OER especially in developing countries. In an effort to protect authors' rights especially in environments where digitized content can easily be copied and shared without permission, open licenses have emerged. These licenses seek to ensure that copying and sharing happen within a structured legal framework, that is more flexible than the automatic all-rights-reserved status of copyright. Green, (2017), notes that 'key distinguishing characteristic of OER is its intellectual property license and the legal permissions the license grants the public to use, modify, and share it'. At the heart of the concept of OER is freedom: freedom of access to content, freedom from cost, and freedom to use in any way (Bliss & Smith, 2017). Open licenses , such as Creative Commons (CC), GNU Free Documentation License GFDL, are critical for defining Open Educational Resources (OER), which are digitized materials offered freely and openly for educators, students, and self-learners to use and re-use for teaching, learning, and research (Bissell, 2009;UNESCO, 2012).

OER include learning content, software tools to develop, use and distribute content, and implementation resources (such as the open licenses themselves)(Atkins, Brown, & Hammond, 2007). Given that open licensing is a core infrastructural element of OER, it is not surprising that copyright and related intellectual property and licensing issues rank among the top concerns that people have about the open education movement (Bissell, 2009;D'Antoni, 2008). It can be challenging for copyright holders to balance the desire for increased access, translation and customization against the desire to prevent abuses and to control their work (Atkins et al., 2007). However, a focus on licensing details may sometimes distract from the core values of the movement thus, that licensing choices should be based primarily on their potential to improve the availability and quality of educational materials while empowering both educators and learners.

OER are usually distinguished from the broader swathe of content on the web by the fact that they are openly licensed, making clear the range of repurposing and reuse that is permitted (White & Warren, 2011). Most often than not, the value of open licensing digital educational content lies in the opportunities it affords practitioners to legitimately reuse or repurpose materials without expressly seeking permission.

The awareness and appreciation of open licensing, let alone commitment to this approach, is very low in most of sub-Saharan countries (Pete et al., 2017). However, the vast majority of teaching and learning activity in most African universities takes place at the level of individual practice (by both lecturers and students), which is often not visible to those outside a given course or department (White et al, 2011). PowerPoint presentations, for instance, are seen as low risk and shared widely without fear (see figure

43). Generally, there is little concern about the legal technicalities of reuse and often little or no awareness of them. This does not mean that lecturers and students do not consider the intellectual property of resources they use; they are simply less aware of the intricacies of copyright (Mulder, 2015).

From our survey, figures 45 & 46 proves this fact among lecturers and students. The dominant option in both figures is that no license is assigned. Thus no idea of open licensing in three countries; as depicted by both the lecturers and students.

Figure 45 Lecturers level of license awareness: Ghana, Kenya and South Africa
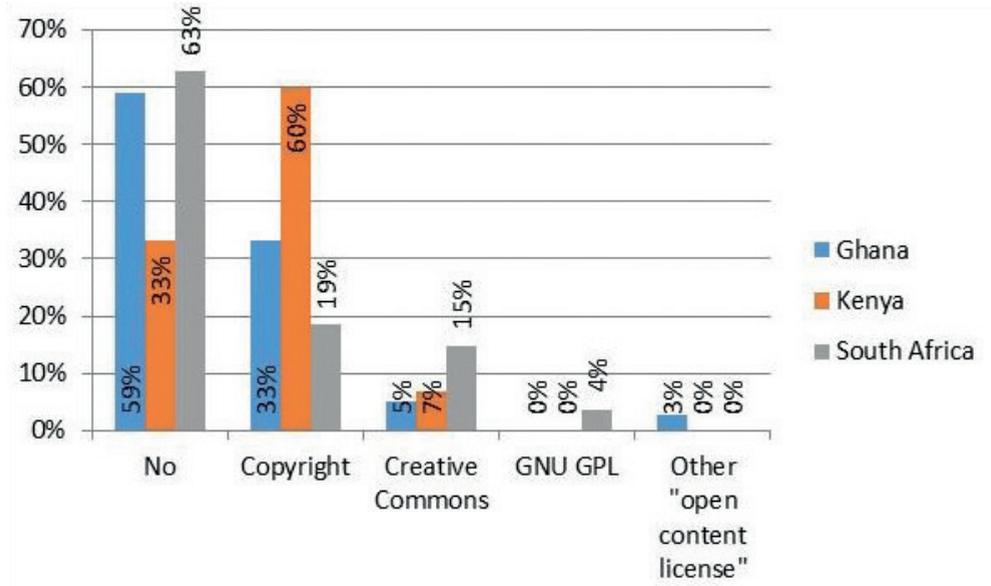
It's clear that most lecturers and students from African countries are not aware of open licenses. One would think that South Africa should lead with regards to its high economic development and several initiatives of OER since the inception of open license by Wiley way back in 1998 (Farrow et al., 2015). From the figures, the prefix 'No', scored higher both for lecturers students (lecturers 63%, students 81%) where as Ghana (lecturers 59%, students 74%) and Kenya (lecturers 33%, students 82%) which portrays a higer level of unawareness. The differences and low uptake, according to Bissell, (2009), could be as a result of educators, as with most endeavors, having no interest or lacking time to become experts in copyright laws. Cambridge, Fernandez, Kahn, Kirkpatrick, & Smith, (2008) points out the challenge of most faculty lacking skills on dealing with intellectual property.

The open access policy and procedures that are lacking in most African institutions of higher learning is to blame for the unwillingness and low uptake of these licenses (Nkuyubwatsi, 2016). In their investigation on the barriers to OER in Tanzania, Mtebe & Raisamo, (2014) laments on lack of awareness amongst instructors regarding copyright

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and IPR issues and the unwillingness to freely share content due to commercialized mentality.

However, it is important that educators become sufficiently aware of copyright laws to understand the value of alternative licensing models that could help them achieve their vision and objectives of competency based-learning through the use of OERs.

Figure 46 Student's level of license awareness Ghana, Kenya and South Africa
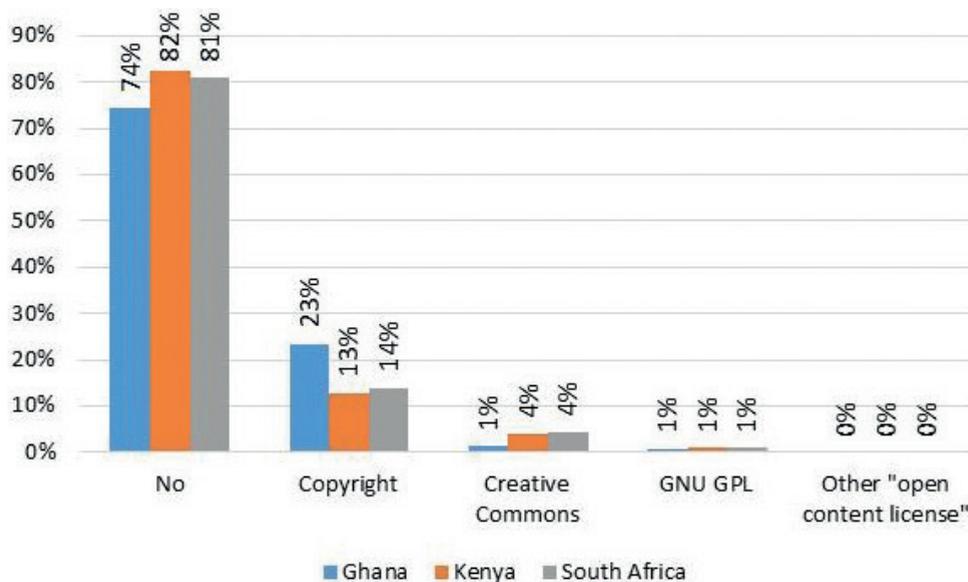
6.4.3 The Perception on value of OER:
What are the perceptions of the value of OER?

The perception eclipse of the respondents (lecturers and students) on the value of OER was a matter of concern to us. The focus on 'usefulness (figure 47) and playfulness (figure 48) were thought to provide a fair angle. From the findings, we see that 'preparedness for openness' that appears from this study by focusing on the processing and behaviour of respondents with respect to educational resources (ER) without explicitly referring to the open philosophy with OER and its sharing principle, may apply merely on pragmatic grounds, without a solid understanding of the OER concept and without bothering about proper licensing (Pete et al., 2017). But the result counts and makes a promise towards real appreciation of what OER and open licensing can offer on the condition that lecturers should become more aware that they generally take too much liberty in their use of resources for their teaching, learning and research.

On similar context, a South African survey carried out to seek the students and teachers perception of use of OER found out that younger students and those with higher levels of resource do value the experience of using OER more and more. Income group, on the other hand, does not appear to generate discernible differences. Students with

higher income achieved higher scores, but when considering the specific evaluation of certain aspects of OER use, students with lower income had a more positive perspective (Hodgkinson-Williams et al., 2017). Work with educators has also depicted that perceived quality is a key criterion for selection of resources, usually expressed as confidence in the creator or a recommendation from a trusted source. Bagarukayo et al, (2015), affirms users positive attitude in using e-learning in South Africa universities, "LMS promoted flexibility, creativity, collaboration, communication and interaction, enhancing the learning process".

Usage could also be influenced by an individual's perception of the ability to use the technology to access those resources (Khorrami-arani, 2001). Subsequently, the approach can serve as predictors of human behaviour thus being seen as a useful predictor in explaining human behaviour concerning technology acceptance (Agudo-peregrina et al., 2014). In some cases, lack of motivation to use technology can often result in resistance to use the technology based on user perceptions (Desmet & Parente, 2017). Hence based on the attitude (positive or negative), this may affect the intention to perform a behavior towards use, re-use and repurpose of OER materials. Mays, (2017), in his analysis of OER Africa project, confirms that there was evidence not only of a willingness to use OER in teaching but also to produce OER among those involved in the initial engagement.

Figure 47 Perceived Usefulness of OER

Answer Options	Ghana		Kenya		South Africa		Response count	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
OER improves my learning outcomes								
Strongly disagree	10	5%	10	3%	2	1%	22	3%
Disagree	7	4%	7	2%	1	1%	15	2%
Neither agree or disagree	89	45%	22	7%	36	22%	147	21%
Agree	74	37%	185	55%	98	60%	357	51%
Strongly agree	20	10%	113	34%	27	16%	160	23%
Total	200	100%	337	100%	164	100%	701	100%
OER is very useful to me								
Strongly disagree	4	2%	10	3%	2	1%	16	2%
Disagree	12	6%	6	2%	1	1%	19	3%
Neither agree or disagree	93	47%	32	9%	38	23%	163	23%
Agree	69	35%	171	51%	98	60%	338	48%
Strongly agree	22	11%	118	35%	25	15%	165	24%
Total	200	100%	337	100%	164	100%	701	100%
OER helps me to acomplish my learning effectively								
Strongly disagree	2	1%	11	3%	2	1%	15	2%
Disagree	9	5%	4	1%	1	1%	14	2%
Neither agree or disagree	101	51%	48	14%	50	30%	199	28%
Agree	69	35%	165	49%	88	54%	322	46%
Strongly agree	19	10%	109	32%	23	14%	151	22%
Total	200	100%	337	100%	164	100%	701	100%

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Figure 48 Playfulness of OER

Answer Options	Ghana		Kenya		South Africa		Response count	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
I feel OER helps me improve my creativity								
Strongly disagree	7	4%	5	1%	3	2%	15	2%
Disagree	12	6%	9	3%	12	7%	33	5%
Neither agree or disagree	112	56%	66	20%	73	45%	251	36%
Agree	62	31%	194	58%	66	40%	322	46%
Strongly agree	7	4%	63	19%	10	6%	80	11%
Total	200	100%	337	100%	164	100%	701	100%
I feel OER helps me improve my imagination by obtaining information								
Strongly disagree	2	1%	6	2%	4	2%	12	2%
Disagree	12	6%	6	2%	8	5%	26	4%
Neither agree or disagree	105	56%	59	18%	56	34%	220	32%
Agree	62	33%	193	57%	82	50%	337	49%
Strongly agree	7	4%	73	22%	14	9%	94	14%
Total	188	100%	337	100%	164	100%	689	100%
I feel I can work with OER, a veriety of experiences without any interferance								
Strongly disagree	8	4%	10	3%	4	4%	22	3%
Disagree	11	6%	6	2%	10	10%	27	4%
Neither agree or disagree	101	51%	70	21%	12	12%	183	29%
Agree	68	34%	192	57%	68	66%	328	51%
Strongly agree	12	6%	59	18%	9	9%	80	13%
Total	200	100%	337	100%	103	100%	640	100%

Let us finally summarize the major conclusions and recommendations for the study:

Digital Literacy

Since a significant number of the lecturers and students in these universities do not have yet the desired ICT competencies as foreseen in the findings, and because there is a significant digital literacy differentiation among lecturers and students, the implementation of their National ICT Policies is still at stake and needs a strong government boost and international support for the three countries.

Internet Access

The alarmingly substantial digital differentiation in terms of internet accessibility and the extremely low level of satisfaction with the internet connection among university lecturers and students, is a challenge and portrays lack of institutional support and national engagement. Proper and persistent government initiatives are required to tackle this challenge and move from dream to reality in Africa.

Open licensing

The overall awareness and appreciation of open licensing, let alone commitment to this approach, is extremely low and therefore a hindrance in the adoption of the OER philosophy in Africa. More positively judged, however, it is not absent either, which may provide a fruitful basis to further increase the lecturer's, institutional and national awareness and understanding of OER and open licensing in Kenya, Ghana and South Africa.

Preparedness for Openness

The 'preparedness for openness' that appears from this study by focusing on the processing and behaviour of respondents with respect to educational resources (ER) without explicitly referring to the open philosophy with OER and its sharing principle, may apply merely on pragmatic grounds, without a solid understanding of the OER concept and without bothering about proper licensing. But the result counts and makes a promise towards real appreciation of what OER and open licensing can offer on the condition that lecturers should become more aware that they generally take too much liberty in their use of resources for their teaching vis a vis sharing the same.

The decision to change reference from OER to ER in collecting data on the actual processing and behaviour of respondents with respect to different ER categories rather than gathering their perceptions of the value of openness in ER, has worked out well. So our attempt to avoid the perception eclipse seems to have been pretty adequate. We call upon the OER research community not to hesitate to be equally explicit on cautioning with respect to the outcomes of similar empirical OER studies, in particular when a perception eclipse might apply.

Chapter 7

Conclusions, reflections, limitations and future research

7.1 General conclusion

This chapter higlights the general conclusions obtained from the research in the three countries: Kenya, Ghana and South Africa. It also emphasizes on reflections and research limitations that were encountered during this period of research. It further states areas for future research by other practitioners, researchers and stakeholders.

7.1.1 Digital Proficiency

Digital proficiency shows various patterns of differentiation in different countries in Africa. Kenya, students at the urban universities rate themselves clearly more 'advanced' than their colleagues at the rural universities. Lecturers at the rural universities score none of them 'advanced' while their urban-based colleagues show a more than 25% 'advanced' share. Finally, urban universities lecturers rate themselves more digitally proficient than their students, whereas - interestingly - at the rural universities this is the opposite. Ghana, there is a significant digital proficiency differentiation between lecturers and students at technical and comprehensive universities. The students and lecturers at technical universities rate themselves more digitally proficient than their colleagues at comprehensive universities. South Africa, students and lecturers from private universities rated themselves more digitally proficient as compared to their counterparts from the public universities.

7.1.2 Location for internet access

The locations for accessing internet are quite diverse. Number 1 for both students and lecturers in the three countries (over 30%) is their school, university, or workplace, while the public library is in both their top-3. Clear differences are the high ranking for 'home' among lecturers versus 'family member or friend's home' for students in Ghana and Kenya, while in South Africa, both students and lecturers rated home highly. A significant share also goes to the options 'internet café' and 'wi-fi hotspot', for both students and lecturers (added to more than 20% for each country).

7.1.3 Devices used to Access Internet

For the devices used, we see a difference where, Kenya, laptop and desktop computers form the top-2 for the lecturers while for the students this is just the other way around. The latter is largely due to the rural-based students who by 60% prefer a desktop computer versus just about 25% of the urban-based students. For both lecturers and students mobile and tablets are ranked No 3 (around 25%) and No 4 (over 10%). In Ghana and South Africa, mobile phones and laptop computers take lead for both the students and lecturers.

7.1.4 Internet Connectivity with respect to cost, speed & stability

With respect to the level of satisfaction with the internet connection a partly alarming outcome comes up. No matter whether this relates to cost, speed, or stability, Kenya and Ghana students and lecturers, the dissatisfaction is very pronounced. South African students and lecturers the overall appreciation is reverse: a very high level of satisfaction (over 45% and 50% respectively) regarding cost for both students and lecturers, reduced to lower levels for speed and stability (but still over 30% at the lowest). Yes, there is a

substantial digital differentiation in terms of internet access and accessibility between African universities.

7.1.5 Open Licensing

Open licensing does not receive proper attention. This appears from the question on the application of licenses, on the one hand to be assigned by respondents for their own materials to others, and on the other hand by respondents using open educational resources from others. The response to this question shows that the open licensing share is very small in all the three countries among lecturers and students. For instance, lecturers said they had no idea of open licenses (Kenya 67%, Ghana 58% and South Africa 63%). It seems fair to say that the awareness and appreciation of open licensing is extremely low.

7.1.6 Sources of Educational Resources used by Lecturers

On the question from what sources lecturers would feel free to use resources for their teaching, the top-3 is 'on the right side' in terms of adopting regulations: there is mention of 'fair use', 'acknowledgement', and 'open licensing', adding up to a share of almost 40% in the three countries. Still, however, more than 50% is taking place in a typically unregulated fashion. Moreover, legitimate doubts may arise on the validity and reliability of the overall response, taking into account the low level of awareness and appreciation of open licensing as indicated above. A conclusion thrusts itself that most of the lecturers seem to take too much liberty in their use of others resources than sharing their own.

7.1.7 Preparedness for Openness

The 'preparedness for openness' combined with 'too much liberty' is confirmed in the other reported outcomes, specific - for both lecturers and students - on ER use as well as on ER sharing, and also - only for the lecturers - on ER creation from different sources. In other words, one could say that both the lecturer's and student's operational behaviour are pretty close to the open philosophy, be it perhaps without bothering too much about proper licensing. And there is a strong commitment to sharing of educational resources, although this may be based more on practical grounds than on adopting the fundamental sharing principle.

7.1.8 The Perception Eclipse

When it comes to the 'real' OER part, the outcomes are sometimes questionable. Various potential reasons are suggested, one of which being the perception eclipse (explained in the Methodology section) regarding the OER concept and its open licensing connection. The caution and reservation in our conclusions does not really apply to our exploration of potential motivators and barriers for the use and reuse of ER. The top-4 motivators (two regarding cost, and two regarding benefits for or from other educators/students) are all rated close to 'very important' by the lecturers and just a little less by the students. Almost all barriers are expressed in terms of 'lack of …'. The top-4, being the same for lecturers and students, is lack of access to the internet, time, training, and hardware respectively, and scores close to the classification next under 'extreme'. It may be fair to

say that the motivator and barrier sets, formulated for ER, will also represent the stimuli and inhibitors for furthering OER.

We have serious reasons to doubt the validity and reliability of the outcomes on the level of agreement that lecturers indicate for a series of statements about OER as applied to their educational institution. The picture among the lecturers seems way too positive and optimistic to be realistic and credible. Similarly, we have reservations with respect to the appreciation that is reported for the usefulness, playfulness, and ease of use of OER, as perceived by the lecturers and students. All judged to be very high.

7.1.9 Intension to Use OER
Lecturers (and students) both appear to have strong intentions to participate in OER initiatives, advocate OER-based courses, and recommend OER to others. Very high scores for the lecturers make a promise for the future, although conditioned by a very low number of respondents (106) and the reservations expressed before.

Finally, we can draw a conclusion for the perception eclipse in survey studies like ours. The decision to change the reference from OER to ER in a collection of data on the actual processing and behaviour of respondents with respect to different categories of educational resources, has worked out well. It generates outcomes showing that - even without a really internalized OER concept and lacking proper appreciation of open licensing - both lecturers and students in practice act positively in line with some essential assets of the open philosophy. That is indeed what counts, maybe even more than gathering their perceptions of the value of openness in educational resources where they easily are lost in 'conceptual abstraction'. So our attempt to avoid the perception eclipse seems to be pretty adequate.

7.2 Limitations

There are 54 countries in Africa. The study only focused on three countries which may not give a comprehensive representation to Sub-Saharan Africa countries. And the umbrella ROER4D (Research on Open Educational Resources for Development) project which among other sub-projects also includes this Kenya, Ghana and South Africa study has been funded by the International Development Research Centre (IDRC) in Canada. However, the funders were not involved in the actual designing of the study.

Another limitation experienced was the demise of Prof. Fred Mulder in the middle of the thesis development. This affected the researcher and also led to the delay of the PhD study by a couple of months.

7.2 Future research

I yearn for an African continent where lecturers/ instructors/ educators are passionate about free and open access to their educational resources (course materials). This will enable everyone, anywhere (rural or otherwise) to attain education their desire. I therefore recommend a research on: Possibilities of enhancing mainstream OER;

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supporting complete sets of curated OER for all levels, in all subjects, in all languages and customized to local needs of Africans (Global South countries). As Green, (2017) asserts, "if we want significant funding available for the creation, adoption and continuous updating of OER, then we need (1) universal awareness of and systematic support for open educational resources and (2) broad adoption of open education licensing policies.

7.3 Reflections

Education policy is about solving education problems for the public(Green, 2017). The primary role of any government anywhere is to ensure all of its citizens have access to effective, high-quality educational resources. To this effect, governments ought to employ current, proven legal, technical, and policy tools to ensure the most efficient and impactful use of public education funding (Paskevicius & Hodgkinson-Williams, 2018;Bliss & Smith, 2017).

A commitment to integrating OER, as a matter of course, into resource- and activity based flexible modes of provision then needs to be reflected in the institutional strategic plan and supporting policy framework, especially in the areas of intellectual property rights, human resource management, ICT policy, infrastructure and support and quality assurance mechanisms (Mays, 2017). Adala, (2016), observes that the policy and regulatory framework in Kenya and other developing countries is now beginning to be more conducive to mainstreaming ODeL provision and integrating OER, with the notification of the intent to establish an Open University.

Kenya, Ghana and South Africa are countries of the Global South which are on the move in the global developments with respect to online learning as well as towards opening up education through OER. These countries face the challenging confrontation between reality and practice versus ambitions and perspectives. Fighting poverty especially in Kenya and Ghana for this study is still a high priority. And the divide between the three countries in terms of GDP, ICT and OER Uptake is huge. As described in the Context section, quality education for all is considered to be a crucial driver for social, political and economic development of Africa. The Educational innovation is seen as a driver to African Unions' mission agenda 2063, which is a strategic framework for the socio-economic transformation of the continent over the next 50 years; build on, and seeks to accelerate the implementation of past and existing continental initiatives for growth and sustainable development.

7.4 The Way Forward

From the study, the survey revealed clearly that, there are promising initiatives to create a better ICT and OER environment and infrastructure that could aid universal education for all in the Global South. For example, the initiation of digital innovation hubs in these countries (South Africa 54, Kenya 27 & Ghana 14) is seen as a motivator in ensuring a much better distribution of ICT and OER infrastructures and enabling environment for online education in the region. But significant barriers remain, at least for the time being and in particular in the in terms of culture, cost of internet access, lack of or interrupted

electricity supply (rural based), dominance of English, low literacy levels, and a poor telephone and travelling infrastructure. Alongside providing an adequate ICT and OER infrastructure, South Africa is on the lead with more engaged in educational innovations as we see occurring worldwide in online and open learning.

The educational policy should therefore be tailored towards incorporation of ICT and OER to enhance the desired quality education that is still a dream in most of the Sub-Saharan higher learning institutions. This thesis has added to the body of knowledge by clearly pointed out the differentiations that exists between and among Global South countries with regards to digital literacy, internet access and connectivity, devices used and access to and use of open educational resources in teaching, research and learning.

All in all, for developing countries like Kenya, Ghana and South Africa, the big challenge in the 'ICT and OER in education journey' is to balance educational ambitions and perspectives with economic realities and opportunities. We have evidences of South Africa in this study. It makes a study like this - to our knowledge the first empirical OER study in the Global South on such a large scale - important since it can contribute to a better OER picture for Sub-Saharan Africa and very informative to policy makers like government, UNESCO and other relevant stakeholders from the region.

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Appendices

Appendix 1: Questionnaires

1.1 Lecturer's Questionnaire

INSTRUCTOR • English • Open Education Resources Differentiation Project

Open Educational Resources Differentiation Project

Dear respondents

The Research on Open Educational Resources for Development (ROER4D.ORG • website) program seeks to understand the adoption and impact of Open Educational Resources (OER) across the Global South, in South America, Sub•Saharan Africa and South East Asia. It is funded by the International Development Research Centre (IDRC) in Canada.

You have been invited to participate in this research survey because you are a current or potential user/creator of OER in the higher education sector. Your participation is voluntary. If you decide to participate in this survey, you may withdraw at any time. If you decide not to participate, or if you withdraw, you will not be penalized in any way.

The survey will take approximately 25 minutes. Thank you for your time,

Jose Dutra • University of Sao Paulo • Brazil
Judith Pete • Tangaza College of Catholic University of Eastern Africa • Kenya
Daryono • Teburka University • Indonesia

If you have any questions, please contact Prof. Dutra (dutra@usp.br) at the University of Sao Paulo, Brazil.

1. ELECTRONIC CONSENT: Please select your choice below. Clicking on the "Agree" button below indicates that:

You have read the above information you voluntarily agree to participate you are at least 16 years of age you understand that your responses with be used for research purposes and that your anonymity will be preserved

If you do not wish to participate in the research study, please decline participation by clicking on the "Decline" button.

○ Agree   ○ Decline
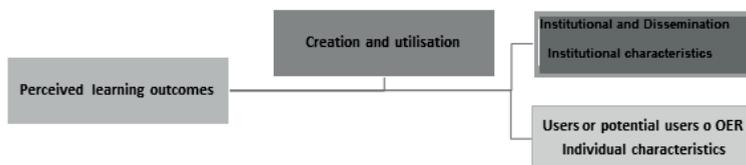
INSTRUCTOR • English • Open Education Resources Differentiation Project

Dimension 1: Individual characteristics
All respondents who completed the questionnaire will be entered into a competition for a prize.

2. The name of your educational institution

....

3. Your country

○ Brazil   ○ Ghana   ○ Kenya

○ Chile   ○ India   ○ Malaysia

○ Colombia   ○ Indonesia   ○ South africa

4. Gender

○ Female   ○ Male   ○ Other

5. *Age*

....

6. *Digital proficiency*

○ Basic Digital Literacy - I can use some common applications effectively

○ Intermediate Digital Competence - I can use a range of applications effectively

○ Advanced Digital Expertise - I can use specific applications and tools, over and above levels commonly required

7. *Where do you access the internet? (tick all that apply)*

☐ I don't access internet

☐ Family member or friend's home

☐ Home

☐ Other (please specify)

☐ Internet cafe (cyber cafe / Lan house / internet shop)

☐ Public Library

☐ School / university / workplace

☐ Wi-fi hotspot (cafe, restaurant, shopping mall)

....

8. *What device(s) do you use to connect to the internet? (tick all that apply)*

☐ I don't access internet

☐ Laptop computer

☐ Other (please specify)

☐ Desktop computer

☐ Tablet

☐ Mobile phone

....

9. *To what extent are you satisfied with the Internet connection where you most frequently access it? Please answer all rows*

	Very dissatisfied	Dissatisfied	Unsure	Satisfied	Very satisfied	N/A
Cost	○	○	○	○	○	○
Speed	○	○	○	○	○	○
Stability	○	○	○	○	○	○

10. Which language do you feel most comfortable with academic reading

○ Bahasa Melayu   ○ Hindi   ○ Spanish

○ English   ○ Portuguese

○ Other (please specify)

....

11. Which language do you feel most comfortable with academic writing?

○ Bahasa Melayu   ○ Hindi   ○ Spanish

○ English   ○ Portuguese

○ Other (please specify)

....

12. When watching educational videos that are not in your first language, you prefer those videos to be:

○ Dubbed (audio translation to my first language)

○ Subtitled in my first language

○ Subtitled in the original language

○ In original language, unchanged

INSTRUCTOR • English • Open Education Resources Differentiation Project

Dimension 1: Individual characteristics - Instructor

13. Years of teaching experience

○ None ○ <1 ○ 1-3 ○ 4-6 ○ 7-10 ○ 11-15 ○ 16-20 ○ 21-30 ○ 31+

14. Highest educational qualification (or equivalent)

○ Certificate (e.g. post-secondary school schort courses)

○ Teacher's accreditation/ certificate

○ Doctorate

○ Bachelors

○ Diploma (e.g. Technologist)

○ Masters

○ Other (please specify)

....

15. Areas in which you teach (Tick all that apply)

☐ Applied Science, Technology, Engineering

☐ Health & Social Care

☐ Psychology and Philosophy

☐ Arts

☐ History & Geography

☐ Religious studies

☐ Computing & Information Science

☐ Languages & Linguistics

☐ Science

☐ Literature

☐ Social science

☐ Economics, Business & Management, Accounting

☐ Mathematics

☐ Special education

☐ Medicine

☐ Education Studies

☐ Physical education

16. Your current position/s at your institution. (Tick all that apply)

☐ Administrator   ☐ Junior lecturer   ☐ Researcher

☐ Assistant professor   ☐ Lecturer   ☐ Senior lecturer

☐ Associate pofessor   ☐ Librarian   ☐ Staff development

☐ Consultant   ☐ Manager   ☐ Teacher

☐ Director   ☐ Post-doctoral fellow

☐ Emerita/us   ☐ Professor

☐   Other (please specify)
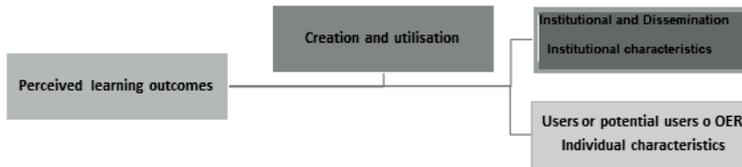
....

INSTRUCTOR • English • Open Education Resources Differentiation Project

Dimension 2: Educational resources

17. Below there are examples of Educational Resources. For each resource listed below, tick all that apply to you. Please answer all rows

	Created by my own	Use others "as is" (copy)	Modified/ Edited or combined others'	Shared my own or modified versions with others (distribute)	Never created, used, modified or shared
Word document or equivalent	☐	☐	☐	☐	☐
Powerpoint or equivalent	☐	☐	☐	☐	☐
Excep spreadsheet or equivalent	☐	☐	☐	☐	☐
PDF	☐	☐	☐	☐	☐
Images	☐	☐	☐	☐	☐
Audio	☐	☐	☐	☐	☐
Video	☐	☐	☐	☐	☐
E-books	☐	☐	☐	☐	☐
Lecture notes	☐	☐	☐	☐	☐
Quizzes	☐	☐	☐	☐	☐
Tutorials	☐	☐	☐	☐	☐
Textbooks	☐	☐	☐	☐	☐
Whole courses	☐	☐	☐	☐	☐
Massive open online courses (MOOCs)	☐	☐	☐	☐	☐
Data sets	☐	☐	☐	☐	☐

18. Apart from educational materials you have developed yourself, which of the following would feel free to use for teaching? Tick all that apply

☐ Anything on the internet

☐ Any materials produced by my colleagues in my department

☐ Anything on the internet, as long as the creator is acknowledged when using

☐ Any research, teaching or learning materials covered by "fair use" regulations

☐ Other or not applicable (please specify)

☐ Any teaching and learning materials on the internet

☐ Anything licensed (with CC, GPL or the like) for re-use, adapting. or editing for local use

☐ Any online teaching courses (MOOCs, etc.)

....

19. Please indicate the activities that you undertake if you USE educational resources. (Tick all that apply)

☐ Copy the content and use it unaltered

☐ Transform the content by adding an interpretation, reflection or practice

☐ Change the content or add locally relevant information, examples and scenarios

☐ Convert the content from one form to another

☐ Summarise the essential ideas

☐ Reuse the content for different purposes than originally intended

☐ Other or not applicable (please specify)

☐ Implement changes to update the resource

☐ Translate the content from one language to another

☐ Change the order or sequence of the materials

☐ Integrate the content with other content in order to develop a module or new unit

☐ Combine the content with new media

....

20. Please indicate the activities that you undertake if you CREATE educational resources. (Tick all that apply)

☐ Check accuracy of content

☐ Check grammar & spelling

☐ Remove contextual information (e.g. dates)

☐ Improve appearance

☐ Add references and acknowledgements

☐ Change file format to one that can be edited

☐ Other or not applicable (please specify)

☐ Use licenses to express the rights others have to my educational resources

☐ Keep a copy on my personal computer

☐ Share new content on a public platform (e.g. SlideShare, institutional repository)

....

21. Have you used any licenses to express the rights others have to use materials you have created/edited/modified/combined? (Tick all that apply)

☐ No

☐ Yes: copyright

☐ Yes: GNU/GPL

☐ Other (please specify)

☐ Yes: creative commons

☐ Yes: other "open content license"

....

22. How do you usually share with others (distribute) Educational Resources that you have copied, created, edited/modified, or combined? (Tick all that apply)

☐ Personal websites or blogs

☐ Personal email

☐ Departmental websites

☐ Institutional learning management systems

☐ Institutional repositories

☐ Country or regional repositories (e.g. OER Africa)

☐ Image/video sharing services (e.g. Flickr, Slideshare, YouTube)

☐ Cloud-based storage (e.g. Google Drive, Dropbox, OneDrive)

☐ Never shared educational resources

☐ Other or not applicable (please specify)

....

23. Please indicate how important are the following factors as potential motivators for you to use/reuse Educational Resources. Please answer all rows.

	Very unimportant	Unimportant	Neutral	Important	Very important	Don't know/ not applicable
Bringing down costs for course development for the institution	☐	☐	☐	☐	☐	
Bringing down costs for students	☐	☐	☐	☐	☐	
Following normal practice in my dicipline	☐	☐	☐	☐	☐	
Enhancing my reputation amongst my peers	☐	☐	☐	☐	☐	
Helping other educators	☐	☐	☐	☐	☐	
Knowing that other educators may use my materials, improve the quality of my materials	☐	☐	☐	☐	☐	

☐ New factors (please specify)

....

24. To what extent do the following barriers influence your use/re-use of Educational Resources ? Please answer all rows.

	Not at all extremely	Slightly	Somewhat	very	Don't know/not applicable
Lack of access to the internet	☐	☐	☐	☐	☐
Lack of hardware	☐	☐	☐	☐	☐
lack of interest	☐	☐	☐	☐	☐
lack of knowlegde about alternative intellectual property systems (e.g. creative commons)	☐	☐	☐	☐	☐
Lack of support	☐	☐	☐	☐	☐
Lack of skills	☐	☐	☐	☐	☐
I worry about the quality of OER	☐	☐	☐	☐	☐
Lack of software	☐	☐	☐	☐	☐
Lack of time	☐	☐	☐	☐	☐
Lack of training	☐	☐	☐	☐	☐
No compensation for use/ reuse of the resource	☐	☐	☐	☐	☐
No reward system for devoting time and energy	☐	☐	☐	☐	☐

☐ New factors (please specify)

....

Dimension 3: OER - Institutional

DEFINITION:

Open educational resources (OER) are teaching, learning, and research materials that are available in the public domain or have an open license that allows their free use and/or adaptation by others.

OER are provided by a number of institutions for example, MIT Open Courseware, Open University's Openlearn, the National Repository of Open Educational Resources in India, OER Africa, and RIVED in Brazil. Examples of OER include full courses, course materials, modules, textbooks, audios,videos, tests, software, and some massive open online courses (MOOCs).

25. Indicate to what extent you agree or disagree with the following statements about Open Educational Resources (OER) in your Educational Institution: Please answer all rows

	Strongly disagree	Disagree	Neither agree nor disagree	agree	Strongly agree	Not available	Not aware
Policies adopted by my institution support the use of OER	☐	☐	☐	☐	☐	☐	☐
My institution has reliable infrastructure to store and preserve access to teaching and learning materials (OER)	☐	☐	☐	☐	☐	☐	☐

	Strongly disagree	Disagree	Neither agree nor disagree	agree	Strongly agree	Not available	Not aware
The OER initiative in my institution is able to sustain the maintenance through internal funding and/or external contributions	☐	☐	☐	☐	☐	☐	☐
The OER initiative in my institution encourages the development and adaptation of teaching and learning materials in a variety of languages and cultural contexts	☐	☐	☐	☐	☐	☐	☐
There are ways for handling and utilizing OER in my institution as the main or supplemental materials to support our courses.	☐	☐	☐	☐	☐	☐	☐
In my institution the instructors have OER support services they need to develop their courses	☐	☐	☐	☐	☐	☐	☐
The instructors' attitudes in my institution are positive towards OER	☐	☐	☐	☐	☐	☐	☐
My institution has a valid model of OER quality assurance	☐	☐	☐	☐	☐	☐	☐
My institution has reliable procedures to accredit online studies from other educational institutions (portability of university credit)	☐	☐	☐	☐	☐	☐	☐
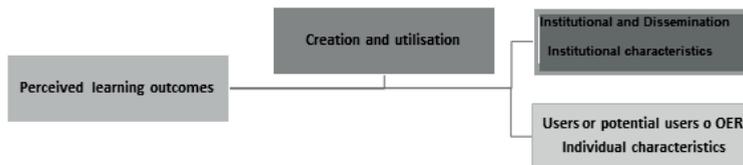
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Dimension 4: OER - Perceived outcomes

DEFINITION:

Open educational resources (OER) are teaching, learning, and research materials that are available in the public domain or have an open license that allows their free use and/or adaptation by others.

OER are provided by a number of institutions for example, MIT Open Courseware, Open University's Openlearn, the National Repository of Open Educational Resources in India, OER Africa, and RIVED in Brazil.

Examples of OER include full courses, course materials, modules, textbooks, audios,videos, tests, software, and some massive open online courses (MOOCs).

26. Have you ever used OER that are available in the public domain or has an open license (e.g. Creative Commons) that allows it to be used and/or adapted by others?

O Yes   O No   O I don't know if the resource I have used is in the public domain or has an open license (e.g. Creative Commons) that allows it to be used and/or adapted by others.
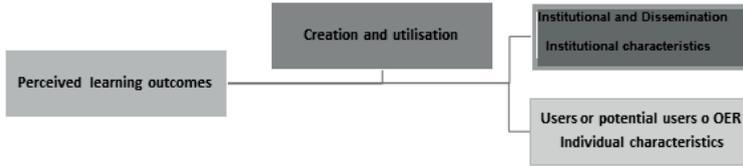
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Only if answered yes in 26. Dimension 4: OER - Perceived outcomes (Instructors and Students).

DEFINITION:

Open educational resources (OER) are teaching, learning, and research materials that are available in the public domain or have an open license that allows their free use and/or adaptation by others.

OER are provided by a number of institutions for example, MIT Open Courseware, Open University's Openlearn, the National Repository of Open Educational Resources in India, OER Africa, and RIVED in Brazil.

Examples of OER include full courses, course materials, modules, textbooks, audios, videos, tests, software, and some massive open online courses (MOOCs).

If your answer to question 26 is "Yes", please answer the following questions. For other answers, you have FINISHED the questionnaire.

For instructors and students that have used an OER.

27. Perceived usefulness - The extent you believe that Open Educational Resources (OER) may enhance learning outcomes. Please answer all rows

	Strongly disagree	Disagree	Neither agree nor disagree	agree	Strongly agree	Not available	Not aware
OER improves my learning outcomes	☐	☐	☐	☐	☐	☐	☐
OER is very useful to me	☐	☐	☐	☐	☐	☐	☐
OER helps me accomplish my learning effectively	☐	☐	☐	☐	☐	☐	☐

28. Playfulness - the extent to which you may enjoy Open Educational Resources (OER). Please answer all rows

	Strongly disagree	Disagree	Neither agree nor disagree	agree	Strongly agree	Not available	Not aware
I feel OER helps me improve my creativity	☐	☐	☐	☐	☐	☐	☐
I feel OER helps me improve my imagination by obtaining information	☐	☐	☐	☐	☐	☐	☐
I feel I can have with OER, a variety of experiences without any interference	☐	☐	☐	☐	☐	☐	☐
I feel OER is fun regardless of usage purpose	☐	☐	☐	☐	☐	☐	☐

29. Intention to use - The extent to which you may intend to use Open Educational Resources (OER).Please answer all rows

	Strongly disagree	Disagree	Neither agree nor disagree	agree	Strongly agree	Not available	Not aware
I prefer OER to traditional learning	☐	☐	☐	☐	☐	☐	☐
I am willing to participate in other OER opportunities	☐	☐	☐	☐	☐	☐	☐
OER should be inplemented into several courses	☐	☐	☐	☐	☐	☐	☐
I will recommend OER to other learners	☐	☐	☐	☐	☐	☐	☐

30. Perceived ease of use - The extent to which you may believe that Open Educacional Resources (OER) will be easy to use. Please answer all rows

	Strongly disagree	Disagree	Neither agree nor disagree	agree	Strongly agree	Not available	Not aware
OER study methods are easy to understand	☐	☐	☐	☐	☐	☐	☐
OER is easy to use	☐	☐	☐	☐	☐	☐	☐

INSTRUCTOR • English • Open Education Resources Differentiation Project

Conclusion

Thank you for completing this survey!

1.2 Student's Questionnaire

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Open Educational Resources Differentiation Project

Dear respondents

The Research on Open Educational Resources for Development (ROER4D.ORG - website) program seeks to understand the adoption and impact of Open Educational Resources (OER) across the Global South, in South America, Sub-Saharan Africa and South East Asia. It is funded by the International Development Research Centre (IDRC) in Canada.

You have been invited to participate in this research survey because you are a current or potential user/creator of OER in the higher education sector. Your participation is voluntary. If you decide to participate in this survey, you may withdraw at any time. If you decide not to participate, or if you withdraw, you will not be penalized in any way.

The survey will take approximately 20 minutes. Thank you for your time,

José Dutra - University of São Paulo - Brazil
Judith Pete - Tangaza College of Catholic University of Eastern Africa - Kenya
Daryono - Teburka University - Indonesia

If you have any questions, please contact Prof. Dutra (dutra@usp.br) at the University of Sao Paulo, Brazil.

1. ELECTRONIC CONSENT: Please select your choice below. Clicking on the "Agree" button below indicates that:

You have read the above information you voluntarily agree to participate you are at least 16 years of age you understand that your responses with be used for research purposes and that your anonymity will be preserved

If you do not wish to participate in the research study, please decline participation by clicking on the "Decline" button.

O Agree   O Decline

STUDENT • English • Open Education Resources Differentiation Project

Dimension 1: Individual characteristics

2. The name of your educational institution

    ....

3. Your country

O Brazil   O Ghana   O Kenya

O Chile   O India   O Malaysia

O Colombia   O Indonesia   O South africa

4. Gender

O Female   O Male   O Other

5. Age

    ....

6. Digital proficiency

○ Basic Digital Literacy - I can use some common applications effectively

○ Intermediate Digital Competence - I can use a range of applications effectively

○ Advanced Digital Expertise - I can use specific applications and tools, over and above levels commonly required

7. Where do you access the internet? (tick all that apply)

☐ I don't access internet

☐ Family member or friend's home

☐ Home

☐ Internet cafe (cyber cafe / Lan house / internet shop)

☐ Public Library

☐ School / university / workplace

☐ Wi-fi hotspot (cafe, restaurant, shopping mall)

☐ Other (please specify)

....

8. What device(s) do you use to connect to the internet? (tick all that apply)

☐ I don't access internet

☐ Laptop computer

☐ Other (please specify)

☐ Desktop computer

☐ Tablet

☐ Mobile phone

....

9. To what extent are you satisfied with the Internet connection where you most frequently access it? Please answer all rows

	Very dissatisfied	Dissatisfied	Unsure	Satisfied	Very satisfied	N/A
Cost	○	○	○	○	○	○
Speed	○	○	○	○	○	○
Stability	○	○	○	○	○	○

10. Which language do you feel most comfortable with academic reading

○ Bahasa Melayu   ○ Hindi   ○ Spanish

○ English   ○ Portuguese

○ Other (please specify)

....

11. Which language do you feel most comfortable with academic writing?

○ Bahasa Melayu   ○ Hindi   ○ Spanish

○ English   ○ Portuguese

○   Other (please specify)

....

12. When watching educational videos that are not in your first language, you prefer those videos to be:

○   Dubbed (audio translation to my first language)

○   Subtitled in my first language

○   Subtitled in the original language

○   In original language, unchanged

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Dimension 1: Individual characteristics - students

13. English proficiency

	Strongly disagree	Disagree	Neither agree nor disagree	agree	Strongly agree	Not available	Not aware
I am sufficiently competent in English to take a course presented in English	○	○	○	○	○	○	○

14. Primary area in which you study. (Tick any that apply)

☐ Applied Science, Technology, Engineering

☐ Arts

☐ Computing & Information Science

☐ Economics, Business & Management, Accounting

☐ Education Studies

☐ Other (please specify)

☐ Health & Social Care

☐ History & Geography

☐ Languages & Linguistics

☐ Literature

☐ Mathematics

☐ Medicine

☐ Physical education

☐ Psychology and Philosophy

☐ Religious studies

☐ Science

☐ Social science

☐ Special education

....

STUDENT • English • Open Education Resources Differentiation Project

Dimension 2: Educational resources

15. Below there are examples of Educational Resources. For each resource listed below, tick all that apply to you. Please answer all rows

	Created by my own	Use others "as is" (copy)	Modified/ Edited or combined others'	Shared my own or modified versions with others (distribute)	Never created, used, modified or shared
Word document or equivalent	☐	☐	☐	☐	☐
Powerpoint or equivalent	☐	☐	☐	☐	☐
Excep spreadsheet or equivalent	☐	☐	☐	☐	☐
PDF	☐	☐	☐	☐	☐
Images	☐	☐	☐	☐	☐
Audio	☐	☐	☐	☐	☐
Video	☐	☐	☐	☐	☐
E-books	☐	☐	☐	☐	☐
Lecture notes	☐	☐	☐	☐	☐
Quizzes	☐	☐	☐	☐	☐
Tutorials	☐	☐	☐	☐	☐
Textbooks	☐	☐	☐	☐	☐
Whole courses	☐	☐	☐	☐	☐
Massive open online courses (MOOCs)	☐	☐	☐	☐	☐
Data sets	☐	☐	☐	☐	☐

16. Please indicate the activities that you undertake if you USE educational resources. (Tick all that apply)

☐ Copy the content and use it unaltered

☐ Transform the content by adding an interpretation, reflection or practice

☐ Change the content or add locally relevant information, examples and scenarios

☐ Convert the content from one form to another

☐ Summarise the essential ideas

☐ Reuse the content for different purposes than originally intended

☐ Other or not applicable (please specify)

....

☐ Implement changes to update the resource

☐ Translate the content from one language to another

☐ Change the order or sequence of the materials

☐ Integrate the content with other content in order to develop a module or new unit

☐ Combine the content with new media

17. Please indicate the activities that you undertake if you CREATE educational resources. (Tick all that apply)

☐ Check accuracy of content

☐ Check grammar & spelling

☐ Remove contextual information (e.g. dates)

☐ Improve appearance

☐ Add references and acknowledgements

☐ Change file format to one that can be edited

☐ Other or not applicable (please specify)

....

☐ Use licenses to express the rights others have to my educational resources

☐ Keep a copy on my personal computer

☐ Share new content on a public platform (e.g. SlideShare, institutional repository)

18. Have you used any licenses to express the rights others have to use materials you have created/edited/modified/combined? (Tick all that apply)

☐ No   ☐ Yes: creative commons

☐ Yes: copyright   ☐ Yes: other "open content license"

☐ Yes: GNU/GPL

☐ Other (please specify)

....

19. How do you usually share with others (distribute) Educational Resources that you have copied, created, edited/modified, or combined? (Tick all that apply)

☐ Personal websites or blogs   ☐ Country or regional repositories (e.g. OER Africa)

☐ Personal email
                                  ☐ Image/video sharing services (e.g. Flickr, Slideshare, YouTube)
☐ Departmental websites

☐ Institutional learning management systems   ☐ Cloud-based storage (e.g. Google Drive, Dropbox, OneDrive)

☐ Institutional repositories   ☐ Never shared educational resources

☐ Other or not applicable (please specify)

....

20. Please indicate how important are the following factors as potential motivators for you to use/reuse Educational Resources. Please answer all rows.

	Very unimportant	Unimportant	Neutral	Important	Very important	Don't know/ not applicable
Bringing down costs for course development for the institution	☐	☐	☐	☐	☐	
Bringing down costs for students	☐	☐	☐	☐	☐	
Following normal practice in my dicipline	☐	☐	☐	☐	☐	
Enhancing my reputation amongst my peers	☐	☐	☐	☐	☐	
Helping other educators	☐	☐	☐	☐	☐	
Knowing that other educators may use my materials, improve the quality of my materials	☐	☐	☐	☐	☐	

☐ New factors (please specify)

....

*21. **To what extent do the following barriers influence your use/re-use of Educational Resources ? Please answer all rows.***

	Not at all extremely	Slightly	Somewhat	very	Don't know/not applicable
Lack of access to the internet	☐	☐	☐	☐	☐
Lack of hardware	☐	☐	☐	☐	☐
lack of interest	☐	☐	☐	☐	☐
lack of knowlegde about alternative intellectual property systems (e.g. creative commons)	☐	☐	☐	☐	☐
Lack of support	☐	☐	☐	☐	☐
Lack of skills	☐	☐	☐	☐	☐
I worry about the quality of OER	☐	☐	☐	☐	☐
Lack of software	☐	☐	☐	☐	☐
Lack of time	☐	☐	☐	☐	☐
Lack of training	☐	☐	☐	☐	☐
No compensation for use/ reuse of the resource	☐	☐	☐	☐	☐
No reward system for devoting time and energy	☐	☐	☐	☐	☐

☐ New factors (please specify)

....

STUDENT • English • Open Education Resources Differentiation Project

Dimension 3: OER Perceived outcomes

DEFINITION:

Open educational resources (OER) are teaching, learning, and research materials that are available in the public domain or have an open license that allows their free use and/or adaptation by others.

OER are provided by a number of institutions for example, MIT Open Courseware, Open University's Openlearn, the National Repository of Open Educational Resources in India, OER Africa, and RIVED in Brazil.

Examples of OER include full courses, course materials, modules, textbooks, audios,videos, tests, software, and some massive open online courses (MOOCs).

22. Have you ever used OER that are available in the public domain or has an open license (e.g. Creative Commons) that allows it to be used and/or adapted by others?

O Yes   O No   O I don't know if the resource I have used is in the public domain or has an open license (e.g. Creative Commons) that allows it to be used and/or adapted by others.
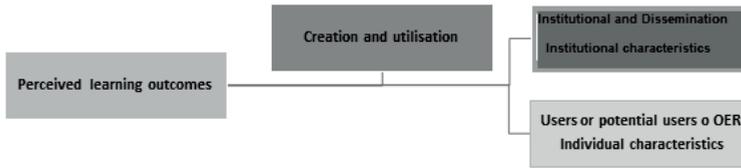
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Only if answered yes in 22. Dimension 3: OER - Perceived outcomes (Instructors and Students).

DEFINITION:

Open educational resources (OER) are teaching, learning, and research materials that are available in the public domain or have an open license that allows their free use and/or adaptation by others.

OER are provided by a number of institutions for example, MIT Open Courseware, Open University's OpenLearn, the National Repository of Open Educational Resources in India, OER Africa, and RIVED in Brazil.

Examples of OER include full courses, course materials, modules, textbooks, audios,videos, tests, software, and some massive open online courses (MOOCs).

If your answer to question 22 is "Yes", please answer the following questions. For other answers, you have FINISHED the questionnaire. .

For instructors and students that have used an OER.

23. Perceived usefulness - The extent you believe that Open Educational Resources (OER) may enhance learning outcomes. Please answer all rows

	Strongly disagree	Disagree	Neither agree nor disagree	agree	Strongly agree	Not available	Not aware
OER improves my learning outcomes	☐	☐	☐	☐	☐	☐	☐
OER is very useful to me	☐	☐	☐	☐	☐	☐	☐
OER helps me accomplish my learning effectively	☐	☐	☐	☐	☐	☐	☐

24. Playfulness - the extent to which you may enjoy Open Educational Resources (OER). Please answer all rows

	Strongly disagree	Disagree	Neither agree nor disagree	agree	Strongly agree	Not available	Not aware
I feel OER helps me improve my creativity	☐	☐	☐	☐	☐	☐	☐
I feel OER helps me improve my imagination by obtaining information	☐	☐	☐	☐	☐	☐	☐
I feel I can have with OER, a variety of experiences without any interference	☐	☐	☐	☐	☐	☐	☐
I feel OER is fun regardless of usage purpose	☐	☐	☐	☐	☐	☐	☐

25. Intention to use - The extent to which you may intend to use Open Educational Resources (OER).Please answer all rows

	Strongly disagree	Disagree	Neither agree nor disagree	agree	Strongly agree	Not available	Not aware
I prefer OER to traditional learning	☐	☐	☐	☐	☐	☐	☐
I am willing to participate in other OER opportunities	☐	☐	☐	☐	☐	☐	☐
OER should be inplemented into several courses	☐	☐	☐	☐	☐	☐	☐
I will recommend OER to other learners	☐	☐	☐	☐	☐	☐	☐

26. Perceived ease of use - The extent to which you may believe that Open Educacional Resources (OER) will be easy to use. Please answer all rows

	Strongly disagree	Disagree	Neither agree nor disagree	agree	Strongly agree	Not available	Not aware
OER study methods are easy to understand	☐	☐	☐	☐	☐	☐	☐
OER is easy to use	☐	☐	☐	☐	☐	☐	☐

STUDENT • English • Open Education Resources Differentiation Project

Conclusion

Thank you for completing this survey!

Appendix 2: Country Universities

Country	University
Kenya *Lecturers =43* *Students =798*	Great Lakes University Jomo Kenyatta University of Agriculture and Technology Maseno University Tangaza University College
Ghana *Lecturers =42* *Students =830*	Catholic Institute of Business and Technology Kwame Nkurumah University of Science and Technology University of Cape Coast University of Ghana
South Africa *Lecturers =25* *Students =621*	University of Cape Town University of Pretoria University of South Africa