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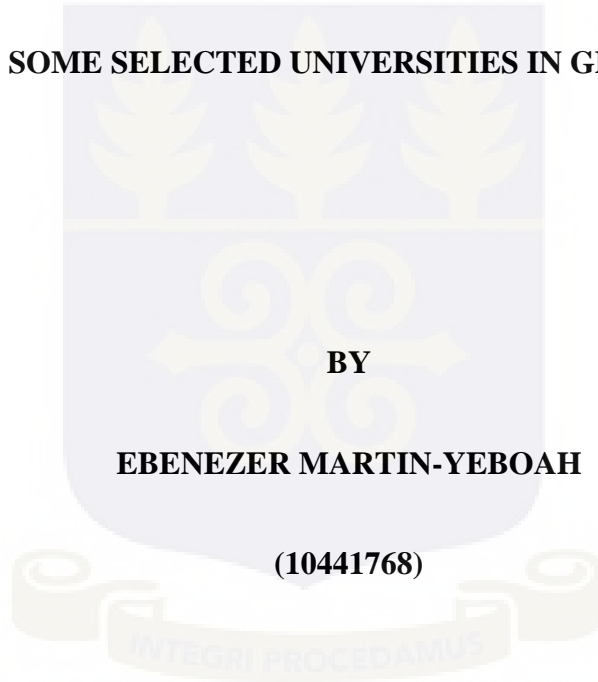
DEPARTMENT OF INFORMATION STUDIES

**CREATION AND MANAGEMENT OF INSTITUTIONAL REPOSITORIES IN
SOME SELECTED UNIVERSITIES IN GHANA**

BY

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DECLARATION

I, Ebenezer Martin-Yeboah, do hereby declare that this thesis is my own original work, supervised by Prof. A. A. Alemna and Dr. E Adjei, and has not been submitted either in whole or in part for any research purposes anywhere. Where references are made to work of other researchers, acknowledgements are given accordingly. I am therefore wholly responsible for any error or omission contained in this work.

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DEDICATION

This work is dedicated to all staff of Ashesi University College, Central University College, Kwame Nkrumah University of Science and Technology and the University of Ghana, Legon who work tirelessly to for the smooth operation of their institutional repositories.



TABLE OF CONTENT

	Page
DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGEMENT	iv
TABLE OF CONTENT	v
LIST OF FIGURES	xii
LIST OF TABLES	xiii
ABSTRACT	xvi
CHAPTER ONE: INTRODUCTION	
1.1 Background to the study	1
1.1.1 Brief background of Ashesi University College	4
1.1.2 Brief background of Central University College	5
1.1.3 Brief background of Kwame Nkrumah University of Science and Technology	6
1.1.4 Brief background of the University of Ghana, Legon	7
1.2 Statement of the problem	8
1.3 Purpose of the study	10
1.4 Objectives of the study	10
1.5 Research questions	10
1.6 Scope and limitation of the study	11
1.7 Theoretical framework	11
1.8 Significance of the study	15

1.9 Organization of chapters	15
References	15
CHAPTER TWO: LITERATURE REVIEW	
2.0 Introduction	22
2.1 Intellectual productivity and scholarly communication	22
2.2 Open Access	25
2.3 Open access institutional repositories	27
2.3.1 Institutionally-defined	27
2.3.2 Scholarly Content	28
2.3.3 Cumulative and perpetual	29
2.3.4 Interoperability and open access	29
2.4 Emergence and growth of institutional repositories	30
2.5 Academic libraries and institutional repositories	32
2.6 Approaches to building and implementing repositories	33
2.7 Policies for the establishment of institutional repositories	34
2.8 Software and engineering protocols for institutional repositories	36
2.9 Preservation of repository contents	37
2.10 Benefits of open access institutional repositories	41
2.11 Marketing and promotion of institutional repositories	43
2.12 Barriers to institutional repositories in Developing Countries	51
2.13 Conclusion	54
References	56

CHAPTER THREE: METHODOLOGY	
3.0 Introduction	70
3.1 Research design	70
3.2 Selection of cases	72
3.3 Selection of subjects	73
3.3.1 Population	73
3.3.2 Sample size	75
3.3.3 Sampling technique	75
3.4 Instrumentation	77
3.5 Data collection	80
3.6 Data analysis	81
3.6.1 Interviews	81
3.6.2 Repository policy document	82
3.6.3 Repository website	82
3.7 Pre-test	83
3.8 Ethical considerations	84
References	85
CHAPTER FOUR: DATA ANALYSIS AND PRESENTATION OF RESULTS	
4.0 Introduction	87
4.1 Case report of Ashesi University College	87
4.1.1 Planning and collaboration	87
4.1.2 Repository creation and content population	88
4.1.3 Policies	91

4.1.4 Marketing and promotion of AIR	91
4.1.5 Preservation and security of repository contents	92
4.1.6 Level use of the repository	93
4.1.7 Challenges	93
4.1.8 Sustainability	93
4.2 Case report of University of Ghana	94
4.2.1 Planning and collaboration	94
4.2.2 Repository creation and content population	96
4.2.3 Policies	98
4.2.4 Marketing and promotion of UGSpace	99
4.2.5 Preservation and security of repository contents	101
4.2.6 Level of use of the repository	102
4.2.7 Challenges	102
4.2.8 Sustainability	103
4.3 Case report of Central University College	104
4.3.1 Planning and Collaboration	105
4.3.2 Repository creation and content population	105
4.3.3 Policies	106
4.3.4 Marketing and promotion of CUCAR	107
4.3.5 Preservation and security of repository contents	108
4.3.6 Level of use of the repository	108
4.3.7 Challenges	108
4.3.8 Sustainability	109

4.4 Case report of Kwame Nkrumah University of Science and Technology	110
4.4.1 Planning and Collaboration	112
4.4.2 Repository creation and content population	114
4.4.3 Policies	114
4.4.4 Marketing and promotion of KNUSTSpace	115
4.4.5 Preservation and security of repository contents	117
4.4.6 Level of use of the repository	118
4.4.7 Challenges	119
4.4.8 Sustainability	120
4.5 Cross-case/comparative analysis of the four institutional repositories	120
4.5.1 Planning and collaboration	120
4.5.2 Repository creation and content population	121
4.5.3 Policies	123
4.5.4 Marketing and promotion of the institutional repositories	124
4.5.5 Preservation and security of repository contents	125
4.5.6 Level of use of the repository	125
4.5.7 Challenges	125
4.6 Conclusion	127
References	128
CHAPTER FIVE: DISCUSSION OF MAJOR FINDINGS	
5.0 Introduction	129
5.1 Background	125
5.2 Planning and collaboration	130

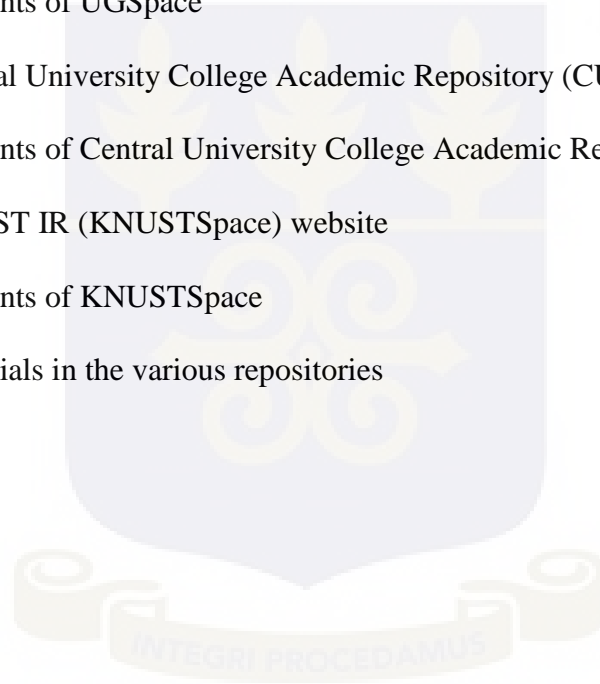
5.3 Repository creation and content	131
5.4 Policies	133
5.5 Marketing and promotion of the institutional repositories	135
5.6 Preservation and security of repository contents	138
5.7 Level of use of the repository	139
5.8 Challenges	140
5.9 Relationship of the findings to the theoretical framework	142
5.10 Conclusion	144
References	146
CHAPTER SIX: SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS	
6.0 Introduction	152
6.1 Summary of findings	152
6.1.1 Policies for the creation and management of the institutional repositories	153
6.1.2 Repository creation and content population	153
6.1.3 Preservation and security of repository contents	154
6.1.4 Marketing and promotion of the institutional repositories	154
6.1.5 Level of use of the repositories	154
6.1.6 Challenges of repository sustainability	155
6.2 Conclusion	155
6.3 Recommendations	156
6.3.1 Repository policies	156

6.3.2 Repository creation and content population	157
6.3.3 Marketing of repository contents	157
6.4 Areas for further research	158
BIBLIOGRAPHY	160
APPENDIX A: Introductory letter	180
APPENDIX B: Agreement form	181
APPENDIX C: Interview Guide	182



LIST OF FIGURES

Figure 1.1: A Model of Five Stages in the Innovation-Decision Process	13
Figure 1.2: Adopter categories in the Innovation-Decision Process	14
Figure 2.1: Proportion of Repositories Worldwide	31
Figure 4.1: Ashesi Institutional Repository (AIR) website	89
Figure 4.2: Contents of Ashesi Institutional Repository	90
Figure 4.3: University of Ghana Institutional Repository (UGSpace) website	95
Figure 4.4: Contents of UGSpace	96
Figure 4.5: Central University College Academic Repository (CUCAR) website	104
Figure 4.6: Contents of Central University College Academic Repository	106
Figure 4.7: KNUST IR (KNUSTSpace) website	110
Figure 4.8: Contents of KNUSTSpace	112
Figure 4.9: Materials in the various repositories	122



LIST OF TABLES

Table 3.1: Population of prospective respondents in the study sites	75
Table 3.2: Sample for the study	76
Table 4.1: IR of the various institutions under study	121



LIST OF ABBREVIATIONS

AIR	Ashesi Institutional Repository
ARL	Association of Research Libraries
AUC	Ashesi University College
BOAI	Budapest Open Access Initiative
CARLIGH	Consortium of Academic and Research Libraries in Ghana
CUC	Central University College
CUCAR	Central University College Academic Repository
CULD	Committee of University Librarians and their Deputies
DOAJ	Directory of Open Access Journals
DOAR	Directory of Open Access Repositories
ETD	Electronic Thesis and Dissertations
FTP	File Transfer Protocol
HTML	Hypertext Mark-up Language
ICGC	International Central Gospel Church
ICT	Information Communication Technology
INASP	International Network for the Availability of Scientific Publications
IPR	Intellectual Property Rights
IR	Institutional Repository
IT	Information Technology
KC	Knowledge Commons
KNUST	Kwame Nkrumah University of Science and Technology

METS	Metadata Encoding and Transmission Standard
MIT	Massachusetts Institute of Technology
NOC	Network Operating Centre
OAI-PMH	Open Archives Initiatives Protocol for Metadata Harvesting
OAIS	Open Archival Information System
OPENDOAR	Directory of Open Access Repositories
ORID	Office of Research, Innovation and Development
OSI	Open Society Institute
PDF	Portable Document Format
RC	Research Commons
ROAR	Registry of Open Access Repositories
RoMEO	Rights Metadata to Open Archiving
SGSR	School of Graduate Studies and Research
UG	University of Ghana
UGCS	University of Ghana Computing Systems
UNESCO	United Nations Educational, Scientific and Cultural Organization
UITS	University Information Technology Services
URO	University Relations Office

ABSTRACT

Much as a lot of intellectual activities go on in Africa, the limited avenues for espousing them, coupled with issues of copyright have led to little visibility of such intellectual output. Institutional repositories have thus been relied upon by many universities to preserve and share their digital resources. However, the few studies on the attrition of repositories often focused on cost and software engineering protocols, with little attention given to the needed collaborative efforts to bring about sustainability of repositories.

This comparative case study, guided by the Diffusion of Innovations Theory, assessed how institutional repositories were created and sustainably managed for use by the academic communities of two private and two public universities in Ghana. It engaged 37 respondents whose activities concerned the operations of these repositories. The tools for data collection were semi-structured interview of respondents as well as observation of repository policy documents and the websites hosting the repositories.

Thematic analysis of the rich qualitative data revealed that institutions see the worth of online digital institutional repositories in advancing scholarly communication and preserving intellectual, heritage and administrative materials, and have accordingly developed their repository with such collections. However, a lack of the needed involvement of key personalities on campus to create a wider acceptance of the repositories has led to low rate of material deposit, uncoordinated marketing and an equally low access rate.

Continuous engagement of the various interest groups within academic institutions in the management of the repositories is suggested to bring about an appreciable level of buy-in. Bodies such as the Committee of University Librarians and their Deputies (CULD) and the Consortium of Academic and Research Libraries in Ghana (CARLIGH) have also been identified to consider the establishment of a national research repository to mutually harness the benefits.



CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Several establishments in the world such as universities, research institutions, museums, governmental organizations retain artifacts and other documents that embody their very culture and identity. These include scientific, technological, cultural, artistic, and historical materials. In order to ensure their perpetuity, such intellectual outputs and historical documents are not only digitized, but are now being created, managed, preserved, and maintained in repositories.

Development of repositories has often occurred in universities and colleges as well as government agencies. In many academic environments, institutional repositories (IRs) appear to be the latest approach in the quest to manage intellectual outputs. They are, as Lynch (2003) puts it, a set of services that a university offers to members of its community for the management and dissemination of digital materials created by the institution and its community members. With the use of standard metadata formats and protocols, contents in an institutional repository could be well described, recognized and retrieved on the World Wide Web (Rosenblum, 2008).

As a system that facilitates the capture, storage, preservation and dissemination of the intellectual output of an institute in electronic form, institutional repository (IR) outputs differ from institution to institution. Whereas some capture theses and dissertations, others capture published papers, pre-prints and post-prints of journal articles, working papers, conference presentations, research data sets, teaching materials, historical or

administrative records and other similar materials (de Sompel & Lagoze, 2000; de Sompel & Lagoze, 2001; Crow, 2002; Campbell-Meier, 2008; Rosenblum, 2008).

Different views exist about the fundamental functions of institutional repositories. Some see the preservation of scholarship as the primary purpose; others see an IR as an assessment instrument to evaluate the output of an institution; and yet, others see it as a means of increasing access and the impact of research as well as promoting visibility on the World Wide Web (Rieger, 2007; Markey et al, 2007; Davis & Connolly, 2007; Rosenblum, 2008; Taylor, 2009). To some, the goal of implementing an institutional repository is mainly to have the intellectual output of an institution in a central source (Lynch, 2003; Campbell-Meier, 2008; Moahi, 2009).

The advent of the internet has transformed how libraries store information. Having traditionally remained as storehouses of print publications, libraries are now expanding services by collecting digital content and becoming content providers by digitizing archival and special collections (Campbell-Meier, 2008). Technology is fast developing to serve as an opportunity to develop repositories. In many academic institutions, the library has been instrumental in the development of repositories, often being solely responsible for their development and operations (Moahi, 2009). This may be so due to libraries' strategic relationship with information resources.

The Association of College and Research Libraries (2003) Environmental Scan recognized IRs as an emerging issue that may affect the future of academic libraries. Institutional repositories are the response of American colleges and universities to the problem of organizing, providing access to, and preserving scholarship that their learning

communities produce in digital formats. A survey by Lynch and Lippincott (2005) found that more than 40% of the ninety-seven doctoral universities surveyed had developed institutional repositories.

Although institutional repositories are a relatively new phenomenon, two registers - ROAR (<http://roar.eprints.org>) and OPENDOAR (<http://www.opendoar.org>) – reported over 1000 institutional repositories in the world of which 20 were in Africa, with a majority being in South African universities (Moahi, 2009). In a ranking of 6,000 universities worldwide by the World University Rankings in 2009, the highest ranked African university – the University of Cape Town – was ranked at 359 (Moahi, 2009, Kgautlhe, 2009). Again in 2014, the Times Higher Education ranked the University of Cape Town 126 out of 400 universities (Times Higher Education, 2014). This clearly suggests that the online presence of African universities is very low. It is however believed that institutional repositories can address this issue, hence a case for their development.

Corleley (2011) paints a vivid picture about the development of institutional repositories in Ghana. He reports that “in 2008, the Kwame Nkrumah University of Science and Technology (KNUST) implemented the first institutional repository in Ghana. Six months later and with 560 postgraduate theses entered, KNUST appeared 52nd on the webometrics ranking for 100 best universities in Africa. This success resulted in the Consortium of Academic and Research Libraries in Ghana (CARLIGH) and International Network for the Availability of Scientific Publication (INASP) helping four academic institutions to implement repositories” (Corleley 2011). Currently most universities in

Ghana, both publicly funded and privately-owned, are gradually embracing the concept of institutional repositories.

1.1.1 Brief background of Ashesi University College

Ashesi University College was established as an independent, co-educational, public benefit education institution operating on a not-for-profit basis. It was incorporated as a company limited by guarantee on 24th October 2001 and has been operating as such since its inception. The University gained accreditation from the National Accreditation Board of Ghana in September 2001, and began instruction with 30 students on 4th March 2002 (Ashesi University College, 2014a).

The University offers four-year bachelor degrees in Business Administration, Computer Science and Management Information Systems, based on a Liberal Arts core curriculum. The Ashesi education teaches students to be problem solvers. The University has quickly gained a reputation for excellence in Ghanaian higher education.

Ashesi operates a hybrid library, with subscriptions to a number of electronic information resources, including the PERI databases which give access to over 20,000 scholarly journals. The electronic library is supplemented by a paper collection that currently includes 6,000 books, as well as a variety of international and local magazines, newspapers, and research publications. Ashesi's library is not limited to the library building; it reaches out, with cutting edge information, into faculty and administrative offices, classrooms, cafeterias, and even outdoor gathering spaces. Unpublished dissertations and theses produced by Ashesi students and faculty may be viewed on a

reference basis in the library. Over time these are being added to the Ashesi Institutional Repository (Ashesi University College, 2014b).

The Ashesi Institutional Repository (AIR) is an archive for preserving and sharing Ashesi's scholarly work. Contributors to the repository ensure that their scholarly and creative work is preserved, indexed and showcased for a global audience. Students who do good work get the privilege of getting their work published on AIR. The repository is organized in "Collections" that group publications by department and/or subject (Ashesi University College, 2014b).

1.1.2 Brief background of Central University College

The Central University College (CUC) was founded by the International Central Gospel Church (ICGC) in Accra, Ghana. It started off as a pastoral training institute in 1988. It later became the Central Christian College in 1993 and eventually became the Central University College in 1997. In 1998, the university college was accredited by the National Accreditation Board (CUC, 2014).

Among the stated aims of the university is to provide an integrated and biblically-based tertiary education with particular reference to the needs of the African continent (CUC, 2014). Most of its current programs are offered up to the graduate level. Over the past decade, CUC's development has been phenomenal, with the construction of a permanent campus in Miotso near Dahwenya (CUC, 2014). It is currently the biggest private university in Ghana.

Central University presently has six (6) libraries in its library system, stocking mostly books on programmes run by the University. The library also runs E-Journal services by virtue of its membership to the Consortium for Academic and Research Libraries in Ghana (CARLIGH). It also has an Institutional Repository built in-house and populated as such. Central University Library presently has staff strength of 34 made up of 9 professionals, 11 sub professionals and 14 non-professionals.

1.1.3 Brief background of Kwame Nkrumah University of Science and Technology

Kwame Nkrumah University of Science and Technology (KNUST) is the second oldest public university established in Ghana. It is an upgrade of former Kumasi College of Technology which offered admission to its first students to the engineering faculty in 1951/1952. An Act of Parliament gave the university its legal basis as the Kumasi College of Technology in 1952 (KNUST, 2014a). The KNUST has, since January 2005, transformed from its previously centralized system of administration into a decentralized collegiate system (KNUST, 2014a). Under this system, the faculties have been condensed into six semi-autonomous colleges with functional college libraries (KNUST, 2014b).

According to the 2014 Vice Chancellor's Matriculation speech, Kwame Nkrumah University of Science and Technology (KNUST) offered admission to a total of eleven thousand, nine hundred and twenty-eight (11,928) undergraduate and postgraduate applicants for the 2014/2015 academic year (KNUST, 2014a).

The University Main Library is the management centre for all library operations within the University. It provides staff and technical services as well as coordinates the activities of the College Libraries. The University Library has seven functional departments;

Administration, Acquisitions, Serials, Cataloguing, Lending, Reference and Research and Institutional Repository & Electronic Information Services. The total collection of the University Library system is 293,164 volumes. The library system provides information from both print and electronic sources for the academic programmes run by the university (KNUST, 2014b).

The university is credited as having been the first university in Ghana to establish a repository in 2008, the KNUSTSpace. Six months later and with 560 postgraduate theses entered, KNUST appeared 52nd on the webometrics ranking for 100 best universities in Africa (Corleley, 2011). The repository currently hosts theses, dissertations, conference papers and course materials of the university.

1.1.4 Brief background of the University of Ghana, Legon

The University of Ghana (UG), Legon, is the oldest and largest of all Ghanaian tertiary institutions. Founded in 1948 as the University College of the Gold Coast, it was originally an affiliate college of the University of London. It gained full university status in 1961, and now has nearly 40,000 full time students. Its original emphasis on the liberal arts, social sciences, basic science, agriculture, and medicine, has been expanded to provide more technology-based and vocational courses as well as postgraduate training (University of Ghana, 2014a).

Established in 1948, the Balme Library is the main library of the University of Ghana. In addition to the Balme Library, there are other libraries in the various Colleges, Schools, Institutes, Departments, Halls of Residence and the Accra City Campus, altogether forming the University of Ghana Library System. The Library provides excellent

facilities and products. Facilities include the 24-Hour reading room, Research Commons (RC), Knowledge Commons (KC), Ghana-Korea Information Access Centre, printing and binding services, reprographic services and a networked environment with computers. The collection of the library, which consists of both electronic and print resources, provides essential background reading for the courses taught. The Library is dynamic and continues to adapt to changing technologies and patron information needs (University of Ghana, 2014b).

UGSpace is the institutional repository of the University of Ghana. It is an open access electronic archive for the collection, preservation and distribution of digital materials. UGSpace was established to facilitate the deposit of digital contents of a scholarly or heritage nature to ultimately share, preserve and promote the intellectual output of the University in a managed environment (University of Ghana, 2014b).

1.2 Statement of the problem

Even though there are a lot of research activities occurring in Africa, the continent accounts for less than 2% of the research output of the world (Moahi, 2012). The main issue has been the means of espousing such research findings. Most of such research outcomes emanating from African universities are often obscured due to inadequate indigenous sustainable journals as well as issues of copyright (Alemna, 1998; Alemna, 2005). The alternative, as revealed by Moahi (2009), is that African academics strive to publish in internationally renowned peer-reviewed journals in order to ensure academic promotion, but then, not many make it into such journals. And when they do, the journals are out of reach of most university libraries, rendering access difficult. Without any

forum of sharing this knowledge, replication becomes the order of the day. Therefore, for many African universities, the concept of institutional repositories is seen as a vehicle for enhancing visibility, access and impact.

Notwithstanding the benefits and successes of institutional repositories abundant in literature, especially in most developed countries; existing studies suggest that repositories are not yet sustainable in most African academic institutions. A cursory look at the literature concerning institutional repositories in Ghana and Africa suggests that many of the institutional repositories crash out shortly after their take-off. The blame has often been directed at the financial constraints and the technical issues such as software and engineering protocols for developing these IRs (Bailey, 2006; Rieger, 2007; Campbell-Meier, 2008; Moahi, 2009; Corlety, 2011). This may be so because much effort is concentrated in the design stage to the detriment of other equally important issues relevant in the sustainability of repositories.

Limited research exists on the critical management issues such as populating the contents of the repositories, long term preservation of contents as well as marketing and promotion of repositories for use by the academic community. However, in examining the sustainability of institutional repositories, it is prudent to understand the peculiar cultural and political issues affecting their demand, lest an expensive mistake is made to implement an institutional repository that simply has no depositors or users. It is for this reason that this study sought to empirically assess the issues pertaining to the campus-wide collaborative creation and management of institutional repositories leading to a sustainable use by the academic community.

1.3 Purpose of the study

The purpose of the study was to comparatively assess how institutional repositories are created and sustainably managed for use by the academic community of two private and two public universities in Ghana.

1.4 Objectives of the study

Specifically, the study sought to:

1. Examine the policies for the creation and management of institutional repositories;
2. Describe the contents of institutional repositories;
3. Identify the preservation strategies for managing Institutional repositories;
4. Find out the strategies for marketing and promoting institutional repositories;
5. Determine the level of use of institutional repositories by the academic community;
6. Establish the challenges faced in the management of institutional repositories; and
7. Make the appropriate recommendations for the sustainability of institutional repositories.

1.5 Research questions

The research questions that guided the study were:

- What are the existing policies for creating and managing institutional repositories?
- Which documents constitute the content of institutional repositories?
- How are the contents of institutional repositories preserved for long term access?

- What strategies exist to market and promote institutional repositories?
- What is the level of use of institutional repositories by the academic community?
- What are the challenges faced in sustaining institutional repositories?
- What recommendations, based on the findings, could be made to ensure the sustainability of institutional repositories?

1.6 Scope and limitation of the study

This study sought to investigate the institutional repositories of two public universities and two privately-owned universities in Ghana. Five out of the ten public universities as well as six private universities (all belonging to the Consortium of Academic and Research Libraries in Ghana [CARLIGH]) have operational IRs and were thus eligible for this study. However, the Kwame Nkrumah University was purposively chosen for being the first in Ghana to operate an IR and the other three randomly chosen from a frame of public and private universities.

It would have been ideal to cover every operational institutional repository but the study sought to focus on these four in order to practically do a comprehensive study within time. The above reason, coupled with the fact that the study was guided by the Qualitative approach, implies that one needs to be careful in any bid to generalize.

1.7 Theoretical framework

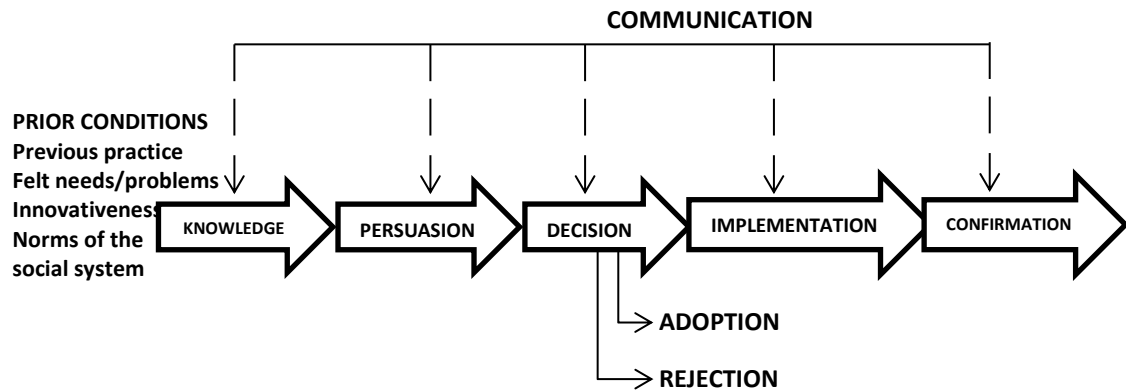
Institutional repository, as a novelty which was conceived of in the early 90s (Jones, n. d.; Harnad, 1995), would only become a reality a decade later after developmental efforts in information and communication technology. It started as an off-shoot of the open access movement which began in Europe and embraced gradually in different parts of the

world (Harnad 1995; Crow, 2002; Lynch, 2003; Harnad & Brody, 2004). In Africa in general and Ghana in particular, its benefits have been realized by some universities and research institutions. In a bid to understand the trickling down or diffusion of this phenomenon to Africa and Ghana, the study will adopt the Diffusion of Innovations Theory as its theoretical framework.

Diffusion of innovations is a theory which attempts to describe how, why, and at what rate new ideas and technology transmit from one society to the other. Rogers (2003) considers diffusion to be the process by which an innovation is communicated among members of a society across certain channels over time. An innovation could be an idea, practice or object that is perceived as new by an individual or other unit for adoption. Rogers (2003) believes that for an innovation to spread and be adopted, it should have relatively better advantages over the existing technology, have an appreciable ease of use and as well be compatible with the existing values, past experiences and the needs of potential users within the social system. The innovation-decision process thus involves five steps: knowledge, persuasion, decision, implementation, and confirmation.

Knowledge takes place when a prospective adopter becomes aware of the existence of an innovation and thinks of how it functions. A person is assisted to form a positive/favourable attitude or a negative/unfavourable attitude towards an innovation through persuasion. The process of decision has to do with making a choice to either adopt or reject the innovation. Implementation occurs when an innovation has been put to use. These steps follow each other in a time-ordered manner as shown in Figure 1.1 below:

Figure 1.1: A Model of Five Stages in the Innovation-Decision Process

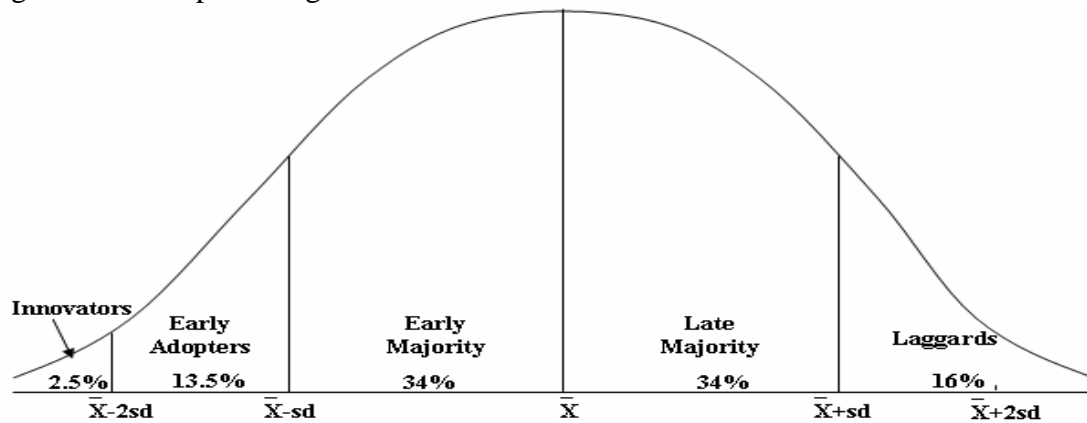


Source: Rogers (2003: p165)

For Rogers (2003), whereas adoption is a decision of full use of an innovation as the best course of action available, rejection is a decision not to adopt an innovation. The theory identifies adopter categories as being the classification of members of a social system on the basis of innovativeness (Rogers, 2003). This classification, as shown in Figure 2, includes innovators, early adopters, early majority, late majority, and laggards (Rogers, 2003).

Innovators play a gate keeping role in the flow of new ideas into a system. Early adopters are individuals more integrated of the social system who adopt an innovation and become a reference point for prospective adopters. The early majority adopt new ideas just before the average member of a system. The late majority adopt new ideas probably as a result of increasing network pressures from peers. Laggards are the last to adopt an innovation because they are suspicious of innovations and change agents.

Figure 1.2: Adopter categories in the Innovation-Decision Process



Source: Rogers (2003: p247)

Several researchers have used the Diffusion of Innovation Theory as a framework for different studies (Zakaria, 2001; Isleem, 2003; Less, 2003). Parisot (1997) and Medlin (2001) consider Rogers' diffusion of innovations theory as the most appropriate for investigating the adoption of technology in higher educational environments. Swanepoel (2005) and Campbell-Meier (2009) also applied the Diffusion of Innovation Theory to a study of the development of institutional repositories in some institutions where it was believed that the concept was in the early majority adoption category.

The development of Institutional repositories, in no doubt, has become one of the widely-embraced channels of scholarly communication with the potency of projecting the image of academic institutions. A university is considered to be a unique society comprising lecturers, administrators, other categories of staff and students. It is safe to assume that these different segments will belong to different adopter categories so long as institutional repositories are concerned. The theory is preferred because its efficient use will bring about the perception, support and interest of the campus-wide community

(policy makers or administrators, librarians and lecturers). Above all, it accommodates the objectives set out for the study, and thus serves as a guide to the entire study.

1.8 Significance of the study

The fact that academic institutions are gradually embracing institutional repositories justifies any study to be carried out to explore factors relating to their creation, management and sustainability. Specifically, this study will bring about all the relevant issues into a unified coherent document that could be referred to by policy makers of any institution hoping to establish a repository. By identifying crucial factors in institutional repository development, and the challenges that the factors pose, a developmental framework can be identified for interested libraries.

Also, it will be useful to information professionals in their bid to build strong associations in the academic community, understand the diverse needs and interests of the campus community and by so doing, be in the position to acquire contents to populate their repositories and promote their use.

Again, this study will contribute to the body of knowledge in the area of open access institutional repositories, especially in Africa and by extension, project the academic productivity of both private and public universities.

1.9 Organization of chapters

The study is organized into six chapters with Chapter One being the introductory chapter where the study background, statement of the problem, objectives, research questions and conceptual framework were discussed.

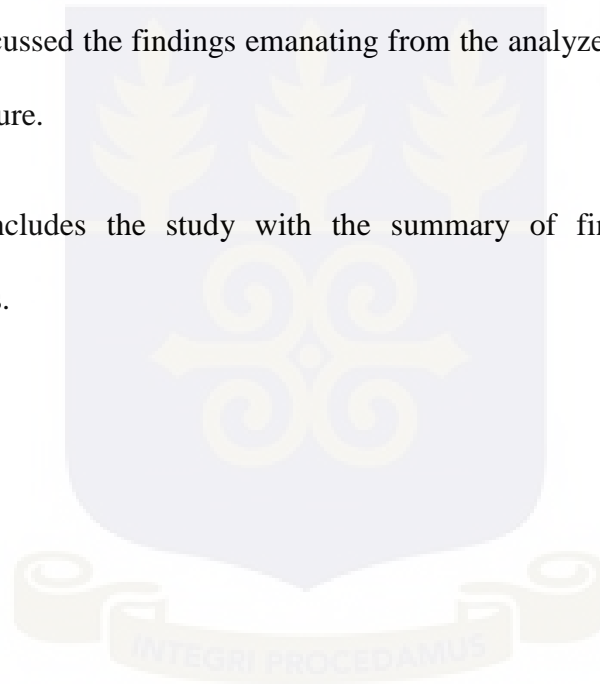
Chapter Two reviewed the conceptual and empirical issues that pertain to institutional repositories. This accommodates the global, African and Ghanaian perspectives in relation to the study objectives.

The third chapter, Chapter Three, dealt with the methodology, describing how the units of analysis were selected, engaged and how the collected data was analyzed.

Chapter Four looked at the analysis of the data collected.

Chapter Five discussed the findings emanating from the analyzed data within the context of relevant literature.

Chapter Six concludes the study with the summary of findings, conclusions and recommendations.



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CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

In the view of Creswell (2009), review of related literature helps situate a particular study in the ongoing dialogue about a topic, thus filling in gaps and extending prior studies. Literature review is to enable the researcher become conversant with previous studies in relation to a study. It thus helps the researcher to find, analyze, evaluate and adopt information. In essence, literature review serves as the foundation or framework upon which new studies are developed, and as well puts the study in proper perspective (Kumar, 2005; Taylor, 2005).

In interrogating a phenomenon such as the creation and management of institutional repositories in some selected universities in Ghana, it is therefore appropriate to discuss some relevant concepts from global, African and Ghanaian viewpoints.

2.1 Intellectual productivity and scholarly communication

Any society that seeks to develop socio-economically cannot do away with information. Information is very fundamental in the field of education, governance, health, finance, agriculture, and across the fabric of society. This suggests that access to accurate, valid, reliable and timely information is absolutely obligatory in the development of a country.

Access to knowledge is fundamental to all aspects of human development, yet access to academic publications is restricted in many developing countries. Even though lots of research activities occur in Africa, the continent is said to account for 2% of the research output of the world (Moahi, 2012). Most of such research outcomes emanating from African universities are often obscured due to inadequate indigenous sustainable journals

as well as issues of copyright (Alemna, 1998; Alemna, 2005). The alternative, as revealed by Moahi (2009), is that African academics strive to publish in internationally renowned peer-reviewed journals in order to ensure academic promotion, but then, again, not many of these do make it into such journals. And the few, when they do, the journals are out of reach of most university libraries thereby rendering access difficult. Without any forum of sharing this knowledge, replication becomes the order of the day.

Reflecting back on the research information related problems faced by developing countries, Abukutsa-Onyango (2010) said there had been two-fold problems in the past: inability to afford subscriptions to journals and inability to integrate national research into the global knowledge pool. The prohibitive cost of publishing and distributing journals in the developing world means much of the research done there remains 'invisible' to the rest of the world (Harnad, 2010).

Wellcome Trust (2003) claims that the monopoly held by publishers in the current system does not act in the interests of either the academic community or the public, further worsening the disparities that exist between resource rich and resource poor countries. To change the current structure of scholarly publishing requires a buy-in of key stakeholders such as faculty, librarians and publishers (Johnson, 2002; Ming, 2002).

Academic librarians have been vocal on the topic of a 'serials crisis,' where the cost of journal subscriptions has taken up an increasing share of stagnating library budgets. Lawal (2002) notes that libraries were paying three times more 'in real dollars' for 7% fewer journal titles in 2001 than in 1986. This has led to the cancellation of journal subscriptions, and decreasing levels of access to research information. This explains why many librarians have misgivings about the traditional journal system and publishers.

Well-established journals wield the power to control the process of professional advancement but are in turn dependent on faculty content to also survive (Tiamiyu & Aina, 2008). Issues of professional recognition, scholarship contribution and career progression have often been high on the radar for academic authors. Authors are willing to give away the copyright to articles they have written in exchange for the services of the publisher in the form of peer-review, quality labeling, marketing and disseminating (Bjork, 2004). In return, the author gains recognition in the academic field and career advancement.

There is hardly a direct compensation for faculties who publish in academic journals as compared to authors involved in trade publishing (Carpenter et al, 2011; Glenn & Russell, 2008). It is upon the realization of this unbridled advantage of publishers by dissatisfied authors who are the providers of the raw materials, and librarians who depend on these journals to build their collections, that the digital option to scholarly communication or online publishing has been embraced and explored.

Authors benefit in enhanced visibility of their research from online publishing emanating from broader dissemination and increased use (Dulle & Minishi-Majanja, 2009; Priti, 2011). With the existence of appropriate indexing and search mechanisms in place, disseminating one's intellectual output online leads to an appreciably higher global citation rates than traditional print publishing. This enhanced visibility and awareness projects both the author and the institution of origin.

It must however be stated that even though online publishing could potentially lead to wider readership, they may critically be limited in access by the issues of cost, copyright and other restrictive policies. An entirely free access to online scholarly materials for all users would widen the audience and recognition, and thus the impact and number of citations (Lawrence, 2001). The ability to locate and retrieve more relevant research quickly and easily online does improve scholarly communication and advance scholarly research (Correia & Teixeira 2005). It also enhances classroom teaching with resources such as illustrations, visualizations, models and course videos placed in the repository. One dimension of online publishing which seeks to do away completely with the issues of restrictions is online open access. It is therefore not surprising that the concept of ‘open access’ to electronic resources is so rife in the information literature.

2.2 Open Access

As a concept, Open access (OA) means an unlimited access to online peer-reviewed scholarly research works such as thesis, dissertations, book chapters, and scholarly monographs (Schwartz, 2012; Schopf & Prost, 2013). To Suber (2010), open-access resources are digital, online, free of charge, and free of most copyright and licensing restrictions, and go beyond scholarly publications to include non-scholarly materials, like music, movies, and novels. Being an ardent advocate of this phenomenon, Harnad (2008) describes the characteristics of open access as information which is free, immediate, permanent, full-text, on-line and accessible.

‘Open Access’, as a term, was formally introduced during conferences in Budapest, Bethesda and Berlin, in the early 2000s. Official statements from these conferences

clearly defined ‘open access’, and thus reduced its misinterpretation and excessive misuse (Suber, 2004). All three conferences called for the removal of price and all forms of barriers to scholarly information. For instance, the Budapest Open Access Initiative (2002) statement, where the term ‘open access’ was formally coined, reads as follows:

By “open access” to this literature, we mean its free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited.

Before these conferences, however, Harnad (2004) believes that an attempt to make free online access to journal articles available had been in place; with the first online-only, free-access journals appearing in the late 1980s. Among them were Bryn Mawr Classical Review, Postmodern Culture and Psycology. With time, the number of Open Access journals continues to rise. The Directory of Open Access Journals reported in 2011 of a total of 6,463 journals. Of these, 2836 journals are searchable at article level with almost 600,000 articles. In the developing countries category, Brazil is on lead with 587 e-journals, followed by India (312), and South Africa (36) (DOAJ a, 2011).

Jain (2012) sees two routes to open access: institutional repositories and open access journals as both proven mechanisms for closing the information gaps in ways that are appropriate for low income countries. Of these, open access institutional repositories seem to be receiving an extremely wider embrace.

2.3 Open access institutional repositories

Several authorities have defined online digital open access repositories differently. Johnson (2002) views a digital institutional repository as any collection of digital material hosted, owned, controlled, or disseminated by a college or university, irrespective of purpose or provenance. Swan and Chan (2009) consider open access institutional repositories as digital collections of the members of a university's research community that make their contents freely available over the internet for archiving and long-term preservation.

Crow (2002), Johnson (2002) and Shearer (2003) have summarily described the key attributes of online digital institutional repositories as being institutionally-defined, scholarly, cumulative and perpetual as well as open and interoperable.

2.3.1 Institutionally-defined

Crow (2002) believes IRs are institutionally-defined in the sense that unlike discipline-specific or subject-oriented repositories, they (institutional repositories) capture the original research and other intellectual property generated by an institution's constituent population in many fields. Institutional repositories therefore represent the very embodiment of the institution that developed it and thus becomes the yardstick to gauge the academic output and quality of the institution (Johnson, 2002; Shearer, 2003). This

‘institutionally-defined’ attribute in no way suggests that each institution should act alone. It often becomes necessary for institutions to form collaborations or consortia to share cost, expertise and advance their unique interest in the management of their repositories.

2.3.2 Scholarly Content

The online repository of an institution often contains materials generated by students, faculty, non-faculty researchers and other employees of the institution. These, according to Crow (2002), might include students’ electronic portfolios, classroom teaching materials, the institution's annual reports, video recordings, computer programs, data sets, photographs, and art works – virtually any digital material that the institution wishes to preserve. With a skewed focus on scholarly contents, IRs may include pre-prints and other works-in-progress, peer-reviewed articles, monographs, enduring teaching materials, data sets and other ancillary research material, conference papers, electronic theses and dissertations, and gray literature (Johnson, 2002).

Content recruitment is so hard to determine because different IRs enumerate different digital documents (Shearer, 2004; Lynch & Lippincott, 2005). Western European IRs are divided between journal articles and theses, while 88% of the content of Australian IRs is considered primary data (van Westrienen & Lynch, 2005). The latter is very similar to most African IRs which largely contain electronic thesis and dissertations (DOAR, 2014). In the United States, repositories are most commonly used to hold digital images, followed by special collections far beyond just faculty output (Ithaka, 2006). Bicknese (2004) calls for a more selective approach to faculty outputs that IRs could well utilize.

2.3.3 Cumulative and perpetual

For purposes of scholarly communication, it is prudent for materials in the repository to be maintained in perpetuity. Items deposited in the repository might never be withdrawn, and this, coupled with the continuous depositing of contents, results in the need for every material in the repository to be accessible at all times. Institutional repositories, as a result of this, not only aim to preserve digital contents but also, make them accessible on a long-term basis as well. Digital preservation and long-term access are inseparably linked, each being largely meaningless without the other.

2.3.4 Interoperability and open access

The scholarly communication goal of institutional repositories suggests little or no barriers to such contents beyond the borders of the institution's community. This becomes the only means to increase awareness of research contributions. It is believed that with the ability to support interoperability through multiple search engines and other discovery tools, users outside the institution could find and retrieve information from the repository. This could simply be done by making the metadata available for other services to search and harvest the content. Jain (2012) observes that around the world, institutional repositories are mostly hosted within academic libraries to digitally collect and preserve academic papers and documents in order to make them freely accessible to the students, faculty and the public.

It must, however, be emphasized that aside from academic institutions, other types of institutions that generate substantial amount of research or other intellectual property could establish repositories as well. That is, governmental departments or agencies, non-

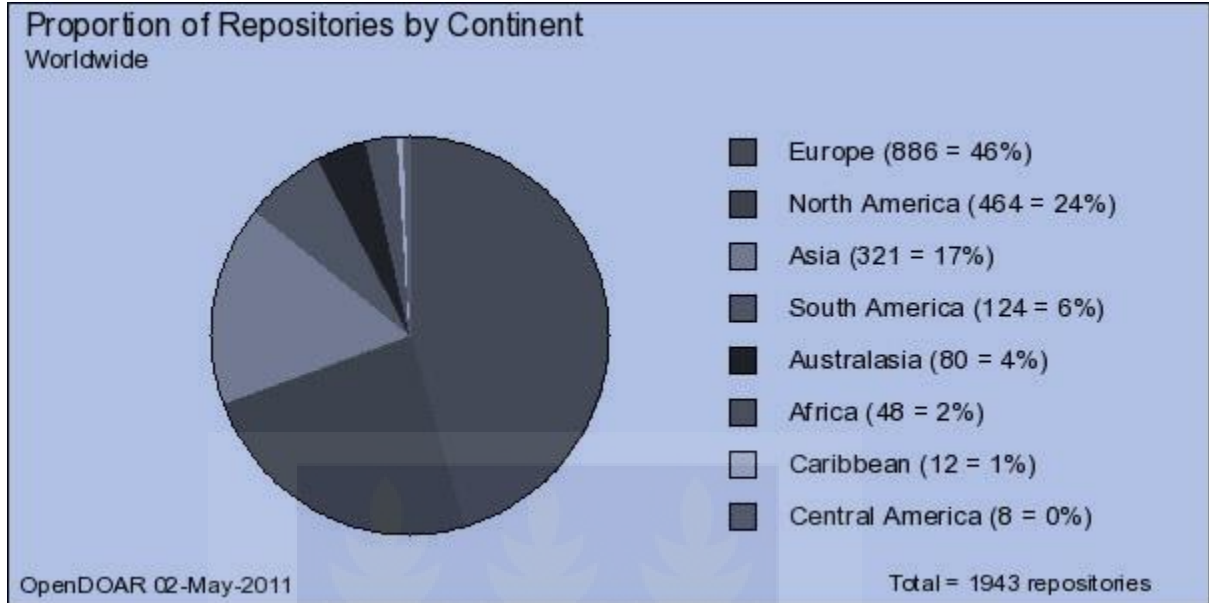
governmental or inter-governmental organizations, museums, independent research organizations, federations of societies, and commercial entities that wish to capture and openly disseminate its intellectual product could set up a digital repository, thus contributing to scientific/scholarly discourse and benefiting from global organizational visibility. This study, nevertheless, looked at the kind of institutional repository created by university campus communities and made accessible to global users without barriers.

2.4 Emergence and growth of institutional repositories

The concept of online institutional repositories is remotely rooted in a movement in 1994 when Stevan Harnad called authors to deposit their work on internet File Transfer Protocol (FTP) servers (Cho, 2008; Gideon, 2008). The main motivation behind these initiatives was high journal subscription rates which often compelled libraries to pay huge subscriptions for restrictive journals. Since then, there have been widespread global embrace of institutional repositories, albeit with differences in the levels of awareness and use in the different continents and regions.

Another remarkable condition that propelled the growth of institutional repositories was the pervasive public access to the World Wide Web in the late 1990s and early 2000s (Jain, 2012). The growth of IRs has been concentrated largely in institutions in the developed world. In the year 2011, the Directory of Open Access Repositories published an outlook of the proportion of repositories by continent as shown below:

Figure 2.1: Proportion of Repositories Worldwide (Source: OpenDOAR, 2011).



Source: OpenDOAR, 2011

Of the 1,943 open access repositories, 48 belonged to Africa (OpenDOAR, 2011). Among these, South Africa led the African continent with 24 followed by Egypt with six and Kenya with four (OpenDOAR, 2011). Technological differences account for this unequal proportion of repositories worldwide. This notwithstanding, there seems to be a growing awareness and use of IRs due to the rapid trickling down of technology from developed countries to developing countries, coupled with decreasing cost of internet-enabled electronic gadgets.

As of June 20, 2014, the Directory of Open Access Repositories (2014) revealed of institutional repositories as existing in African countries including Algeria, Botswana, Cameroon, Cape Verde, Egypt, Ethiopia, Ghana, Kenya, Lesotho, Morocco, Mozambique, Namibia, Nigeria, Rwanda, Senegal, South Africa, Sudan, Tanzania, Tunisia, Uganda, Zambia, Zimbabwe.

In Ghana, the Consortium of Academic and Research Libraries in Ghana (CARLIGH) and International Network for the Availability of Scientific Publication (INASP) has provided immense support to academic libraries in their quest to set up institutional repositories. An outlook of the Ghanaian situation, according to Corletey (2011), depicted that most of the IRs were at the pre-operational stage, with the few operational being mostly for public universities.

2.5 Academic libraries and institutional repositories

The significance of academic libraries in ensuring that academic institutions meet their research mandate cannot be overlooked. The core duty of an academic library is to support the teaching, learning and research activities of the parent institution. It is only through a library well-equipped and endowed with print and electronic information resources that scholars can keep pace with developments in various disciplines and transmit same to students (Kavulya, 2004). Unfortunately, annual budget cuts, inflation and the increasing cost of journals and books prevent libraries from achieving this mandate.

The benefits associated with open access have led academic libraries to participate actively in the open access movement (Swan & Chan, 2009). This new approach to scholarly communication, even though has some challenges, presents promising opportunities, such as reduced cost through eliminating the publisher as a middleman (Giarlo, 2005). It is the view of Grundmann (2009) that institutional repositories have received a wider embrace due to the fastest route to unrestricted access to a wider range of scholarly and research literature.

The significant role that a university library plays in institutional repositories has been acknowledged by many scholars (Bakewell, 1991). In a study by Kavulya (2004) of academic libraries in Kenya, it was revealed that apart from collection, processing and storage of traditional materials, academic libraries have become centres for the distribution of repository contents, with the librarian playing the roles of a teacher and a guide to the campus community by ways of investigation and research. As Cho (2008) succinctly puts it, libraries today are becoming alternative publishers through open access institutional repositories. In Malaysia, academic libraries are the pioneers of open access institutional repository initiatives created for a wider dissemination of scholarly literature by their own community members (Kiran & Yip, 2009). Thus, the library has become an instrument of education through open access by contributing to the intellectual development of the user (Adeya, 2000). Open access to up-to-date scientific information resources is the first condition for quality research.

2.6 Approaches to building and implementing repositories

The creation and sustainability of a repository dwells on the collaborative work of librarians, archivists, faculty and information technology experts. A successful approach to implementing repositories entail the identification of stakeholders and their involvement in the decisions concerning the selection of an IR model and its implementation as well as a needs analysis to determine what the IR should encompass. According to Moahi (2009), it fundamentally requires understanding the “existing human landscape” in the form of the organizational climate (culture, policies, governance issues, politics and goals). Building a successful institutional repository requires comprehension, collaboration, context, change, caring, commitment, creativity, competence. It could

therefore be realized that the real pivot of sustainable repositories are not only the technical issues but rather the cultural change necessary for it to become embedded in the activities and normal behavioural pattern of the campus community (Chan et al., 2005, Moahi, 2009). Institutional culture refers to the manner in which an organization is structured and how the various units interact. Typical of academic institutions, there are different faculties, departments, disciplines and research groups. Competition for the various resources may be more aggressive in some academic institutions than others. As such, cooperation and trust need to be nurtured for the repository building process to be successful.

On different campuses, different people assume different responsibilities relating to an institutional repository. However, the common trend in most academic communities is that the bulk of responsibilities will be undertaken largely by library staff in conjunction with the information technology section. It therefore behooves on libraries to know about the principles, benefits and operations of repositories in order to promote it and, in the words of Ashworth (2006), act as IR evangelists. It is believed that the tenets of institutional repositories are stimulated by librarianship techniques. Therefore, librarians are expected to help remove barriers, simplify the process of material submission and also be visible in the training of students, faculty and other stakeholders to contribute content and as well, use the repository (Walters, 2007; & Bentley, 2008; Moahi, 2012).

2.7 Policies for the establishment of institutional repositories

The institutional repository concept is fairly new, and so needs enough time to plan, formulate policies, and bring the campus community to consensus. This tends to drag the

entire process. Jain (2012) prescribes different roles and responsibilities to be assumed by different categories of people in different institution in order to make IRs more wide-spread and successful. With librarians rests the necessity to understand faculty needs, simplify the deposit process and promote IR benefits to faculty, students and other stakeholders. Whereas authors are responsible to submit knowledge in the form of research outputs in repositories, the roles of the parent institution comprise introducing mandatory policy for submitting research work and formulating other policies for the operational management of IRs.

Even though librarians are very significant in the creation and use of institutional repositories, and hence involved in lots of decisions in that regard, policy issues go beyond librarians to be affected by the larger campus community and other factors such as the institutional culture, the scope of the repository, content, access levels, legal aspects, standards and funding. These are the factors which lead to sustainability or otherwise of repositories.

There is always the need to ensure that all legal requirements for operating and maintaining repositories are met. These requirements include appropriate software and content licenses. Many universities have comprehensive intellectual property policies setting forth the responsibilities of faculty and administration towards the repository. In some cases, intellectual property issues may be covered in employment contracts.

It is therefore safe to conclude that Institutional repository policies are basically the amalgamation of several other policies that have harmoniously been brought together. This is because the IR process involves several processes and individuals within campus.

In other words, the IR policy of every institution will be affected by intellectual property right issues, preservation or archival policy, faculty progression or promotion issues, the ICT policy, among others.

2.8 Software and engineering protocols for institutional repositories

Interoperability, which is the possibility of different institutional repositories to be accessible on a single platform, requires that repositories employ standards developed to handle issues associated with open access (Lagoze, et al, 2001; Shearer, 2002). These standards include the Open Archival Information System (OAIS) Reference Model, Open Archives Initiatives Protocol for Metadata Harvesting (OAI-PMH), and the Metadata Encoding and Transmission Standard (METS) (Lagoze, et al, 2001; Lynch, 2001). The issue of interoperability begins with choosing the right software, making it a key element in the construction of an institutional repository. The two main groups of software for the setting up or creation of institutional repositories include open source and commercial software.

The Directory of Open Access Repositories (DOAR) data reveals that the majority of institutional repositories are built using open-source software (DOAR, 2014). This partly has to do with the fact that open-source software is compatible with the ideology of the freedom and independence of the internet from commercial interests. Again, increased visibility, interoperability and availability of technical support have been cited as advantages of using open-source software. Many of the software have been created with a strong focus on repository integration, storage and preservation, as well as stewardship and dissemination of scholarly publication. Among such open-source institutional

repository software are ARNO, CDSware, DSpace, ePrints, FEDORA, Greenstone, Invenio, MyCoRe and SobekCM. Among these, Dspace and E-prints are the widely used for the reasons that the DSpace software facilitates the management of multidisciplinary contents while E-Prints can be locally customized. On the other hand, Greenstone, open source software, is also preferred because it can support multilingual documents (Laxminarsaiah & Rajgoli, 2007).

Some institutions on the other hand opt for outsourced commercial solutions such as Digital Commons, a full-service commercial platform from the Berkeley Electronic Press and SimpleDL (OSI, 2004).

It is often rewarding to choose comprehensive software that comes with other advantages that make the operation and sustainability of the repository attainable. In a survey of 123 Association of Research Libraries (ARL) member libraries in the US by Bailey et al (2006), it was established that DSpace is the software of choice for many institutions because of the availability of technical support and its ability to support different formats of content. The fact that it has a large user group is also a major attraction.

2.9 Preservation of repository contents

Digital information is at a grave risk of loss due to technological obsolescence. This situation is as a result of the rapidly shrinking time between the creation of digital documents and their preservation. Unlike information stored on paper, digital resources are very delicate. Conway (1996) believes that as the human “capacity to record information has increased exponentially over time, the longevity of the media used to store the information has decreased equivalently. It is believed that since digital contents

have gradually become a major component in the current information dispensation, their preservation is also a key issue (McGovern & McKay, 2008).

Digital preservation is the long term protection of digital information to ensure its retrieval and interpretation for all the period that the information in the document is needed. It is the act of physically and intellectually protecting, as well as technically stabilizing the transmission of the content and context of electronic records across space and time, in order to produce copies of those records that people can reasonably judge to be authentic (Akussah, 2011). It is an organized series of actions taken to ensure the continued use of digital objects over time (Akussah & Tihamiyu, 2000). The chief motive of digital preservation is to ensure that digital objects are never lost or damaged, can always be found, and understood.

Preservation of repository contents is dominated by two main issues namely media obsolescence and technology obsolescence. Media obsolescence refers to a situation where storage media is superseded by newer media. In many cases, it is the obsolescence of the hardware that reads the media that prevents access to the media, even though much emphasis is often placed on the readable lifetime of digital media.

Technology obsolescence, on the other hand, is where current hardware and software is superseded by new technology, which may not be compatible with older systems. This can lead to the loss of the ability to make sense of data. In the view of Jackson (n.d), "the rate of change in computing technologies is such that information can be rendered inaccessible within a decade". Often, when newer version of software emerges, it might not support the original file format. As such, information may no longer be available

without the intervention of digital preservation techniques. For an electronic document to exist and be used, neither the digital representation nor the visible product at any time can be separated. To be able to use an electronic document in future, it is necessary to preserve the digital representation that instantaneously generates the visible or perceptible end product in a stable secure form. Akussah (2011) believes that preserving an electronic document is not only a matter of prolonging the life of a document as in the case of paper documents but rather, the software's ability to create the observable product again and again.

In response to the threats of technological obsolescence and the deterioration of digital storage media there are two approaches to preservation of digital information resources. These are passive preservation and active preservation (Akussah & Tiamiyu, 2000). Passive preservation entails the set of preservation processes which ensure the continuous integrity and controlled access to digital documents while preserving their associated metadata characteristics. Essentially, passive preservation aims at keeping the original digital document intact without any interference in the technologies that are used to store, process and access them. Passive preservation strategies include refreshing data and replicating data.

Active preservation ensures the continuous and long-term access of electronic documents by actively intervening in how the document moves onto a new storage platform. The process does not alter or corrupt the content of the document. It only moves the document from one system to another. Active preservation is often carried out through the processes

of migration which include migration by normalization, migration at obsolescence and migration on demand.

There has often been a disagreement regarding whether long-term preservation is part of the functions of institutional repositories (Smith, 2007). However, with repository content being in digital formats, its preservation has now become a major challenge facing libraries. The difficulties in digital preservation, as pointed out by McGovern and McKay (2008) include little or no control over what is deposited, deposit of materials in less-optimal formats, poor metadata, insufficient intellectual property rights clearance; and digital content that is difficult or costly to preserve.

In a survey conducted by Kenney and Buckley (2005), it emerged that only about a third of institutions have developed, approved and implemented digital preservation policies for their repositories. It is incumbent on any approach at guaranteeing preservation to first consider the formulation of a preservation policy which prescribes the strategies for preserving IR content and the decisions about what content requires short, medium, or long term preservation. Aspects of collection policies such as selection criteria and submission guidelines could be incorporated into such preservation policies.

DSpace and CDSware are cited by OSI guide to institutional repository to be the only software having a defined digital preservation strategy (OSI, 2004; Wheatly, 2004). The DSpace software for instance classifies files as known, supported and unsupported formats for the purpose of preservation thus, giving different levels of preservation commitments to different formats. The software used to create the documents is not part of the document but is only a tool, hence successful preservation of IR content is hardly

dependent on software alone (Wilczek & Glick, 2006). The debate on digital preservation is ongoing with several initiatives being explored worldwide.

2.10 Benefits of open access institutional repositories

Due to their focus on the removal of access limitations, the benefits of open access platforms such as institutional repositories cannot be overemphasized. Open access provides diverse advantages to academic institutions, researchers, funding agencies, publishers and the entire nation (Giarlo, 2005; Nicholas & Rowlands, 2005; Canada, 2009; Cullen & Chawner 2009; Abukutsa-Onyango, 2010; Suber, 2010; Willinsky, 2010). In the view of Jain (2012), it is an effective vehicle to information exchange between and among countries. Swan (2009), in a briefing paper, sums up the advantages that repositories bring to an institution as:

- Opening up outputs of the institution to a worldwide audience;
- Maximizing the visibility and impact of these outputs as a result;
- Showcasing the institution to interested constituencies – prospective staff, prospective students and other stakeholders;
- Collecting and curating digital output;
- Managing and measuring research and teaching activities;
- Providing a workspace for work-in-progress, and for collaborative or large-scale projects;
- Enabling and encouraging interdisciplinary approaches to research;
- Facilitating the development and sharing of digital teaching materials and aids,
and

- Supporting student endeavours, providing access to theses and dissertations and a location for the development of e-portfolios.

With the availability of insufficient funding to libraries, Christian (2008) believes this type of unrestricted access to information helps researchers in the developing world. Canada (2009) further stresses that considering the limited financial resources available; the potential for researchers, educators, and institutions in developing countries to benefit from open access platforms is great.

Regarding academic institutions, institutional repositories lead to an increased global visibility and prestige, serves as a marketing tool to attract funding, students and quality staff. It also provides an avenue for the centralization and long term curation of all types of institutional outputs (Johnson, 2002; Pickton & Barwick, 2006; Lyte et al, 2009; Jain, 2010). As Jain (2012) puts it, it is a way of maximizing availability, accessibility, discoverability and functionality of scholarly research outputs at no cost to the user.

Several benefits also accrue to authors who utilize the services of institutional repositories. These are by ways of greater security and long term accessibility of material compared to a personal web site; a central archive of one's work; boosted professional prominence emanating from broader dissemination and increased use of publications; and the opportunity for large scale collaborations (Johnson, 2002; Bankier & Perciali, 2008; White, 2009; Lyte et al, 2009; Jain, 2011).

Evidence abounds in the benefits of institutional repositories that come the way of academic librarians. They provide improved visibility and institutional presence to

librarians by according them the opportunity to work hand-in-hand with academia. In many academic institutions, librarians do lead the way and provide the skills required to develop and run an effective IR in areas such as copyright checking, metadata creation, authority control and to a larger extent, championing the entire project (Walters, 2007; Bankier, Foster, & Wiley, 2009; Daly & Organ, 2009; Jain, 2011).

2.11 Marketing and promotion of institutional repositories

Marketing is defined as the anticipation, management and satisfaction of demand through the exchange process (Evans & Berman, 1985). It is the process of making sure that the right goods and services are produced and find their way to consumers. To some, it is the process of planning and executing the conception, pricing, promotion and distribution of ideas, goods and services to create exchanges that satisfy individual and organizational objectives (The American Marketing Association, 1985; 2006). The key functions of marketing include buying, selling, advertising, consumer analysis, marketing research, distribution, pricing, promotion, management and social responsibility.

While conceding that myriad of definitions exist for the concept of marketing, Ramirez and Miller (2011) believe that the definition by Kotler is most befitting for non-profit organizations. Marketing is seen by Kotler (1975) as “the analysis, planning, implementation and control of carefully formulated programs designed to bring about voluntary exchanges of values with target markets for the purpose of achieving organizational objectives. It relies heavily on designing the organization’s offering in terms of the target markets’ needs and desires, and on using effective pricing, communication, and distribution to inform, motivate, and service the markets.”

Academic communities share a common characteristic with other non-profit organizations being that, instead of a tangible product, they offer services. To Kotler (1975), a service is “any activity or benefit that one party can offer to another that is essentially intangible and does not result in the ownership of anything”. Services often do not appear in a physical state and thus inseparable from the service provider. As such the quality of service can differ based on consumer demand as well as the service provider.

There is often the feeling that library-related information should not be marketed because the library is a social agency established to serve the educational and information needs of society. Confirming this assertion, Anafo (2014) is of the view that Librarians sometimes feel uneasy with this concept partly because the idea of ‘marketing’ has acquired commercial connotations; and partly, perhaps, because the concept of a market-led service driven by customer need contradicts the traditional subordinate and independent ‘client to professional’ relationship. Most libraries summarily conclude that the marketing concept is “offensive and unethical, and those who practiced it were to be treated with some suspicion (Condous, 1983, [cited in Ramirez and Miller, (2011)]. By virtue of the fact that most academic libraries saw themselves as essential part of the campus community, they deemed it unnecessary to market their services or products. This stance is considered as part of the reasons to blame for a dip in the image of the library in most academic institutions.

Conversely, information marketing has become very essential in recent years because of reduced funding for library services worldwide. The earlier passive approach of information professionals waiting for clients to bring in their requests, has long given

way to professionals rather being more proactive to anticipate the requests of clients. Competition for limited funding threatens the continued survival of information centres. This makes it even more imperative for information services and products to be marketed and for libraries to review their information providing activities in order to retain existing users and win back lost ones.

What is more, developments in information and communication technology (ICT) have further complicated the already complex nature of the user. It is, however, believed that this same ICT could be seized to further improve the work and image of information providers to become even more relevant in their service provision. When e-resources are involved, technology is needed to create the desirable awareness about their availability of, and to ensure accurate, timely and reliable delivery of the information. It is heartwarming to note, as existing literature suggest, that marketing of academic products have currently become widely accepted, albeit sophisticated and strategic (Hemsley-Brown & Oplatka, 2006).

Though many have been slow to adopt marketing strategies, there seem to be a great pay-off accruing to libraries which embraced publicizing their services. This is evidenced in a change of library users' attitude towards the library and the services it provides. There is enough evidence to suggest that information professionals now appreciate the value of marketing and thus promote their collections and services to the campus community (Smykla, 1999).

Entsua-Mensah (n.d. [as cited in Alemna, 2012]), in discussing the relevance of marketing in a non-profit making establishment, points out the need for information

workers to adopt some marketing strategies to get information to their clientele. In a similar fashion, Alemna (2001) recommends libraries in Ghana to adopt marketing initiatives in order to ensure survival and sustenance. This is because in his opinion, the conditions which challenged libraries in developing countries to adopt marketing and total quality management strategies are very much prevalent in Ghana at present. What is however not clear is as to whether library managers are effecting the necessary changes to satisfy their clients. Creating awareness about the existence of the contents of an online institutional repository is far-reaching. It is for this reason that Crow (2006) suggests for close ties to exist between the repository and marketing for a wider adoption and use.

Smith and Albaum (2010) are of the view that effective information marketing often begins with research. The aim of such research is to find out more about the prospective users of the information and the type or format they are interested in. Such research also reveals the full range of services needed and the efficient channels to assist users receive the service. In the University of Maryland for example, the library system created and maintained a document that defined the target audiences, listed the key benefits of using the IR, and provided specific communication strategies for contacting campus entities and groups throughout the first academic year after launch (Ramirez and Miller, 2011).

Several strategies have been identified to market, promote or publicize institutional repositories and e-resources in general. Among these techniques necessary to ensure that information resources gets to the right people in real time are:

1. Using creative repetitive communication through word of mouth (informal), notices, posters, banners and radio announcements

2. Inclusion in annual reports, brochures and newsletters
3. User education/training
4. Meetings and various fora, seminars/workshops and special events such as open days
5. The library's homepage, other websites, Facebook, blogs and e-mail (Listserve)

In the view of Leong (2009), the strategies to increase awareness of electronic resources typically fall into three categories: using the contact opportunities afforded by prospective content generators and users who are seeking help; providing outreach information on the web site; and proactively delivering information directly to end-users. Ramirez and Miller (2011) reiterate that on some campuses, personalization is one of the most effective outreach strategies adopted by repository managers to reach faculty members. This breeds a favourable response from faculty, especially when they receive customized emails that reference their recently published scholarship, including a journal name and article title, mined from citation or journal databases.

Though many have suggested the use of handouts, flyers, pamphlets and websites, it is believed that a lot more could be achieved when campus opinion leaders are involved. Ramirez (2009) admits that notifying faculty of monthly download statistics for them to realize how often their work is being used, as well as creating an annual report to university administrators to summarize the repository's accomplishment and growth are also very useful strategies.

Marketing strategies change as the IR project matures. To some repository managers, the focus on marketing often is at the pre-launch and launching stage. During the early

stages, marketing efforts focus more heavily on the mechanics of the IR, including software, policies, benefits, and processes for getting started with the service. Handouts, pamphlets, bookmarks, and other paper collateral are useful tools to inform target audiences. Workshops and other “mini-conferences” on the changing scholarly communication model, the open access movement or educating faculty on related IR issues such as copyright, publishing processes, and citation analysis to draw attention to larger issues facing higher education are also useful (Ramirez & Miller, 2011). Some believe that by capturing the attention of faculty with these issues, many opportunities unfold to highlight the value and use of the IR in a broader context.

Strategically, on some campuses, library leaders and library-led committees are commonly employed to identify specific campus or faculty groups that would benefit from an institutional repository, and often, the Provost and other campus administrators are cited as important initial audiences. It is often when the benefits of the repository are linked to the Provost’s mission of research visibility and advancement that a strong case is made automatically for the IR on campus. This approach raises awareness of, and garners support for the initiative (BEPress, 2009). As the Diffusion of Innovations Theory postulates, early adopters are very crucial in the success of any new innovation (Rogers, 2003). As such, such opinion leaders who are held in high esteem by peers could be selected to become champions for the IR, raising awareness with colleagues and influencing others to use the repository. In other words, if it comes from a respected campus official, people are more likely to pay attention to the message. This could then be followed up with occasional report about the statistics, achievements, and future areas of growth.

It is the position of Revell and Dorner (2009), that subject librarians are in a better position to act as change agents by promoting institutional repositories as an innovative resource while aiding students and academics to meet their information needs. As the project gains acceptance, IR managers could then gather and incorporate anecdotes, quotes, and stories that directly illustrate how the repository has solved problems or benefited faculty. Generating good word-of mouth advertising involves relationship building with key users over time. By working with a pilot group of faculty, the value of the IR can be demonstrated on a small scale. Given the right circumstances, these faculty members will articulate the value of the IR to their colleagues, who are other potential IR contributors, in understandable terms.

Even though different institutions engage in different marketing or promotional activities, the main purpose still remains getting the word out about the IR using an array of methods. In general, at the launch of the IR or at new phases of development, far reaching communication tools such as campus-wide announcements, newspaper articles, letters, post cards, brochures, bookmarks, emails, give-aways, workshops, flyers and press releases are used to raise awareness. At other stages, depending on timing and repetition, more directed forms of marketing may play a significant role and may be used in a variety of ways. For example, Ramirez and Miller (2011) report that after exceeding 100,000 downloads from its repository, Cal Poly issued a press release, a campus announcement, and ran a story in the library's annual publication to draw attention to the achievement.

Marketing experts believe that no matter the approach, repetition is very important. This is because individuals do not readily accept a message at the first instance. Even though there is no agreement about the exact number of times before a concept is accepted, Andreasen and Kotler (2003) report that several of the institutions they surveyed indicated that they expect to contact faculty as many as seven times in order for the message to yield the desired results. It is obvious that there is competition for faculty attention; hence, conveying the marketing message in a number of ways increases the likelihood of eliciting the desired response.

Beyond the number of times, the actual timing of promotional events is also critical. Typically, at the launch of an IR, the service is new and fresh. This indicates a burst of marketing and therefore provides an opportunity for a lot of people to be reached. Again, with the arrival of a new faculty comes an opportunity to reach a new and a potentially receptive audience. Ramirez and Miller (2011) report that in Cal Poly, there is the inclusion of marketing materials in new faculty packets as well as faculty members who have recently received research grants. Reaching faculty at the early stages of research may result in obtaining research materials in the future. When material distribution is aligned with the campus calendar to cater for events like breaks and reopening, it becomes helpful.

Several constraints have been associated with marketing e-resources in academic environments. These notwithstanding, in the view of Martey (2003), the academic librarian should be motivated by these challenges to plan and implement a marketing strategy to ensure heavy patronage. Heavy use determines the worth and survival of the

library in the face of stiff competition from new and aggressive entrants into the information market place. Active and dynamic marketing requires that promotional programmes are incorporated right from the earliest stages of repository development, clearly spelt out in policy, even predating software acquisition and hiring of personnel. This is because, according to Foster and Gibbons (2005), the “build it and they will come” attitude is no longer effective.

As Ramirez and Miller (2011) put it, marketing is not an exact science, but rather an art. Every institution is unique and as such, would have a peculiar combination of marketing techniques that resonate with its faculty and students. Marketing an IR to campus, while it may entail focusing persistent attention on target audiences, is an effort rewarded with the building of strong, long-term relationships with faculty and students. Effectively marketing the IR opens up new opportunities for libraries to recast their role and utility on campus as educators, collaborators, and innovators.

2.12 Barriers to institutional repositories in Developing Countries

In spite of various benefits, developing countries' road to open access institutional repositories has not been smooth. Especially in Africa, there exist lots of challenges and barriers to the smooth take-off and sustainability of repositories.

The high cost of ICTs, connectivity and poor telecommunication in developing countries makes the sustainability of open access repositories very difficult (Giarlo, 2005; Canada, 2009). According to Dicovitsky (2010) developing countries are still struggling to achieve broadband services even though significant improvements have been made in access to mobile technology and infrastructure. Pickton and Barwick (2006) observe that

the problem often does not lie in the initial set-up cost but regular maintenance cost. The required funding needed to upgrade and maintain IRs is lacking in many developing countries (Christian, 2008; Abdulrasak, 2009; Canada, 2009).

The issue of little or no institutional support to IRs is a great drawback. In his observation, Christian (2008) points out that knowledge about the benefits of open access institutional repositories is very low among the major stakeholders like lecturers, researchers, librarians and students. As such, commitment and support seldom come from key stakeholders (Pickton & Barwick, 2006). Lynch (2003) has succinctly described this obstacle by claiming that “stewardship is easy and inexpensive to claim; it is expensive and difficult to honour, and perhaps, it will prove to be all too easy to later abdicate”.

In most cases, researchers accustomed to the well-established routines of publication in academic journals of known prestige, with effective systems of peer review and dissemination, see little benefit in alternative methods of access to the same material (Cullen & Chawner 2009, cited in Jain, 2012). In India both top-down and bottom-up approaches are used to create awareness of open access through talks at local and international fora, local workshops and via reputable databases such as Bioline (Fernandez, 2006).

The issue of copyright cannot also be overlooked in any discussion of challenges confronting institutional repositories. When it comes to alternative publishing arrangements, it often becomes difficult for researchers to negotiate their intellectual property right to their advantage. In most cases, because some researchers don't have adequate knowledge about intellectual property rights issues, they end up being too

careful not to infringe upon publisher copyright. In the same vein, publishers have developed a subtle opposition to institutional repositories since they see it as a competition and threat to their business (Pickton & Barwick, 2006; Davis & Connolly, 2007; Moahi, 2012). In a typical situation in Nigeria, Christian (2008) reveals that the International Institute of Tropical Agriculture (IITA) developed an institutional repository, but the repository could not go public due to some copyright issues. This was because copyright in research works conducted by the researchers at the Institute had been signed away to commercial journal publishers (Christian, 2008).

Closely knit to the intellectual property right issues is the difficulty in generating content, especially in the early life of the IR. This problem stems from the unwillingness on the part of academics to deposit their research work, and has compelled an ePrint pioneer, Stephen Harnard to suggest self-archiving feature. It is believed that when it becomes mandatory for the academic community to populate repositories, they could function to optimal capacity (Bankier & Perciali, 2008; Xia, 2009; Harnad, 2009). Gardner (2008) states that some universities and institutes like the Hong Kong and Harvard universities have already started with this option.

Research reveals the perception that materials in open access institutional repositories hardly achieve any recognition (Davis & Connolly, 2007; Royster, 2008). One reason for academics to publish in commercial journals is the promotion value that such publications have on their career progression. This is however missing in publishing in online open access institutional repositories. This, coupled with lack of financial incentive gives academics little motivation to cooperate with the open access initiative.

Challenges related to technical issues also affect the success of repositories. Technical issues relate largely to human resources, material resources and conversion of materials from their existing format to electronic format.

It is believed that many of the issues above are aggravated by the lack of a deliberate attempt to market and promote the benefits of repositories to academic communities in order to ensure their buy-in. There is difficulty in promoting the benefits repositories offer whilst allaying stakeholders' concerns which will make IRs become embedded and commonplace in the activities and normal behavioural pattern of researchers (Chan et al., 2005). This concept is relatively new to many, especially in developing countries, and Westell (2006) believes that scholars and administrators are yet to come to terms with it. In the light of the above challenges, a relentless promotional and marketing aspect is crucial to successful IR implementation.

2.13 Conclusion

It is quite obvious that the current system of scholarly publication limits, rather than expands the readership and availability of most scholarly research. This has always been the thrust of the arguments made by the advocates of IRs. It is believed that open access institutional repositories, no matter how noble the benefits are, will never be realized if researchers or academes in Africa merely become active consumers and passive contributors. From the literature reviewed it could be realized that the sustainability of repositories depend on the issues that go beyond their creation. This study will contribute to the field of repository development by focusing on the extent to which the campus

community is involved in a collaborative approach to develop and run repositories to ensure their wider use and sustainability.



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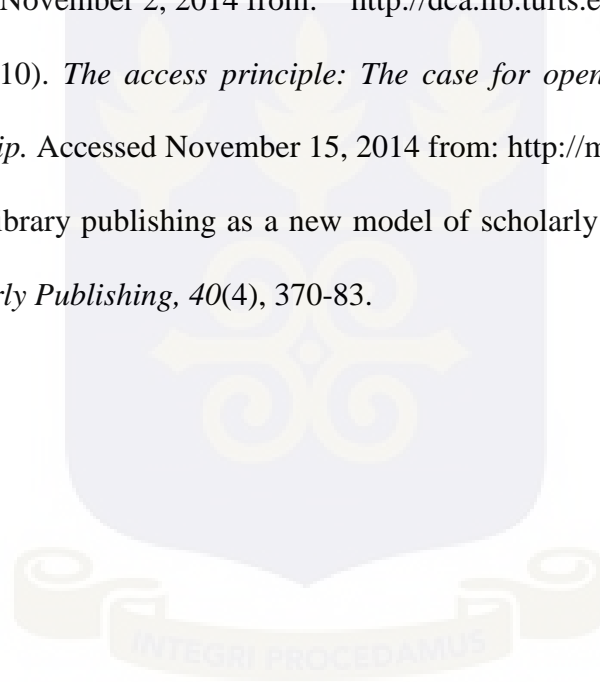
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CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter addresses the various means, tools and methods employed to elicit the necessary information for the study. Since research methodology is the systematic approach to solving a research problem, the chapter describes the design, instruments, sampling, method of analysis, and how ethical standards were followed procedurally. The study was guided by the Qualitative School of Thought where the researcher builds a complex, holistic picture, analyzes words, reports detailed views of informants, and conducts the study in a natural setting (Creswell, 1998).

3.1 Research design

The case study research design was used to carry out the study. Case studies seek to provide an in-depth description of the features or attributes of a particular phenomenon (Hamel, Dufour & Fortin, 1993; Sarantakos, 2005). In the view of Creswell (2009), case study is an empirical inquiry, in which focus is on a contemporary phenomenon within its real-life context. Not only is a case study flexible, but it can introduce new and unexpected results during its course, and lead to research taking new directions. Case studies also provide more realistic responses than a purely statistical survey (Stake, 1995; Flyvbjerg, 2001; Creswell, 2009). Case studies are primarily associated with the fields of anthropology and sociology and could either be single or multiple-case designs.

Single cases are often employed to confirm or refute a theory or to represent and explore a unique or extreme phenomenon that was hitherto inaccessible (Yin, 2003). However, in

applying single-case designs, great care needs to be taken to avoid misrepresentation and to maximize key documents and people. A single case, unless carefully selected, may fail to represent the object of study, while dependence on a single case renders a study incapable of providing a generalizable conclusion (Hamel et al, 1993; Tellis, 1997).

Multiple-case studies, on the other hand, follow replication logic. Each individual case in the multiple case studies consists of a complete study, in which facts are gathered from various sources and conclusions drawn from those facts. Multiple cases strengthen the results by replicating the pattern-matching, thus increasing confidence in the strength of the theory. Applications of case study methodology have been done by several researchers to study institutional repositories because by their nature, institutional repositories research relies heavily on qualitative methods of inquiry.

It must be noted though, that case studies have some few difficulties inherent in them. Construct validity, the extent to which a measurement corresponds to the concepts under study, is problematic in case study research (Giddens, 1981; Flyvbjerg, 2001). However, Yin (2003) proposed using multiple sources of evidence, establishing a chain of evidence, and having a draft case study report reviewed by key informants to mitigate the problem. Reliability is also achieved in many ways in a case study. One of the most important methods is the development of the case study protocol and the consistent use of uniform procedures. Yin (2003) posits that five components are very significant in every case study protocol: a study's questions; its propositions, if any; its unit(s) of analysis; the logic linking the data to the propositions; and the criteria for interpreting the findings. As such, the first task of the researcher is to develop 'why and how' questions. It must be

stated that the unit of analysis could be an individual, an event or a process. Stake (1995) and Yin (2003) identified sources of evidence in case studies as documents, archival records, interviews, direct observation, participant observation and physical artifacts.

Therefore, this study used comparative case study approach to investigate the creation and management of institutional repositories in two privately-owned and two public-funded universities, thus helping to analyze and highlight the similarities and differences between cases, and identifying areas that have direct implications for institutional repository development. Yin (2003) pointed out that generalization of results, from either single or multiple designs, is made to theory and not to populations. Multiple cases strengthen the results by replicating the pattern-matching, thus increasing confidence in the robustness of the theory. Multiple case studies have been applied in the field of library and information science to address various concepts (Busha & Harter, 1980; Powell, 1985; Lisl, 2006; Tella, Owolabi & Attama, 2009).

3.2 Selection of cases

This study, using a comparative case study approach to gather and analyze data, investigated the creation and management of repositories in some private and public universities in Ghana, ascertaining the various issues that influenced development as well as best practices. The repositories of Ashesi University College (AUC), Central University College (CUC), Kwame Nkrumah University of Science and Technology (KNUST), and University of Ghana (UG) were engaged in the study. Apart from KNUST which was purposively selected for being the first to develop and operate an institutional repository in Ghana, the University of Ghana, Central University College and the Ashesi

University College were randomly chosen from a frame of public and private universities that have their repositories in operation respectively. Pieces of paper containing the names of the four other public universities with operational repositories were put in a container and randomly picked. This resulted in the University of Ghana being selected. A similar practice was done for private universities whereby Ashesi University College and Central University College were randomly selected from a group of six private universities with operational repositories.

A comprehensive account and analysis of academic institutional repositories was developed with the purpose of generating knowledge about how individual IRs were set up, as well as a cross case comparison of the repository management with respect to their marketing and promotion for wider use and sustainability.

3.3 Selection of subjects

Setting up an institutional repository is an initiative so complex for an academic library to carry out alone. It must naturally involve many other stakeholders ranging from technical services, public services and administration to succeed. The study thus engaged all the relevant personnel in the selected universities whose activities and responsibilities were essential for the operations of the repository. These include significant individuals who are directly linked to the creation and management of the institutional repository on one hand, as well as those who play an indirect or passive role in the creation and management such as lecturers of the institution under study. The necessary procedures to choose respondents from a population of prospective respondents were carefully followed as discussed below.

3.3.1 Population

Busha and Harter (1980) and Nueman (2006) consider population in research as the larger unit with similar characteristics from which a sample is taken. The concept goes beyond human subjects to include documents, artifacts, activities or social actions, archival records and physical artifacts. Regarding this study, the population of the key individuals responsible for the creation and management of the repository included the University Librarian, Digital Librarian, the University Archivist, Information and Communications Technology Director, the Dean of Graduate Studies and Research and the University Public Relations Officer. These added up to a total of six persons. However, to accommodate the unique culture in each campus, room was made for any other outfit or individuals whose responsibilities towards the repository demanded that their views be sought for inclusion in the study.

With respect to the lecturers, those who had ever submitted materials to the repository as well as those who had never submitted materials were all engaged for their input. A tabular description of the population from which respondents were chosen for the study is shown below:

Table 3.1: Population of prospective respondents in the study sites

		Institution			
		AUC	CUC	KNUST	UG
Respondents	University librarian	1	1	1	1
	Digital Librarian	1	1	1	1
	University archivist	-	-	-	1
	University ICT Director	1	1	1	1
	Dean of Graduate School	-	1	1	1
	Public Relations Officer	1	1	1	1
	Lecturers	35	273	801	1045

Source: Field data, 2015

3.3.2 Sample size

The study sought to tentatively engage all the significant individuals who are responsible for the creation and management of the IR making it six (6) in each institution.

Concerning the lecturers, two each were selected from the categories of those who have ever submitted and those who have never submitted materials to the repository summing up to four. This altogether led to a tentative total of ten (10) respondents in each institution.

It must be noted however, that in some of study areas, some of the key informants listed above did not exist. For example, there was no Graduate School in Ashesi University College for which reason no Dean of Graduate School could be interviewed.

Again, it was only the University of Ghana which had a University Archivist and an Office of Research, Innovation and Development (ORID) having a direct responsibility towards the repository. The final sample for the study is presented in the table below:

Table 3.2: Sample for the study

		Institution				
		AUC	CUC	KNUST	UG	Total
Respondents	University librarian	1	1	1	1	4
	Digital Librarian	1	1	1	1	4
	University archivist	-	-	-	1	1
	University ICT Director	1	1	1	1	4
	Dean of Graduate School	-	1	1	1	3
	Public Relations Officer	1	1	1	1	4
	Lecturers	4	4	4	4	16
	Other*	-	-	-	1	1
	Total	8	9	9	11	37

* Office of Research, Innovation and Development (ORID)

Source: Field data, 2015

3.3.3 Sampling technique

The study employed purposive sampling approach to select key individuals involved in the creation and management of the institutional repositories in each study setting.

The four lecturers (two each of those who have ever deposited materials, as well as those who have never done so) included in the study were conveniently sampled. In doing this, the website hosting the various repositories were visited whereby some lecturers who had their materials in the repository were earmarked. Afterwards, these academics with their materials in the repository were, through e-mail, invited to participate in the study. When

the response was positive, another mail was sent to them with the semi-structured interview guide attached. It was through this e-mail correspondence that a convenient date and time was agreed upon for the interview to be conducted.

To make it practically possible to identify willing lecturers who have never submitted materials into the repository to be interviewed, an opportunity was used to identify them from the department of the lecturers who had ever deposited materials. That is, on the agreed date to interview a lecturer who had ever deposited material into the repository, other lecturers in the same department who had never deposited materials were approached and invited to part-take in the study. After a willing lecturer was identified, the necessary arrangement was made for the interview to be conducted. Though this was a very cumbersome process, it was about the most practical means to get “willing” lecturers to participate in the study.

3.4 Instrumentation

Instrumentation, in the view of Hsu and Sandford (2010), refers to the tools or means by which a researcher attempts to measure variables or items of interest through the data collection process. Since the study was qualitative in nature, multiple sources of data were collected to meet the objectives of the study. These consisted of interviews of respondents, an analysis of the respective institutional repository policy documents and the websites hosting the repositories.

Semi-structured interviews were used to elicit primary information from respondents. This type of interview, while ensuring uniformity, also makes room for the uniqueness of the various individuals and situations from which information is elicited (Sarantakos,

2005). Within an institution, different set of interview guides were used for the different categories of persons to be interviewed. However, across cases, same set of interview guides were used for the same sets of people. For instance, the interview guide used for the librarian of AUC was the same used for the librarian of KNUST but the guide used for the librarian of AUC was different from that used for the ICT officer of AUC. Broadly, the interview was semi-structured to accommodate thematic areas of IR policy, creation, marketing/promotion and use of the repository.

Under the policy theme, the semi-structured interview guide sought to interrogate issues concerning how the repository sits in the general ICT policy, vision and mission of the university, interrogate the motivation for their set up, copyright and intellectual property right issues, as well as how the repository is used to enhance the global image of the university. This theme also looked at how mandatory it was for sections of the campus community to submit materials to the repository, resourcing or funding of the repository, the designated people who manage the various aspects of the repository and the sustainability of the repository. These issues were broadly addressed by the University Librarian, the University Information and Communications Technology Director and the Public Relations Officer of the university. The views of lecturers were also sought, especially to corroborate issues of copyright and intellectual property rights.

Issues related to the creation theme on the interview guide included the software used for the repository, what types of materials are submitted, how they are submitted and uploaded in the repository, what type of metadata are created for a particular item and who creates it. This theme also addressed how contents of the repository are preserved

for perpetuity as well as all the challenges associated with creation. It was supposed that the Digital Librarian, the University Archivist (if any) and lecturers who have ever submitted contents were the best to speak to these issues.

Marketing remains one of the strong pillars of this research. The focus of marketing was two-pronged: how the repository is publicized to attract more contents and also, how it was marketed to draw more users. This theme probed into the various platforms, events and processes used to popularize/promote or market the repository. It determined who the architects of the various marketing activities were, and the kind of groups or individuals such activities are targeted at. Under this theme, the study found out which of the marketing strategies had worked well for students, lecturers, administrators and persons outside of campus, and the means of evaluating the success or failure of any marketing strategy. In each institution, questions relating to marketing were posed to the University Librarian, ICT Director, the Digital Librarian, Dean of Graduate Studies and Research, the University's Public Relations Officer and lecturers.

The main issues on the interview guide concerning use of the repository included access and harvesting of the repository from its website and search engines, ease or difficulty of use of the repository, rate of patronage, direction of flow of the users of the repository, discovery support and the restrictions to the access of the repository. These issues were addressed largely by the digital librarian, lecturers, and to some extent, the university librarian and the director of ICT.

Semi-structured interview was preferred since it allowed for the accommodation of other significant issues that did arise at any material moment. Again, it was more preferred to a

structured interview since each of the respondents was unique, and needed to be approached as such. It can however be time-intensive and prone to possible bias. Although face-to-face interviews can result in interviewer bias, they provide visual cues or aids to the discussion. It is believed that by interviewing those involved with IR development at several institutions, noticeable patterns or regularities of IR creation and management would have become apparent for enhanced analysis in order to expand the generalizability of the findings (Yin, 2003).

3.5 Data collection

Prior to the interview, the researcher visited the various institutions under study to familiarize with the environment in order to ascertain how best the interview sessions will be schemed to accommodate the resources and unanticipated events. A convenient date had been scheduled with the prospective respondents prior to the interview giving ample time for both the interviewee and the researcher to prepare well for utmost success. Four people were trained as field assistants to help in the gathering of the primary data.

The interviews were conducted within the months of February and March, 2015 and were taped and transcribed. Transcripts of the interviews were sent to participants to ensure that the content and contexts had been correctly recorded by the researcher. Not only did this allow for corrections and additions, but it also increased construct validity (Yin, 2003). Room was made to accommodate the options of email and telephone interviews to clarify some issues and also as a substitute for situations where a face to face interview was not possible.

Other key documents such as policy statements that support the establishment of institutional repositories as well as the website hosting the repository was observed and studied accordingly. Secondary data for the study included various journal articles and books in both print and electronic formats.

3.6 Data analysis

The researcher shares in the opinion of Bryne (2001) that a very large volume of detailed data emerge out of qualitative research, and since it is often subjective and contextually loaded, they would have to be revised to represent major themes or categories that describe the phenomenon being studied. Data was thus analyzed according to its source (interview, repositories website and policies) and format (text or audio).

3.6.1 Interviews

The transcribed interviews were read through and coded according to the respective themes to bring out the emerging patterns and categories which provided the basis of analysis. In doing this, the entire transcribed interviews were placed into a single MS Word document. After this, a Microsoft Access database was populated with the following fields:

1. Unique ID (preceded by the initial of the university);
2. Role of the participant;
3. Organization of the participant;
4. Theme that the data record fit in;
5. Coding based on research questions; and
6. Page and line number from the MS Word document

Records of the transcribed data were created using the MS Word software. Afterwards, categories and subcategories were identified within the themes to further sort the data. Once populated, the records were sorted by institution, theme, categories and subcategories to form the foundation for the development of the case study reports. For the comparative case studies, the records were sorted by theme and category to compare them across institutions. Each institutional repository had its own narrative with a separate section covering cross-case analysis.

3.6.2 Repository policy document

There was content analysis of the policy documents that set up the various repositories. This was done by subjecting the policies to the major themes under which they were carved in in juxtaposition with the objectives of the study. The purpose of this analysis was to situate the operation of the repository within the broad IR policy framework. It is upon this that finality could be drawn as to whether the repository was following the roadmap for its creation and management, and as to whether the success or otherwise is attributable to the soundness or otherwise of the policy.

3.6.3 Repository website

The websites hosting the repositories were browsed, examined and analyzed according to user interface design and the contents. User interface forms an important component of an information retrieval system since it connects users to the organized information resources. The user interface is the means by which information is transferred between the user and the computer and vice versa (Shneiderman, 1998). Well-designed user interfaces allow users to easily find the information that the system provides access to,

and to exploit such information once it is found. Under the analysis of the repository website, some statistical tools such as tables, charts and graphs were employed to describe the contents of the repository with respect to the number of theses, dissertations, journal articles, pre-prints and post-prints, audio files, video files, lecture notes among others.

Upon analysis of the interviews, policy documents and website, a comprehensive case report and cross case discussion was written covering the following areas:

- A description of the IR, providing historical information about its development.
- A discussion of the material submission and current contents and preservation.
- Discussion of the marketing or promotional processes, including resources and stakeholder groups.
- An evaluation of how these marketing activities have translated into use of the repository
- An overview of benefits, opportunities and challenges of the repository.

Cross case analysis was done to compare and contrast relevant themes from individual cases in order to draw the necessary conclusions.

3.7 Pre-test

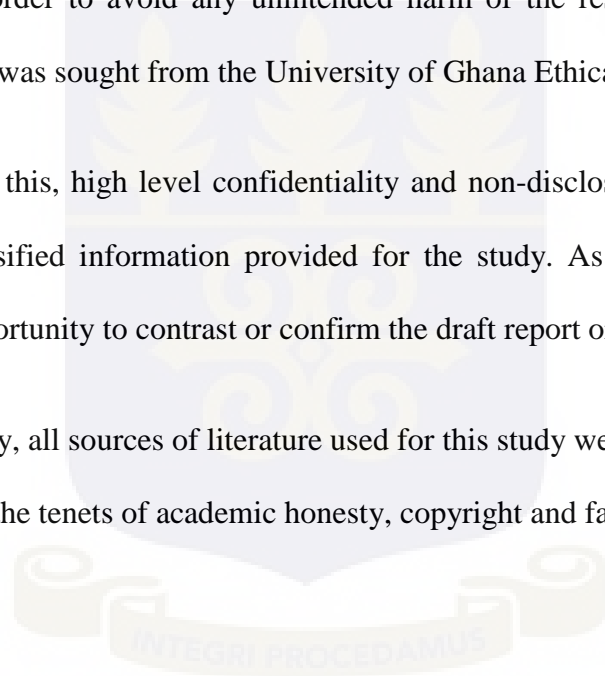
The instrument was pre-tested in the University of Cape Coast. There was a mock interview of some officials of the University of Cape Coast Institutional Repository. This was to ascertain how the objectives could be covered within a practical time period, test the data recording devices as well as measure the reliability and validity of the research instrument.

3.8 Ethical considerations

The intent of this study was strictly to contribute to knowledge in the field of online open access institutional repositories. Thus this study shares in the view of Fraenkel and Wallen (2000) about the need to hold information acquired from respondents in confidence. As such, participants were duly informed, and their consent sought accordingly before being engaged in the study. In doing this, a clearance letter from the Department of Information Studies of the University of Ghana was sought and used accordingly. In order to avoid any unintended harm of the respondents for the study, ethical clearance was sought from the University of Ghana Ethical Review Board.

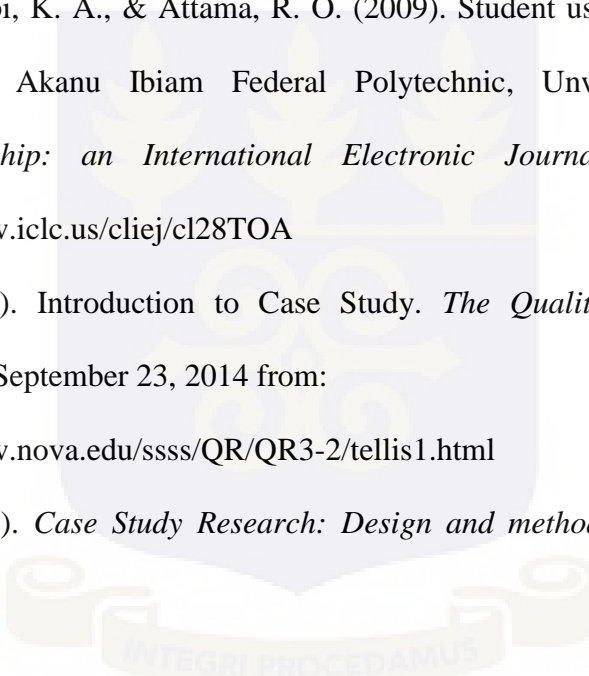
In furtherance to this, high level confidentiality and non-disclosure were ensured in the case of any classified information provided for the study. As such, respondents were accorded the opportunity to contrast or confirm the draft report or transcribed interviews.

More significantly, all sources of literature used for this study were duly acknowledged in accordance with the tenets of academic honesty, copyright and fair use.



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- The logo of the University of Ghana is a watermark in the background. It features a shield with a book and a banner below it that reads "INTEGRI PROCEDAMUS".

CHAPTER FOUR
DATA ANALYSIS AND PRESENTATION OF RESULTS

4.0 Introduction

Data collected regarding how repositories have been created and managed in the individual institutions have been analyzed and presented in this chapter. The analysis, which have been comprehensively put together under the various themes, were gathered from interviews with respondents, content analysis of repository policy documents and an observation of the website hosting the repository. All 37 respondents duly made time for the interview and cooperated in validating the transcribed interviews. This chapter, after presenting the individual cases, further brings out the differences and similarities within the study sites in a cross-case analysis based on the themes emanating from the data sources within the context of the objectives of the study.

4.1 Case report of Ashesi University College

The operations of the repository are in consonance with the policy of the first decade of the university which was to concentrate mainly on teaching and producing a new generation of ethical entrepreneurial leaders in Africa (AS 4, AS 1, AS 2). Having fulfilled its teaching target over the past decade, the Ashesi University College hopes to commence the next phase which is to concentrate on research (AS 4, AS 1, AS 6). This is where the Ashesi Institutional Repository (AIR) becomes even more strategic.

4.1.1 Planning and collaboration

“Our motivation to develop and operate an institutional repository emanate from the various CARLIGH (Consortium of Academic and Research Libraries in Ghana)

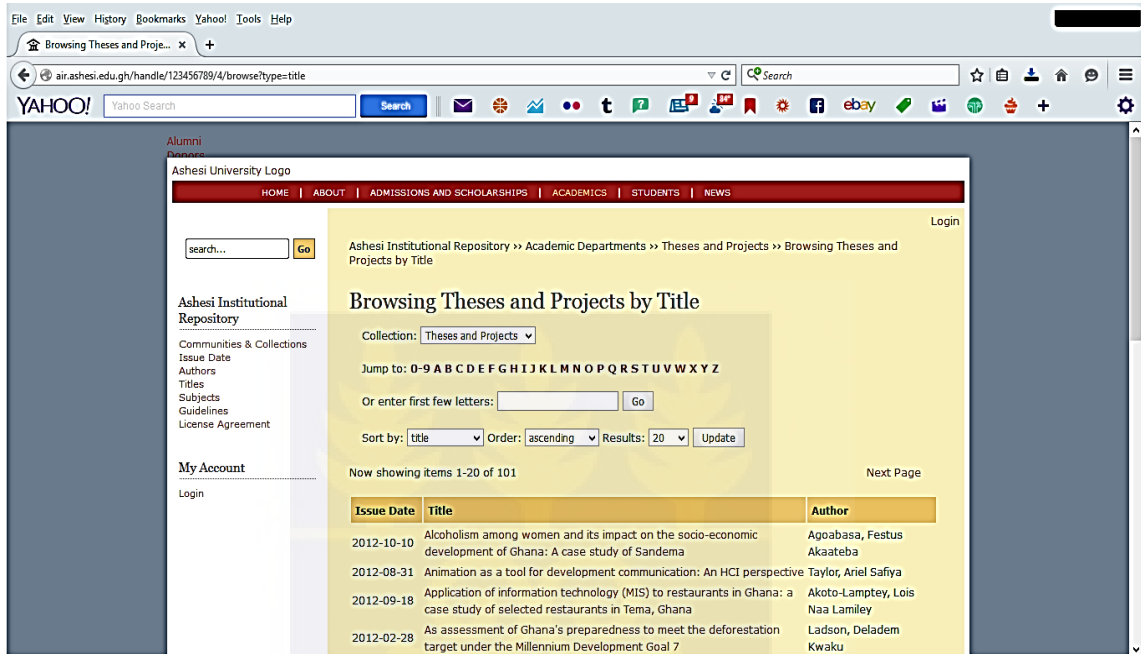
workshops on IR. A lot had to do with the image of the university, sharing of scholarly output and also, to some extent, the preservation of digital content” (AS 1). The organizational culture at Ashesi supports the rapid adoption of new technology and its use. To kick start the idea of an institutional repository into action, a preliminary planning was done by a team of people from the library, ICT outfit, the University Provost, Public relations (AS 1, AS 4, AS 2). The University librarian spends a considerable amount of time seeing to the operations of the repository. She has been with the library immediately after the inception of the university college, and has a background in information and communication technology (AS 1, AS 3). She further has a great deal of clout in her dealings with faculty (AS 5, AS 2). This notwithstanding, the creation of the repository has mainly been done with the cooperation of some units within the campus community. Now that the project is in operation, it is “mainly under the ambit of the library with the ICT outfit providing the connectivity backbone” (AS 2). But, however subtle it might seem, faculty, students, administration up to the president of the university are all involved in AIR (AS 4, AS 1 AS 2, AS 5).

4.1.2 Repository creation and content population

The institutional repository of Ashesi has been developed with the DSpace software to showcase largely the intellectual output of students and faculty. “At the initial stages, a key technical issue to decide on was whether to use an open source or vended software. After some deliberations on the strengths and weaknesses of the various software available, DSpace, which is an open source software developed by the MIT, was chosen. This software was most preferred because it supports the open access principle which

drives the Ashesi Institutional Repository” (AS 3). A graphical outlook of AIR is shown Figure 4.1 below:

Figure 4.1: Ashesi Institutional Repository (AIR) website



Source: AUC, 2015

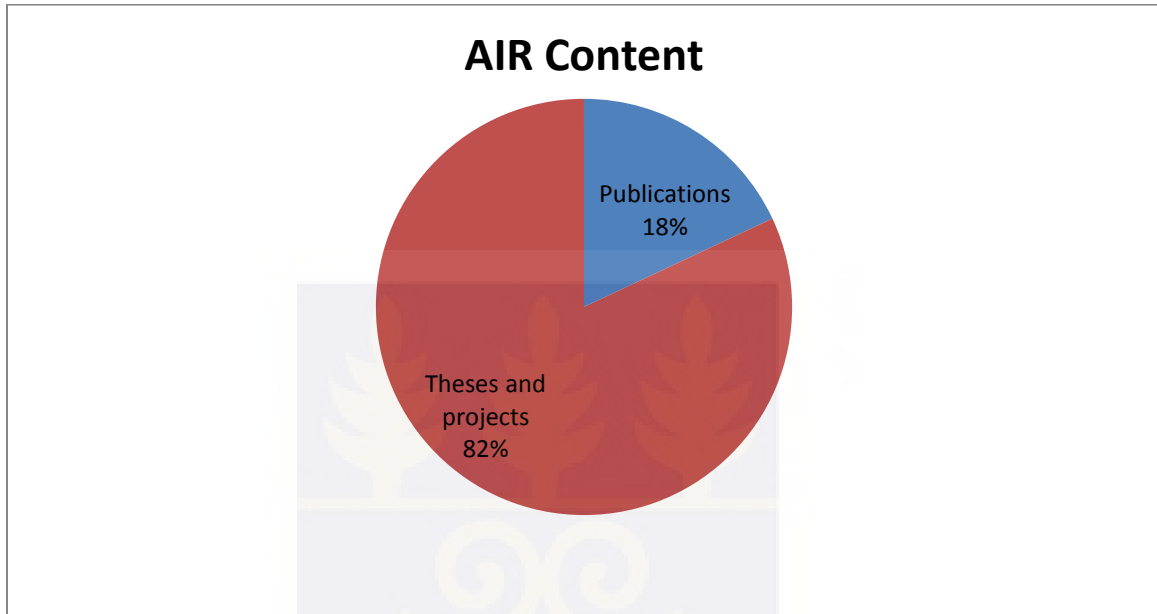
“The repository commenced with a pilot project and by 2013, it was declared operational. Though the repository is not registered with the various repository directories, the materials are picked up by Google Scholar for wider distribution” (AS 1).

In the AIR, material deposit is mediated by the library staff by scanning and converting documents into PDFs when the need arises, acting as editor for many of the collections as well as adding the associated metadata (AS 1, AS 3). The content of the repository are mainly text. Thus in the meantime, there are no audio and video files in the repository.

As can be seen from Figure 4.2 below, the repository has mainly been populated with undergraduate final year students’ theses or project work and a few faculty papers. The

communities in AIR are simply publications and theses and projects. The publications include 20 items whilst the theses whilst projects are 91 in number (AUC, 2015).

Figure 4.2: Contents of Ashesi Institutional Repository (AIR)



Source: Field data, 2015

In all, the repository contains 111 items. “Generally, we have been uploading student’s project works but we also have some faculty/staff publications” (AS 3). Students’ dissertations dominate the content of the repository. This is because “it is mandatory for such contents to be deposited in the repository and also, due to the fact that the earlier decade has been dedicated to teaching, there has not been much keenness on the part of faculty to carry out research (AS 2).

In the view of a respondent responsible for some technical issues, “the rate at which contents have been added to the repository has not been very satisfactory”. There is actually no zeal on the part of lecturers to deposit materials into the repository. They often need to be reminded” (AS 3).

4.1.3 Policies

The repository of the Ashesi University College is governed by an unwritten or ‘as and when policy’. However, the roles and duties of the various actors, as well as issues concerning material submission, upload and accessibility of the repository are very open. The librarian, as the immediate custodian of the repository, often serves as a constant reminder to all actors to ensure a smooth operation of the repository. “Only dissertations that have been graded and scored ‘Grade C’ or above are admitted into the repository. Such dissertations are first submitted to the courseware before library staff do the onward uploading into the repository with the metadata assigned” (AS 3). This is a mechanism instituted to “check and affirm that whatever ends up in the repository has been well-vetted. Faculty publications are also verified to avert any copyright infringements” (AS 1).

4.1.4 Marketing and promotion of AIR

A respondent believes that “the awareness of the campus community about the repository is 50-50” (AS 2). Marketing activities have been mostly internal with the aim to get faculty, students and administrative staff to patronize the repository (AS 4, AS 2, AS 1, AS 6). Such marketing activities are “championed by the outfit of the library. There are links from the main university website, emails to faculty, staff and students” (AS 3). As one respondent involved in the marketing of the repository posits, “we have not ceased to seize any opportunity to drum home the repository to management and faculty during board and council meetings.

There is often face-to-face or word of mouth publicity to faculty by the library staff, and this has been observed to be working very well” (AS 3). The trickle-down effect is that, “lecturers, after having been impressed upon to patronize the repository, also go ahead to influence students to do same. In effect, our marketing activities targeted at students (especially in levels 300 and 400) are greatly augmented. It is our belief that when the repository has been effectively promoted among the campus community; it will be very easy to market it to the outside world” (AS 4). The next level of marketing is envisaged to be a campus-wide responsibility where every unit will have a role to play (AS 4, AS 1, AS 5).

4.1.5 Preservation and security of repository contents

A very simple preservation process is followed in order to ensure the longevity of contents of the repository. To begin with, “the dissertations in MS Word format submitted to CourseWare are first converted into PDF. Also, faculty publications in print format are scanned and converted to PDF. After such documents are uploaded into the repository with their metadata, the documents are monitored to ensure that they are always compatible with new upgrades of the software used in their creation” (AS 3). When newer versions of the PDF software emerge, the life of the documents are intervened and migrated onto such versions to make them accessible over time. Again, “contents of the repository have been backed up at a secure location so that in the event of any irreparable damage to the operational repository, there would not be any prolonged interruption in access” (AS 2).

4.1.6 Level of use of the repository

“Even though there has not been any drive to market the repository to the outside world, because AIR contents are picked up by Google Scholar, it has led to usage traffic from outside campus” (AS 3). According to another respondent, “usage has been okay, though it has not been great. I don’t have numbers. Again, tracking is an issue but we do rely on feedback from the campus community to determine the trend and rate of usage” (AS 3). Put differently, “some members really do appreciate the repository but of course, some don’t, and such are the people that marketing and promotional activities are targeted at” (AS 2).

4.1.7 Challenges

Even though on the whole the Institutional repository of Ashesi University College can be said to be doing well, there are still more rooms for improvement (AS 2, AS 1, AS 3, AS 6, AS 4). The overarching “challenge, I would say, is the difficulty in getting buy-in from considerable members of the campus community” (AS 1).

One other main challenge has been a lack of staff time dedicated to activities of the repository. “There is the need for a repository librarian who will devote all attention to the operations of this initiative” (AS 3). Again, even though faculty members understand the benefits of the repository, issues of copyright do not encourage them to contribute (AS 1, AS 3, AS 5).

4.1.8 Sustainability

In the wake of these challenges, the repository comes with several benefits. One key benefit that the repository has provided is about uplifting the image of the institution in

terms of global visibility through the showcase of its intellectual output (AS 7, AS 4, AS 1). “Our students’ theses are recognized and some of them are even approached with publication offers” (AS 4). The repository is even more strategic in the next decade journey of the university which is a focus on faculty research. Specifically to the library, “the repository has brought us an avenue to improve our digital service provision” (AS 1) It is on the heart of many concerned for AIR to be sustainable over time. In actual fact, “a lot of opportunities exist for the IR” as stated by one stakeholder, and “a lot more of faculty should be involved to increase deposit and usage” (AS 6). Without any reservation, a key stakeholder shared the view in this manner: “for me, if the repository was to be established again, with the benefit of hindsight, I would wish we had someone who is an IT person committed to it. I mean, I think it will also be good to have a member of library staff whose duty it will be to ensure that stuff are uploaded and metadata assigned. Also, I would have tried to get more colleagues involved” (AS 1).

4.2 Case report of University of Ghana

UGSpace, the institutional repository of the University of Ghana (UG), simply fits into the current milieu of the university, which is a focus on research as it aspires to become a world class research-intensive university (UG, 2014c).

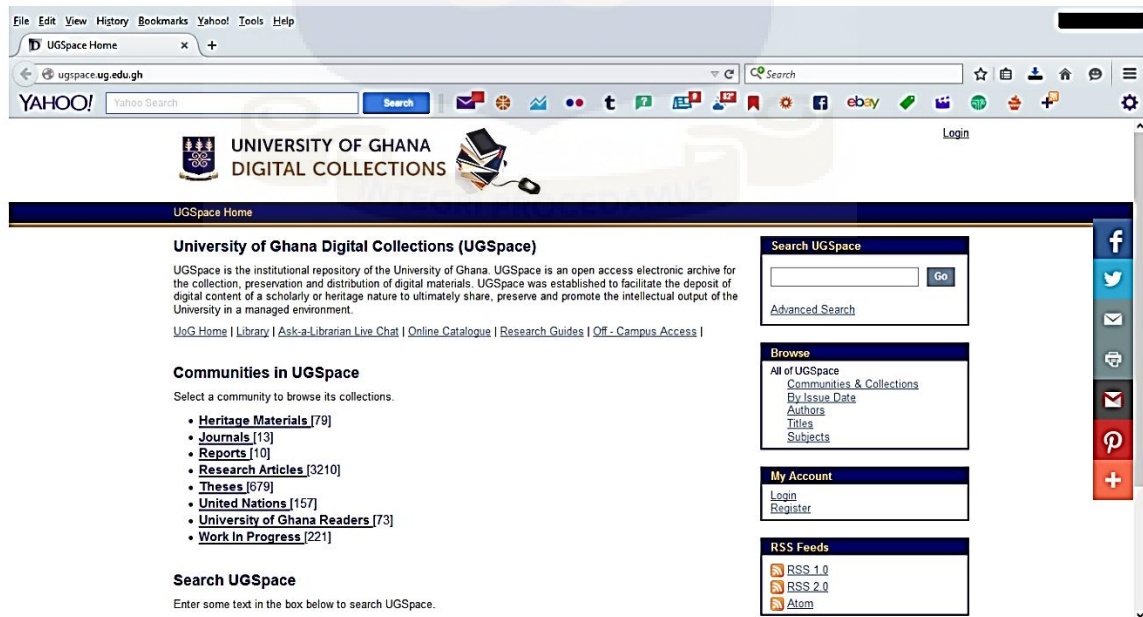
4.2.1 Planning and collaboration

“The development of the repository commenced with consultations with, and involvement of very significant stakeholders whose activities contribute to the bringing out of scholarly research” (UG 2). That is, the outfit of the library engaged with the Office of Research, Innovation and Development (ORID), Public Relations Office,

School of Graduate Studies and Research, UG Archives, the UG Computing Systems as well as some deans and heads of departments. Fortunately, because many of these officials were aware of the IR concept as an existing standard practice in many foreign universities, the idea was embraced without much hesitation or opposition (UG 3, UG 6, UG 2).

It must be stated however, that the purpose of these initial meetings was to determine how the IR concept could receive a wider acceptance by the university community, how it could well be used to project the image of the university and also, the expected roles to be played by the various stakeholders in order to ensure its sustenance (UG 2, UG 3, UG 5). After such consultations, the University library, the UG Archives, ORID and the UG Computing Systems continued with the direct technical issues of UGSpace development and operations. Figure 4.3 gives a visual appreciation of UGSpace website.

Figure 4.3: University of Ghana (UGSpace) website

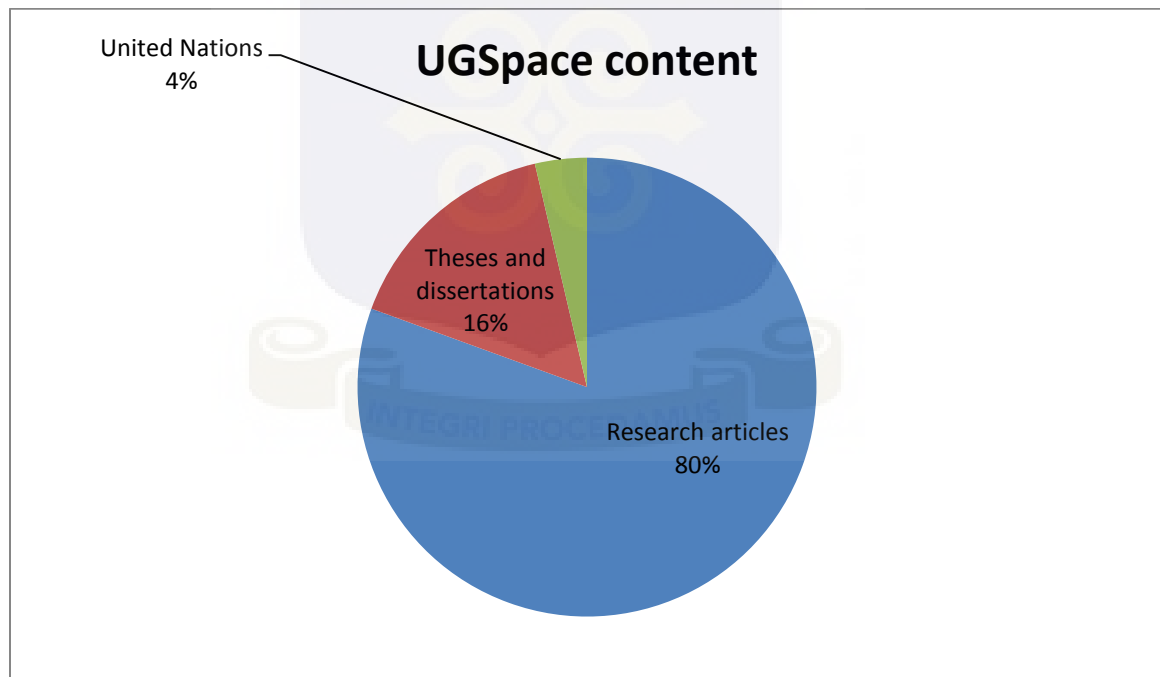


Source: UG, 2015a

4.2.2 Repository creation and content population

“The UGSpace platform was created with the DSpace software. Materials in the repository include research articles, heritage materials, reports and United Nations publications. A cursory look into the repository website portrays that journal articles constitute the majority with 3,444 items and the least being heritage materials, contributing 10 items. It is also interesting to note that apart from the thesis and dissertations which are full texts, a lot of the research articles are abstracts, especially articles published in high impact journals with access restrictions. Figure 4.3 below gives a pictorial appreciation of the content of UGSpace.

Figure 4.4: Contents of UGSpace



Source: Fieldwork, 2015

Theses and dissertations are automatically made part of the repository content because post-graduates are mandated to supply their work for onward upload into the repository

(UG 5, UG 6). “It is an understanding that has been accepted generally by students and supervisors. Graduate School now wants all theses and dissertations digitized. If the university is truly to become a first class university, then it is not proper for our theses to be in only print. Elsewhere, they don’t even submit hard copies of theses anymore” (UG 6). Old theses in the custody of the library which are in print format are first digitized and converted into PDF before being uploaded into the repository. Of late, final copies of thesis are submitted along with their electronic version in digital format whereby Graduate School does the onward upload into the repository (UG 6). This reduces the amount of time and effort used by repository managers. The library again liaises with the Public Relations and Archival outfits to retrieve and digitize some heritage materials worthy of the repository for onward uploading (UG 6, UG 11).

With respect to preprints, published articles and post-prints, they are not as easy to come by. Intellectual property right or copyright issues, coupled with the general unwillingness on the part of academics to make their works available to the repository manager reduce the rate of populating the repository with such contents (UG 3, UG 6, UG 2). As such, the library, together with the Office of Research, Innovation and Development do go for the articles from the lecturers instead of waiting for them to bring it to the library (UG 3, UG 6, UG 2). Also, the digital librarian uses SHERPA-RoMEO to identify journal articles authored by University of Ghana lecturers which are on open access platforms. When found, such articles are uploaded into the repository since the open access principle does not bar their further or wider distribution or circulation. There is also a library staff who checks to forestall any possible rights infringements (UG 6).

All members of the campus community, units, sections, schools, departments and colleges can deposit (UG 3, UG 6, UG 2). “The repository has no editors but all items go through the IT or electronic support unit of the library for the sake of uniformity. The thesis and heritage materials that constitute the repository content have their worth or value inherent in them. That is, a thesis for instance passes through rigorous process before it is accepted and graded. Thus the propriety of an item is determined and certified before being put online” (UG 6).

A library-supplied metadata is assigned to the document before being uploaded. “The Dublin Core standard is followed to extract the metadata from the document. Each item is uploaded with its metadata for easy retrieval and harvesting by internet search engines” (UL 6).

When a material is deposited, its ownership does not change but all materials are in the custody of the university (UG 6, UG 2). Hence, when things are found later to be unworthy, they could be removed. The rate at which materials are deposited is fairly satisfactory. “The College of health sciences has the greater proportion of materials because naturally they publish more” (UG 6)

4.2.3 Policies

UGSpace is supported by an all-encompassing policy which situates the repository in the open access ideology. Though approved in 2014, the policy is yet to be made freely accessible online. This notwithstanding, a look at the policy portrays that the essential issues for the IR to stand the test of time have been addressed in the policy. The document, which was “inspired by the IR Policy of the University of Cape Coast, Kwame

Nkrumah University of Science and Technology and the Massachusetts Institute of Technolog (MIT), stipulates the expected roles and functions of the various units for smooth operation and sustainability of the repository” (UG 6). The policy also spells out the joint or collaborative efforts expected from the various relevant sections of the university such as ICT, ORID, the Library and faculty among others (UG, 2015b). Above all, the UGSpace’s policy addresses the rights and responsibilities of other members of the academic community with respect to content submission and access to the repository content (UG, 2015b).

4.2.4 Marketing and promotion of UGSpace

The publicity of UGSpace is a collaborative effort among the library, ORID, Public Relations, School of Graduate Studies and Research and in fact, the entire academic community, with different levels of promotional activities.

“The library already subscribes to a number of online academic databases. So the electronic resources librarian, as part of her roles to market academic databases to the students and faculty, uses the opportunity to thoroughly promote UGSpace to ensure that the IR becomes a preferred destination of students” (UG 2). Such promotional activities are carried out during the many orientation programmes, the use of fliers and word of mouth (UG 3, UG 6, UG 2). “We also impress on some lecturers who are ‘friends of the library’ to encourage their students to patronize the repository” (UG 2).

The activities of the Office of Research, Innovation and Development (ORID) are geared towards attracting more materials from content creators. This unit is seriously “in league with the various colleges, schools and departments” with the utmost aim of receiving

more documents to populate the repository (UG 3). In fact, “if we are to sit down and hope that lecturers will themselves submit materials to the library to be uploaded, it will never happen. It is only when we go to them that we do appreciate the difficulties they have in terms of their time schedule, copyright issues and even the their limited understanding of the benefits the repository provides” (UG 3).

What ORID has done is that, its officers have been assigned to the various academic departments and lecturers. So all what these officers do is to engage with the lecturers, telling them about the potency the IR has in increasing the impact of their publications due to the wider coverage (UG 3, UG 7, UG 8). As such, ORID is able to secure manuscripts or published articles for onward upload into the repository. The collaboration between ORID and the library has worked so well that, the proportion of research articles as compared to theses and dissertations are increasing of late (UG 3, UG 6, UG 2). This can be seen clearly from Figure 4.3 above.

The Public Affairs Unit of the University of Ghana believes that it is not only the main university website that could be used to project the university’s image but also, the UGSpace platform could be used to ‘sell’ the university (UG 11). For this reason, a lot of publicity is done for the repository at the various local and international events which the university participates in. The institutional repository is one of the few items whose link is showcased permanently on the main university website since it has a symbiotic relationship with the website to enhance the image of the university (UG 11, UG, 2015c). “When we organize any public event, we don’t miss the opportunity to tell the audience about the wonderful things residing within our repository. Again, when we get any

opportunity to participate in any event outside of our campus, we make people aware of UGSpace. It is our belief that these in no small way direct traffic to the repository” (UG 11).

With respect to the school of Graduate Studies and Research, the focus of their marketing activities is basically to encourage students to use the repository. “Since as a policy, students are mandated to supply their final thesis to the repository manager, material submission is not much the problem than getting students to patronize the IR” (UG 5). To trigger more usage from the front of the about 3,587 graduate students, the School, in association with the university library, organizes series of orientation programmes for fresh graduate students and a number of seminars and workshops for continuing graduate students during their thesis writing (UG 5, UG 2). “Such activities are interspersed with the distribution of fliers and the use of posters at vantage points to publicize the repository” (UG 2).

4.2.5 Preservation and security of repository contents

In the University of Ghana, there is a University Archives outfit managed by a professional archivist. As such, the expertise of archival professionals is brought to bear concerning the preservation of the digital repository contents. What the team of digital library and archival staff do is to identify the fragility of the various digital resources and determine the appropriate preservation strategies for each category of documents (UG 1, UG 6). Fortunately, since the documents are in PDF and HTML formats, “the key preservation activity is the migration of documents to the newer versions of PDF software as and when such newer versions emerge” (UG 6).

However, one critical issue the preservation team concerns itself with is how to secure the repository against disasters. To address this issue, the contents of the repository have been backed up in a secure location. “Again, the server hosting the repository, which used to reside in the university library, has now been moved to the Network Operating Centre (NOC). Hence, the interruptions in the operations of the repository that used to be very rampant are now a thing of the past” (UG 6).

4.2.6 Level of use of the repository

“We operate by the open access principle so there are no limits on viewing. UGSpace is accessible outside of campus and it has huge international traffic” (UG 2). Due to the fact that “the repository has been populated with lots of research articles, and for the fact that it is harvested by popular search engines such as Google and Google Scholar, many users are attracted to the repository website. Patronage is okay but there are still more rooms for improvement. On the average, in a day, we get not less than 800 people visiting the site” (UG 6). “What we have done is to provide the platform for people to access relevant materials to satisfy their information need. And the people have also responded by patronizing what the repository has on offer” (UG 2). There is the need for a policy direction to entice even more people to patronize (UG 5, UG 2, UG 6).

4.2.7 Challenges

“Some materials brought to the repository manager exist in the print format manager. As such, extra time and effort have to be expended to digitize them before finally uploading into the repository” (UG 2). Even more worrying is that sometimes, the CD supposedly containing the soft copy of master’s thesis turns out to be blank or contain videos or

music tracks. Again, the IT outfit of the library has to intervene in the upload of materials since content creators don't have the permission to do so directly.

Also, “a key psychological issue that confronts us in our bid to secure materials from lectures for submission into the repository is when we are questioned about our mandate. Sometimes, you go to a lecturer and he asks you, ‘what obliges me to give my own publication to you?’ I believe there should be some administrative order encouraging or compelling lecturers to deposit materials into the repository, probably as part of their conditions of service” (UG 3). It could be stated in the appointment letters of new faculties that they have to submit materials into the repository. This is one sure way of getting more of research articles (UG 2, UG 6). Furthermore, erratic power supply also used to affect our operations especially when the alternative power is unavailable at the Network operating Centre where UGSpace is hosted.

4.2.8 Sustainability

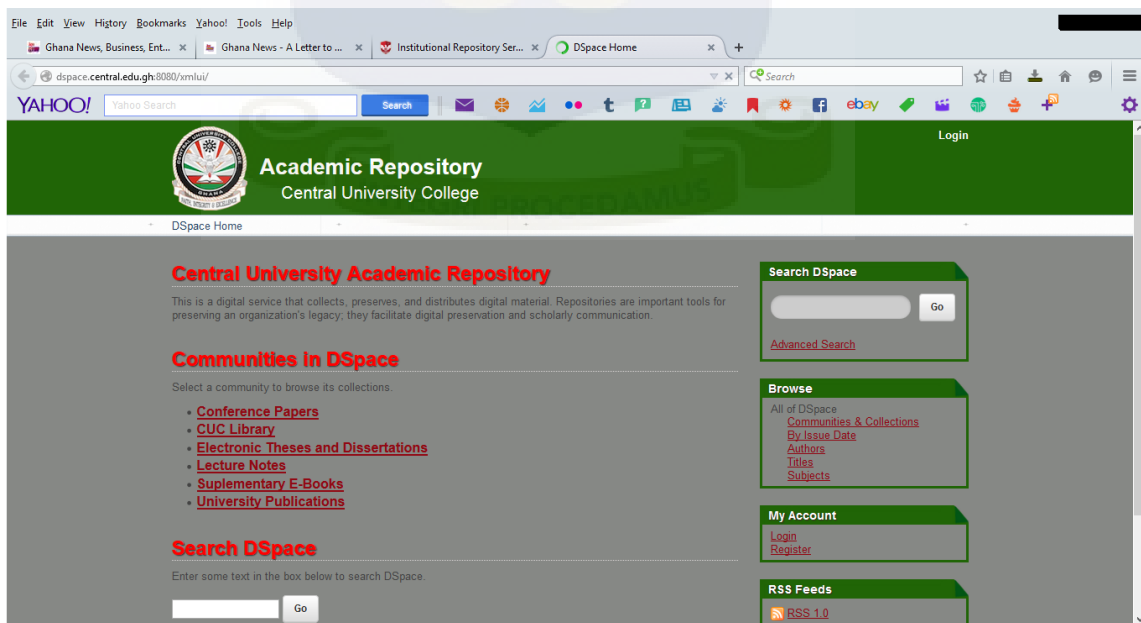
Generally, the IR is actually on track and making steady progress. The repositories webometrics ranks our repository 35th in Africa, having been at 57th position at the previous ranking. However, if the operations of the repository are to be efficient, the various aspects such as content submission and upload, accessibility and use of the contents, marketing and preservation, have to be decentralized” (UG 6). It would have been okay if content creators or authors could submit the material directly into the system. Then, when approved, the document be uploaded automatically. This will afford the various units such as the library, ORID and ICT to concentrate on the critical issues

that concerns the daily operations (UG 8). This kind of “division of labour is seriously needed for the repository to be sustainable” (UG 6).

4.3 Case report of Central University College

The Central University College believes that the Central University College Academic Repository (CUCAR) is just another avenue to project the university’s image by showcasing the intellectual output of its faculty and students. There was actually no assessment prior to the setting up of the repository. “It was one lecturer who lobbied the ICT outfit that we needed something like this. He sold the idea to us to formally initiate it” (CU 5). In any case, there was always the motivation to come out with digital initiatives which will make distribution of scholarly works easier. The design interface of Central University College Academic Repository (CUCAR) is shown in Figure 4.5 below:

Figure 4.5: CUC Academic Repository (CUCAR) website



Source: CUC, 2015

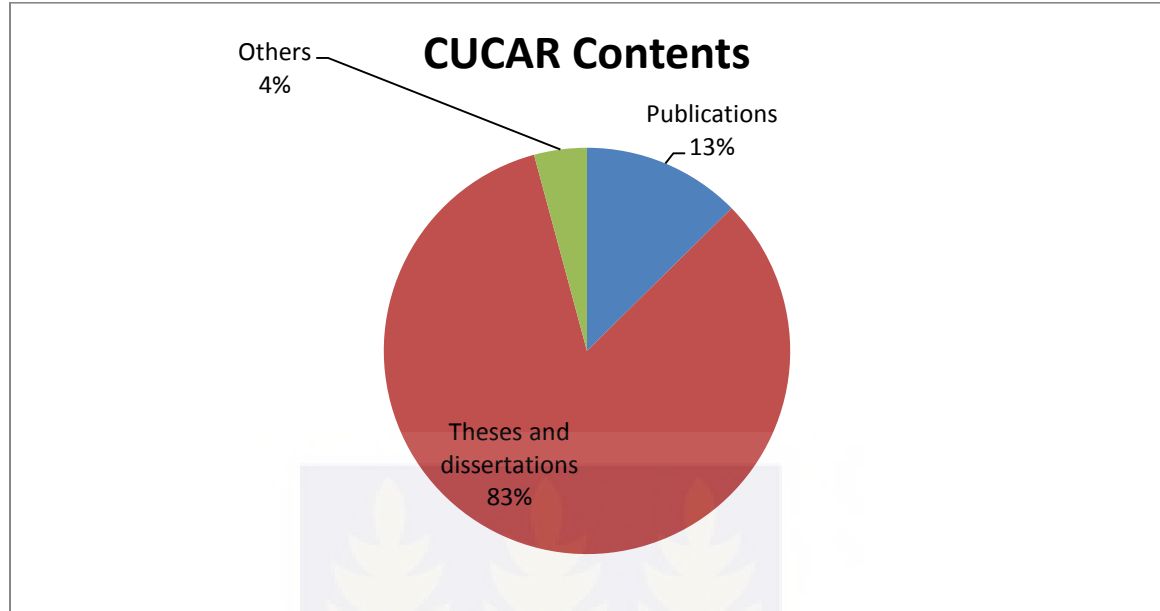
4.3.1 Planning and Collaboration

Even though the repository idea was pushed by a faculty member through the ICT Directorate, not so much collaborations had been done at the planning stage. It was during the implementation stage that the university library was brought on board. That is, after building it, the ICT outfit handed the repository over to the library outfit to manage its operations (CU 5, CU 2).

4.3.2 Creation and means of populating the repository

The repository is sitting on a 155mb internet backbone with the server residing in the Miotso campus of the Central University College. It has essentially modified the original D-Space programme to accommodate local issues, and uses the Dublin Core format to generate the metadata for its contents. The main materials making up the content of the repository are conference papers, electronic theses and dissertations, lecture notes and examination questions, university publications and supplementary e-books (CUC, 2015). A look at the repository website indicates the composition of the repository components as comprising 15 publications, 19 electronic theses and dissertations and five other materials. A graphical representation of the contents is shown in Figure 4.6 below.

Figure 4.6: Contents of Central University College Academic Repository (CUCAR).



Source: Field data, 2015

The library usually sends circulars around to various departments to bring research content to be placed on the repository. The repository was initially developed purely for faculty members (CU 1). At the moment, the theses of final year undergraduates who attain good grades are also uploaded into the IR. Graduate students used to submit their final thesis in hard copy but of late they submit the softcopy alongside (CU 3, CU 1). The softcopy is then processed and uploaded into the repository. Also, all lecturers have accounts to log in at the back-end. The staff emails of lecturers are connected to the repository so they can submit directly. There is however no substantive editor. On the whole, the rate of deposit is not very satisfactory (DL, IT).

4.3.3 Policies

“There is no formal policy guiding the operations of the repository. Neither is there a general ICT policy for the university. Therefore issues of ownership, copyright and

intellectual property rights are discretionary” (CU 5). Issues of intellectual property rights, which need to be addressed for lecturers to safely contribute materials, have rather received little attention (CU 5, CU 8, CU 6). Also, there is no policy mandating students to deposit their thesis into the repository so far. However, certain issues such as withdrawal of materials and access control are very forthright. The contents of the repository are owned by Central University College. As a responsibility, the repository manager checks copyright and propriety or worthiness of a document before being uploaded.

4.3.4 Marketing and promotion of the CUCAR

Central University College has a website which is used to market the programmes and products of the school. Other trendy digital technologies are used to publicize the repository. “We engage in more publicity using Facebook, twitter by creating links which directly connects the repository to the outside world” (CU 2). There is also the use of memos, phone conversation and email reminders (CU 4, CU 5).

Again, “influential persons such as deans, heads of departments and the SRC executives, as well as well-patronized events such as SRC weeks, durbars, university retreats and chapel services have been used to publicize and promote the repository. The repository enjoys much publicity through various mentions by our chancellor and president when they travel to preach or present papers” (CU 4).

Regular education of the various members of the campus community about the repository has been significant in promoting the repository. At the beginning of every academic year there are orientation and training programmes for students on how to access e-resources

(CU 2, CU 1). This approach has been successful because the participants were always informed on time and the trainer was always well prepared. Marketing is a shared responsibility but the e-resource librarian is largely in charge. There is no extra budgetary allocation for the marketing and promotion of the repository so all marketing activities are funded from the general library budget (CU 1).

4.3.5 Preservation and security of repository contents

“We have a redundant version of the repository, which is a slave to the operational IR. As such, when the operational IR (master) goes off, the slave or redundant repository automatically comes on stream. However, they are all on one server at Miotso so any catastrophe which might affect the server will disturb the operations of the entire repository if not damage it completely” (CU 1).

4.3.6 Level of use of the repository

“It must be admitted that the level of use of the repository is not satisfactory. Even within Central University College itself, the rate is not at that level that we can boast of. Again, we cannot also boast of international traffic. This is mainly because our repository has not been registered with any repository directory and its contents are also not being harvested by search engines. The necessary features to allow for harvesting have not been added yet” (CU 5). With respect to access, there is no restriction either to full text viewing or downloads.

4.3.7 Challenges

“This institutional repository was done as a small project. However, with the passing time, it has now assumed a wider dimension. As such, the IT unit can no longer combine

the technical responsibilities with the duties of marketing. So the university administration has to come in strongly in promoting the repository” (CU 5).

“A scanner is an equipment which is much needed to digitize the print version of materials. Unfortunately, the university does not have a high speed scanner that could be used for this project. Coupled with this is the difficulty in getting materials to populate the content of the repository” (CU 2).

Again, the on-going load shedding also militates against the smooth operations of the institutional repository. When the lights go off beyond 6 hours, the IR becomes inaccessible (CU 2, CU5).

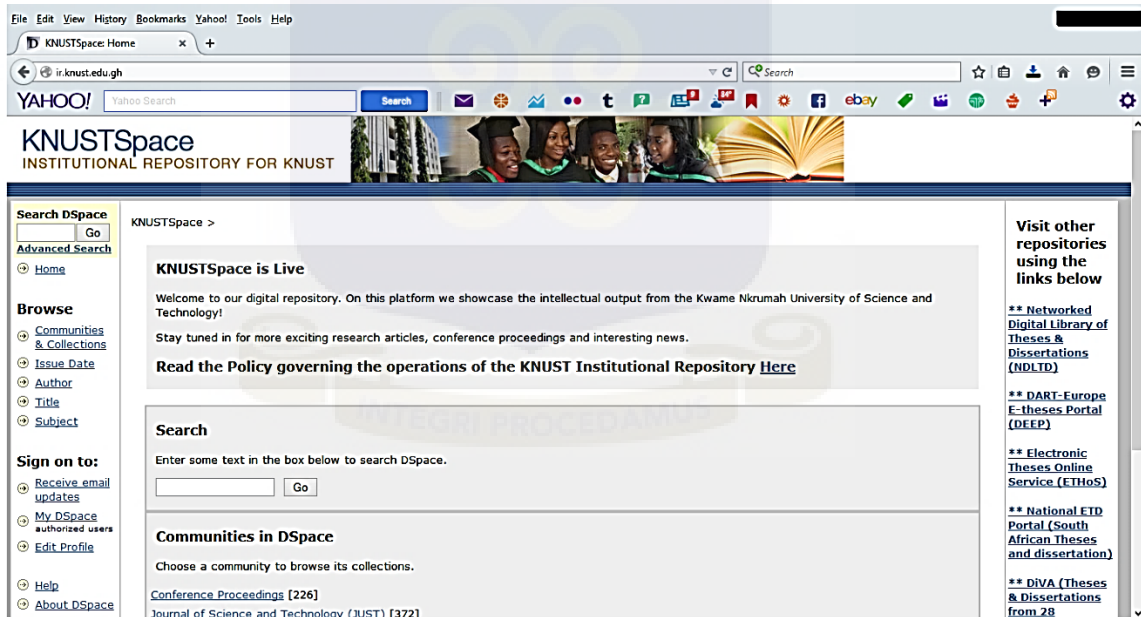
4.3.8 Sustainability

The institutional repository has given the university community wider options in access to scholarly materials. There is easy information retrieval making life easier for students, faculty and researchers (CU 6, CU 2, CU 3). To academics who have their materials on the platform, it leads to wider distribution of their works and several opportunities for global collaboration. The perceived lack of appreciation may be due to a general lack of understanding of the benefits of the IR (CU 1, CU 4, CU 2). With the adoption, acceptance and ownership by the entire university community, this can be overcome. “In fact, if the repository is to be developed again, then university management should take serious interest in it, whet up the appetite of the entire campus community before the whole thing takes off (CU 5). That is, first create awareness and then form committees to handle the various features of the creation and management of the repository.

4.4 Case report of Kwame Nkrumah University of Science and Technology

Known as KNUSTSpace, the Kwame Nkrumah University of Science and Technology's Institutional Repository was created in 2008 with the utmost aim to preserve its administrative documents and to project the image of the university and the campus community through the sharing of scholarly research (KN 3, KN 2, KN 1, KN 7, KN 4). The repository, which is accessible at *ir.knust.edu.gh* was “developed in response to the open access movement to showcase not only heritage materials and scholarly articles but also lecture notes, data sets among others” (KN 3). An outlook of how KNUSTSpace appears online is shown in Figure 4.7 below:

Figure 4.7: KNUST IR (KNUSTSpace) website



Source: KNUST, 2015

4.4.1 Planning and Collaboration

Before the repository was created, certain individuals who were not necessarily library staff but had interest or experience in digital repositories were consulted and engaged

(KN 3, KN 6). There were series of preliminary meetings with the various stakeholders responsible for the smooth take-off of the repository. “The library held meetings with units such as University Information Technology Services (UITS), University Relations Office (URO), School of Graduate Studies and Research (SGSR), and other academics who are ‘friends of the library’ even before internal library meetings were held to discuss the birth of the repository” (KN 3). Even though very detailed technical issues were not discussed during such meetings, broad issues that constituted the policy framework of the repository were addressed at such meetings, especially about how to get the buy-in of to the campus community (KN 5, KN 2, KN 4). The issues handled by the outfit of the library were those very technical such as software, standards, metadata, preservation and accessibility among others (KN 3, KN 5). Even though the library championed the development of the repository, other key stakeholders were also part of the decision-making and adoption process. As one lecturer puts it:

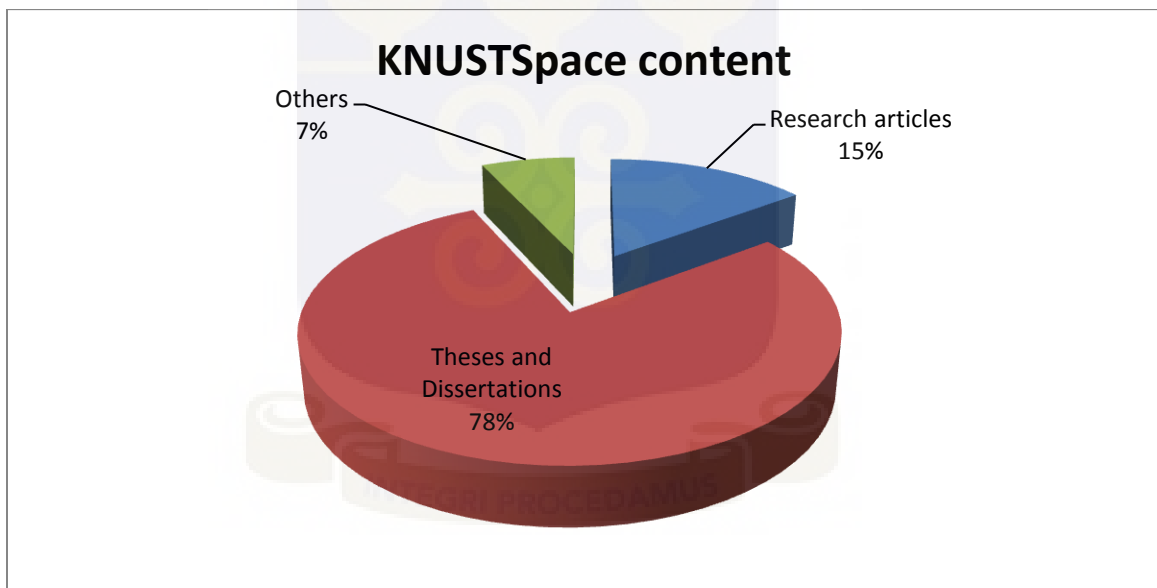
“Yea, you know my PhD thesis was on institutional repositories because I read about it in a book called UNESCO’s guide on Electronic Thesis and Dissertations (ETDs). My focus was on electronic thesis and dissertations, and I realized that ETDs are posted on IRs. So in fact, someone alerted me of something like that in the pipeline. And in fact, I wanted to be on board because I was highly interested. I almost completed my research before it came in. So I think I have been involved in the sidelines” (KN 6).

In 2012, KNUST Library together with the Department of Publishing Studies, and collaborating with the Public Knowledge Project and seven journals in Kumasi, launched an initiative encouraging faculty to utilize open access platforms (KN 2, KN 5).

4.4.2 Repository creation and content population

“KNUSTSpace was created using the D-Space software because it is open source software which is more preferred to proprietary software in open access initiatives. The metadata is more of the bibliographic details of the document. “We have the title, author, record number, format and these serve as the document surrogates which lead the user to the actual document being sought after. Since the repository is registered with ROAR, OpenDOAR and Google scholar, the metadata serves as the conduit for the contents of the repository to be harvested” (KN 5).

Figure 4.8: Contents of KNUSTSpace



Source: Field data, 2015

Doctoral and Masters theses and dissertations constitute the majority of the content with 5,521 materials. The repository also contains a considerable amount of pre-prints, post-prints of journal articles (1,042) and peer-reviewed articles as well as other materials such as speeches, administrative and heritage materials. The theses and dissertations are

converted into the soft format whereby the repository manager assigns the metadata and upload such softcopies into the repository (KN 1, KN 5).

For pre-prints and post-prints of journal articles, authors of such materials are often sought after and the publication retrieved from them by library staff responsible for populating the repository. And if need be for them to be converted into soft format, they are processed as such (KN 7, KN 5).

The repository has no editors but luckily enough, with the theses and journal articles, the means of judging their worth are taken care of by the rigorous processes which they are subjected to before their being graded. Also, the peer review process of journal articles eliminates any kind of review on the part of the repository managers”. Preprints and post prints are also indicated as such so that it is not mistaken for a final published paper (KN 3).

Other documents such as public lectures, inaugural lectures and annual reports are also forwarded to the library for onward upload and display (KN 2, KN 3). Even though the tenets of the IR policy aims at direct upload by individual creators of such documents, the library currently mediates in their upload. “In order for individuals to submit directly, we did training for some people showing them how it is done. However, for the time being, library staff do the uploading. The reasons for this trend are of two folds: there is the need for some of the materials to be subjected to proper scrutiny at the outfit of the digital library, and secondly, not many people are perfect at uploading by themselves” (KN 5).

One other approach is that the repository manager goes online to search for articles of KNUST staff that are already on open access platforms and then upload them into the repository. This approach works very well because once the document is already in open access there are little or no problems with copyright” (KN 3). As one lecturer confirms, “ours was a joint publication; myself, with a colleague. And I was mailed to permit this article of mine to be showcased in the university’s repository to further increase free access. I then discussed with my colleague co-author who agreed, though he wasn’t an employee of KNUST. Then in no time, I was alerted that my article is on the KNUSTSpace platform” (KN 7).

4.4.3 Policies

KNUSTSpace is governed by a 19-paged policy document which stipulates the various issues that relate to the operations of the repository. Broadly, the policy, which touts KNUSTSpace as an open-access university-based repository, touches on issues of repository population, access control, preservation and marketing (KNUST, 2008). The KNUSTSpace policy is overseen by a 13-member management committee drawn from a cross-section of the university to determine the policies on submission and dissemination of content, licensing and copyright issues for approval by the university and above all, make decisions to fit into the University mission and strategic plan. The committee meets quarterly and submits its reports to the Library Committee for the smooth running of the KNUSTSpace services.

4.4.4 Marketing and promotion of KNUSTSpace

In promoting the KNUSTSpace, different schemes exist for the different target groups. Marketing of the repository is done to two broad categories of communities – community of content creators/depositors and the community of content users (KN 3, KN 4, KN 2, KN 5).

The content generators include students, lecturers and administrative staff. Students (especially final year graduate students) are under compulsion to submit their thesis and dissertations to the library for onward addition into the repository. This suggests a nearly 100% deposit of the annual primary research of the university in the repository. However, since lecturers and other administrative staff of the university are not under such obligation, a lot of the marketing activities towards populating the repository with materials are engineered towards them (KN 3, KN 5, KN 2, KN 6, KN 7).

The library outfit has not ceased to proclaim the benefit the university received in terms of its ranking, appearing 52nd in Africa right after the IR became operational (and currently 45th) (KN 3, KN 2). This feat has always been used to impress upon members of the campus community to submit materials to populate the repository. “Members of the academic community have been told that an enhancement of the image of the university by virtue of its global presence via the repository is a shared glory since their own image will also be enhanced” (KN 4). In actual fact, some lecturers are already enjoying this global acknowledgement as the piece from this lecturer suggests: “after my paper was showcased, a German journal wrote to me to consider publishing with them. It brings some pride” (KN 7).

KNUST also uses the Open Access Week, a week-long programme, to impress upon members on open access (KN 2, KN 3, KN 4, KN 5, KN 7). During such programmes, the institutional repository is publicized to the entire academic community. It is a period where all the influential people of the university came together to educate members on open access platforms and the benefits of some open access platforms like open access journals and open access institutional repositories among others (KN 3, KN 2).

The word of mouth approach has also been very much useful in promoting the repository (KN 6, KN 3, KN 7). “Librarians are the main evangelists of the IR and are thus entreated to win more souls. Hence, library staff have been encouraged to mention the repository to colleagues anytime they come into contact with them” (KN 3). “This word of mouth strategy to promote KNUSTSpace is really apt because it works in both formal and informal environments. It also provides the avenue for quick feedback and again, to detect the feelings of people concerning the repository” (KN 5).

Flyers about KNUSTSpace are often handed to users of the main library and research commons (KN 3, KN 5). The flyers contain the basic information one needs to know about the repository with the anticipation that it will trigger a visit to its website.

Apart from open access week, word of mouth and the flyers, “we go on Focus FM, a campus-based radio station on Saturdays. But the coverage is too narrow for me. I am thinking of going to Joy FM which has a nation-wide coverage. We have done one nationally on Citi FM, Accra Our University again hosted an open access conference with Biomed and our repository featured prominently.” (KN 5).

“You know, most of the things about promoting the repository are all about lobbying. Now I have lobbied for this place [where we are sitting] to be used as a state-of-the-art research commons for graduate students, and this is very significant in directing traffic unto the repository” (KN 5).

4.4.5 Preservation and security of repository contents

An incident that ever obstructed the smooth running of KNUSTSpace was a power outage which led to the crashing of the entire system (KN 4, KN 5). As a result of this, another look was taken at the security of the repository. “Our server is not here in the library. It is at our network operating centre because when it was here, anytime our lights went down, it affected the server. But since it was moved there, we have not encountered any challenge. One great lesson we learnt from this incident was to back up the contents of KNUSTSpace at a secure location” (KN 5).

Attention has not also been lost on the long-term access to contents of the repository. “In order for access to the contents to be perpetual, the documents are often migrated onto the current versions of PDF software. Even though this often is a cumbersome process, it is the only sure means to ensure the longevity and accessibility of the contents” (KN 5).

This strategy is enshrined in the preservation policy found in the IR Policy document of KNUSTSpace which states that “KNUSTSpace will use two levels of digital preservation namely bit preservation and functional preservation” (KNUST, 2008). Also in harmony with the DSpace software, “documents in the repository are classified as supported, where the format will be given full preservation through format migration or emulation techniques; known, where KNUSTSpace recognizes the format but cannot guarantee full

preservation; and unsupported, where KNUSTSpace cannot recognize the format and so will put it under the “Unknown” list. Anytime an item is uploaded to KNUSTSpace it is supposed to be assigned to one of these three categories so that bit preservation could be done to enable future use of the actual work” (KNUST, 2008).

4.4.6 Level of use of the repository

KNUSTSpace has local as well as international traffic. By virtue of the fact that the repository operates on the open access principle, there are no restrictions to viewing or downloads of document (KN 3, KN 5, KN 2, KN 4). By way of proportion, there are more local than international users. The repository has the usage statistics inbuilt which gives an overview of total visits, visit per month, top city and country view.

The peak season of the repository is often in March, probably when a lot of literature review is done by students who write theses (KN 3, KN 4). As aptly put by a respondent, “fantastic, huge traffic. When it started, we had like 100, and then it got to 250 now it has gotten to 600 a day. Especially when we get to March, a lot of people download so many materials from the repository” (KN 5). Again, from another respondent, “the feedback and suggestions we get from all categories of people suggest that people are really patronizing the repository. Some of the suggestions are simply timely” (KN 3). “In one of our publicity drives on Citi FM in Accra in 2013, we had a lot comments from people outside of our campus community who had actually accessed and used materials in the repository, with some showing keen interest in how we could take it to the next level” (KN 2).

4.4.7 Challenges confronting the operations of KNUSTSpace

Broadly, the obstacles facing KNUSTSpace are some technical issues together with challenges in marketing or promoting usage of the repository and material submission (KN 4, KN 3, KN 5, KN 2, KN 7). However, the technical issues such as occasional power outages leading to fire outbreaks, erratic internet connectivity were all very grave during the early operational stages of the repository. At the next level of the operational phase, the main challenges could be said to be directly or remotely related to marketing and promotion.

Even though the library believes it is doing a lot of publicity, the trickle-down effect is yet to be realized. As one lecturer puts it, “most of us are not aware and this suggests why there is little enthusiasm on the part of content creators to submit their articles” (KN 8). Interestingly, for those who have bought the message of the repository and deposited contents, their articles have received further dissemination boost.

Material submission is also not at an enviable level. “The truth is, we are only doing up to 30% of what is expected of us. Ideally, the repository should include research data, power point presentations of lectures so that before class, they are put there for students to access. We don’t get such materials and this has affected the anticipated rate of populating the repository content” (KN 5). There have been several kinds of collaboration across and within the university but the marketing bit is such that it must involve some highly placed people in the university in order to succeed, it must not be left in the hands of the library alone (KN 2, KN 1, KN 4, KN 6, KN 8). “It is not getting the top support. Our community is such that you need to get some top people to be

personally interested. For instance, the Open Access Week which served as a huge platform to market the repository to the campus community is no longer celebrated” (KN 3). This same issue is bemoaned by a respondent: “there used to be open access week but I think now it has died down. I don’t think it is there anymore” (KN 7).

4.4.8 Sustainability

The future of KNUSTSpace looks very bright as efforts to bring the attention of university management to the initiative are yielding good response (KN 3, KN 4, KN 2). “The drive towards digitization of materials for onward upload has met a positive response with the steps to purchase a new state-of-the-art scanner. There is also the move to bring back the ‘Open Access Week’ back and further involve faculty and the entire academic community in all aspects of the repository. In fact, if the whole repository project is to be done again, the best would be to create more awareness even before the project takes off” (KN 5).

4.5 Cross-case/comparative analysis of the four institutional repositories

With all of them having unrestricted access, preservation and projection of the image of the academic community are what run through as the main purpose or benefit of the institutional repositories under study.

4.5.1 Planning and collaboration

In all the universities, the library and IT units directly dealt with the technical issues of repository development and as well, collaborated with the public relations and other outfits such as Graduate School, to publicize the IR. Whereas there were Schools of Graduate Studies and Research in the other universities which played key roles in the

repository development, Ashesi University College had no such outfit. Also, Office of Research, Innovation and Development (ORID), an adjunct office for the advancement of scholarly communication existed in the University of Ghana, with clearly spelt out roles towards the repository.

Typical of the University of Ghana, the library often teamed up with the university archives and ICT to hold occasional seminars and workshops on digitization and institutional repositories for the key stakeholders such as lecturers, ORID, Public Affairs and librarians. The main actors of the various universities are shown in Table 4.1 below:

Table 4.1: IR of the various institutions under study

IR	Main actors	Year launched	Items
AIR	The library, ICT	2013	112
UGSpace	The library, ICT, ORID, UG Archives	2011	4,387
CUCAR	ICT, the library	2014	119
KNUSTSpace	The library, ICT	2008	7,050

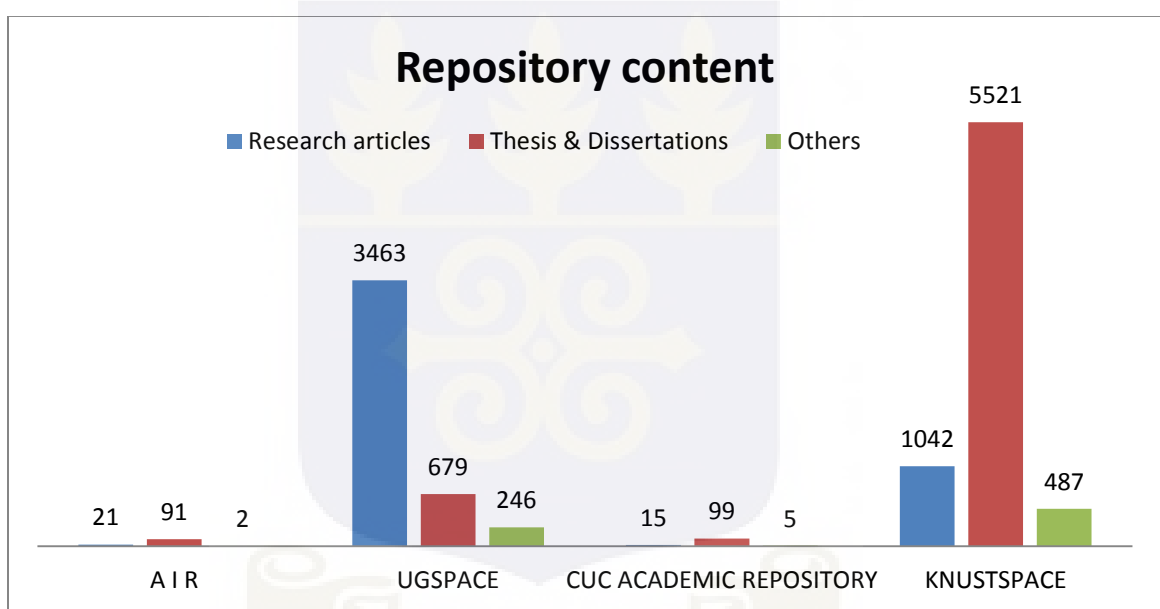
Source: Field data, 2015

4.5.2 Repository creation and content population

In all the universities, the D-Space, an open-source software developed by Massachusetts Institute of Technology, was the software used in the creation of the repositories under study. As could be seen from Table 4.1 above, KNUSTSpace has the highest number of items followed by the University of Ghana's UGSpace (4,388). The rest are Central University College Academic Repository with 124 items and the Ashesi Institutional Repository with 112 items.

In all the repositories, there are electronic thesis and dissertations, reports, journal articles, or heritage and administrative materials. However, there were differences in the proportions of such components. UGSpace focused more on research publications whilst the other repositories considered students’ thesis and dissertations. None of the institutions had audio or audio-visual materials in its repository. A breakdown of the respective constituents has been shown in figure 4.9 below:

Figure 4.9: Materials in the various repositories



Source: Field data, 2015

Whereas CUCAR, KNUSTSpace and UGSpace used the Dublin Core standard for generating the metadata of the documents, the repository of Ashesi University Colleges have the metadata of their repository content generated by the repository manager. Again, whereas KNUSTSpace and UGSpace belonged to a larger cooperative of repositories worldwide, the repositories of the other two private universities are not registered with

any cooperative. In all but the Central University College, students' thesis and dissertations were mandatory to be deposited into the IR.

4.5.3 Policies

The operations of UGSpace and KNUSTSpace are backed by comprehensive policies which address the various foreseeable issues. Both institutions have their IR policies modeled on other universities in Ghana and outside of the country. The policy of KNUSTSpace is available online whilst that of the University of Ghana is yet to be put on open access. The University of Ghana formulated and adopted a policy for its repository not so long ago whilst the Kwame Nkrumah University of Science and Technology is considering reviewing its already existing policy to accommodate the current times.

On the other hand, Ashesi University College and Central University College operate with unwritten policies. To this end, some officials at the university library and the ICT have been assigned greater levels of responsibility and power to oversee the IR operations. Both institutions are considering putting up policy documents in the shortest possible time.

What is however common in all the universities is that, whether there is a written policy or not, matters concerning how the repository should run, and which outfit or individuals should perform which responsibilities had all been agreed in the initial collaborative meetings.

Unfortunately, issues of Intellectual Property Rights (IPRs), which are very significant in so far as populating the repository is concerned, have not been given much attention in the study areas. There is seldom any structured programme to engage especially academics to address how they can negotiate their IPRs in order for their published peer-reviewed articles to be eligible for uploads into their institution's repository.

Even though the institutions that had no policies are preparing to adopt one, they are also of the belief that a policy that is so strict on metadata standards, document withdrawal and content format could also affect the sustainability of the repository.

4.5.4 Marketing and promotion of the institutional repositories

The word of mouth approach of publicizing the IR was common to all the four universities under review as well as the use of the main university website. Again, education or orientation programmes were a common feature in all the study sites.

Peculiar to the Kwame Nkrumah University of Science and Technology was the existence of Open Access week as well as the use of radio station to promote the repository.

In a different vein, the Head of the International Central Gospel Church, the parent institution of Central University College, uses the church and the numerous international fora to publicize the repository. It also emanated from the various interviews that in all the institutions, the outfit of the university library has been spearheading the marketing of the repository, with irregular support coming from the Public Relations outfits.

4.5.5 Preservation and security of repository contents

Mainly, the content of the repositories are preserved through migration onto newer versions of the PDF software used to create them. Also, the contents of the repository are backed up in secure locations in order to prevent permanent loss in the event of any misfortune. The preservation and security measures have been taken mainly as a preventive measure. In the situation KNUSTSpace, the measures at preservation became even more important after a fire outbreak affected the server hosting the repository leading to a colossal damage.

Due to the fact the University of Ghana has an archival outfit, the preservation strategies for UGSpace are in harmony with the archival policy of the University of Ghana formulated in 2014. None of the two private universities has any comprehensive preservation plan.

4.5.6 Level of use of the repository

The managers of the repositories of the University of Ghana and Kwame Nkrumah University of Science and Technology are able to track the usage statistics on regular basis. It emerged from the interviews that on the average not less than 600 users visit the repository sites of the two public universities.

With respect to the Ashesi repository and Central University repository, the mode of measuring usage of the repository is through the various feedbacks from the campus community. There is currently no tracking system to ascertain the level of use of the repositories in those universities.

4.5.7 Challenges

The rate at which materials were submitted for uploading into the repository was generally not encouraging in all institutions. Other materials which emanate from the institution such as research data sets, audio-visual materials, power point presentations, course outlines and lecture notes are not included in repositories under study. This might probably stem from the overarching challenge of the difficulty in getting buy-in from the campus community.

With respect to marketing, even though the library believes it is doing a lot of publicity, the trickle-down effect is yet to be felt. Again, it takes the involvement of some key personalities for any promotional programme to be effective. The library outfit alone is unable to handle such an obligation successfully.

Another key issue had to do with the lack of decentralization in especially, material submission. In almost all the study sites, the outfit of the library had to intervene in the processing and uploading of materials into the repository. This led to a great burden on the outfit of the library. The problem comes about as a result of the fact that content generators have not been taught how to independently submit materials, or don't have the permission or are not keen on doing it by themselves.

Again, the on-going load shedding also militates against the smooth operations of the institutional repository.

4.6 Conclusion

Given the circumstances around which lots of the institutions find themselves, the findings presents a mixed feeling as to whether the operations of the repositories were living up to expectation. This can only be confirmed by subjecting the findings to the available relevant literature. There was unanimity, however, concerning the fact that a lot of awareness must precede the setting up and operations of the repositories if ever they were to be established again.



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CHAPTER FIVE

DISCUSSION OF MAJOR FINDINGS

5.0 Introduction

This chapter discusses the findings emanating from the sources of data retrieved from the case study sites. The study investigated how institutional repositories are created and sustainably managed in two public universities (University of Ghana and Kwame Nkrumah University of Science and Technology) as well as two private universities (Central University College and Ashesi University College). The discussion situates the analysis of the data collected within the context of literature related to the various issues discussed.

5.1 Background

Libraries across the world have been considering a more cost-effective means of developing their collections as a result of the disadvantages associated with the existing publishing system (Carpenter et al, 2011; Glenn, & Russell, 2008). This trend of relying on online open access platforms is not so different from what pertains in the four institutions engaged in the study. The libraries of the study areas are now actively involved in the scholarly communication process by leading academics to share their scholarly findings with the rest of the world through open access. Some mutually-beneficial outcomes have been adduced for this initiative, as some lecturers revealed of increased citation and invitation to publish in some journals. This trend is in sync with Dulle and Minishi-Majanja (2009) and Priti (2011) who found out that authors benefit in enhanced visibility of their research from online publishing emanating from broader dissemination and increased use.

With all of them having unrestricted access to the showcased contents, it emerged that wider distribution or sharing and preservation of the intellectual output, as well as the projection of the image of the academic community are what run through as the main purpose for establishing the repositories. In contributing to the discussion as to why institutions are adopting the repository concept, Giarlo (2005) is of the view that even though this approach to scholarly communication has some challenges, open access institutional repositories present numerous opportunities. It is the view of Grundmann (2009) that institutional repositories are much appreciated for providing a faster route to scholarly and research work.

All the institutional repositories studied were in the operational stages. This outcome is different from a study by Corleley (2011) where it emerged that most institutional repositories in Ghana were at the pre-operational stage, with the few operational being those of public universities. This difference could be attributed to the fact that his study was done quite earlier when the repository concept was newly embraced.

5.2 Planning and collaboration

To Lynch (2003), an effective institutional repository includes collaboration among librarians, information technologists, archivists and records managers, faculty, university administrators and policymakers. From the study, it was realized that the three constituencies which drive IR development on the four campuses are content generators, implementers, and users. Content generators comprise students, lecturers and administrative staff who are authors or originators of scholarly and administrative materials respectively. The implementers are librarians often supported by the IT outfit.

Finally, the users include students, faculty, administrators and all members within the campus community and beyond who access or download materials in the repository for different purposes.

It has been observed that often in the initial planning and development of most repositories, key stakeholders such as university administrators and faculty are often left out (Campbell-Meier, 2008). (2012) observes that around the world, institutional repositories are mostly hosted within academic libraries. To Moahi (2009), however, developing repositories requires an understanding of the “existing human landscape” in the form of the organizational climate (culture, policies, governance issues, politics and goals).

The situation is rather different in this study. In the case of all the repositories investigated, the library and IT units directly dealt with the technical issues of repository development, and as well, collaborated with others such as the public relations and faculty to publicize the IR. This portrays that however limited it was, there were some levels of collaboration with the significant units of the institutions in some key activities of the repository. This is in sync with Ashworth (2006) who claims that since on different campuses, different people assume different responsibilities relating to an institutional repository, it behooves on libraries to know about the principles, benefits and operations of repositories in order to promote, and act as their evangelists.

5.3 Repository creation and content

In all the universities, D-Space, an open-source software developed by Massachusetts Institute of Technology, was used in the creation of the repository. This software is

considered very potent in supporting open access initiatives which was the bedrock of all the repositories. Worldwide, majority of institutional repositories have been created with open source software. This is attributed partly, according to the Directory of Open Access Repositories (DOAR, 2014), to the fact that open-source software is compatible with the ideology of the freedom and independence of the internet from commercial interests. Bailey et al. in 2006 established that DSpace was the software of choice of the repositories of 123 Association of Research Libraries (ARL) member libraries in the US due to the availability of technical support, increased visibility, interoperability and its ability to support different formats of content. The Dublin Core Standard was followed in generating the metadata of the documents in three of the four institutions.

Ideally the contents of a university repository include pre-prints and other works-in-progress, peer-reviewed articles, monographs, enduring teaching materials, data sets and other ancillary research materials, conference papers, electronic theses and dissertations, and gray literature, as indicated by Johnson (2002). Content recruitment in IRs is not very uniform because different repositories enumerate different digital documents (Lynch & Lippincott, 2005; Shearer, 2004). The Directory of Open Access Repositories (DOAR) in 2014 revealed that the contents of Western European IRs depicted a balance between journal articles and theses.

However, in the repositories under study, there were thesis and dissertations, abstract and full text of journal articles as well as heritage and administrative materials making up the contents, albeit with differences in the proportions of such contents. Although contents in the repositories vary from institution to institution, electronic theses and dissertations

remain a common feature of the contents, serving as the base collection in all the institutions studied. Hodkinson (2004), believes that the existence of electronic thesis and dissertations in a repository reposes the trust of students and new members of faculty about the use of repository for scholarly communication and wider sharing. That is, students mandated to publish dissertations within a repository are likely to publish in same as faculty members especially if they enjoyed the open access benefits.

Again, the repositories of the two public universities (KNUSTSpace and UGSpace) belonged to a larger cooperative of repositories worldwide. Belonging to larger cooperatives often leads to a higher level of interoperability and translated into both local and international traffic. According to Lagoze and de Sompel (2001) and Lynch (2001), the issue of interoperability becomes easy after identifying and choosing the right software since many of the software have been created with a strong focus on repository integration, storage and preservation, as well as stewardship and dissemination of scholarly publication. DSpace software is seen to facilitate the management of multidisciplinary content (Bailey et al, 2006). It is thus often rewarding to choose comprehensive software that comes with other advantages that make the operation and sustainability of the repository attainable.

5.4 Policies

Policies or lack of it determine the success or failure of institutional repositories. Repositories that have been able to stand the test of time are always guided by policies that stipulate and address very relevant issues. The content and rate of population of the repository as well as the marketing and use of the repository demand that all members of

the campus community are involved. The only way to move the campus community along is when there is a binding policy.

The existence of repository policy also strengthens the operations of the repository managers since their mandates will be drawn from the document. Policies also clear doubts and address some sensitive issues such as copyright or intellectual property rights. From the study, both UGSpace and KNUSTSpace have their IR policies modeled on policies of other universities in Ghana and outside of the country. The two private universities, on the other hand, operate their repositories with unwritten policies. To this end, some officials at the university library and the ICT have been assigned greater levels of responsibility and power to oversee the IR operations. Both institutions are considering putting up policy documents in the shortest possible time. In fact, in all the universities, whether there is a written policy or not, matters concerning how the repository should run, and which outfit or individuals should perform which responsibilities had all been agreed in the initial collaborative meetings.

It must be pointed out, however, that the mere existence of a policy does not translate into implementation. For example, the issues of Intellectual Property Rights (IPRs), which are very significant in so far as populating the repository is concerned, have not been given much attention in the study areas even though such issues exist in the policies of the institutions. There was seldom any structured programme to engage especially academics to address how they can negotiate their IPRs in order for their published peer-reviewed articles to be eligible for uploads into their institution's repository. But the point, as revealed by Bjork (2004), is that authors are willing to give away their copyright in

exchange for ‘peer-review, quality labeling, marketing and disseminating services of the publisher. In return, the author gains improved recognition in the academic field and career advancement. This situation suggests that a serious attention needs to be taken at IPR issue.

Workshops and other “mini-conferences” on the changing scholarly communication model, the open access movement or educating faculty on related IR issues such as copyright, publishing processes, and citation analysis to draw attention to larger issues facing higher education are also useful. It has been established that by capturing the attention of faculty with these issues, many opportunities unfold to highlight the value and use of the IR in a broader context (Ramirez & Miller, 2011).

5.5 Marketing and promotion of the institutional repositories

The defining element of every marketing activity is for the promoter to understand and communicate the benefit of the product or service for the prospective user to understand same. That is, the librarian who is the implementer of the repository service should first understand the significance of this digital initiative and drive other members of the academic community to buy into such a new phenomenon. Campbell-Meier (2008) is of the view that if the faculty or librarians do not understand what open access is or why the repository is important, there is no incentive to participate, regardless of the story associated with it.

Even though the repository project is an avenue to showcase scholarly output of an institution, it actually does compete with the existing scholarly communication model. It therefore becomes important for any marketing approach to reveal the peculiar benefits

that the institutional repository provides such as higher accessibility and increased citation rates, especially to the prospective content providers. Alemna (2001) recommends for libraries in Ghana to adopt sound marketing initiatives in order to ensure survival and sustenance. This is because in his opinion, the conditions which challenged libraries in developed countries to adopt marketing and total quality management strategies are very much prevalent in Ghana at present. Another reason why this assertion is relevant is that the IR concept is at the early adoption stage, and diffusion of information about the repository becomes very easy when it is done across a network of stakeholders. Creating awareness about the existence of the contents of an online institutional repository is far-reaching. As such, in order to attain wider adoption and use, there need to be close ties between the repository and marketing as proposed by Crow (2006).

In all the institutions, the outfit of the university library had been spearheading the marketing of the repository, with occasional support from the Public Relations outfits. This is in sharp contrast to what pertained in the past where most libraries summarily concluded that the marketing concept was “offensive and unethical, and those who practiced it were to be treated with some suspicion (Condous 1983, [cited in Ramirez and Miller, (2011)]. This was because most academic libraries saw themselves as essential part of the campus community thereby no need to market their services or products. The residual effect of this former stance, notwithstanding, is partly to blame for the incoherent approach to marketing of the online digital repositories. Smykla (1999) is of the view that the repository cannot be promoted the same manner that other digital initiatives of the library such as Online Public Access Catalogue (OPAC), interlibrary loan and citation

linking have been promoted. This is because these services mentioned earlier are completely internal as compared to the IR which transcends the physical confines of the institution.

Entsua-Mensah (n.d. [as cited in Alemna, 2012]), in discussing the relevance of marketing in a non-profit making establishment, points out the need for information workers to adopt some marketing strategies to get information to their clientele. Of the four universities, even though none had a coordinated and comprehensively developed long-term marketing plan, there were evidence to suggest that information professionals now appreciate the value of marketing, and thus promote their collections and services to the campus community. The use of fliers and the word of mouth approach in publicizing the IR were common to all the four universities under review as well as the use of the main university website.

Again, education or orientation programmes were a common feature in all the study sites. Peculiar to the Kwame Nkrumah University of Science and Technology was the existence of Open Access week as well as the use of radio station to promote the repository. Also, the Head of the International Central Gospel Church, the parent institution of Central University College, uses the church and the numerous international fora to publicize the repository. Although the aforementioned approaches are good, a great deal of dexterity is needed to make such strategies impactful. In using any of these approaches, intentional repetition among all stakeholders is very important to ensure sustainability. Timing and conveying the promotional message in a number of ways increases the likelihood of eliciting the desired response. Andreasen and Kotler (2003)

report that several of the institutions they surveyed indicated that they expect to contact faculty as many as seven times in order for the message to yield the desired results. Ramirez and Miller (2011) have observed of personalization as one of the most effective outreach strategies adopted by repository managers to reach faculty. They again noticed that in the University of Maryland for example, the library system designed a document that defined the target audiences, listed the key benefits of using the IR, and provided specific communication strategies for contacting campus entities and groups throughout the first academic year after launch of the IR.

5.6 Preservation and security of repository contents

It is believed that preserving an electronic document goes beyond prolonging the life of such documents as it is with paper documents, to include the software's ability to create the observable intellectual component over time. McGovern and McKay (2008) believe that digital contents have gradually become a major component in the current information dispensation, for which reason their preservation has also become a key issue. Mainly, in all the repositories studied, the content of the repositories are preserved through migration onto newer versions of the PDF software used to create them. Also, the contents of the repository are backed up in secure locations in order to prevent permanent loss in the event of any misfortune. The preservation and security measures have been taken either as a preventive measure or in response to a situation such as fire outbreak leading to a colossal damage. Such preservation activities, were largely not backed by any comprehensive plans, and were handled by the library's outfit in most cases.

Some schools of thought believe that preservation is not part of the functions of institutional repositories (Smith, 2007). Such arguments even become more pervasive with the difficulties associated with digital preservation such as little or no control over what is deposited, poor metadata, insufficient intellectual property rights clearance and the cost of preserving some digital content (McGovern and McKay, 2008). In a survey conducted by Kenney and Buckley (2005), it emerged that only about a third of institutions studied had developed, approved and implemented digital preservation policies for their repositories.

The OSI Guide to Institutional Repositories lists DSpace and CDSware as the only software having a defined digital preservation strategy (OSI, 2004; Wheatly, 2004). The DSpace software for instance classifies files as known, supported and unsupported formats for the purpose of preservation thus, giving different levels of preservation commitments to different formats. It must however be noted that preservation of IR content is hardly dependent on software alone. The software used to create the documents is not part of the document but is only a tool, hence the need to factor in the different aspects in the life of a document right after its creation (Wilczek & Glick, 2006).

5.7 Level of use of the repository

Repository usage has always been part of the agenda of the drive towards promotion of the repository. Patronage of repository contents is dependent on the kind of materials and its scope, as well as the document surrogates used to describe the material. In most repositories, full text journal articles and theses attract more users than just the abstracts of such documents. Repository usage in the public universities (UGSpace and

KNUSTSpace) amounted to not less than 600 per day. Fascinated by the numbers, most repository managers dwell on quantitative data of usage to measure the success or otherwise of the repository. With respect to the Ashesi repository and Central University repository, the mode of measuring usage level was through the various feedbacks from the campus community. There is currently no tracking system to ascertain the level of use of the repositories in those universities.

5.8 Challenges

According to Corleley (2011), most of the challenges that Ghanaian institutional repositories were facing were very technical such as poor connectivity, low bandwidth and a lack of skilled personnel. These were a common feature of repositories trying to take off after their creation. In this study, it emerged that the fulcrum of the challenges of the repository was about getting the involvement of the broader campus community to participate fully. Meanwhile, to change the current structure of scholarly publishing requires a buy-in of key stakeholders such as faculty, librarians and publishers (Ming, 2000; Johnson, 2002). As the Diffusion of Innovations Theory postulates, early adopters are very crucial in the success of any new innovation (Rogers, 2003). As such, bringing on board respected campus officials such as the vice chancellor, the provost and the university registrar would make them champion the course of the repository to the entire campus community. Moahi (2009), believes that doing this implies understanding the “existing human landscape” in the form of the organizational climate (culture, policies, governance issues, politics and goals). Hence, the study agrees with the assertion of Chan, Kwok and Yip (2005) and Moahi (2009) that the real pivot of sustainable repositories are not the technical issues but rather the cultural change necessary for it to

become embedded in the activities and normal behavioural pattern of the campus community.

Also, the rate at which materials were submitted for uploading into the repository was generally not encouraging in all institutions. Other materials which emanated from the institutions such as research data sets, audio-visual materials, power point presentations, course outlines and lecture notes were not included in repositories under study. This challenge stems from the overarching challenge of the difficulty in getting total buy-in from the entire campus community.

Furthermore, even though the library believes it is doing a lot of publicity, the trickle-down effect is yet to be found. Several constraints have been associated with the marketing of the repository with the key being lack of interest of top management, inadequate funds and a general lack of coordination among the various campus units. These challenges notwithstanding, in the view of Martey (2003), should motivate the academic librarian to plan and implement a marketing strategy to ensure heavy patronage. This is because heavy use determines the worth and survival of the library in the face of stiff competition from new and aggressive entrants into the information market place. Active and dynamic marketing requires that promotional programmes are incorporated right from the earliest stages of repository development, clearly spelt out in policy, even predating software acquisition and hiring of personnel. This, according to Foster and Gibbons (2005), is because the “build it and they would come” attitude is no longer effective.

Even though the materials in the repository are mainly textual and thus require very simple preservation strategies, preservation and security of digital materials still require the existence of a well-thought out plan to forestall any future eventuality. Unfortunately, in almost all the repositories, there were no existing preservation policies. It is incumbent on any approach at guaranteeing preservation to first consider the formulation of a preservation policy which prescribes the strategies for preserving IR content and the decisions about what content requires short, medium, or long term preservation. Aspects of collection policies such as selection criteria and submission guidelines could be incorporated into such preservation policies.

Another key issue had to do with the lack of decentralization in especially, material submission. In almost all the study sites, the outfit of the library had to intervene in the processing and uploading of materials into the repository. This led to a great burden on personnel. The problem comes about as a result of the fact that content generators have not been taught how to independently submit materials, do not have the permission, or are not keen on doing it themselves. It is believed that since the tenets of institutional repositories are stimulated by librarianship techniques, librarians will help remove barriers, simplify the process of material submission and also, be visible in the training of students, faculty and other stakeholders to contribute content and as well, use the repository (Walters, 2007; & Bentley, 2008; Moahi, 2012).

Again, the on-going load shedding also militates against the smooth operations of the institutional repository. Its impact is such that without any other alternative source of power, the operation is halted and the repository goes offline.

5.9 Relationship of the findings to the theoretical framework

The Diffusion of Innovation theory was the underpinning theory of the study. The institutional repository concept is an innovation that continues to be diffused across space and time in most academic communities (Rogers, 2003). As an innovation that emanated from Europe, it could be generally concluded that the concept has been embraced in many academic institutions across the world (Pocket Guide, 2005). It is therefore not surprising that universities such as Ashesi University College, Central University College, Kwame Nkrumah University of Science and Technology and the University of Ghana have respectively developed their repositories.

In the respective repositories (AIR, CUCAR, KNUSTSpace, UGSpace), the main actors in this diffusion process are library and IT staff, faculty, students and university administrators. The library and the IT mainly generate the idea through a platform or bedrock funded by the university administration from where the innovation is made available to students and faculty who also provide the innovation with the raw materials. Rogers (2003), puts the adoption of an innovation into five categories as: Innovators, Early Adopters, Early Majority, Late Majority, and Laggards. In consonance with Swanepoel (2005), Campbell-Meier (2008) and Corlety (2011), the analyses from the various campuses depict that they are at the early adopter stage of the IR idea.

The Diffusion of Innovation Theory postulates that before members of a community would totally adopt a new technology, idea or concept, they need to be fully convinced that it has higher advantages over the existing one (Rogers, 2003). This is about convincing the various campus communities about the superior ability and advantage a

repository has over existing avenues of sharing and preserving digital content as well as projecting the image of the university. However, no form of formal assessment of the interest of the campus community was done prior to the creation of the repository in all universities even though the planning processes involved collaboration with major stakeholders. Another significant issue had to do with the non-existence of a well-structured communication channel to further diffuse this innovation. And after the repository had taken off, there were no kind of unified assessment measures except occasional voluntary feedbacks and the usage tracking system.

Unfortunately, creating and operating repositories in this manner, and later employing marketing or promotional strategies to ‘push’ the concept to the entire academic community would definitely be ineffective. Campbell-Meier (2008) is of the view that change takes time, and involving stakeholders such as campus administration and faculty early in the process will provide early identification of potential problems. For Starkweather and Wallin (1999), since the current scholarly publishing outlets serve the needs of some faculty, they may not participate in the IR concept unless they believe it really serve their needs. The solution lies in involving all the actors within this system right from the initial stages of the IR development in order to attain complete adoption of the novelty (Rogers, 2003).

5.10 Conclusion

The study purposed to analyze how institutional repositories are created and managed to showcase and share the scholarly output over a long period of time. In doing this, it sought to ascertain the extent of collaboration of the campus community during the

planning process, how the repository was created and populated, issues of preservation, marketing as well as the peculiar challenges in the respective case study sites. These were the themes which have been subjected to a thorough discussion by comparing and contrasting with earlier studies and existing best practices. Much as it involved only four universities, it presents very significant lessons, identifying the many difficulties associated with repository development.



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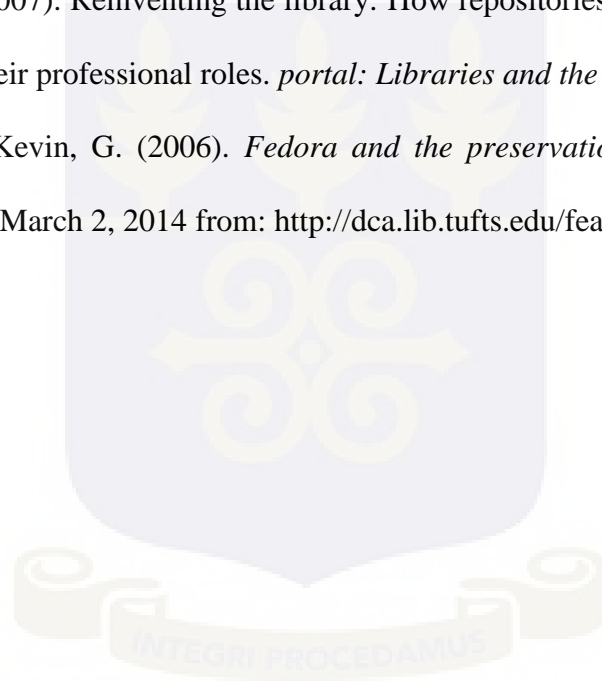
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CHAPTER SIX

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

6.0 Introduction

This chapter deals with summary of the main findings, the conclusions, recommendations and areas for further research. The conclusions are derived from the main findings of the study, which tried to answer some important issues raised by the study's objectives. The recommendations for policy makers and implementers, on the other hand, are based on the conclusions. The section on area for further research covers areas that can be studied to expand the existing knowledge of open access institutional repositories and new trends of scholarly communication.

The study set out to assess how institutional repositories were created and managed sustainably at the Ashesi University College, Central University College Kwame Nkrumah University of Science and Technology and the University of Ghana. Specifically, the inquiry sought to examine the policies for the creation and management of institutional repositories, describe the contents of the repositories as well as identify the means of preserving such contents. Also among the study objectives were to ascertain the strategies for marketing and promoting the IRs, determine the level of use, establish the challenges faced in the management of the repositories and finally make recommendations based on the findings.

6.1: Summary of findings

The findings of the study, which were based on the objectives, were arrived at by bringing out the individual cases and then comparing them to see the similarities and differences. A summary of the salient issues have been presented as follows:

6.1.1 Policies for the creation and management of the institutional repositories

The study sought to find the mandates of the various sections of the university in so far as commitment to the repository is concerned. From the findings, it emerged that the repositories began after collaborative meetings with the various sections of the university. This occurred in all the universities. However, repository policy documents existed in the two public universities but none in the private university colleges. This notwithstanding, the actions expected to be performed by individuals and offices were discussed and agreed during the collaborative meetings.

6.1.2 Repository creation and content population

In the four universities under study, the DSpace software was used to set up the repositories whilst in all but the Ashesi University College, the Dublin Core Standard was followed in assigning metadata for the materials in the repositories. Electronic theses and dissertations and research articles or publications were the dominant materials in the repository. In fact, apart from the University of Ghana, electronic thesis and dissertation constituted the majority in all the institutional repositories. As a policy, most final year students' (either post-graduate or undergraduates) were mandated to submit soft copies of their theses to the library for onward submission. With respect to the research publications, the authors of such documents made them available to the outfit of the digital library for processing and subsequent upload. Also, publications of faculty already in online open access platforms were identified and verified with SHERPA RoMEO, and then added to the university's repository contents.

6.1.3 Preservation and security of repository contents

DSpace, the software used in creating the repositories already has some in-built preservation features identifying document as supported, unsupported or unknown. Beyond this, the repository managers also carried out migration of documents onto newer versions of the PDF software to make them continuously accessible. Also, to secure the repositories from any mishap and resultant interruptions in access, the contents of the repositories have been backed up in secure locations.

6.1.4 Marketing and promotion of institutional repositories

Publicity of the repository was mainly limited to the immediate campus environment and was done mainly through the word of mouth, use of fliers and notices as well as the use of the main university website. In the case of the institutions which targeted at ‘selling’ the repository to the outside world, radio stations and international outreach programmes were used for such promotional activities. The outfit of the library spearheaded the publicity of the repositories in all institutions with support often from the public relations outfits.

6.1.5 Level of use of the repositories

The level of use of the repositories, as emerged from the findings, could be regarded as fairly satisfactory. At the University of Ghana and Kwame Nkrumah University of Science and Technology, there was a tracking system to account for daily usage which averaged around 600. Though there was no quantitative tracking system for Ashesi and Central University Colleges, user feedbacks were efficiently relied upon to gauge the

level of use of the repositories. In the cases of the repositories with tracking system, it emerged that there were campus-wide, nationwide and international traffic.

6.1.6 Challenges of repository sustainability

A number of challenges have confronted the smooth operations of the repository in all institutions. These include difficulty in getting materials leading to low rate of populating the repository content and the difficulty in getting the buy-in of the entire university community. There was also the issue of copyright laws which prevented the addition of materials to the collections.

6.2 Conclusion

It can be concluded, based on the findings of the study, that institutions see the worth of online digital institutional repositories in advancing the scholarly communication and preserving intellectual and administrative or heritage materials. For this reason, these institutions are gradually building their repository collections using theses, dissertations and research publications as the base materials. To trigger increased material submission and use of the repository, several marketing strategies have been adopted targeting the campus community and beyond. Conspicuously missing is the needed involvement of key personalities on campus to create a wider acceptance of the concept by the general university community. The institutional aspect of the repository leaves much to be desired. The lack of involvement of these prominent individuals has led to other problems such as low rate of material deposit, uncoordinated marketing of the repository and a low access rate. This calls for more concern, especially because the two public institutions engaged in the study (UG and KNUST) are the two oldest and largest universities in

terms of population and academic programmes. Thus, many other universities may look up to them in following the path of repository development.

6.3 Recommendations

Based on the findings and conclusion of the study, the study makes some recommendations with the proposed actors to carry out such initiatives.

6.3.1 Repository policies

The existing trend was that the repository had become operational before the birth of a policy document instead of the other way round. In some institutions, there was no policy at all. Much as it is recommended for the two universities without repository policies to consider formulating them, a policy will remain a mere document unless its implementation is done in a manner that brings about the desired change. The development of an institutional repository does not only challenge the existing model of scholarly communication but also, brings additional tasks and budgetary constraints. This notwithstanding, the benefits it brings to all actors are enormous. Although any new policy will essentially challenge the status quo, it is still prudent to involve all parties in its formulation and implementation. Repository policies should marry the existing library and ICT policies and accommodate the broad vision of the institution. This will lead to total ownership of the project other than it looking like an imposition from management on the rest of the campus community. A good policy will ultimately cater for content population, copyrights, marketing and awareness creation, preservation and usage.

As such, even though it is essential to involve the cross-section of the university in formulating the policy, the university librarian should take the lead in formulating and

implementing the policy. It is also suggested that the already operational repository policies of KNUST and University of Ghana could be considered by other institutions.

6.3.2 Repository creation and content population

The drive to increase the repository content could be approached in different angles. In the first place, the existing print theses should be digitized as a massive project by procuring high capacity multi-purpose scanners. Again, faculty should be impressed upon by university authorities to publish in high impact open access journals for the purpose of onward upload of such publications into the institutional repository. They should again be educated on copyright and intellectual property right issues in order to negotiate to the advantage of their affiliate institutions for further distribution of their publications and image enhancement. Furthermore, universities may consider making the availability of funding for academics to attend conferences subject to their contribution of content to repository. Also, whilst maintaining the conditions for appointment and promotions of faculty members, consideration could also be given to academics who contribute content regularly in the institutions repository.

6.3.3 Marketing of repository contents

It is possible to increase the daily average visits and downloads of repository materials by harmonizing the various marketing strategies and putting in place rotational repository marketing committee. There should be a permanent marketing librarian who will work with other members of this marketing committee drawn from the various faculties, school, departments, sections and units. This will ensure that the diversities of the campus community are always taken care of when trying to make the repository embraced by all.

Every available time and physical or virtual space should be capitalized to publicise the repository to the campus community and beyond. These include word of mouth, posters, handouts, interactive electronic platforms such as like email, whatsapp, linkedIn, twitter as well as university events such as open days, hall weeks and sports festivals.

Above all, the Consortium of Academic and Research Libraries in Ghana (CARLIGH), which has been championing the many digital initiatives of libraries, should think of instituting a national academic or research repository. This will harness the potentials of the well-endowed and less-endowed academic institutions together by providing a single platform to share the intellectual output of academic institutions in Ghana. By so doing, a less endowed university will not have to incur the huge initial setup cost but just upload its materials into the CARLIGH-managed repository and still achieve the same or even more benefits an institution gains from an online open access repository as a solo project. This is very viable judging from the fact that CARLIGH has been able to bring most academic and research libraries under one umbrella to acquire academic databases for members at a highly subsidized cost.

6.4 Areas for further research

When juxtaposed with existing literature, the study reveals other equally important areas worth investigating. These include, but not limited to:

- Awareness and use of institutional repositories among students of some selected universities in Ghana.
- Scholarly communication in Ghana: trends, challenges and prospects.
- Beyond the rhetoric: the quest for a cooperative digital library in Ghana.

It is believed that these inquiries could well add to the existing body of knowledge of open access, scholarly communication and digital initiatives.



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Introductory letter



APPENDIX B
UNIVERSITY OF GHANA
COLLEGE OF EDUCATION
DEPARTMENT OF INFORMATION STUDIES
AGREEMENT TO PARTICIPATE IN A RESEARCH STUDY

TITLE OF STUDY: Creation and management of institutional repositories in University of Ghana, Kwame Nkrumah University of science and Technology, Central University College and Ashesi University College.

RESEARCHER: Ebenezer Martin-Yeboah
0 2 4 6 1 5 4 3 2 1
ebemary@yahoo.com

PURPOSE

You are kindly being asked to participate in a research study. The purpose of this study is to assess how institutional repositories are created and sustainably managed for use by members of the academic community. This study is being conducted in partial fulfillment for the award of Masters of Philosophy Degree in Information Studies.

APPENDIX C

INTERVIEW GUIDE

UNIVERSITY LIBRARIAN

1. What were the events that led to the founding of the IR?
2. What was the biggest motivating factor? (preservation, image projection, sharing etc)
3. What obstacles were encountered in the founding of the IR and how were they addressed?
4. What are your core functions so long as the operation of the repository is concerned?
5. What task roles do the different library departments (technical services, public services, archives) play in the IR development/management?
6. What are the sources of funding for the IR?

Policy

7. Have you reviewed the IR policy after its inception?
 - a. **If yes:** Which aspect was reviewed?
 - i. Was it a response to a problem?
 - b. **If no:** Are you considering reviewing?
 - i. And which aspect?

Marketing/promotion/awareness-creation

8. So far, how is the awareness of the campus community about the repository like?

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9. What have been the means through which the repository has been made aware to the campus community?
 10. How do you make lecturers aware of the repository?
 11. What has been the approach for reaching out to students?
 12. Which category of students has been your target?
 13. Is there a committee or an individual, within or outside, responsible for marketing and promoting the IR campus-wide and beyond?
 - a. **If no:** Could there be formal or structured schemes to promote the IR among the campus community and beyond?
 14. Is there a budgetary allocation or a fund to advertise the existence of the repository to the campus community and beyond?
 15. Is such a fund for the promotion of the IR even necessary at all?
 16. Is there a programme and set target for this?
 17. Are the promotion programmes successful?
 18. What accounts for this success or failure?
 19. What more could be done to market the IR to faculty and thus increase the patronage of the repository?

Material submission

20. What is the focus with respect to the kind of materials for populating the content of the repository?
21. Is the rate at which materials have been deposited in the repository satisfactory?
22. Is there any zeal on the part of lecturers and researchers to deposit materials to the repository?

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23. What are the avenues available to you to persuade lecturers/researchers and students to contribute content to the repository?
 24. What more could be/is being done to further increase the rate at which the repository content is populated?
 25. In your view, do members of this campus appreciate the peculiar advantages or significance of the IR to project the university to the outside world?
 26. Have the peculiar benefits of the IR been well understood by the campus community to ensure their buy-in?

If yes: Why is it that they still don't submit contents even though they appreciate the significance?

27. What constraints face material depositors?
28. Has there been any effort at assisting lecturers to secure their intellectual property rights even when they publish in journals, in order for such journal articles to be eligible for the repository?

Use

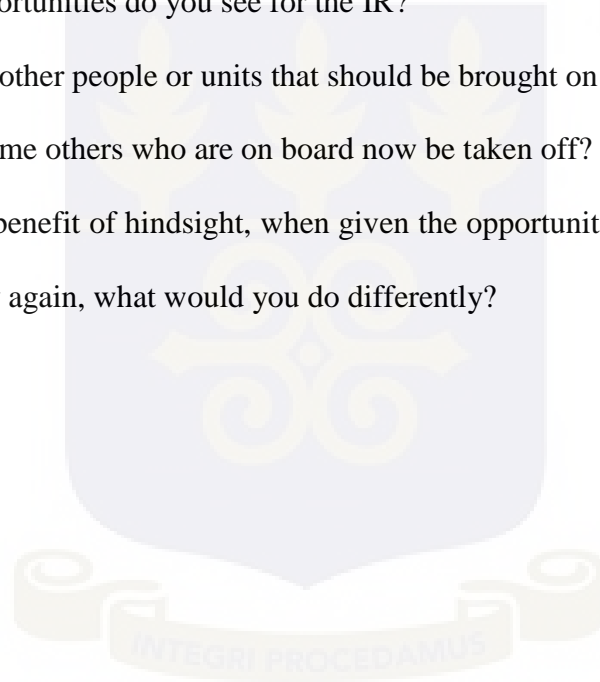
29. Are you satisfied with the hits per day or week or month of the repository?
30. What is the proportion of local and international traffic to the repository like?

Assessment

31. How do you assess the success or otherwise of the IR?
32. How would you define IR success?
33. Do you have any examples of the benefits the IR has produced?

Sustainability

34. For this repository to last a long time, what should be done to increase material deposit?
35. How about usage? What more should be done to increase the use of the repository?
36. What other resources will be needed to put the IR in good shape?
37. What challenges do you see for the IR?
38. What opportunities do you see for the IR?
39. Are there other people or units that should be brought on board?
40. Should some others who are on board now be taken off?
41. With the benefit of hindsight, when given the opportunity to create or manage the repository again, what would you do differently?



DIGITAL LIBRARIAN

1. What are your functions with respect to the Institutional repository?
2. Prior to the operation of this Institutional repository, have you been involved any other repository?

Materials Submission

3. What types of materials do you collect?
4. Who authors the materials?
5. How are materials submitted?
6. What guidelines are followed in collecting or submitting materials for the repository?
7. Do you have an editor(s)?
8. How do you judge content?
9. How do you know if something is appropriate?
10. How do you know if something belongs in a collection (subdivision)?
11. What formats are collected?
12. Do you take all formats?
13. Is it brought to you or you go for it or it is both ways?
14. Has the rate at which contents have been deposited in the repository satisfactory?
15. By way of statistics, which faculty or department contributes materials the most to the repository?
16. What accounts for such high contributions as compared to the other departments or faculties?

17. What are the avenues available to you to persuade the campus community to contribute content to the repository?
18. What more could be done/is being done to further increase the rate at which the repository content is populated?

Metadata application

19. What types of metadata are assigned to a material before adding to the content?
20. Is it author-supplied or library-supplied?

Access Control/usage

21. How do you manage digital rights?
 - a. Do you authenticate?
 - b. Do you support logins?*
 - c. Do you have to be on campus to access or submit?
22. Is the rate at which the repository is being accessed satisfactory?
23. Are there limits on viewing full-text (on-campus; by the author)?
24. Does the IR belong to a larger cooperative which harvests contents to the global scale?
25. Is the repository accessible beyond the campus community?
26. Is the repository being accessed by the campus community or it has international traffic as well?

Policy Development

27. Who can deposit?
28. Is there an approval process?
29. Can things be withdrawn?

30. Who owns the content?
31. Is participation mandatory for some groups (such as post-graduate students)?
32. Who checks copyright?

Marketing/promotion and awareness creation of the Institutional Repository

33. What are the avenues available to you to persuade the campus community to use the repository?
34. Has your outfit considered the use of social media as an avenue to create awareness among lecturers about the need to deposit content?
35. What are some of the existing collaborative efforts with other bodies on-campus or off-campus to promote the repository?
36. Which of these avenues have been more effective?
37. Why do you think it/they have been more effective?
38. Which of them has/have been less effective?
39. Why do you think they have been less effective?
40. Are there formal or structured schemes or a committee to promote the IR among the campus community and beyond?
41. In your view, do members of this campus appreciate the significance of the IR to project the university to the outside world?
- a. **If no:** Why do you think they don't understand?
 - b. **If yes:** Why is it that they still don't submit contents even though they appreciate the significance?

Assessment

42. What was the biggest motivating factor for the establishment of the repository?
43. How would you define IR success?
44. Do you have any examples of the benefits the IR has produced?
45. In your general assessment, is the repository living up to the policy framework?
46. What have been some of the practical constraints faced in the implementation of the IR.
47. If you could develop the IR again, what would you do differently?



UNIVERSITY ICT OFFICER

1. What are your core functions so long as the operation of the repository is concerned?
2. Did you assess the need for an IR prior to planning? How?
3. What were the events that led to the founding of the IR?
4. What was the biggest motivating factor?
5. What are the sources of funding for the IR?
6. Could you please explain to us the capacity of the bandwidth dedicated to the IR?
7. Is it enough to accommodate increasing traffic on the repository?
8. *Is it able to accommodate the growing size of the IR?
9. Is there a back-up strategy in the event of any mishaps?
10. Apart from the IR, what other digital initiatives exist to enhance the image of the university?
11. Which other persons/units or departments are responsible for the digital initiatives of the university?
12. What obstacles were encountered in the founding of the IR and how were they addressed?
13. In order for this repository to last longer, what should be done differently?
14. Will it require a review of policy?

Policy Development

15. Is the IR accommodated in the overall ICT policy of the university?
16. What practical challenges has the IR encountered so far?
17. Does this challenge(s) require a review of the IR policy?

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18. Is participation mandatory for some groups (dissertations)?
 19. Who owns the content?
 20. Who checks copyright?

Marketing

21. Are there limits on viewing full-text (on-campus; by the author)?
22. Do you belong to a larger cooperative?
23. Is the repository being accessed by the campus community or it has international traffic as well?
24. Is the rate at which the repository is accessed satisfactory?
25. What are the avenues available to you to persuade the campus community to use the repository?
26. Is your outfit engaged in programmes or projects that will increase the awareness of the campus community of the IR?
27. What are some of the existing collaborative efforts with other bodies on-campus or off-campus to promote the repository?
28. Which of these avenues have been more effective?
29. Why do you think it/they have been more effective?
30. Which of them has/have been less effective?
31. Why do you think they have been less effective?
32. Has your outfit considered the use of social media as an avenue to create awareness among lecturers about the need to deposit materials?
33. Do you have to be on campus to access or submit?

Material submission

34. Is the number of materials in the repository satisfactory?
35. What more could be/is being done to further increase the rate at which the repository content is populated?
36. What are the avenues available to you to persuade the campus community to contribute content to the repository?
37. Is there a budgetary allocation or a fund to advertise the existence of the repository to the campus community and beyond?
38. Is it even necessary to separately channel efforts at promoting the repository for use?

Sustainability

39. Do you have any examples of the benefits the IR has produced?
40. Do you think this repository is sustainable?
41. How long will it last?
42. In your view, do members of this campus appreciate the significance of the IR to project the university to the outside world?
43. Has there been any effort at assisting lecturers to secure their intellectual property rights even when they publish in journals, in order for such journal articles to be eligible for the repository?
44. What challenges and opportunities do you see for the IR?
45. If the IR is to be developed again, what do you think should be done differently?

UNIVERSITY ARCHIVIST

1. What is your role or core functions in the IR?

Pre-operational stage

2. Did you assess the preservation needs of an IR prior to planning? How?
3. How did you decide what software to use?

Policy Development

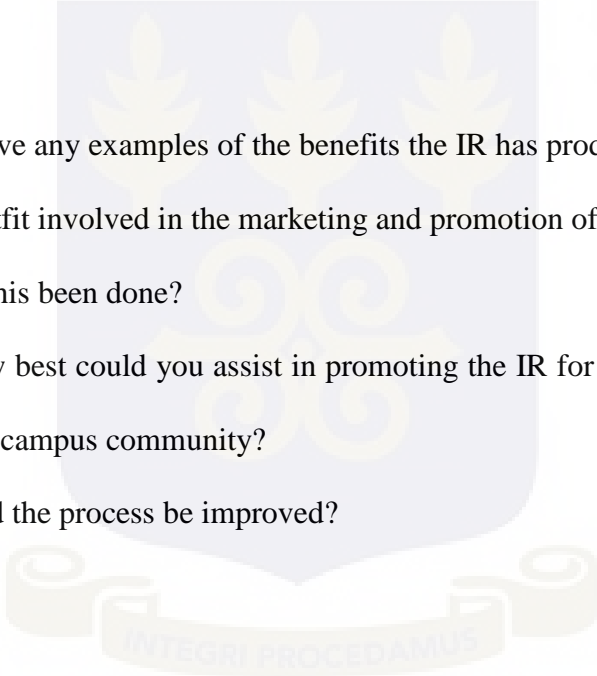
4. What individuals, organizations or resources play key roles in the preservation of content in the IR.
5. How are the documents tracked or monitored to ascertain their longevity?
6. Is there a preservation policy for the repository?
 - **If yes:** Were the policies put in place before or after you developed the IR (are they a response to a problem?)
7. How do you address copyright issues linked to preservation?

Operational stage

8. Are materials submitted in an easy-to-preserve format?
9. What are the various preservation plans for the different materials in the repository?
10. Do you back up the entire content of the repository?
11. How often is this backing-up done?
12. Do you convert file formats (i.e. Word to PDF or HTML)?
13. How often do you update formats?
14. How do you see the longevity of materials in the repository?
15. What are the challenges and opportunities you see for the IR?

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16. If this repository is to be developed again, what different preservation strategy would you adopt?
 17. Which other individuals were involved in the initial planning of the IR?
 18. What practical/operational challenges are encountered in the preservation of contents of the IR and how are they addressed?
 19. Do you think this repository is sustainable?
 20. Is archival material included?

Promotion

21. Do you have any examples of the benefits the IR has produced?
 22. Is your outfit involved in the marketing and promotion of the IR?
 23. How has this been done?
 24. If not, how best could you assist in promoting the IR for content contribution and use by the campus community?
 25. How could the process be improved?
- 
- The image shows a large, faint watermark of the University of Ghana crest in the background. The crest is a shield-shaped emblem with a blue field containing three golden leaves at the top and three golden scrolls below. A banner at the bottom of the shield contains the Latin motto "INTEGRI PROCEDAMUS" in blue capital letters.

THE UNIVERSITY PUBLIC RELATIONS OFFICER

1. What are the main channels through which this university is projected worldwide?
 - a. **Probe:** How about institutional repositories?
2. Does it really showcase what the university has to the outside world without any restriction?
3. What are your core functions concerning the marketing or promoting the IR so that people will contribute materials or use?
4. What are some feedbacks you have had from people outside of the university concerning the institutional repository?
5. Has your outfit executed any programme targeted at driving people to what exists in the repository?
 - a. **Probe:** What are these programmes or projects?
 - b. **Probe:** What more, in your view could be done to make the outside world aware of the digital contents created by the members of this university?
 - c. **Probe:** In what ways could this be done?
6. What more could be done to make the repository sustainable?

DEAN OF THE GRADUATE SCHOOL AND RESEARCH

1. What is your core function concerning the operations of the repository?
2. Does the orientation run by the library on user education entail a discussion of the IR?
3. Apart from the orientation, are there other avenues for graduate students to be aware of the IR?
4. Of what significance is the IR to graduate work?
5. What efforts has your outfit made to encourage graduate students to submit material to the IR?
6. Are graduate students under any compulsion to submit their thesis to the IR?
7. Is there any policy in your outfit to ensure content contribution to the IR?
8. How does your outfit deal with Intellectual Property rights issues?
9. What else could be done make this repository more sustainable?
10. What are the benefits of the repository to the university?
11. What have been some of the challenges faced in the use of the repository?
12. How best could such challenges be addressed?

LECTURER, EVER SUBMITTED

1. How long have you been in your current rank as a lecturer?
2. About how many journal articles have you submitted to print journals?
3. How about electronic journals, how many have you submitted?
4. Do you belong to any professional network that enables you to display your articles online for unrestricted access (such as academia.edu or research gate)?
5. Do you have the opportunity to follow the citation analysis of your publications?
 - a. **If yes:** What is your impression about how your publications are accessed?
6. Have you ever been involved in any activity of the Institutional Repository?
7. How did you know about the IR?

Materials Submission

8. In what formats do you submit your materials?
9. Do you have to convert file formats (i.e. Word to PDF or HTML) before submission?
10. Are the metadata of your materials supplied by you or is library-supplied?
11. Have ever submitted a material that you were a co-author?
12. How do you submit materials, directly or through an intermediary?
13. Are your materials peer-reviewed?
14. How is the content of your material judged before it is admitted?
15. Has a material of yours ever been rejected?
16. Do you go through any approval process?
17. Have you ever withdrawn a material you submitted.

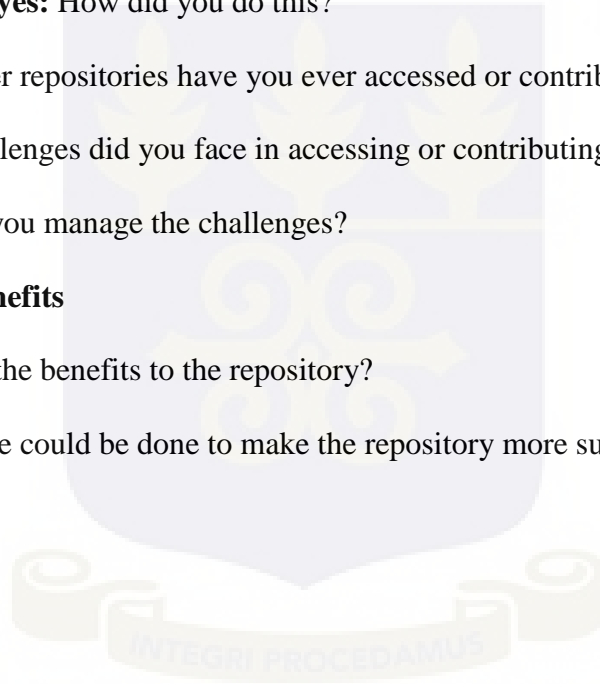
18. Do you incur any cost in any form in submitting materials to the IR?
19. What is your motivation for submitting contents to the institutional repository of this university?
20. How do you secure your Intellectual Property Right?

Marketing/promotion/awareness creation

21. Have you ever promoted or marketed the Institutional Repository to students or other lecturers?
 - a. **If yes:** How did you do this?
22. What other repositories have you ever accessed or contributed material?
23. What challenges did you face in accessing or contributing materials in the IR?
24. How did you manage the challenges?

Perceived IR benefits

25. What are the benefits to the repository?
26. What more could be done to make the repository more sustainable?



LECTURER, NEVER SUBMITTED

1. How long have you been in your current rank as a lecturer?
2. About how many journal articles have you submitted to print journals?
3. How about electronic journals, how many have you submitted?
4. Do you belong to any professional network that enables you to display your articles online for unrestricted access (such as academia.edu or research gate)?
5. Do you have the opportunity to follow the citation analysis of your publications?
 - a. **If yes:** What is your impression about how your publications are accessed?

Materials Submission

6. Have you ever attempted submitting materials to the IR?
 - a. **If yes:** Why did it not end up in the repository?
7. Why have you not attempted submitting materials to the repository?
8. How come then, that you have never done so with your university's repository?
9. Do you access or use materials in the repository?
 - a. **If yes:** How do you judge contents of the repository?
10. If no, why do you not use?
11. What are the challenges and opportunities you see for the IR?
12. Have you ever been involved in any activity of the Institutional Repository?
13. What will motivate you to contribute materials to or use the IR?
14. How would you assess the success of the IR?
15. Do you know any examples of the benefits the IR has produced?

Content

16. How do you secure your Intellectual Property Right?
17. Do you believe that a lot is being done to promote and make the IR attractive?
18. To whom? (students, colleague lecturers or who)
19. What other repositories have you ever accessed or contributed material to?
20. How easy or difficult was it?
21. What do you think should be done differently for the repository to attract people like you who have never submitted materials?



OFFICE OF RESEARCH, INNOVATION AND DEVELOPMENT (ORID)

1. What are your core functions so long as the operation of the repository is concerned?
2. What joint roles do you play with the library?

Marketing/promotion/awareness-creation

3. So far, how is the awareness of the campus community about the repository like?
4. What have been the means through which the repository has been made aware to the campus community?
5. How do you make lecturers aware of the repository?
6. What has been the approach for reaching out to students?
7. Which category of students has been your target?
8. Is there a committee or an individual, within or outside, responsible for marketing and promoting the IR campus-wide and beyond?
 - a. **If no:** Could there be formal or structured schemes to promote the IR among the campus community and beyond?
9. What more could be done to market the IR to faculty and thus increase the patronage of the repository?

Material submission

10. What is the focus with respect to the kind of materials for populating the content of the repository?
11. Is the rate at which materials have been deposited in the repository satisfactory?
12. Is there any zeal on the part of lecturers and researchers to deposit materials to the repository?

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13. What are the avenues available to you to persuade lecturers/researchers and students to contribute content to the repository?
 14. What more could be/is being done to further increase the rate at which the repository content is populated?
 15. In your view, do members of this campus appreciate the peculiar advantages or significance of the IR to project the university to the outside world?
 16. Have the peculiar benefits of the IR been well understood by the campus community to ensure their buy-in?

If yes: Why is it that they still don't submit contents even though they appreciate the significance?

17. What constraints face material depositors?
18. Has there been any effort at assisting lecturers to secure their intellectual property rights even when they publish in journals, in order for such journal articles to be eligible for the repository?

Use

19. Are you satisfied with the hits per day or week or month of the repository?
20. What is the proportion of local and international traffic to the repository like?

Assessment

21. How do you assess the success or otherwise of the IR?
22. How would you define IR success?
23. Do you have any examples of the benefits the IR has produced?

Sustainability

24. For this repository to last a long time, what should be done to increase material deposit?
25. How about usage? What more should be done to increase the use of the repository?
26. What other resources will be needed to put the IR in good shape?
27. What challenges do you see for the IR?
28. What opportunities do you see for the IR?
29. Are there other people or units that should be brought on board?
30. Should some others who are on board now be taken off?
31. With the benefit of hindsight, when given the opportunity to create or manage the repository again, what would you do differently?

