

**UNIVERSITY OF NAIROBI, SCHOOL OF COMPUTING AND
INFORMATICS**

**MASTER OF SCIENCE IN INFORMATION TECHNOLOGY &
MANAGEMENT**

RESEARCH PROJECT REPORT



**IMPLEMENTATION OF OPEN EDUCATION RESOURCES AT THE
UNIVERSITY OF NAIROBI: A CASE OF INNOVATION STUDIES
COURSE**

BY

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Research report submitted to the School of Computing and Informatics in partial fulfillment of the requirement for the award of a degree in Masters of Science in Information Technology Management of University of Nairobi

DECLARATION

This project is my original work and to the best of my knowledge this research work has not been submitted for any other award in any University

Selina Atwani Ochukut: _____ Date: _____
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This project report has been submitted in partial fulfillment of the requirement of the Master of Science Degree in Information Technology Management of the University of Nairobi with my approval as the University supervisor

Tonny Omwansa: _____ Date: _____

DEDICATION

I dedicate this project to my father and my husband who have constantly encouraged me to pursue this master's degree and complete the project.

ACKNOWLEDGEMENT

I wish to express my sincere gratitude to the Almighty God for enabling me carry out this project. I am greatly indebted to my supervisor Dr. Omwansa for his, devoted contribution enormous support and guidance. I also appreciate the panelists for their corrections and guidance.

ABSTRACT

Universities all around the world are grappling with issues of increasing access to higher education. Open education resources (OER), have the potential to increase participation in higher education and promote lifelong learning. There are several projects that have been initiated in several countries especially in the developed countries, to foster the agenda of OER. Although OER are high on the agenda of social and inclusion policies, and are supported by many stakeholders in the educational sphere, their use in higher education has not yet reached a critical threshold (Ehlers, 2011). The uptake of OER at the University of Nairobi is still low. It's in this line that this research was carried out in order to explore the implementation of OER at the University of Nairobi and to offer guidance on how OER courses should be implemented. The research employed the use of exploratory research design to get insights on the implementation of OER courses at the University of Nairobi. A course on innovation studies was "OERized" using the Side Cap model, deployed and its use evaluated through sign ups to the course and students participations. A questionnaire was administered to further evaluate the use of the OER course. The "OERized" course attracted 153 learners by the time this report was being written. The results of the study indicate that there is little evidence of "OERization" of the courses at UON though there is some form of openness; the policies at the UON do not fully support "OERization"; there is low awareness of OER among learners; ICT skills are necessary for uptake of OER courses and there is need to train the staff and learners on the use of the technology being used. The researcher concludes that "OERization" can help UON and other universities bridge the gap of access to higher education and recommends, establishment of the necessary policies and guidelines, ICT literacy and OER awareness campaigns, use of an engaging platform to deploy the course, provision of incentives to content producers and learners and training the content producers and learners on use of the platform as things the UON should do in order to achieve "OERization".

Keywords: OER, OERization, higher education, University of Nairobi

TABLE OF CONTENTS

DECLARATION	II
DEDICATION	III
ACKNOWLEDGEMENT	IV
ABSTRACT	V
TABLE OF CONTENTS.....	VI
LIST OF TABLES AND FIGURES	IX
ABBREVIATIONS	X
1.0 CHAPTER ONE	1
1.1 Background	1
1.2 Problem Statement.....	2
1.3 Purpose of the research.....	2
1.4 Significance of the study	3
1.5 Limitations.....	3
1.6 Scope.....	3
2.0 CHAPTER TWO: LITERATURE REVIEW	4
2.1 OER status in the world.....	4
2.2 OER in Africa.....	5
2.3 OER in Kenya	5
2.4 OER in the University of Nairobi	7
2.5 Actors in OER implementation.....	8
2.6 Challenges of OER	10
2.7 Why OER is not gaining attention at higher institutions of learning	12
2.8 OER Repositories.....	14
2.9 Models for development of OER based learning materials.....	15
2.9.1 OER based course development cycle	15
2.9.2 Virtual University for Small States of the Commonwealth model for OER courseware development.....	16
2.9.3 The SideCAP project model.....	16
3.0 CHAPTER THREE: METHODOLOGY.....	19
3.1 Exploring the state of OER	19
3.2 OERization of the course.....	20

3.3 Evaluation of the “OERized” course.....	24
3.4 Data analysis	25
CHAPTER 4: FINDINGS AND DISCUSSION	26
4.1 Exploration of the state of OER at UON.....	26
4.1.1 General view of OER implementation in the university	26
4.1.2 OER actors’ responsibility as pertaining to the implementation of OER courses.....	27
4.1.3 Fears academic staffs have in regards to making their courses open	29
4.1.4 How to motivate learners to take OER Courses.....	29
4.1.5 Challenges faced by the university in implementing OER courses and their proposed solutions	29
4.2 The “OERrization” process	30
4.2.1 Challenges encountered during the “OERization” process and lessons learnt	30
4.3 Evaluation of the use of the” OERized” course.....	31
4.3.1 Learners’ profile	31
4.3.2 Activity Participation	32
4.4 Survey results	35
4.4.1 OER Awareness	35
4.4.2 Enrollment in OER courses.....	36
4.4.3 Course evaluation	36
4.4.5 Frequency of course access	37
CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS.....	38
5.1 Conclusion.....	38
5.2 Recommendations	38
5.2.1 Establishment of the necessary policies guiding the implementation of OER courses	38
5.2.2 Funding.....	39
5.2.3 ICT literacy.....	39
5.2.4 OER awareness Campaigns	39
5.2.5 An engaging platform (Technology).....	39
5.2.7 Training of staff and students on the use of technology	40
5.3 Further research	40
REFERENCES	42
APPENDIX 1	46

APPENDIX 2	47
APPENDIX 3	49
APPENDIX 4	51

LIST OF TABLES AND FIGURES

Fig 2.1: OER-Based Course Development Cycle (Chung and Khor 2012).....	15
Fig 2.2 The VUSSC: OER course development process. (West and Daniel 2009)	16
Table 3. 1: Sampling criteria.....	19
Table 3. 2: Checklist for available content	22
Table 3.3: A tutor review	22
Table 3.4: Olat review	23
Table 3.5:Sakai Review.....	23
Table 3.6: Open Class review	24
Table 3.7: Canvas review	24
Table 4.1: Summary of the OER actors' responsibilities	28
Table 4. 2: Challenges faced by the university in implementing OER courses and their proposed solutions	30
Fig 4.1: Education Background.....	31
Fig 4.2: Professional background	32
Table 4.3: Activity participation	32
Table 4.4: Page views.....	33
Table 4.5: Weekly page views.....	35
Fig 4.3:OER awareness.....	35
Fig 4.4: Enrolment in OER courses	36
Fig 4.5: Course access	37

ABBREVIATIONS

OERs-Open Education Resources

OEP-Open Education Practices

C4DLab- Computing for Development Lab

UNESCO- The United Nations Educational, Scientific and Cultural Organization

UON-University of Nairobi

OERization- The process of making courses open education resources

MOOCS-Massive Open Online Courses

1.0 CHAPTER ONE

1.1 Background

Access to higher education is becoming inaccessible to many because of the costs involved in it. In Kenya much effort has gone into establishing several universities and increasing infrastructural capacity to handle more students. The increase in the number of universities has led to another problem of lack of enough qualified personnel to train the large number of students. Most Universities in Kenya have most of their departments run close to none PhD holders and most university teaching staff are Masters degree holders and tutorial fellows (Ogenga 2013). Several strategies have been developed to solve the problems of access to higher education; one of them being the development of courses as open education resources.

“Open Educational Resources (OERs) are any type of educational materials that are in the public domain or introduced with an open license. The nature of these open materials means that anyone can legally and freely copy, use, adapt and re-share them. OERs range from textbooks to curricula, syllabi, lecture notes, assignments, tests, projects, audio, video and animation” (UNESCO 2015). “OERs has been seen to potentially expand access to learning for everyone, but most of all for non-traditional groups of students—and thus widen participation in higher education. They can also be an efficient way of promoting lifelong learning, for both individuals and governments, and can bridge the gap between informal and formal learning” (Ehlers, 2011). In addition, OERs have the potential to change the playing field in terms of an individual’s right to education (Wilson 2008). Several projects have been established all around the world to develop OER; this has seen the building of several OERs repositories e.g OERcommons, Openlearn, connexions, MIT Open Courseware, Wikieducator where educational materials from leading universities in the world have been posted.

Several universities in the world have developed their content and published it in repositories; for instance Massachusetts Institute of Technology has made their course materials available to the world since 2002 through their Open CourseWare (OCW) initiative. Other universities that have OER initiative include John Hopkins Bloomberg School of Public Health, Rice University Connexions, Utah State University Sharing of Free Intellectual Assets, Open Learning Initiative from Carnegie Mellon, China Open Resources for Education Initiative and Japanese OCW Alliance, among others.

For a number of years, efforts have been made to promote OER in Kenya. Adoption is not yet high, yet the need is obvious. Numerous academic institutions have been establishing OERs in the country and the

urge to learn more about OERs continue. The number of faculty members utilizing OERs continues to grow demonstrating an appreciation and demand for the same (UNESCO 2015).

The University of Nairobi was ranked position 7 in Africa and 855 worldwide by the web ranking of universities. The University is strategically positioned and endowed with a huge pool of talent and resources to continue providing leadership in technology innovation. Currently, the University has a total student population of 79,000, 2052 academic staff, 154 professors and 253 associate professors (University of Nairobi 2015). In an effort to promote Open Education resources, the University of Nairobi in collaboration with Unesco have published four courses in the OER commons repository.

The University of Nairobi has a centre for open and distance learning which was established in 2005 with the mandate of enabling the University of Nairobi to diversify its delivery modes, enrich the learning process and increase access to quality university education by using open, distance and e-learning modes. Though the centre deals with open access to education it deals more with development of e-learning courses. There is no evidence of any OER initiative established by the centre.

1.2 Problem Statement

Although OER are high on the agenda of social and inclusion policies, and are supported by many stakeholders in the educational sphere, their use in higher education has not yet reached a critical threshold (Ehlers, 2011). Drop and Lane also note that despite numerous OER-based projects and the obvious advantages of OER, many educational institutions to date do not seem to be using OER on a mass scale (Dorp and Lane 2011). OER concept, although known for over a decade, is not as widely used by educational institutions in the developing countries as anticipated (Pete 2015). At the University of Nairobi, there is low adoption and use of OER courses. That which has been done is much of individual lecturers' initiatives than institutional initiatives. Though, the University has set up a center for Open and distance learning which has been running since 2003, the center has yet to implement OER courses. Exploring the implementation of OER courses at the University of Nairobi is therefore necessary in order to be to understand what is required for the process to be successful.

1.3 Purpose of the research

The purpose of this research was to explore the key elements in the implementation of OER course at the University of Nairobi and to offer guidance on how "OERization" would be carried out.

Objectives

1. Explore the state of OER at the University of Nairobi and identify the actors in the implementation of OER courses

2. “OERize” one course offered at the university of Nairobi
3. Evaluate the usage patterns of the “OERized ” course
4. Recommend the key ingredients to the success of “OERization” at the University of Nairobi

1.4 Significance of the study

The significance of this study was to help understand the key elements of the implementation of OER course at the University of Nairobi. In addition, the study can be used as guide for “OERization” of courses in other universities and colleges.

1.5 Limitations

The study investigates the “OERization” of one course at the University of Nairobi, which is limiting, a wider study to cover several courses and several higher learning institutions would be necessary in order to gain deeper understanding of the implementation issues.

1.6 Scope

The study involved: carrying out an exploratory study to determine the status and the actors of OER courses at the University of Nairobi; “OERization” of a course on the innovation studies; evaluation of the course usage and offering of recommendations on key elements of “OERization” in the University of Nairobi

2.0 CHAPTER TWO: LITERATURE REVIEW

2.1 OER status in the world

OER is said to include: Learning Content: Full courses, courseware, content modules, learning objects, collections and journals, Tools: Software to support the development, use, re-use and delivery of learning content including searching and organization of content, content and learning management systems, content development tools, and on-line learning communities. Implementation Resources: Intellectual property licenses to promote open publishing of materials, design principles of the best practice, and localization of content. (Hylén 2006)

In the United States of America and around the world, the demand for high quality education has never been greater. By 2025 there will be 263 million students who will be eligible for higher education. In order to accommodate this demand, at least 4 universities of 30,000 students would need to open every week for the next 15 years. Clearly, traditional avenues to quality education are not meeting this demand. Open Educational Resources can play an important role in meeting this need and ensuring equal access to knowledge for teachers and students around the globe. (The William and Flora Hewlett Foundation 2013)

Open education resource has gathered a lot of attention recently, with many projects being initiated to foster its development all over the world. The movement originated in the late 1990s with the first major initiative coming from the Massachusetts Institute of Technology (MIT). In 2002, MIT released 50 freely available courses through the OpenCourseWare initiative. One year later, MIT officially opened OpenCourseWare with 500 classes. In 2007, the Open Society Institute and the Shuttleworth Foundation gathered parties interested in the open educational resource movement in Cape Town to offer a venue to collaborate on formalizing this movement. From this gathering, the Cape Town Open Education Declaration was drafted (Goldberg and LaMagna 2012)

Since 2001, the Hewlett Foundation has made grants in excess of \$40 million to support institutions and organizations that develop and provide online access to open educational content. Among the initiatives supported by Hewlett Foundation are; MIT OpenCourseWare – to publish course materials from virtually all MIT courses, Carnegie Mellon University’s Open Learning Initiative – a portfolio of highly interactive multi-media courses, African Virtual University – to provide free digital and printable materials to train teachers in Sub-Saharan Africa, Creative Commons – to offer innovative copyright solutions that allow for more “open access” of creative work and scholarly materials online, Widernet eGranary – to improve digital access in developing countries (The William and Flora Hewlett Foundation 2005)

Currently MIT's OpenCourseWare is accessed by a broadly international population of educators and learners. MIT OpenCourseWare receives over 2 million visits each month. These visits come from all over the world, with over half coming from outside of North America. 43% of those accessing the OpenCourseWare are self-learners, 42 are students and only 9% are educators. By July 2015 2,292 courses had been published in the MIT OpenCourseWare. (MIT OpenCourseWare 2015)

OER represents an emerging movement that is re-shaping learning and teaching in higher education worldwide. The growth of the open educational trend "is a response to the rising costs of education, the desire for accessing learning in areas where such access is difficult, and an expression of student choice about when and how to learn" (L. Johnson et al., 2010, cited in (Bossu, Brown and Bull 2013)). In line of this, many universities around the globe have launched OER projects.

OER are already being used by learners for self-study, by teachers to enhance classroom learning, and by education providers to bring down the cost of instruction. Clearly, open education resources hold some answers to maintaining the quality of learning material while significantly reducing the cost of education. (Wiley, Green and Soares 2012)

2.2 OER in Africa

OER Africa has also showcased some great initiatives for instance: ACEMaths project whose aim is to pilot adaptation and use of OER materials for teacher education programs in South Africa; Free courseware project, which promotes the publication and use of free and open educational resources at the University of the Western Cape (UWC); African Health OER Network which is a collaboration of institutions seeking to develop a sustainable and scalable model for the systematic rollout of OER to support health education on the continent; IADP-SADC Digital Resources Project, Leadership Initiative for Public Health in East Africa (LIPHEA); MERLOT African Network (MAN); Open Content UCT , Skills for a Changing World; Teacher Education in sub Saharan Africa (TESSA); African Virtual University (AVU). (OER Africa 2014)

2.3 OER in Kenya

Although there are not many initiatives of OER in Kenya, there are signs of developing OER in the country for instance, the launch of the School of Open Africa in Nairobi in October 2014 (Creative Commons 2014) and the establishment of the open access policy by the University of Nairobi (OER Africa 2012); Kenya is also the host of African Virtual University which is an independent and

intergovernmental organization whose objective is to promote and support initiatives in open distance and electronic learning in Africa.

Egerton University is also part of the founding partners of TESSA (Teacher Education in Sub-Saharan Africa) which is a network of teacher trainers and teachers working alongside The Open University, UK and other international organisations. It focuses on the education and training needs of teachers in sub-Saharan Africa. The aim is to bring together teachers and teacher educators from across the region. Its principal purpose is to improve the quality of classroom practice and extend access to teacher education resources across sub-Saharan Africa. It does this through offering a range of materials, all of which are OER, in four languages to support school-based teacher education and training (Teacher Education in Sub-Saharan Africa (TESSA) 2007).

The South African Institute for Distance Education (SAIDE) OER Africa Initiative recently entered into a MoU with African Nazarene University (ANU) to explore the possible use of OER at ANU and to support its ODeL provision (SAIDE 2014)

In terms of policies, Kenya participated in the Inception Meeting for implementation of the Paris OER Declaration (26-27 March 2013 UNESCO HQs), a project launched with the financial contribution of the William and Flora Hewlett Foundation, that aimed to support Member States to develop national level OER Policies and implement support to the UNESCO ICT Competency Framework for Teachers (ICT CFT) by harnessing OER. (UNESCO 2013)

UNESCO and the Kenya Ministry of Education organized a Workshop in Nairobi, Kenya in the year 2014, to formulate the draft Policy on Open Educational Resources for achieving high-quality Education for All. The Workshop resulted in the development of the comprehensive draft National OER Policy focusing on key-entry points aligned to the Sessional Paper including: Intellectual Property Rights and Licensing; Leadership and management; Skills/Knowledge for policy advisors, Quality Assurance Policy Guidelines; Professional Development (Human Resource Policy); Curriculum and Assessment (Curriculum Design/Materials Development, Sourcing (procuring) content, Costs, File Formats); ICT Infrastructure and Deployment (ICT Infrastructure and Connectivity) and Marginalized and Vulnerable Groups. The policy was expected to be ready in September 2014. (MEDIA SERVICES 2014)

2.4 OER in the University of Nairobi

In terms of policy development, the University of Nairobi in 2012 launched the open access policy which requires all the University community members to submit their scholarly output to the University of Nairobi Digital Repository which is a non-profit, non-commercial, open access facility. The policy grants the university non-exclusive, irrevocable, world-wide license to exercise any and all rights under copyright relating to their scholarly articles in any medium, provided that the articles are not sold for a profit, and to authorize others to do the same. The policy does not deal with issues of re-purposing and modification of the scholarly work.

According to the basic guide for OER by the Commonwealth of learning, there are at least four main policy issues that institutions need to deal with in order to have effective and sustainable OER projects. These are: Provision in policy of clarity on IPR and copyright on works created during employment (or study) and how these may be shared with and used by others, Human resource policy guidelines regarding whether the creation of certain kinds of work (e.g. learning resources) constitutes part of the job description for staff and what the implications are for development, performance management, remuneration, and promotion purposes, ICT policy guidelines regarding access to and use of appropriate software, hardware, the Internet and technical support, as well as provision for version control and back-up of any storage systems for an institution's educational resources, Materials development and quality assurance policy guidelines to ensure appropriate selection, development, quality assurance, and copyright clearance of works that may be shared (Commonwealth of Learning 2011).

In 2015 under the framework of Open Education Week and in a bid to promote Open Solution for knowledge Societies and also enhance accessibility, UNESCO supported the "OERisation" of the four pilot courses at the University of Nairobi. The selected pilot courses included: Innovation Studies; a course unit offered to masters students at the college of Biological and Physical Sciences, Introduction to Business and Entrepreneurship; a course unit offered to undergraduate students at the college of Biological; Physical Sciences, Audit and Control; a course unit offered to both undergraduate and master's students at the College of Biological Physical Sciences and Database Systems; a course unit offered to both undergraduate and graduate masters students in different departments at the College of Biological and Physical Sciences (UNESCO 2015).

In addition The University of Nairobi has a centre for open and distance learning which was established in 2005 with the mandate of enabling the University of Nairobi to diversify its delivery modes, enrich the

learning process and increase access to quality university education by using open, distance and e-learning modes. Though, the center deals with open access to education it deals more with development of e-learning courses. There is no evidence of any OER initiative established by the center.

2.5 Actors in OER implementation

Open Educational Practices (OEP) address the whole OER governance community: policy makers, managers/ administrators of organizations, educational professionals and learners. (Camilleri, Ehlers and Pawlowski 2014)

Governments willing to promote OER should earmark a small proportion of funds made available for education for openly publishing education materials developed within publicly funded institutions, as well as open up national digital archives and museum collections to the education sector. The rapid pace of development of the OER movement means that it will soon have an impact on all higher education institutions. This calls for management of institutions to consider the risk of doing nothing. Higher education institutions are advised to have an information technology strategy which includes, among other things, how the institution should deal with the opportunities and threats posed by the OER movement. Institutions willing to embrace the opportunities offered by OER should create incentives for faculty members to participate in the initiative, such as implementing teaching portfolios with at least one OER element, as part of the tenure process. The use of OER in teaching should also be encouraged and training offered (OECD 2007).

(Ehlers and Conole, 2010) divide the stakeholders engaged with creating, using or supporting the use of OER as those involved in ‘creation and use’ of OER and those involved in ‘policy and management’ aspects of OER, namely: the Creators - create the OER, and could be either ‘teachers’ or ‘learners’, Users - Use the OER, and could be either ‘teachers or ‘learners’, Managers - Provide the infrastructure to support the OER (technical and organizational) and the tools/support to create/use OER, Policy makers - Embed OER into relevant policy.

Open Educational practices have a lifecycle; from creation through use and management and a number of stakeholders are involved with and influence this lifecycle. This includes: national policy makers who are promoting the use of open educational resources, rectors or vice chancellors of higher education institutions, who initiate institution-wide open education initiatives. As part of this, teachers will then be asked to create, find, adapt and share OER via an institution-wide OER repository. Teachers, who encourage learners to produce, share and validate content, learners who use open available content to

create knowledge landscapes on study topics which better fit their needs than the available text book “one size fits all” style

According to a study by Hylén (2006), the most significant barriers among colleagues not using OER in their teaching are lack of time and skills, the absences of a reward system and perceived lack of interest for pedagogical innovation. (Hylén 2006)

Effective use of OER can lead to many benefits such as; expanded access to learning, scalability, augmentation of class materials, enhancement of regular course content, quick circulation, less expense for learners, showcasing of innovation and learning, ties to alumni and continually improved resources. (University of Maryland University College 2014).

OER initiatives need to be more effectively supported by governmental and institutional policies, structures and procedures. The government create an enabling environment for the implementation of OER this may include, creation of enabling policies and policy guidelines — such as on copyright and intellectual property rights (IPR) — supportive funding regimes, development of human resources, creation of partnerships, and provision of accessible and robust ICT connectivity infrastructures. Governments play a crucial role in setting national policies, providing guidelines and setting priorities that shape the direction of higher education systems.

It is vital for the government to continue raising awareness, within governments in particular, about the importance of open licensing of educational materials and the effect that OER can have on quality education (Wyk)

UNESCO gives the following as guidelines to institutions, faculty and students for integrating OER to higher education;

Universities should provide institutional strategies for adopting OER, incentives to staff for the development of quality OER, flexible copyright policies and ICT access for staff and students.

Academic staff should; develop skills to develop and evaluate OER, Publish in OER, Encourage student participation and Promote OER.

Student should; Explore OER, Encourage others to be involved and use the OER material (UNESCO 2011)

In order for OER production and adaptation to be sustainable long term, the culture of creating and using OER should become a teaching and learning practice norm within a university (Ng’ambi and Luo n.d.).

2.6 Challenges of OER

Though the OER movement is gaining momentum, it still faces challenges for mainstream adoption after a decade of research. An understanding of the major barriers to wide-scale engagement with openness is the foundation to any practitioner (Stagg 2014). The poor use of OER could be due to the fact that OER practices and initiatives have not been included in the current strategic plans of most participating institutions. Many challenges still remain in the adoption of OERs due to; lack of interest in creating, but mostly in adopting OER, the poor quality of OER resources available, insufficient institutional support to encourage and promote the adoption of OER and OEP, and copyright and intellectual property policies issues, which is considered by many as one of the biggest challenges of OEP and OEP adoption (Bossu, Brown and Bull 2013).

Barriers for re-use of OER include: A lack of technical skills and support; A lack of understanding of copyright and licensing; A lack of a culture of sharing; a lack of relevant OERs, Difficulty in searching for and finding OERs; Localization of the OERs; restrictive licenses; Difficulty in adapting formats that resources are made available in; Granularity of the resource, with parts of courses or single assets being preferred to whole courses; Lack of infrastructure in some parts of the world (White and Manton 2011).

A lack of trust, limited sharing in institutional cultures and low acceptance of OER by educators hinder OER use and access (Ehlers 2011)

Use of OER by learners has not been evaluated at a greater length. To encourage students to be able to have confidence in using OERs, tutors should facilitate and validate the sharing of online resources shared by students. This is because students place a higher value on resources that have been given a ‘seal of approval’ by their tutors and lecturers (White and Manton 2011).

Some of the challenges that face the adoption and use of OERs include; lack of OERs awareness ,the unwillingness of the potential users to spend time to adapt and use the resources even when the benefits of using OERs are very clear, potential users seeing OER as foreign content that does not fit to their situations and lack of infrastructure. (Ngimwa and Wilson 2012).

A research done on the adoption and use of open textbooks by teachers and learners revealed that cost, quality of content and ease of use were the most significant factors influencing the adoption and use of open textbooks by learners (Petrides, et al. 2011).

Richter and McPherson note that without considerable thought to adaptation, OER produced in Western industrialized countries may not necessarily fit the needs of learners in developing countries. Making OER available will not necessarily serve the aim of achieving educational justice throughout the world, because provision does not lead to widespread uptake (Richter and McPherson 2012).

Several gaps for reusing OER could easily be overcome by a better design of the resources. Greater efforts will have to be made to understand the personal, organizational, and environmental factors that hinder or enable creation, sharing, use, and reuse of OER. (Ehlers, 2011)

One of the challenges of sustainability of OER production and use is that each learning material is like a unique puzzle piece, each created by different authors. Educators and learners must then identify an appropriate puzzle piece that could meaningfully fit a specific “teaching and learning” goal (Ng’ambi and Luo n.d.).

Development and widespread adoption of open educational resources will require meeting a number of short-term and long-term challenges. Not only will advocates of OER need to develop better strategies to incentivize faculty development of these materials, but a better technical infrastructure must be built to house and provide ease of search for these materials. Some development challenges include:

a.) Incentivizing development- One of the biggest challenges is to find ways to incentivize faculty to develop and share high-quality OER materials. Traditionally, publication of scholarship and, to a lesser degree, textbooks and learning resources, long has been a significant factor in determining tenure and promotion. Under the current tenure and promotion environment, faculty is not incentivized to spend any of their limited time and resources in producing non-peer-reviewed materials. As a result, it will be necessary to find ways to incentivize faculty to develop OER;

b.) Revising, not just reusing, materials-The very dynamic nature of open educational resources relies upon such materials being constantly revised, remixed, and reused. Currently, revising and remixing OER remains problematic. For OER to remain dynamic and relevant, user modifications and revisions are necessary. Thus, it is not enough just to incentivize faculty initially to produce OER materials; institutional policies also must be created that incentivize faculty to take existing OER materials and modify, reuse, and share those materials with the field;

c.) Need for faculty technical knowledge- The skills necessary for the development of high-quality OER materials surpass the high level of content knowledge that many faculty possess. Faculty members developing high-quality OER must, at minimum, understand digital accessibility design, as well as have a technical understanding of metadata tagging, learning management systems, and, increasingly,

rudimentary coding abilities. Also, because of the dynamic nature of the Internet, this knowledge must be constantly updated. (Texas Higher Education Board 2010)

2.7 Why OER is not gaining attention at higher institutions of learning

Plotkin Hal (Plotkin 2010) gives three main factors that appear to account for most of the current lack of higher education governance attention to OER as: cultural, chronological and systemic.

a.) Cultural: OER have not been a part of pre-existing educational practices within the often tradition-bound higher education enterprise; on occasion, the reliance on sound, proven and reliable past practices can sometimes make it difficult for promising new teaching methods to gain momentum. Constrained by past practices, many instructors operate in environments that leave little room for innovations, except at the individual classroom level, and provide even less support for any attempts to expand successful classroom innovations to a larger scale.

b.) Chronological: majority of collegiate board members and senior academic officers holding positions of authority today, those who could lend material support to these activities, assumed those leadership posts well before the relatively recent advent of the opportunities associated with OER. Like many Internet-related skills, knowledge and expertise about OER within higher education institutions today is often inversely proportional to rank. In this case, higher education's foot soldiers, teachers and learners, frequently know much more about OER than the generals who command the system.

c.) Systematic: the initial lack of OER that met the requirements of the Americans with Disabilities Act (ADA) and the Federal Rehabilitation Act (FRA) also slowed down adoption of OER by higher education institutions, in particular, public schools such as community colleges that lacked the resources needed to remedy violations of these laws as required when challenged. This systemic obstacle is being removed, however, thanks to more recent efforts focused on the creation and use of OER that meets the requirements of these laws, which in turn permits the use and continuous improvement of these materials within public educational institutions without fear of costly legal challenges related to the rights of disabled students.

A study by Texas Higher Education Board (Texas Higher Education Board 2010) cites the following as Structural Limitations for the Development and Use of OER;

a.) Availability and unintended market decline: There are still fundamental challenges with the availability of high-quality OER materials In part; this lack of material is due to the challenges of developing OER materials in some disciplines. Although there are some disciplines where there are

already an abundance of public domain and Creative Commons-licensed resources, there are other disciplines in which those sorts of primary documents are much more difficult to find. In addition the adoption and widespread use of OER materials may have unintended economic consequences at institutions with campus bookstores.

b.) Hidden costs: Effective OER must include provisions for several cycles of update and improvement. Each of these cycles requires sustaining funds to ensure that materials remain relevant and usable.

c.) Technical infrastructure development: There are often significant technological challenges with the dissemination and use of open educational resources. Because many OER resources are being built without significant technological support and scaffolding, it may be difficult for faculty to use materials they do find. For example, some OER may not be built to the technical specifications necessary to be easily digested into a variety of learning management systems. Without knowledge of these technical specifications and the skills to conform to them, even quality materials will be worthless.

Other challenges mentioned by the Texas higher education board includes; intellectual property, institutional policies, changing pedagogy and finding quality resources.

A study done in Tanzania on the challenges and instructors' intention to adopt open educational resources in higher education found the challenges facing instructors to adopt OER in higher education as being:

a.) Technology-There is inadequate ICT infrastructure which hinders the adoption and use of OER in teaching. In some institutions access to computers is still limited while some are faced with unreliable internet services and low bandwidth;

b.) Awareness of intellectual property and copyright issues-some instructors do not have knowledge about copyright and intellectual property issues. In this regard, instructors do not know which resources should be shared in the public domain, and which rights should be reserved to the institution or to the authors;

c.) Relevance and quality of OER-majority of instructors could not find resources which are relevant to their contexts. Some of the instructors are suspicious about the quality of OER and other resources from the internet;

d.) Awareness about the existence of OER-some instructors are still unaware of the existence of OER (Mtebe and Raisamo 2014).

2.8 OER Repositories

There are several online repositories that have been developed for publishing different OER materials. The aim of the repositories is to provide easy access to the produced OER materials. The following is a description of the a few repositories that are commonly used.

OER Commons

OER commons was launched in 2007 by ISKME, to support and build a knowledge base around the use and reuse of open educational resources (OER). As a network for teaching and learning materials, the site offers engagement with resources for curriculum alignment, quality evaluation, social bookmarking, tagging, rating, and reviewing. OER Commons provides a single point of access to the highest quality content from around the world. IT houses over 50000 vetted and fully-indexed OER. (OER Commons 2007)

OpenLearn

OpenLearn is an initiative of the Open University which aims to break the barriers to education by reaching millions of learners around the world, providing free educational resources and inviting all to sample courses that their registered students take – for free . Open learn boasts of over 800 courses. (Open Learn 2014)

Connexions

Connexions is a dynamic digital educational ecosystem consisting of an educational content repository and a content management system optimized for the delivery of educational content. Connexions is one of the most popular open education sites in the world. It has more than 17,000 learning objects or modules in its repository and over 1000 collections (textbooks, journal articles, etc.) are used by over 2 million people per month. Its content services the educational needs of learners of all ages, in nearly every discipline, from math and science to history and English to psychology and sociology. Connexions deliver content for free over the Internet for schools, educators, students, and parents to access 24/7/365. Materials are easily downloadable to almost any mobile device for use anywhere, anytime. Schools can also order low cost hard copy sets of the materials (textbooks). (Openstax CNX 2015)

MIT Open courseware

MIT OpenCourseWare (OCW) is a web-based publication of virtually all MIT course content. OCW is open and available to the world and is a permanent MIT activity. MIT published the first proof-of-concept site in 2002, containing 50 courses. By November 2007, OCW completed the initial publication of

virtually the entire MIT curriculum, over 1,800 courses in 33 academic disciplines. Currently MIT OCW has 2250 courses published, 1 billion page views and 170 million visits. 100 courses have complete video lectures and 900 older versions of courses have been updated. (MITOPENCOURSEWARE 2014)

From these repositories you can get a whole range of learning materials that learners and lecturers can use, reuse and remix. The repositories also offer an avenue for publishing of the OER materials. Though the repositories are a great place to publish and get OER materials, most of them do not provide avenues of tracking the learning activities.

2.9 Models for development of OER based learning materials

2.9.1 OER based course development cycle

The OER based course development cycle includes creation phase, evaluation phase and production phase as depicted in Figure 2.1.

The development phase of OER based learning materials in this approach is initiated with the creation of Course Syllabus, Course Development Timeline and Course Blue Print by Course Team Coordinator and respective Course Writers. This cycle lacks the specific phases that go into the development of OER course.

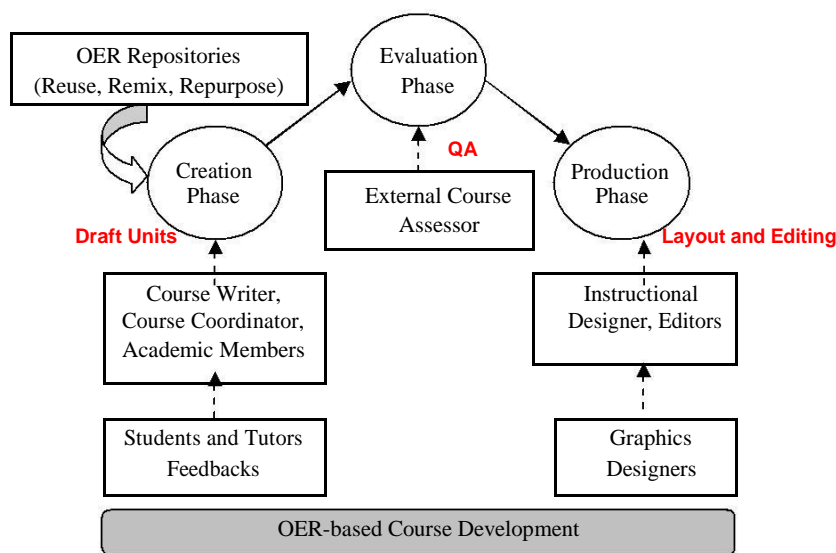


Fig 2.1: OER-Based Course Development Cycle (Chung and Khor 2012)

2.9.2 Virtual University for Small States of the Commonwealth model for OER courseware development

The VUSSC (Virtual University for Small States of the Commonwealth) community proposes a 5-Step life cycle model for OER courseware development as follows: Search for OER, Create materials, combine units, review and publish as shown in Figure 2.2. This model does not take into account the pedagogical needs and requirements (prepare phase) of a particular course before searching for resources that are available. (Santally 2009)

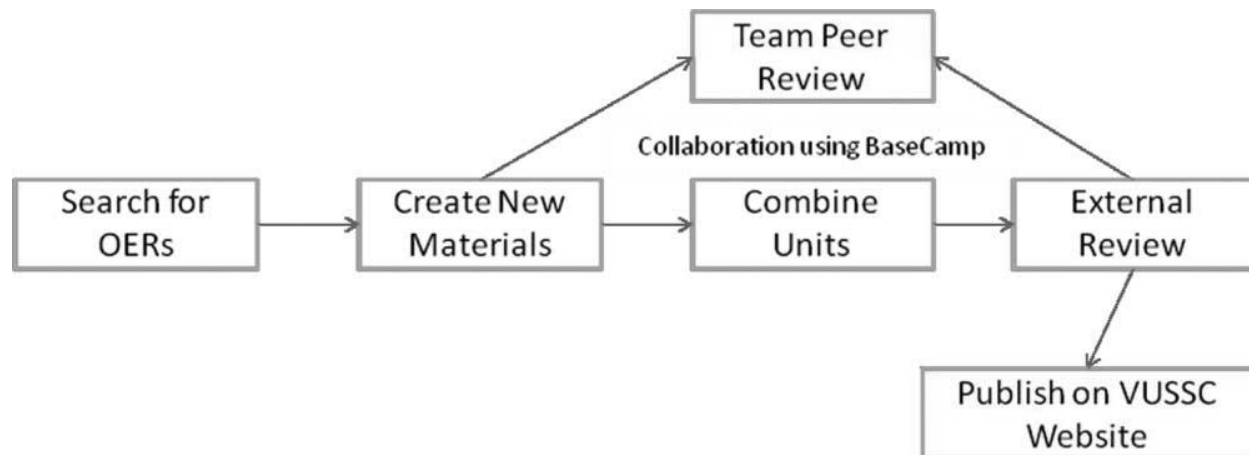


Fig 2.2 The VUSSC: OER course development process. (West and Daniel 2009)

2.9.3 The SideCAP project model

The Staff Innovation in Distributed Education in Caribbean, African, and Pacific countries (SideCap) project model consists of the following stages; Prepare, Search and Classify, (re-) purpose, Value Addition, Publish and Deliver, Review. The SideCAP model takes into account the pedagogical needs and requirements (prepare phase) of a particular course before searching for resources that are available (Santally 2009)

Explanations of the SideCap model stages

a. Prepare

- Module Specifications Sheet (Outline, Duration, Learning Outcomes, Assessment Criteria, Learning Units Description).
- Context of Use (whether mainstream educational system through programmes of studies or short professional development courses or both).

- Identify type of Open Licensing to be used.
- Selection of the pedagogical strategy and instructional techniques.

b. Search and Classify

- Identify repositories to be used (e.g. Openlearn, Connexions, MIT, OERCommons, WikiEducator or Wikipedia etc).
- Look for related content – browse metadata, check licence type, check content quality, level, format, pedagogical approach, duration etc.
- Build a checklist of available content – classify according to the pertinent criteria above or as per one's requirements.
- Identify what is missing and what needs to be added, developed from scratch and/or adapted/repurposed/recontextualized.

c. (re-)Purpose

- Decontextualize highly adapted learning content.
- Rewrite material that is not contextually correct, write new materials to cater for those that are missing, and/or mix materials from different sources.
- Add context-related learning activities that meet the pedagogical approach selected.

d. Value Addition

- Add new learning/pedagogical scenarios that improve the learning experience of learners.
- Provide multiple modalities (such as animations and multimedia) for learning to suit individual preferences of learners (such as learning/cognitive styles).
- Provide multiple access/delivery modes to increase accessibility to learners with different constraints such as internet connection, limited bandwidth etc.

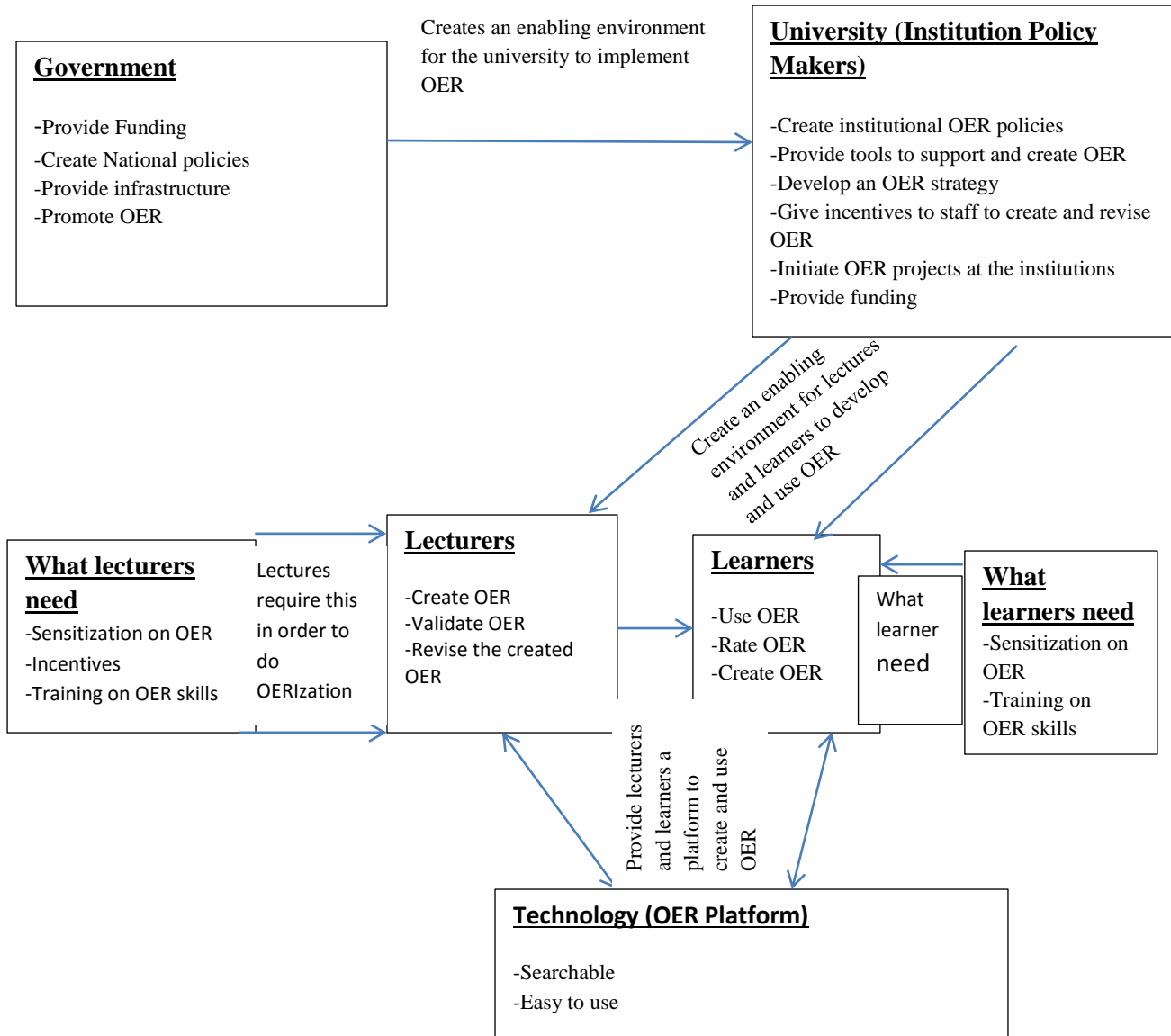
e. Publish and Deliver

- Publish on e-learning platform, stand-alone websites, and CD/DVD formats.
- Deliver the course to target audience.
- Monitor the learner progress and achievements and provide tutoring/technical support.
- Share in the different OER repositories or simply put the content available on your local website and let others know about it.

f. Review

- Gather feedback from learners on the course.
- Review content to improve the course for subsequent cohorts.
- Restart the cycle if there are changing requirements and/or to keep up-to-date with ongoing developments in the area or to check for other OERs that have been published or improved. Note that successive cycles might span over a much shorter time frame except if module syllabus is reviewed in depth.

2.10 Conceptual model



3.0 CHAPTER THREE: METHODOLOGY

3.1 Exploring the state of OER

In order to understand the status of the OER at the University of Nairobi and in Kenya in general, the researcher did a desktop research on the existing documents that relate to OER and OER initiatives both in Kenya and at the University of Nairobi. The researcher further carried out in-depth interviews with key stakeholders in the University.

Purposive sampling was carried out to select the participants of the exploratory study from the University of Nairobi. The researcher had purposed to interview; policy makers, lecturers, staff who work in the centre for open learning , staff from the school of education, staff in charge of academics and staff in charge of ICT at the university of Nairobi. The respondents were purposefully chosen because of their supposed involvement in the OER course development process. Table 3.1 shows the number of respondents who were invited to the interviews and those who responded.

An interview guide was developed to aid in the data collection. The interview guide explored the following; Thoughts of OER in the university, responsibilities of different stakeholder, faculty fears, benefits of OER, challenges facing the “OERization” of University courses and how to overcome the challenges.

Each interview lasted between 20-30 minutes and was recorded. All the interviews were conducted through face to face except one where the interviewee was not available for the face to face interview in which case he filled the interview guide.

Area	No of responses	No invited
Lecturers	1	2
Staff from the Centre for open learning	2	2
Staff from school of education	0	1
Policy makers	2	1
Head of ICT	1	1
Total	5	9

Table 3. 1: Sampling criteria

3.2 OERization of the course

Four courses were chosen randomly for “OERization” by UNESCO under the framework of Open Education Week and in a bid to promote Open Solution for knowledge Societies and also enhance accessibility. The selected courses included: Innovation Studies, Introduction to Business and Entrepreneurship, Audit and Control, and Database Systems.

Although there were four courses that were “OERized”, for this study the researcher selected Innovation Studies; a course unit offered to masters’ students at the school of Computing and Informatics, because;

- The research’s supervisor was teaching the course therefore making it easy for the researcher to get information and work with the supervisor to convert the course to OER
- It cuts across several disciplines since innovation applies to all fields.

The course was “OERized” using the SideCap project model for the development of OER course. The SideCap project is a trans-national educational and research project funded by the ACP-EU Cooperation Programme in Higher Education (EDULINK). The SideCap model was chosen because it takes into account the pedagogical needs and requirements (prepare phase) of a particular course before searching for resources that are available. This stage is very important for development of University courses.

The SideCap project model has six stages namely; Prepare, Search and Classify, (re-) purpose, Value Addition, Publish and Deliver, Review.

a. Preparation

During the preparation stage the researcher got the course outline for the course from the lecturer which was used as a guide to search for the information. The course outline that was used is found in Appendix 3

b. Search and Classify

This stage involved searching for the actual content of the courses.

Four repositories were identified as the sources for the content. The repositories were;

- OERCommons
- Openlearn
- Connexions
- MIT Open CourseWare

Table 4.2 shows the resources that were used by the researcher in the “OERization” of the course

Innovation Studies

Resource	License	Decision
Book on Democratizing Innovation http://web.mit.edu/evhippel/www/democ1.htm	CC-By-NC-ND	Use as a reference book
Open Learn-The Concept of Innovation http://www.open.edu/openlearn/money-management/management/technology-management/the-concept-innovation	CC-BY-NC-SA	Remix with the other content
Managing innovation and entrepreneurship http://ocw.mit.edu/courses/sloan-school-of-management/15-351-managing-innovation-and-entrepreneurship-spring-2008/	CC-BY-NC-SA	Remix with the other content
OnInnovation http://www.oercommons.org/courses/on-innovation/view	BY-NC-ND.	Remix with the other content
Managing Innovation: Emerging Trends http://ocw.mit.edu/courses/sloan-school-of-management/15-352-managing-innovation-emerging-trends-spring-2005/lecture-notes/	CC-BY-NC-SA	Remix with the other content
Managing the Innovation Process http://ocw.mit.edu/courses/sloan-school-of-management/15-351-managing-the-innovation-process-fall-2002/	CC-BY-NC-SA	Remix with the other content
How to Develop "Breakthrough" Products and Services	CC-BY-NC-SA	Remix with the other content

http://ocw.mit.edu/courses/sloan-school-of-management/15-356-how-to-develop-breakthrough-products-and-services-spring-2004/lecture-notes/		
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Table 3. 2: Checklist for available content

c. (Re)-Purpose and value-addition

After looking at the available material, the course outline was re-purposed to encompass other aspects of the material found according to their relevance. The new outline is shown in the Appendix 4;

d. Publish and deliver

In order to publish the course a review of various platforms was carried out in order to determine the best.

A review of the open source e-learning platforms was carried out in order to select the best platform to publish the course. This was done because the OER repositories did not have a way to track the activities of those who signed up and since the researcher wanted to track the activities of course participants, a platform that catered for that was necessary. The selection criteria for the platform comprised of; installation process, Students’ signup process, the ease of use, analytics, openness, assignment submission, collaboration tools and accepted data formats.

Review of e-learning platforms

The following platforms were reviewed.

A tutor

A tutor is a free open source learning management system used to develop online courses and create e-learning content.

Strengths	Weaknesses
<ul style="list-style-type: none"> • Its open source • Students can register for the courses by themselves • Easy to create content • Has collaboration tools 	<ul style="list-style-type: none"> • Needs hosting and has a complicated installation process • Does not have tracking of students activities • Does not have analytics • No feature for assignment submission

Table 3.3: A tutor review

OLAT

OLAT is a **course-based LMS** and provides a variety of elements which can be used to integrate learning content into a course, organize the learning environment, collaborate through activation and interaction, or assess user achievements

Strengths	Weaknesses
<ul style="list-style-type: none">• Students can easily enroll for the course once logged in the system• Has collaboration tools• Information can be presented in different formats• Easy to use	<ul style="list-style-type: none">• Has a complicated process of uploading course content• Needs hosting• Does not have analytics

Table 3.4: Olat review

Sakai

Sakai is an open source e-learning management system developed by Apereo foundation.

Strengths	Weaknesses
<ul style="list-style-type: none">• Easy to create course content• Ability to track students' progress• Has collaboration tools• Has the assignment feature	<ul style="list-style-type: none">• Students are enrolled manually by the course creator• The instructor cannot know the students enrolled for the course• Needs hosting and has a complicated installation process• Does not provide course analytics

Table 3.5: Sakai Review

Open class

OpenClass is a dynamic learning environment that helps educators bring social learning and experiences to their students. It's open to everyone, easy to use, and totally free.

Strengths	Weaknesses
<ul style="list-style-type: none">• Its cloud based• Has collaboration tools	<ul style="list-style-type: none">• Takes a long time for registration confirmation

<ul style="list-style-type: none"> • Accepts content with different formats • Has an assignment feature 	<ul style="list-style-type: none"> • Does not provide analytics
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Table 3.6: Open Class review

Canvas

Strengths	Weaknesses
<ul style="list-style-type: none"> • Its cloud based so need for hosting • Easy to enroll students • Easy to create course content • Has analytics • Has collaboration features • Supports creative commons licenses 	<ul style="list-style-type: none"> • Not customizable

Table 3.7: Canvas review

After a review of the various platform, canvas was chosen because of its ease to use, easy to enroll students, provides analytics, supports creative commons licenses and the fact that its cloud based therefore removing the need for installation and hosting.

3.3 Evaluation of the “OERized” course

The use of the “OERized” course was evaluated by keeping track of students who registered for the course and their participation in the course. A Google form was created in order to collect the demographic data of students who registered for the course since the registration process could not capture many details. The Google form captured background information of the course participants. The background information collected about the students included; their occupation, the organization they work and their highest educational level. 61 participants filled the background information form.

Course analytics from the e-learning platform was used to establish usage patterns of the course by learners who had signed up for the course. The course analytics captured details of students’ participation, how many pages they accessed, whether they took any action or not and if they submitted assignments. The analytics also provided the number of pages viewed daily.

A questionnaire was further developed in order to capture the experiences and usage patterns of the learners. The questions for the questionnaire were adapted from a study on evaluation of the Open

Learning Design Studio Massive Open Online course (MOOC) curriculum design course: Participant perspectives, expectations and experiences (Cross 2013).

Coined in 2008, the term “massive online open courses” pertains to online courses that allow the participation of hundreds, if not thousands, of students simultaneously. Not only are they free, they offer essentially unlimited enrollment to anyone interested. Based on Stephen Downes’ connectivist theory, MOOCs feature three aspects: open content, open instruction, and open assessment (Examined Existence n.d.). MOOC have the same concept as that of OER courses in terms of being open for anyone to enroll at any time anywhere. They differ in terms of the ability to be remixed. MOOCs are not changeable in any way but OER can be remixed and because the evaluation was focusing on just the use of the course, the questionnaire from study of MOOCs was adapted with modifications to suite the study. Some questions were added in order to capture OER awareness by the participants.

The questions that were adopted from the MOOC study covered issues relating to learners compliance, content evaluation and platform evaluation. The ones that were evaluating the use of MOOC were dropped because they were deemed not fitting to the study instead questions evaluating the use of OER were added.

The questionnaire covered the participants’ background, their awareness of OER, their reasons for enrolling for the course, their satisfaction of the course and how it can be improved, their views on the platform and how it can be improved.

3.4 Data analysis

Due to the number of respondents, the analysis done was predominately qualitative though in some cases quantitative analysis was captured to show distribution. Content analysis was used.

Content analysis is the procedure for the categorization of verbal or behavioral data for the purpose of classification, summarization and tabulation (The writing studio 2012)

For the interviews the interviews ware transcribed before being categorized under the different categories.

CHAPTER 4: FINDINGS AND DISCUSSION

4.1 Exploration of the state of OER at UON

This section provides the results of the in-depth interviews that were carried out in order to get an understanding of OER at the University of Nairobi.

4.1.1 General view of OER implementation in the university

From the analysis of the existing documents and review of the initiated OER projects, it's evident that there is little implementation of OER courses at the University. Apart from the development of the open access policy in 2012 (OER Africa 2012) which allows University staff and students to share their research outputs, there are no other policies that guide the development of OER courses at the University.

Making University of Nairobi Courses Open Educational resources is a good initiative which would bring several benefits to the University and the public if properly implemented. The following as are the benefits the UON is set to gain if it implements OER courses

- Visibility which will lead to High ranking of the university
- Improved quality of Education at lower costs
- Increased income from research grants to fund the development of OER courses
- Wider student audience
- Reduction of cost in form of travel costs to extra mural centers
- Promotion of learning at a self-pace
- Easy dissemination of knowledge
- Enhancement towards open-access
- Standardized teaching
- Improved quality of teaching

These results indicate that there is much to gain in the implementation of OER courses at UON.

There are some elements of openness of University Courses in the sense that there are units which one can enroll even if he is not a student of that particular degree but is a registered student of the University and pays for the course. This indicates that there is low implementation of OER courses at the University as open access alone does not amount to the courses becoming Open Educational resources.

OER courses pose a challenge to the University courses and can lead to infringement of copyright issues if not implemented properly and OER alone cannot be used for learning and it should be therefore be used as supplementary learning materials.

The University should make courses open but not everything they use for teaching in order to maintain their competitive advantage.

An independent body like the higher education board should be the one to spearhead the development of the OER courses, not the individual universities so as to have standardized courses and to avoid issues of copyright infringement, unless the University is doing so as a marketing strategy.

The policies at the University do not support the implementation of OER courses, but individual lecturers have embraced OER courses and some are utilizing OER for developing their courses at an individual capacity.

In terms of ICT infrastructure there is enough physical infrastructures for the implementation of OER courses, but there is a challenge of manpower to support the implementation of OER courses.

4.1.2 OER actors' responsibility as pertaining to the implementation of OER courses

The finding of the study indicates that there are several actors in the “OERization” process and each of the actors have a role to play. The actors include the government, the University Management, the lecturers and the learners.

The government has a bigger role to play in the implementation of OER courses in the University. The government responsibilities help in setting a conducive environment for the University to implement OER Courses. The University of Nairobi cannot therefore ignore the government in their implementation of the OER courses, it should constantly engage with the government to provide the necessary environment for the implementation of OER courses.

Paul Stacey in his study on government support for OER notes that there is a growing awareness that government can generate significant public benefits by supporting OER through policy, guidelines, and incentive funding (Stacey 2013).

The University management is a key player in the “OERization” process. The management has to provide the structures and the environment necessary for the implementation of OER courses. Without these structures the lecturers and the students will find it difficult to implement and utilize OER.

The lecturers are the ones at the centre of the implementation of the OER courses because they are the ones involved in the development of the OER courses. Table 4.1 provides a summary of the actors' responsibilities.

Responsibilities of different actors

Actor	Responsibility
Government	<ul style="list-style-type: none"> • Creating national policies regarding OER • Development of OER standards • Providing ICT infrastructure • Creating a regulatory framework • Creating awareness • Funding
University	<ul style="list-style-type: none"> • Creating awareness through the lecturers • Give Lecturers incentives • Form institutional OER policies like anti-plagiarism • Training the lecturers on the use and development of OER courses • Put structures within the university to deal with OER issues e.g Manpower to manage the OER platforms
Lecturers	<ul style="list-style-type: none"> • Develop content, package and disseminate it • Supervision of students • Sensitization of students on OERs • Skilled facilitation of OER Courses • Help in drafting OER policies • Support students who use OER's
Learners	<ul style="list-style-type: none"> • Use OER • Co-author OER

Table 4.1: Summary of the OER actors' responsibilities

4.1.3 Fears academic staffs have in regards to making their courses open

Major stumbling blocks to OER course implementation are the fears the lecturers have. Much effort should therefore be put in trying to encourage the lecturers to be involved in the development of OER courses. The use of technology is one key thing that is coming as a cause of the fears lecturers have. A study by Reedy also notes that most significant barrier to OER use remained to be technological (Reedy 2011). Training of the lecturers in basic IT skills and the “OERization” process is therefore necessary in order to help in dispelling the fears. In addition The UON should do the following in order to support the lecturers;

- Give them incentives can be in the form of promotions, monetary value, honorary
- Good compensation
- Establish structures in the universities
- Appoint Champions to spearhead the OER initiative

4.1.4 How to motivate learners to take OER Courses

The study found out that learners are always willing to use OER courses so long as;

- They are made aware of their existence
- The materials are of high quality
- They are trained on how to find and use the material

Motivation for learners to utilize the produced OER courses at the UON is necessary, failure to which developed courses will end up not being utilized. Much effort should be directed in making learners aware of OER and train them how to utilize them.

4.1.5 Challenges faced by the university in implementing OER courses and their proposed solutions

Challenge	Proposed Solution
-Funds to cater for and sustain the development and maintenance of OER courses	-Government to fund the development of OER courses -Seek for grants from research organs
-Fear of Change - Developing countries are still skeptical about the motives of OERs	-Create OER awareness -Compensate the OER course developers
-Issues of copyright, intellectual property, patents and trademarks -Ensuring lecturers of protection of their content	-Develop policies and guidelines -The government to put in place structures to support OER

- Loss of competitive advantage as other institutions can copy the content of one institution	
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Table 4. 2: Challenges faced by the university in implementing OER courses and their proposed solutions

4.2 The “OERrization” process

The “OERized” course was published in the Canvas e-learning platform and can be found in the link below;

<https://resources.instructure.com/courses/309>

4.2.1 Challenges encountered during the “OERization” process and lessons learnt

Searching for information

Getting relevant information that directly fits to the course outline produced by course instructors is a challenge. As much as there are many repositories having “OERized” courses, this information does not directly fit to the local context. A lot of redefinition of the course topics has to take place. This requires much time and effort. There is therefore a need of the production of local OER resources in the country.

Licensing

Different sources have different creative common licenses appended to them; it therefore poses a challenge on how the re-purposed and the remixed course should be licensed. For instance if one source is using the attribution license (CC BY) and the other is using Attribution-NoDerivs (CC BY-ND) this will bring a conflict on how the resultant remixed course will be licensed. A lot of care need to be observed while remixing courses so as not to breach the licenses appended to the source courses. The University should also have a standardized way of licensing the produced OER courses.

Training

The researcher undertook the process without any prior training in the “OERization” process. This resulted to too much time being taken in the development of the “OERized” course. Prior “OERization” training is therefore necessary for those who will be involved in the “OERization” process.

4.3 Evaluation of the use of the "OERized" course

Invitations to enroll for the course were sent to the entire university of Nairobi fraternity and the C4DLab community.

4.3.1 Learners' profile

Education background

The vast majority of the people who signed up for the course were degree holders, consisting of 61% followed by masters at 19% as shown in fig 4.1. This is mainly because the vast majority of the student fraternity where the course was piloted is undergraduate students.

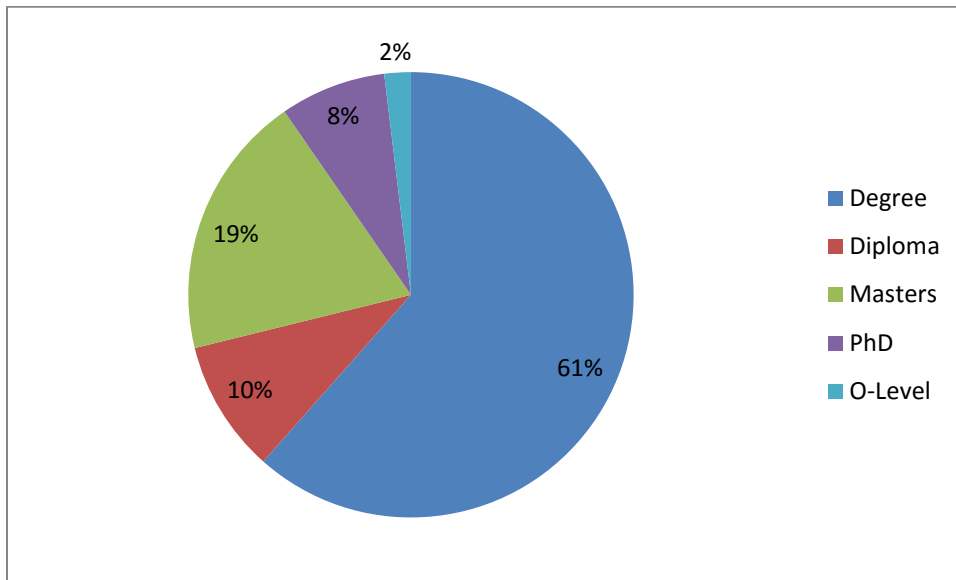


Fig 4.1: Education Background

Profession

Learners who participated in the course come from a wide range of professional background as shown in fig 4.2. The majority of the course participants were working in the ICT sector. This indicates that those with relevant ICT skills easily sign up for the online courses as compared to those without the skills. ICT literacy is therefore important for the development and utilization of OER courses

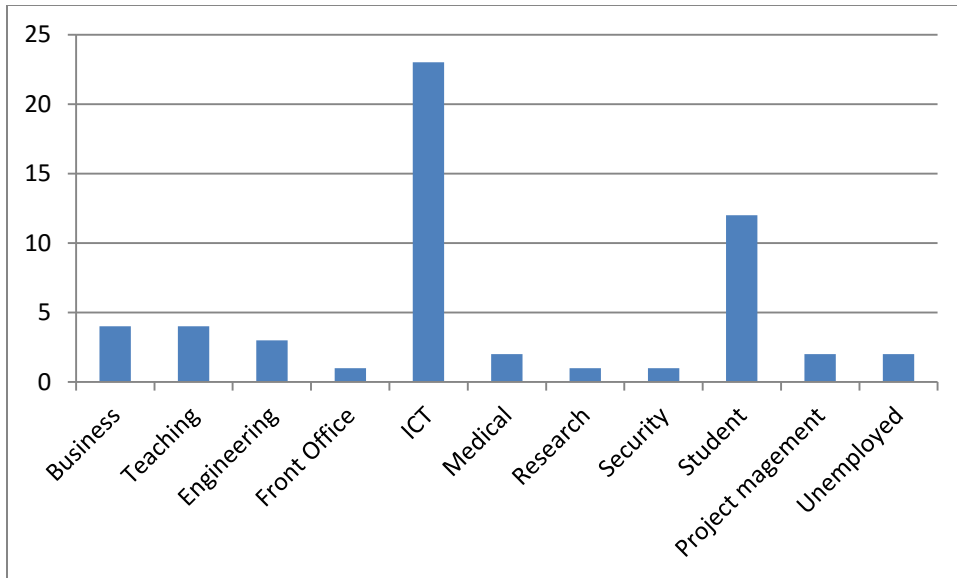


Fig 4.2: Professional background

4.3.2 Activity Participation

There was a decrease in the participation of activities in the course as time went by. 158 learners signed up for the course. 60 Learners filled the background information form that was requested after signup and 10 of them filled the questionnaire that was published two months later. The high registrations from the beginning of the course were more of the hype that was created and was an indication that many people were interested in the course. Lack of time and constant reminders to the course participants are some of the reasons for the dropped participation in the course. The platform required learners to set their own reminders of the course, going per the drop in activity participation most of the learners were not able to do this possibly because they were not aware of how to do it. This indicates that learners will need to be trained on how to use the platform to ensure participation.

Activity	Number of Participants
Course registration	152
Filling Background information form	60
Participation in the survey	10

Table 4.3: Activity participation

Individual page views

The average page views per person were 8 pages, the minimum page views being zero indicating that some of those who signed up for the course didn't do anything. The maximum page views were 87. The distribution of the page views is shown in the table below.

11	2	4	2	3	4	1	6
10	7	3	8	1	1	5	1
2	3	0	12	5	15	5	15
5	1	10	2	10	1	2	2
1	6	2	17	1	0	1	10
1	0	4	3	62	0	2	49
3	5	3	21	2	2	10	12
5	10	4	12	2	4	32	0
5	2	6	0	35	7	6	2
3	3	3	0	8	19	0	9
2	1	3	6	2	3	14	14
5	1	66	6	61	7	2	6
3	5	0	52	2	3	0	0
3	2	6	0	6	2	1	3
3	0	11	19	9	1	0	23
2	0	2	29	0	1	11	11
1	12	6	78	4	15	4	1
4	5	7	3	7	15	0	3
9	2	1	87	5	2	4	0
9	3	10	18	6	8		

Table 4.4: Page views

Participation and page views for 8 weeks from 16th march to 16th May 2015

There was an increase in page views between week one and week two after which the page views decreased. Monday had the highest page views for weeks one, six, seven and nine. Tuesday had the highest page views on weeks two, five and eight. The highest page views were on week two. Participation on the assignments was low with the highest participation being only 4. There was much activity during

the weekdays than weekends. This shows that most learners access the course while in campus because of the internet availability and access to computers. Computer access and internet connectivity is therefore a key ingredient in the implementation of OER courses. This is consistent with a study done by Mtebe and Raisamo that includes access to computers and the Internet, low Internet bandwidth as the major barriers to the utilization of OER (Mtebe and Raisamo 2014)

	Mon	Tue	Wed	Thursday	Friday	Sat	SUN
Week 1							
Page Views	206	67	49	48	3	0	1
Participation	4	0	2	1	0	0	0
Week 2							
Page Views	159	224	120	146	85	7	12
Participation	1	1	1	1	0	0	0
Week 3							
Page views	29	42	0	76	26	0	7
Participation	0	0	0	0	2	0	0
Week 4							
Page views	0	29	14	68	17	0	0
Participation	0	0	0	0	0	0	0
Week 5							
Page views	0	79	4	11	26	0	0
Participation	0	0	0	0	0	0	0
Week 6							
Page views	29	2	8	16	2	0	0
Participation	2	0	0	0	0	0	0
Week 7							
Page views	11	0	5	26	0	0	2

Participation	0	0	0	0	0	0	0
Week 8							
Page views	33	35	6	21	11	0	18
Participation	0	0	0	0	0	0	0
Week 9							
Page views	5	0	0	0	4	7	0
Participation	0	0	0	0	0	0	0

Table 4.5: Weekly page views

4.4 Survey results

4.4.1 OER Awareness

OER awareness is still low as per those who filled the questionnaire with only 20% being aware of OER. This explains the low utilization of OER at the University. For OER courses to be implemented its awareness should be increased. (Ngimwa and Wilson 2012) Also cite lack of OER awareness as a barrier to its adoption.

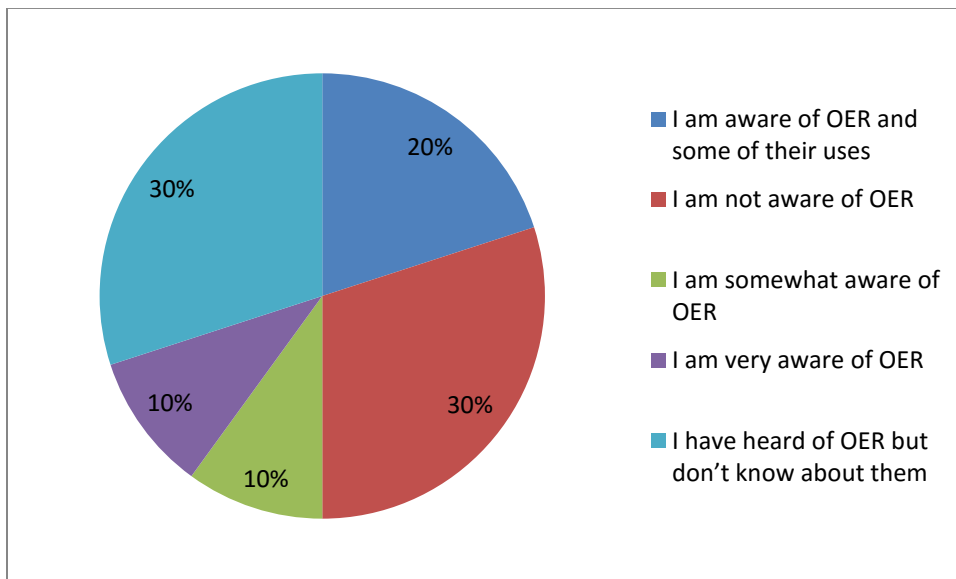


Fig 4.3:OER awareness

4.4.2 Enrollment in OER courses

70% of the survey participants had never enrolled in any OER course. Those who had done an OER course before had used courser and Q-system

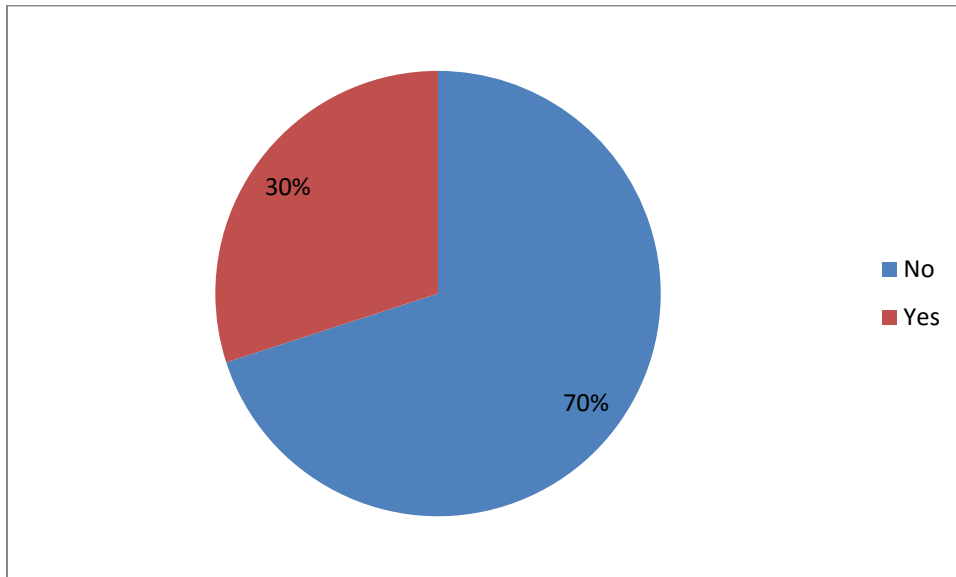


Fig 4.4: Enrolment in OER courses

4.4.3 Course evaluation

The highest number of the modules accessed was 6; the majority of the participants just signed up and did not go through the course. Most of the participants cited lack of time as the major reason for not going through the course. Internet access time was also a hindrance to course completion. When asked if they will consider taking another OER course, all the participants of the survey said yes. When asked about their expectations while enrolling for the course, the participants cited addition of knowledge at their own pace, more understanding of the course, and improvement of skills as their expectations. Participants were then asked if their expectations were met and only one said yes others said no citing the fact that they did not complete the course as the reason why their expectations was not met.

Reasons for enrolment of the course

- Gaining more knowledge
- Learning more about innovation

4.4.5 Frequency of course access

Most of the survey participants accessed the course only once citing lack of time as the reason for not going through the whole course this is constituent with the survey done by Hylén which found out that the most significant barriers for not using OER to be lack of time and skills together with the absences of a reward system. (Hylén, n.d.).

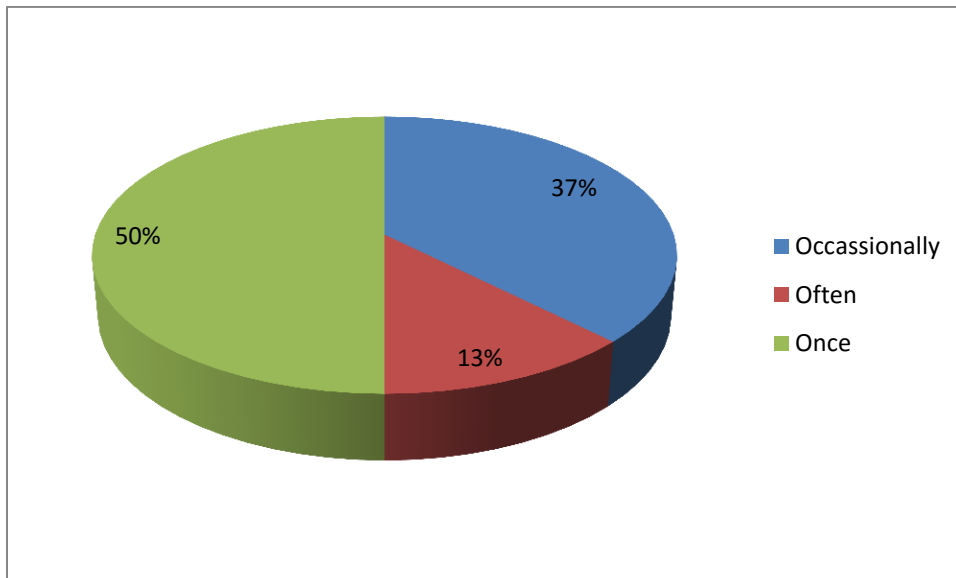


Fig 4.5: Course access

How to improve the course

Participants gave the following as some of the way future OER courses should be improved;

- Having more structured questions
- Having assignment available offline

Platform Evaluation

The participants indicated that they found the platform easy to use and offered the following as suggestions of improving it further;

- Having follow-ups for learners who get stuck
- Have a good time schedule
- Have automated emails to remind learners of the course activities

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Making University courses OER is a good concept that can bring many benefits to the University. The University of Nairobi can utilize OER to offer; staff training on specific topics in order to enhance their skills, offer common courses and training to other people outside the university in order to impart knowledge and improve on the quality of education in the country. The UON can also provide quality learning materials in the country through “OERization” of its courses. This study was achieved through the use of in-depth interviews, “OERization” of an innovation study course and the evaluation of the course using analytics and a questionnaire. The study found out that the implementation of OER at the University requires the collaboration and engagement of different actors, policies that govern the development and use of OER, creation of OER awareness and training of staff and students on how to create and use OER and the use of ICT.

5.2 Recommendations

Below are the recommendations that the researcher gives for the implementation of OER courses at UON;

5.2.1 Establishment of the necessary policies guiding the implementation of OER courses

Any new initiative without the proper policies and guidelines to guide its implementation is bound to fail. Institutional policies can facilitate and enable OER uptake by academic staff and students. These policies need to be in line with the purpose of the institution’s involvement in OER work and provide institutional endorsement of processes leading to creation of reusable products (Nikoi and Armellini 2012). From the study the issues of lack of policies and copyright issues stood out to be a big challenge when it comes to development and publishing of OER courses. Though OER uses Creative Commons licenses it will be good for The UON to have guidelines on the licenses it needs to use while publishing the courses and also sensitize its staff on this licenses and how to use them. Guidelines should also be provided on the use of the materials which employ the use of the creative commons licenses.

5.2.2 Funding

From the study one of the main challenges facing implementation of OER course is funding. Funds will be required to facilitate the development and maintenance of OER courses and creation of awareness. For the UON to implement OER it has to make sure it has the funds to sustain it. In order to do this UON should explore different models for funding the OER initiatives, this is in line with Hylén recommendations that Institutions launching OER programmes need to look into different revenue models for the long term stability and viability of their initiative. (Hylén).

5.2.3 ICT literacy

From the analysis of the course participants' background a bigger percentage of the people who signed up for the course had an IT background. This is mostly because they have the skills to easily use the platform. Most people shy away from signing up for online courses because of their lack of IT skills. From the exploratory study the participants cited lack of IT skills as one of the reasons lecturers shy away from developing OER courses. Most OER courses are published in repositories which are online and require basic IT skills to access and upload, therefore it will be important to equip both learners and OER producers with basic IT skills for the use and development of OER courses. The government and institution of higher learning are the ones cited from the study as responsible for training of ICT literacy skills.

5.2.4 OER awareness Campaigns

The study indicated low awareness of OER. More awareness of OER and their benefits need to be created in the University of Nairobi and the country at large. The UON should appoint champions of OER to help in creating awareness.

5.2.5 An engaging platform (Technology)

From the study there is a drop in the access and participation of the course as shown by the page views as days go by. Most participants just signed up and didn't come back because some of them forgot about the course. Constant reminders to those who signed up for the course should be initiated prompting those who registered to continue with the course. More mechanisms to engage learners and keep them in the course should be embedded on OER platforms in order to ensure learning takes place. Other mechanisms to make the learning process interesting should be employed.

5.2.6 Incentives to learners and staff

Reward and recognition for OER production is a concern for many staff (Nikoi and Armellini 2012). One of the biggest challenges is to find ways to incentivize faculty to develop and share high-quality OER materials (Texas Higher Education Coordinating Board 2014). From the exploratory study, one of the key thing that was identified as a responsibility of the University was compensation of lecturers to produce OER materials. It will therefore be important for the UON to develop reward mechanisms for staffs who are involved in OER development if they are going to implement OER courses. Such incentives might include monetary incentives to offset the lack of royalties from published works or positive consideration of OER development during tenure and promotion reviews (Texas Higher Education Coordinating Board 2014).

Learners also need some form of motivation to enable them finish the courses. From the survey, the main reason given for not going through the whole course was lack of time. Learners will be able to create time to do the course if they know there is something they are going to achieve at the end of it. The UON should provide some form of reward, like certificates and badges to learners in order to motivate them to finish the courses. Learners should also be sanitized on the value of OER courses so that they get to know what the benefits the courses will be to them in terms of improved skills and knowledge at their own pace anywhere

5.2.7 Training of staff and students on the use of technology

From the study we find out that constant reminder was one of the ways suggested for the improvement of the platform. Though the platform had reminder capability it required the users to set it up themselves and going by the recommendation of the learners it shows that they did not set it up because they didn't know how to do it. It's therefore necessary to have training on how to use the platform to both the lecturer and the users prior to the start of the course. In addition training on the development and use of OER will be necessary in order to make it easier for the lecturers and learners to develop and use OER.

5.3 Further research

This study results show that learners participation was low. It will be therefore be necessary to carry out a study that focuses on learners' ability to utilize OER, their challenges, reasons for utilizing OER courses and how adoption and their participation in OER could be increased

This study was an exploratory study therefore its results have not been confirmed, it will be necessary to carry out a confirmatory study on the same.

OER course implementations need funding from the UON which already is cash strained. There is therefore need to make OER course implementations sustainable. Further research on the issues of sustainability will therefore be necessary.

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APPENDIX 1

INTERVIEW GUIDE

Introduction

Date of the interview	
Name of the interviewee	
Position	
Department/College	

1. What do you think about making university courses open educational resource
2. What is the role of the government in making university courses open
3. What things does the government need to put in place in order to make university courses open
4. What things does the university has to put in place in order to ensure successful implementation of OER course
5. What benefits can the university gain by implementing OER courses
6. What are some of the challenges the university faces in implementing OER courses
7. What are some of the solutions that can be implemented to solve the above challenges
8. What role do the academic staff have to play in the implementation of the OER courses
9. What kind of support can the University offer to faculty who want to make their courses OER
10. What do you think are some of the fears that the academic staff have in making their courses open

THANK YOU

APPENDIX 2

Questionnaire

Thank you for enrolling for the innovation studies OER course. OER is defined as "teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others." Unlike traditionally copyrighted material, these resources are available for "open" use, which means users can edit, modify, customize, and share them.

As part of the effort to help in improving the development and publication of OER courses at higher learning institutions, we are carrying out a survey to help understand the use of OER courses. We will highly appreciate your feedback.

Participant profiles

1. Please indicate your educational level
 - PHD
 - Masters
 - Degree
 - Diploma
 - Certificate
 - O-Level
2. How aware are you of Open Educational resources (OER)?
 - I am not aware of OER
 - I have heard of OER but don't know about them
 - I am somewhat aware of OER
 - I am aware of OER and some of their uses
 - I am very aware of OER
3. Have you ever enrolled for any OER course before?
 - Yes
 - No

If yes, indicate the course and the platform you accessed if from

Learners' compliance

4. Why did you enroll for this course?
5. How frequently did you access the course?
 - Once
 - Occasionally
 - Often
 - Frequently
6. How many modules have you gone through?
7. What are some of the reasons made you not go through the whole course?

Content evaluation

8. What were your expectations when enrolling for the course?
9. Were your expectations met?
10. Did you attempt the assignments?
 - Yes
 - No

If no, please give the reasons why

11. What suggestions would you give for improving the course?

Platform evaluation

12. Did you find the platform easy to use?
13. What suggestions could you give for improving the platform?

APPENDIX 3

Innovation Studies

Course summary

Success in creative work greatly depends on having good ideas, having the capacity to develop, manage and present them. Innovation becomes meaningful when it is managed effectively to produce some form of economic, social or political benefits. This course will explore different techniques for generating and developing ideas, transforming these ideas into viable business concepts, executing and managing the business concepts for them to translate into business value.

Course aims

- (1) To provide students with fundamental knowledge of the phenomenon of innovation and innovation processes in economies from the perspective of firms and industries;
- (2) To enable students to use basic theoretical tools that help analyze and manage real-world processes of innovation;
- (3) To enhance students' appreciation of the importance of understanding innovation-related issues for the development of businesses, industries, countries and citizens.

Learning outcomes

- Demonstrate understand the roles of strategic thinking and planning in today's business environment,
- Appreciate the generation of ideas, management and evaluation/measurement of innovations
- Learn how to coordinate an innovation within an organization setting
- Appreciate how to develop an innovative culture while creating an environment that is adaptive to the changes that innovation brings

Outline

1. Introduction to Innovation
 - a. Define Innovation
 - b. Why innovate
 - c. Origin of Innovation

2. Innovation process
 - a. Steps and stages of innovation
 - b. Innovation environment
3. Role of strategy
4. Organization culture and change management
5. Idea generation
 - a. Sources of ideas
 - b. Tools and techniques
 - c. Creativity
 - d. Evaluating ideas
6. Piloting, Research and Development
7. Developing innovative culture
8. Measuring and evaluation of innovation

APPENDIX 4

Course outline

Introduction to innovation

Upon successful completion of this unit the student will be able to;

- Understand the concept of innovation
- Know the difference between innovation and invention
- Understand the reasons for innovation

Process of Innovation

Upon successful completion of this unit the student will be able to;

- Know what the process of innovation entails
- Know the steps involved in creative problem solving
- Know how to build organizations for executing innovation

Idea generation

Upon successful completion of this unit the student will be able to;

- Understand the discovery process for opportunities
- Identify the people to be involved in the idea generation process
- Know the methods for discovering opportunities

Developing innovative culture

Upon successful completion of this unit the student will be able to;

- Know the organizational features that facilitate innovation
- How organizations can learn from new information

Leveraging on user innovation

Upon successful completion of this unit the student will be able to;

- Know how to identify lead users
- Strategies of leveraging on user innovation
- How to create new products based on user innovations

Innovation attributes and their adoption rate

Upon successful completion of this unit the student will be able to;

- Know the attributes of innovations
- Know the rate of innovation diffusion
- Know the variables determining the rate of adoption of an innovation

Measuring and evaluation of innovation

Upon successful completion of this unit the student will be able to;

- Know why measuring and evaluating innovations is important
- Know the different types of evaluation
- Know the process of evaluation

Innovation and intellectual property rights

Upon successful completion of this unit the student will be able to;

- Know what free revealing of innovation is
- Know how to protect their innovations

Innovation portfolio

Upon successful completion of this unit the student will be able to;

- Know how to exploit innovation
- Effective commercialization strategies
- Know how to manage available resources for innovation