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Content Recruitment and Institutional Repositories in Kenyan Universities

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Abstract

Rationale of Study – The purpose of this paper is to discuss the role of institutional repositories in supporting teaching, learning and research in four selected universities in Kenya.

Methodology – Mixed methods research approach and a multiple case design was used for this study. Data was collected using questionnaires administered to 370 students and 322 academic staff randomly in the four universities in Kenya. Face to face interviews were used to collect data from the university librarians, system librarians and research directors in these universities.

Findings – The study revealed that content in the selected institutional repositories was dominated by grey literature and was found to be inadequate, sometimes outdated and of poor quality. The findings also showed that although IRs in the selected universities contained many types of material covering many subjects, each specific subject area contained only a few materials. In addition, the results indicated that the rate of content recruitment in the selected IRs was very low.

Implications – The findings of this study can contribute to discussions about the reasons for poor content recruitment in IRs and used to develop an appropriate model; it is expected that staff will deposit their scholarly content in institutional repositories more readily.

Originality – Little has been documented on the effectiveness of content recruitment in institutional repositories in Kenyan universities. Therefore, this paper is a valuable addition to the existing literature on the subject.

Keywords

Content, Content Recruitment, Institutional Repositories, Universities, Kenya

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1 Introduction

Over the years, the advance of information and communication technology (ICT), along with the Internet and the Web, has altered the patterns of communication and brought about a transition in scholarly communication. Open access and institutional repositories (IRs) have emerged as new channels for scholarly communication. These IRs have been developed, implemented, and used as an alternative channel for scholarly communication to benefit the faculty as well as the university communities. Institutions have put more effort by investing human and technical resources to ensure robust infrastructure that will foster access to the content in their IRs. However, accessing this content has been one of the biggest hurdles that hinder research and teaching in universities. The realisation of the true value of IRs in developing countries has been hindered by low acceptance and use of the facilities by the university community.

IRs are digital archives that provide the means to collect, manage, provide access to, disseminate, and preserve digital materials produced at an institution. IRs are products of the changing digital landscape of the 21st century and are emerging as vehicles for potentially supporting the academic communities to share knowledge widely. According to Jain, Bentley and Oladiran, (2016), an IR is a digital research archive consisting of accessible collections of scholarly works that represent the intellectual capital of an institution. It is a means for institutions to manage the digital scholarship output their communities produce, maximise access to research outputs both before and after publication and also to increase the visibility and academic prestige of both the institution and authors. Lynch (2003:2) defines IR as a "set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members."

The global focus on generating knowledge and innovation to drive economic and social progress has created challenges for universities and other equivalent institutions. Frieda and Yule (2019) note that the technological advances in recent years have made it possible to think and package significant knowledge of the human population in a digital form for reference and utilisation.

Institutional repositories have become a global phenomenon. They are now established on all continents with the largest repositories being found in Europe, North and South America, Japan, India and Australia. Interest in establishing and promoting repositories is likely to show continued growth. This is particularly so as academic staff increase their

online presence and adapt their work patterns to the new Web 2.0 tools such as blogs, RSS, wikis, and virtual communities (Cullen & Chawner, 2013).

Different studies in Africa show that IRs are being integrated and used in institutions of higher learning where they display research outputs such as theses and dissertations. Mutula (2012) highlighted the increasing importance of information and communication technology (ICT) in the digitisation and preservation of content, and establishment of IRs in Africa. The IRs capture and preserve the university's intellectual output, for instance, PhD theses, preprints, post prints, working papers, technical reports, public archives, and graphic material. He noted that the Association of African Universities (AAU) was helping in the digitisation process. Despite all the efforts to create digitisation programmes, challenges such as copyright issues, inadequate funding, institutional support, technical drawbacks and conservation of originals have hampered meaningful progress in building digital libraries and institutional repositories (Mutula, 2012).

Studies conducted in Kenya indicate that development and implementation of IRs has been gaining momentum in higher institutions of learning (Mutula, 2012). For instance, Chilimo (2016) and Chilimo (2015) reported that the number of IRs in Kenya listed in OpenDOAR rose from two in 2009 to 22 in 2016 while many more universities were in the process of developing them. While some of them are already on the World Wide Web but not yet listed in OpenDOAR, others still operate on their institutions' local area network (LAN). Karanja (2017) documented the scarcity of research outputs that are made available in university IRs in Kenya. The researcher contended that the outputs are dominated by abstracts rather than full texts. The IRs have also failed to incorporate a full range of services that could support academic and research work. Ogenga (2015) looked at adoption of IR in dissemination of scholarly information at United States International University – Africa while Talam (2014) investigated the integration and use of IRs in University of Nairobi. However, there is scarcity of studies in Kenya that have empirically investigated how IRs in universities has helped them address challenges in teaching, learning, and research.

2 Research Rationale

Rapid expansion in Kenyan universities has strained infrastructure and resources leading to a decrease in the quality of learning, teaching, and research. Teaching and research have also been impeded by inadequate learning resources such as textbooks and journals as well as lack of qualified staff (Sarker *et al.*, 2010). Institutional repositories can

potentially solve some of the most significant challenges of Kenyan universities and hence support teaching, learning and research, for instance, by providing the much sought scholarly information to students and staff. Storing research articles, lecture notes and other articles, this could help in teaching and learning. Despite the high uptake of IRs to support teaching, learning and research of higher learning institutions of digital resources more effectively, little research has been documented on the effectiveness of content and content recruitment in Kenyan universities. Therefore, this study addresses this gap by establishing effectiveness of content and content recruitment in IRs.

The objective of the study was to investigate the effectiveness of content and content recruitment in institutional repositories in selected universities in Kenya.

3 Literature Review

Relevant literature has been reviewed and presented hereunder under two key research themes. These are content in institutional repositories; and content recruitment for institutional repositories.

3.1 Content in Institutional Repositories

This paper operationally defines content as the material deposited in IR, such as journal articles, theses and dissertations (Crow, 2002). Four parameters, all with implications on their ability to be used in teaching, learning and research, define IR content: diversity, currency, size, and metadata (Kanto, 2005; Saracevic, 2000 &2005; Saracevic & Covi, 2000; Fuhr, Hansen, Mabe, Micsik & Sølvberg, 2001). Crow (2002) explains that the content of an IR is a web-based database (repository) of scholarly material (the material are purely scholarly); and institutionally defined (as opposed to a subject-based repository, it contains institution-wide material). Others are cumulative and perpetual (a collection of permanent and increasing material); open and interoperable (compliant with Open Archive Initiative compliant software); and collect, store and disseminate scholarly material as part of the process of scholarly communication.

Content is an essential component as far as the success of IR is concerned. However, IRs as currently modelled in Kenya are not efficient in supporting teaching, learning and research in universities because of challenges in content recruitment and the type of content in them. The predominance of grey and non-published literature in IRs over published and peer-reviewed material limit the ability of repositories in supporting teaching, learning and research. Studies continue to illuminate low usage of IRs and preference for the traditional journal publishing in Kenyan universities (Shukla &

Ahmad, 2018). Discovery of content in IRs tends to be accidental when using search engines, such as Google, rather than a purposeful visit of IR's websites (Njagi & Namande, 2018).

If IRs are to legitimately support teaching, learning and research in higher institutions, the contents they carry must be both broad and deep. If a repository contains few materials, potential users will not bother checking it while depositors will resist depositing their work as it will not be visible to the academic community (Dubinsky, 2014; Richardson & Wolski, 2012). It is important to note that if nothing is deposited in IRs then definitely there will be nothing to access or retrieve.

Nevertheless, there has been wide variation in content of IRs, with Shreeves and Cragin (2008) arguing that the type of content contained in them depended upon the goal of the repository. Each institution defines its own content and decides what to populate the repository with because the policy guides them on deposition of content into IR. According to the University of Nottingham's Directory OpenDOAR, IRs of top 100 universities in the world contains 12 main document types: journal articles, theses and dissertations, conference and workshop papers, books, chapter and section, datasets, and multimedia and audio visual materials (2008). Others are unpublished reports and working papers, learning objects, patents, software, bibliographic references, and other special item types (Tsunoda *et al*., 2016; Kaur, 2017).

Allen (2005) and McDowell (2007) reported a wide variance in scope and content of IRs and identified several small and under-utilised repositories. They noted that the contents were dominated by science and technology and found that the largest proportion of deposits consisted of PhD and other theses followed by faculty research output, of which only 13% was peer reviewed. The inclusion of grey literature in IR has sometimes brought collision between IRs and repository managers for veering away from the objectives of the open access movement (Poynder, 2006. Grey literature includes preprints, working papers, theses and dissertations, research and technical reports, conference proceedings, departmental and research centre newsletters and bulletins, papers in support of grant applications, status reports to funding agencies, committee reports and memoranda, statistical reports, technical documentation, and surveys (Scholarly Publishing & Academic Research Coalition, SPARC, 2002).

According to Adie (2014), grey literature is created by researchers and informed by research but are not usually viewed as first class "citizens" of the scholarly literature.

First, this content is not peer-reviewed and is unlikely to attract scholars looking for serious literature. Secondly, this breeds a vicious cycle. If scholars are unwilling to visit IRs and search for research articles, it is unlikely that they would voluntarily deposit their research outputs in them. Thirdly, grey literature is not tracked in citation indices like Web of Science or Scopus, and hence, they are not very visible to scholars. Thus, while IRs may be great at archiving this type of university intellectual output, they are unlikely to increase the academic profile, visibility and prestige of the institutions because the output is not seen. In addition, materials deposited in IRs by lecturers have been plagued by concerns over misspelling and grammar, unclear copyright issues, prominence of style over substance, and technical problems, lowering its quality. However, it has been argued that such content is not substandard as students usually use it, and hence, it could be important in teaching, learning and research (Arlitsch & Grant, 2018).

3.2 Content Recruitment in Institutional Repositories

The scope and content of IRs depend upon the rate at which materials are deposited in them. Content recruitment or deposition is the process of getting IRs filled up with research output and other institutional materials. It is generally accepted that content recruitment is the core function of an IR (Covey, 2011). The sustainability of IR depends on the volume of research and IR content submission in a particular field of study. Successful content recruitment requires collaboration between various actors. For instance, Lynch (2003:12) stated that, "an effective institutional repository of necessity represents collaboration among librarians, information technologists, archives and records managers, and university administrators and policy makers". One of the earlier visions of IRs was that faculty and researchers at the university or their agents would deposit or self-archive their own work pre- or post-peer review. This practice, also known as green archiving, would ensure that people most knowledgeable about the work would describe it (provide its metadata) rather than mere cataloguers, such as librarians and repository managers (Davis-Kahl, 2016; Chapman, Reynolds, & Shreeves, 2009). However, self-archiving has not been successful in filling up IRs with McDowell (2007) showing a median annual increase of only 366 items in IRs between 2005 and 2006. The best practice in populating IRs has been mediated green archiving or where repository managers deposit faculty work and other university materials on behalf of the authors (Davis-Kahl, 2016; Chapman *et al*., 2009).

Studies show that faculty members are reluctant to contribute material to IRs. A study conducted by Omeluzor (2014) in Nigerian universities on IR awareness and willingness

of faculty staff to deposit research work revealed that many faculty staff were not willing to contribute any publication in IR or find it difficult to deposit content in IR. Casey (2012) surveyed directors at the Association of Research Libraries (ARL) and found that most of the faculty members at the institutions were not contributing. Similarly, Schonfeld and Houseright (2010) found that less than 30 percent of faculty in U.S. colleges and universities were contributing to IRs. Reasons for reluctance to contribute include steep learning curve for IRs, fear of copyright infringement, concerns about plagiarism, fear that low quality of some material in the IR would taint the research, and concerns over whether contributing to the IR is equated with publishing. Others included perceived quality of self-archived materials, disciplinary culture and practices, lack of time, lack of technical skills, and concerns regarding promotion of materials (Arlitsch & Grant, 2018). All respondents in the Census of Institutional Repositories in the US reported having difficulty recruiting content from faculty and graduate students, and also found that the more mature the repository is, the more sceptical the staff in charge of the repository are of any given recruitment strategy (McDowell, 2007). National Institute Informatics (2014) reported a similar trend with regard to IRs in Japanese universities noting that the large amount of content registration that occurs during inception of repositories tends to taper off and give way to mundane, routine content registration, inevitably leading to a decline in the number of new materials. These findings appear to challenge the foundational basis of IRs as alternative tools for the current scholarly publishing model (McDowell, 2007).

Giesecke (2011) argued that faculty and other researchers may upload inferior materials that may not meet quality standards. Consequently, the work needs to be corrected and improved to ensure continued reputed quality of IRs. Faculty may not know how to describe the work in such a way that it optimises their chances of discovery by search engines such as Google. Providing correct keywords and expressive abstracts can increase the chances of users identifying and using them in teaching, learning and research.

Material in IRs is often made as one-time deposits or through periodic batch additions of works, rather than by continuous additions by enthusiastic faculty (Davis & Connolly, 2007). Salo (2008) presents a pessimistic view of IRs, noting faculty disinterest, abysmal marketing efforts, implementation dictated by university policy rather than user needs, inadequate staff and support services. The IR, in essence, had become a "roach motel", in which the faculties work "live and die" after submission (Salo, 2008). Based on the

reviewed literature, the faculty neither understood the purpose of the IR nor did derive the full range of benefits from it. Cullen and Chawner (2011) showed that regardless of the medium, the faculty just wanted to carry out research, share their findings, and find the research of their colleagues. They concluded that an IR should not be a place where research goes to die.

4 Theoretical Framework

This study was guided by the technology acceptance model (TAM) and diffusion of innovation theory(DOI). Institutional Repositories are relatively novel technologies. Thus, technology adoption theories and models were used to explain the spread, adoption, use and acceptance of IRs in universities. These were relevant to this study because TAM focused on explaining why a group (students and staff) embraced a technology (IR) and DOI, explained why usage of IRs could spread to students and academic staff not using them. The TAM theorises that a users' acceptance of technology is determined by their attitude towards using that technology(IR) and to determine whether users use an IR is their attitude towards it, which is influenced by the perceived usefulness and perceived ease of use of that IR, which in turn are shaped by external factors (IR infrastructure). Academic staff and students who deposit content and use institutional repositories are those who perceived them to be useful and easy to use. On the other hand, those who are reluctant to deposit content and use IR found them to be of little value and difficult to use

On the other hand, diffusion of innovation theory explained how over time an idea or product gains momentum and spreads through a specific population or social system. Adoption of an innovation is a mental process through which an individual pass from first understanding knowledge of an innovation to forming an attitude towards the innovation, to adopt or reject, to implementation of the new idea, and to confirmation of the decision. In this study the benefits gained from depositing content in IR has to spread to academic staff and students, so that they can have positive attitude towards content recruitment, and hence deposit content more often which in turn will increase content in IRs.

5 Methodology

Mixed methods research approach was used with a multiple-case design. The population of the study consisted of academic staff, students, university librarians, system librarians and research directors of the four universities in Kenya. The respondents were selected

based on their presence and performance in the 2017 webometrics ranking of the universities. These universities were Moi University and University of Nairobi (public) and Strathmore University and United States International University - Africa (private). From the four universities stratified sampling was done to obtain a sample of 322 academic staff and 370 students. Self-administered questionnaires were used to collect data from these respondents. The quantitative data collected was analysed using SPSS to obtain descriptive and inferential statistics while qualitative data from the open ended questions were analysed thematically. Four (4) University librarians, four (4) system librarians and four (4) research directors of the four universities were purposively selected as key informants who have expert knowledge about IR use and they are the key decision makers in issues of content management, and thus, more credible. Face to face interviews were used to collect qualitative data from the key informants.

6 Results and Discussion

The results of the study are presented and discussed in this section.

6.1 Scholarly Content in the IRs

The study sought the opinions of the respondents on the types of scholarly content present in their IRs. Table 1 shows that IRs in the four universities contained over 12 types of scholarly content, including preprints, book reviews, journal articles, thesis, working papers, and conference papers. Others were technical reports, datasets, book chapter, software, books and multimedia.

Table 1: Types of scholarly content present in IRs

IRs' content	Academic staff			Students		
	Responses			Responses		
	N	%	% of cases	N	%	% of cases
Preprints	109	6.8	37.5	74	4.9	22.9
Book Reviews	114	7.1	39.2	93	6.1	28.8
Journal Article	148	9.2	50.9	189	12.4	58.5
Thesis	183	11.4	62.9	188	12.3	58.2
Working papers	124	7.7	42.6	118	7.7	36.5
Conference Papers	110	6.9	37.8	91	6.0	28.2
Technical Reports	143	8.9	49.1	98	6.4	30.3
Datasets	105	6.6	36.1	120	7.9	37.2

Book Chapter	146	9.1	50.2	99	6.5	30.7
Software	183	11.4	62.9	130	8.5	40.2
Book	134	8.4	46.0	171	11.2	52.9
Multimedia	104	6.5	35.7	152	10.0	47.1
Total	1,603	100.0	550.9	1,523	100.0	471.5

The number of responses for this question was 1,603 for members of academic staff and 1,523 for students, which was more than the number of staff (293) and students (332) in the study. This was because most respondents answered that IR contained more than one type of scholarly content, that is, the question was a multiple response type. The results showed IRs mainly contained theses (staff: 11% of the 1,603 responses and students: 12% of the 1,523 responses), journal articles (staff: 9% and students: 12%), and software (staff: 11% and students: 9%).The total percentage of cases was 550.9 and 471.5 for academic staff and students, respectively, indicating that on average, each staff answered that the IR contained about six types (550.9/100) of scholarly content compared to a student's four (471.5/100). This suggested that staff thought the IR had more content than students did.

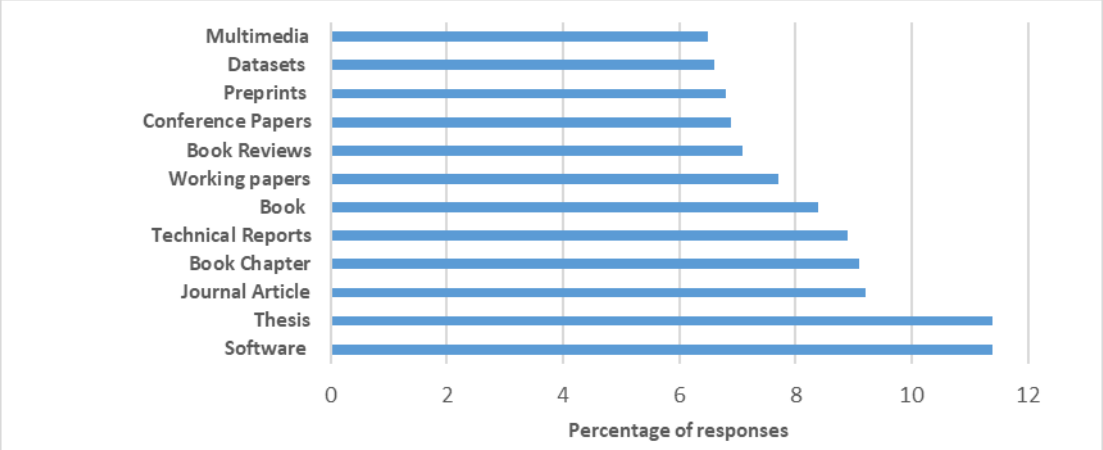

Figure 1a: Scholarly content according to staff

Figures 1*a* and *b* show that, according to both staff and students, the most prevalent items in the IR were journal articles, thesis, and book/book chapters while the least prevalent were preprints, conference papers, and book reviews. The staff answered that IRs did not contain much multimedia, students thought the opposite. According to answers from university librarians, system librarians and research directors, IRs, in addition, contained graduation speeches, press briefings, research projects, media

clippings, newspaper articles, university calendars, almanacs, ISO manuals, and school magazines. Others included examination papers, historical documents of the university, research questions, past papers, lectures, speeches, manuscripts, pictures, policies, newsletters, microfilms, workshop, and seminar proceedings. Removing journal articles, book reviews, book chapters and books, which made up about 35% of the IR content, the rest of the material (about two thirds) consisted of grey literature that had not been peer reviewed. The type of IR content was compared between the four universities in the study and the results are presented in Figure 2

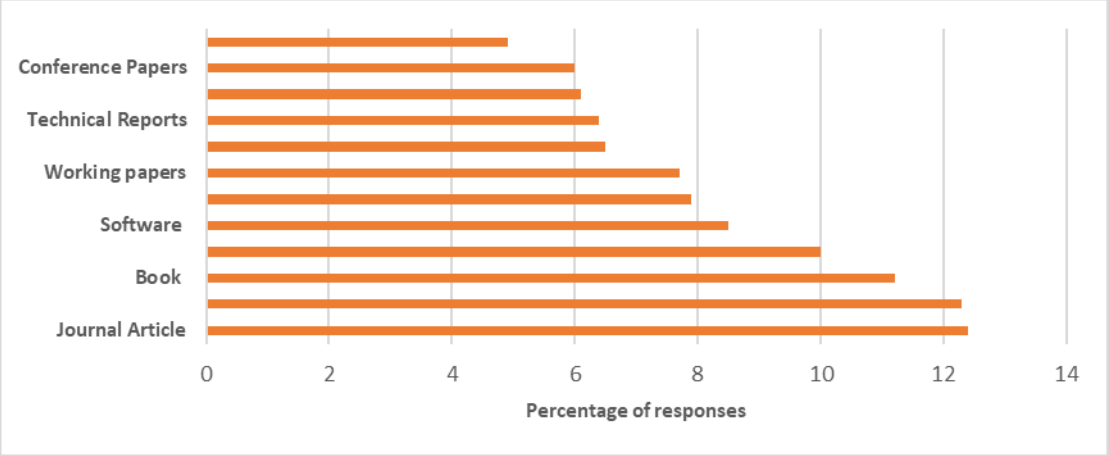

Figure 1b: Scholarly content according to students

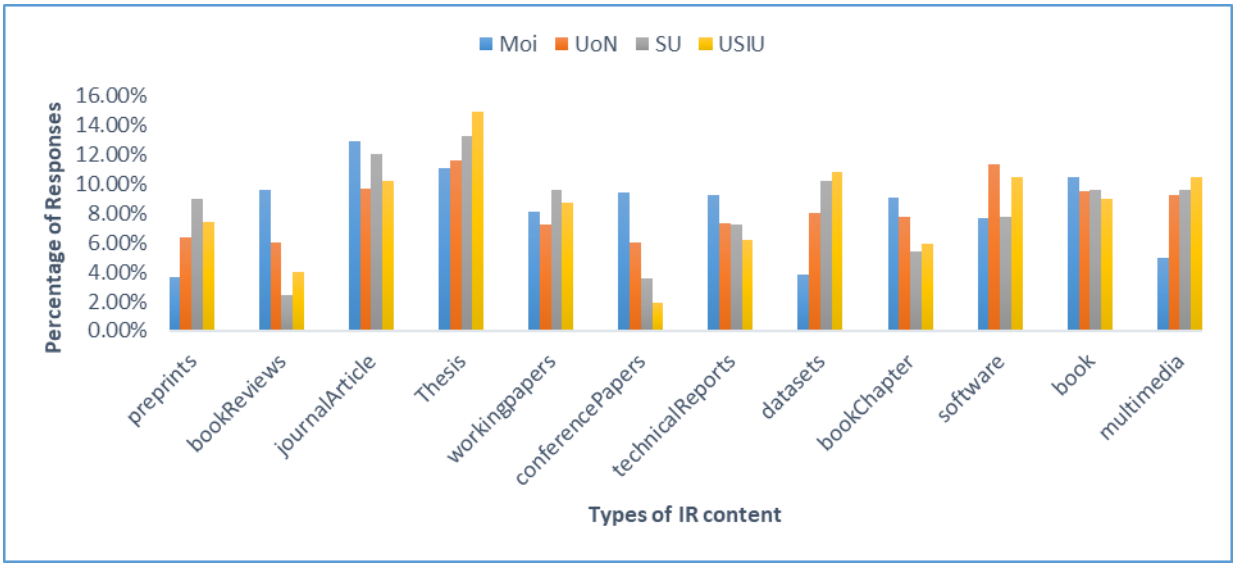

Figure 2: IR content in the selected universities in the study

Slight differences in the type of content were observed in the universities, notably conferences and book reviews, which were more in public universities whereas theses, datasets and multimedia were predominant in private universities. These differences

reflect Shirky's (2005) argument, that because content in IRs is institutionally defined, each university decides on which content to recruit, leading to subtle variability. Nevertheless, generally, IRs from the selected universities contained similar materials. Analysis of the selected IRs also showed that all of them used the same type of software platform, DSpace, which could explain the similarity of their content. No university was found to use other software, whether proprietary or OSS (open source software), such as EPrints, Digital Commons, Fedora, Greenstone, Aigainon, BRICKS or Invenio.

6.2 Type of Content Deposited in IRs

The study also asked respondents the type of content they had ever deposited in their IR. This information is presented in Table 2.

Table 2: Types of content academic staff and students deposit in IRs

IRs' content	Responses		
	N	%	% of cases
Journal Articles	283	28.2	58.2
Theses	217	21.6	44.7
Grey literature	126	12.6	25.9
Books	98	9.8	20.2
Conference Presentation	279	27.8	57.4
Total	1,003	100.0	206.4

Overall, the study found that the content consisted mainly of journal articles and conference presentations (both 28% of the 1,003 responses), followed by theses (22%) and grey literature (13%).The least were books (10%). This question was also a multiple response type, as the number of responses (1,003) is more than the number of respondents. These numbers reflect the relative proportions of the different communities' resident in the selected IRs, with the major ones being theses and dissertations, journal articles and research papers, and conference proceedings. Combining conferences, theses, and other non-peer reviewed material; the results indicated that the predominant material deposited in the IRs was still grey literature. The type of content deposited in IRs was compared between members of the academic staff and students, and the departments respondents belonged to. Table 3 presents results of the comparison of content deposition between students and academic staff.

Table 3: Comparison of content deposition by staff and students

			Respondent Type		
			Student	Academic staff	Total
Content deposited	Journal articles	Frequency	102	181	283
		%	36.0	64.0	
	Theses	Frequency	30	187	217
		%	13.8	86.2	
	Grey literature	Frequency	60	66	126
		%	47.6	52.4	
	Books	Frequency	21	77	98
		%	21.4	78.6	
	Conference presentation	Frequency	82	197	279
		%	29.4	70.6	
	Total	Frequency	295	708	1,003

Findings showed that, in absolute numbers, staff have deposited more items in IRs (708) relative to students (295). Compared to students, members of academic staff were found to have deposited larger proportions of theses (86%), books (79%), conference presentations (71%), and journal articles (64%). However, with grey literature, deposition by staff (52%) was comparable to that of students (48%).

Table 4: Comparison of content deposition across various departments

		Content deposited					
department		Journal Article	Theses	Grey literature	Books	Conference Presentation	Total
Engineering	Frequency	4	0	13	5	9	31
	% within department	12.9%	0.0%	41.9%	16.1%	29.0%	
Library and Information Science	Frequency	64	68	21	2	48	203
	% within department	31.5%	33.5%	10.3%	1.0%	23.6%	
Education	Frequency	13	1	5	1	9	29
	% within department	44.8%	3.4%	17.2%	3.4%	31.0%	
Science	Frequency	33	25	16	15	48	137
	% within department	24.1%	18.2%	11.7%	10.9%	35.0%	
Humanities	Frequency	117	105	52	52	126	452
	% within department	25.9%	23.2%	11.5%	11.5%	27.9%	

Business	Frequency	42	8	19	15	38	122
	% within department	34.4%	6.6%	15.6%	12.3%	31.1%	
Total	Frequency	273	207	126	90	278	974

Key: Percentages and totals are based on responses

Results showed that books are deposited mainly by Engineering (16%), Humanities (12%), Business (12%) and Science (11%) departments, but rarely by Library (1%) and Education departments (3%). Engineering, Education and Business departments deposited limited or no theses while Engineering deposited a lot of grey literature. Generally, every department deposited their journal articles and conference presentations into their IRs.

6.3 Content deposited in IRs in the last five years

Respondents were also asked about the approximate number of content that they had deposited in IRs in the last five years (Table 5).

Table 5: Frequencies of respondents' IR's content deposit in last five years

Quantity of deposits in IRs in last five years										
Type of content	None		1		2		3		4 or <	
	Fq	%	Fq	%	Fq	%	Fq	%	Fq	%
Journal article	522	83.5	45	7.2	17	2.7	27	4.3	14	2.2
Theses	583	93.3	28	4.5	13	2.1	1	0.2	0	0.0
Grey literature	585	93.6	21	3.4	7	1.1	8	1.3	4	0.6
Books	612	97.9	9	1.4	3	0.5	0	0.0	1	0.2
Conference presentation	547	87.5	45	7.2	21	3.4	6	1.0	6	1.0

Results showed that only a tiny fraction of respondents had deposited content in IRs, this could be the reason why the rate of content recruitment in the selected IRs was found to be very low, Proportions of respondents who had not made any deposits were 98% for books, 94% for grey literature, 93% for theses, 88% of conference presentations, and 84% of journal articles. Conversely, the study found that items mostly deposited in IRs were journal articles, followed by conference presentations, theses, grey literature, and lastly, books. The low rates of content recruitment could explain why the selected IRs had relatively little content. This suggests that the IRs may not be effective in supporting teaching, learning and research activities.

6.4 Preferred Publishing Modes

Members of the academic staff were asked about their most preferred mode for scholarly publishing. Figure 3 shows these results.

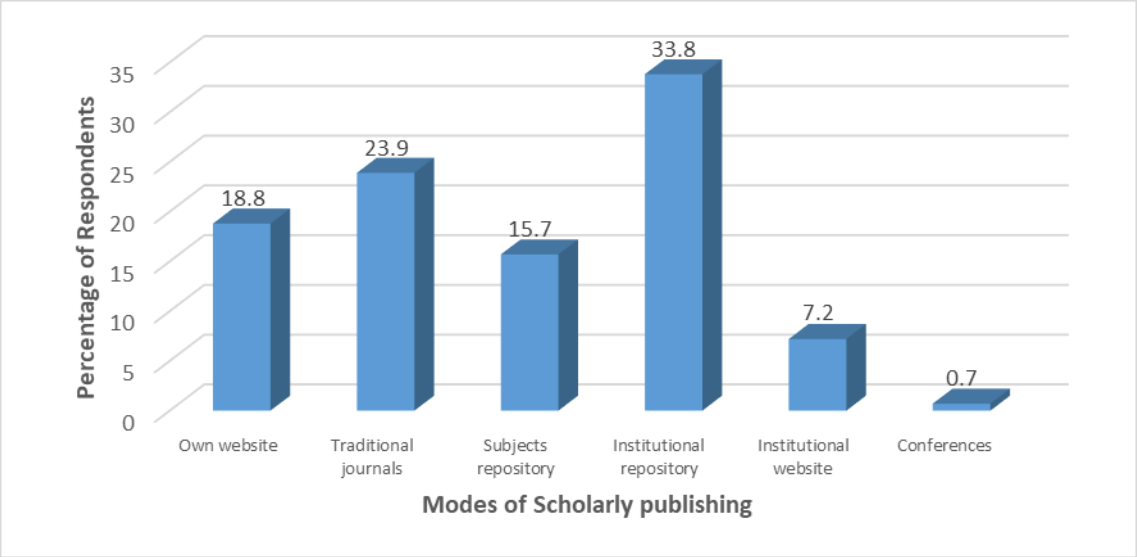

Figure 3: Preferred modes of scholarly publishing by academic staff

Results in Figure 3 indicated that staff mostly preferred to publish in IRs (*n*=99, 34%), followed by traditional journals (*n*=70, 24%), own websites (*n*=55, 19%), and subject repositories (*n*=46, 16%). The least preferred modes of scholarly publishing were found to be conferences (n=2, 1%) and institutional websites (*n*=21, 7%). Those who preferred publishing in their own websites said that it was most secure. Those who preferred subject repositories stated that finding information was faster than other modes. One academic staff stated about subject repository thus: *Scanning information takes less time and therefore speedily. It is the most accessible*. Some who publish in IRs appear not to have any specific reason other than because others were doing so. One academic staff stated that it "…*it is commonly used*…". This implies that some staff did not see any tangible benefits in publishing in IRs; only being compelled because others were doing so. The preferred mode of scholarly publishing by academic staff was compared with their department and academic ranks. Table 6 presents the results of comparisons between the preferred mode of publishing by academic staff and the department they belonged to.

Table 6: Preferred modes of publishing in different academic departments

Department		Preferred mode of publishing						
		Own Website	Traditional Journals	Subject Repository	Institutional Repository	Institution Website	conference	Total
Library and Information Science	Frequency	26	20	4	1	2	0	53
	%	49.1	37.7	7.5	1.9	3.8	0.0	
Education	Frequency	2	0	0	1	0	0	3
	%	66.7	0.0	0.0	33.3	0.0	0.0	
Science	Frequency	3	1	0	31	0	0	35
	%	8.6	2.9	0.0	88.6	0.0	0.0	
Humanities	Frequency	15	38	38	49	19	2	161
	%	9.3	23.6	23.6	30.4	11.8	1.2	
Business	Frequency	1	11	4	16	0	0	32
	%	3.1	34.4	12.5	50.0	0.0	0.0	
Total	Frequency	47	70	46	98	21	2	284

Key: SR=subject repository, IR=institutional repository, IW=institutional website

Results indicated that staff from science (89%) and business (50%) departments preferred publishing in IRs relative to other modes. Library and information science was the least likely department to publish in IR (2%), (this suggested that although they know the potentially important roles that IRs can play (they are the promoters), they themselves are not willing to invest in them, for instance, by deposition of content), followed by humanities and education. Library and education preferred to publish in their own websites or traditional journals. Table 7 presents results on the relationship between the mode of scholarly publishing by academic staff and their academic ranks.

Table 7: Preferred modes of publishing among academic staff of different ranks

			Preferred publishing mode						
			Own Website	Traditional Journals	SR	IR	IW	Conferences	Total
Academic rank	Assistant lecturer	Frequency	22	23	15	12	0	1	73
		%	30.1%	31.5%	20.5%	16.4%	0.0%	1.4%	
	Lecturer	Frequency	14	2	9	27	11	1	64
		%	21.9%	3.1%	14.1%	42.2%	17.2%	1.6%	
	Senior lecturer	Frequency	14	19	11	35	0	0	79
		%	17.7%	24.1%	13.9%	44.3%	0.0%	0.0%	
	Associate professor	Frequency	5	18	11	17	0	0	51
		%	9.8%	35.3%	21.6%	33.3%	0.0%	0.0%	
	Professor	Frequency	0	8	0	8	10	0	26

	%	0.0%	30.8%	0.0%	30.8%	38.5%	0.0%	
Total	Frequency	55	70	46	99	21	2	293

Key: SR=subject repository, IR=institutional repository, IW=institutional website

Lecturers (42%) and senior lecturers (44%) preferred publishing in IRs relative to other publication modes (Table 7). However, associate professors (35%) and assistant lecturers (32%) preferred publishing in traditional journals rather than using other modes of publication. On the other hand, professors favoured institutional websites compared to other modes.

6.5 Deposition of IR Contents and preparation of Metadata

The study asked university librarians, system librarians and research directors on who normally makes deposits into IRs. The answers ranged from IR administrators, system administrators, IR staff, university librarian, system librarian, digital repository librarian, and research directors. The results suggest that the universities use two types of content recruitment: mediated and self-archiving. In the former, a specialised and dedicated IR staff, usually in the library, managed IRs and made deposits to them. The staffs are variously called system librarians, digital repository librarians, IR staffs, and system administrators in different universities. In self- or green archiving, the authors themselves describe and upload contents to IRs. For instance, one university librarian answered: *We have members of staff whose sole work is to manage the repository. So they collect the materials that need to be digitalized and they scan them and upload them. In other situations, we get materials in soft format and it is just uploaded directly.* A system librarian thus answered: *We have staffs that do that. We have types of dissemination; mediated archiving where there are some members of staff who submit documents on behalf of others like our students do not interact with IR bucket so all their documents come to the library then we have librarian who upload. Secondly, self-archiving where lecturers can submit a document themselves although it may be subjected to some checks before being deposited in IR so librarian will be there to check.* The study found that essentially the same members of staff who upload content to IRs are the same ones responsible for generating metadata. The answers ranged from IR administrators, system administrators, librarians, school administrators, and library staff working at IR section, information technologists, and depository librarian.

6.6 Challenges that limit IR Content Recruitment

The study asked respondents what they perceived to be the greatest challenges that limit deposition of materials in IRs. Typical responses were as follows: *Lack of awareness and overdependence on traditional teaching and research materials. Lack of willingness to share materials*

amongst students and researchers. Inadequate experts to guide others on the whole process of getting materials deposited in institutional repositories. Insecurities in institutional repositories, there is the issue of intellectual property rights. Fear of plagiarism, there are too many steps needed in deposition of any IRs materials……hence difficulty in content recruitment. Respondents were also asked about how IRs could be improved so that more people could deposit materials in them. One recurring theme was to ask universities to advertise IRs and the potential roles that they could play. For instance, in the words of a member of academic staff: *Advertise institutional repository in order to make it available to many people…those responsible with IR should announce and publicize IR contents through library website or institutional bulletin. More funds should be put in place to curb the deprivation or lack of such materials in institutional repositories'. Library should liaise with departments to ensure they submit academic materials to IRs…also librarians should be sending notices to academic staff and students on IR updates.*

6.7 Institutional Policy on IR Content Recruitment

The study asked respondents whether their institutions had a policy regarding content recruitment by students and staff (Figure 4).

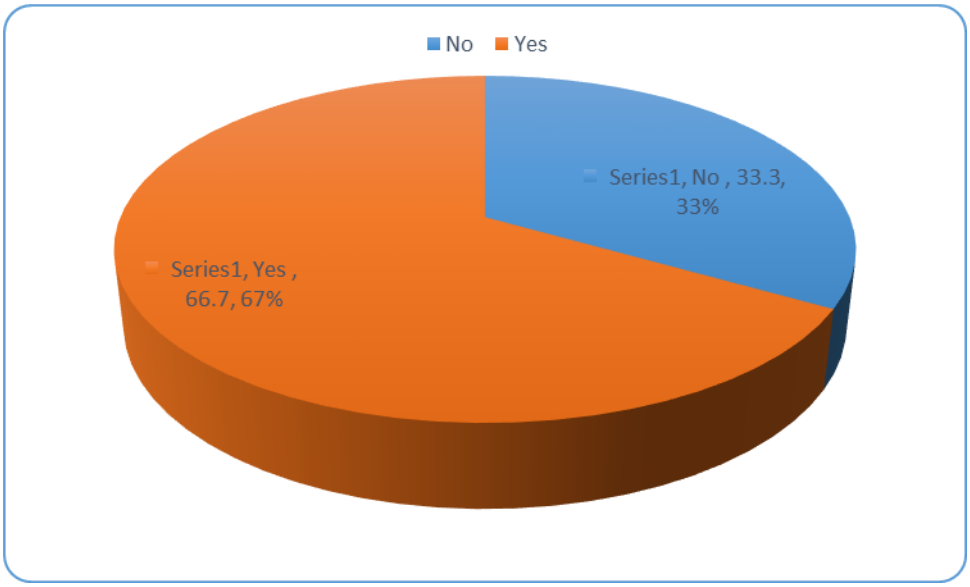

Figure 4: Existence of an IR policy

Results showed that most respondents (n=198, 67%) answered that there was a policy compared to 33% (n=99) who thought there was none.

7 Conclusion and Recommendations

The study investigated the role of IR in supporting teaching, learning and research in four selected universities in Kenya. The study revealed that IR content was dominated by

grey literature. It was also broad but not sufficiently deep. Content recruitment in the selected IRs was found to be very low. Therefore, the study recommends that the university top management should redress imbalances in deposition of materials in IRs by different departments, by instituting a framework of rewards and incentives. This may be done through a way of recognition and promotion so as to motivate academic staff and students. The university librarians, system librarians and research directors should aggressively promote and market the benefits IRs through conducting of seminars, workshops forums, conferences and meetings. They should also campaign through university official website, university social media, use of posters and notice boards to explain the benefits of IRs to students and academic staff.

University librarian in liaison with the university top management should also review and update the requirements on deposition which will mandate all academic articles produced at the university to be deposited. For instance, PhD and master's students should be a mandatory to deposit their theses or dissertations in IR with the help of the system librarians. Thus this may help to increase content in IR.

References

Adie, E. (2014). The grey literature from an altmetrics perspective-opportunity and challenges. Research Trends, 37, 23-25.

Allen, J. (2005). Interdisciplinary differences in attitudes towards deposit in institutional repositories. Retrieved from http://eprints.rclis.org/archive/00005180/

Arlitsch, K., & Grant, C. (2018). Why so many repositories? Examining the limitations and possibilities of the institutional repositories landscape. Journal of Library Administration, 58(3),264–281. doi:10.1080/01930826.2018.1436778

Casey, A. M., (2012). Does tenure matter? factors influencing faculty contributions to institutional repositories. Journal of Librarianship and Scholarly Communication 1(1).

Chapman, J., Reynolds, D., & Shreeves, S. (2009). Repository metadata: Approaches and challenges. Cataloguing& Classification Quarterly, 47, 309–325.Doi: 10.1080/01639370902735020

Chilimo, W. (2015). Green open access in Kenya: a review of the content, policies and usage ofinstitutional repositories. Mousaion, 33(3), 25-54.

Chilimo, W. (2016). Institutional repositories: Awareness and self-archiving practices of academic researchers in selected public universities in Kenya. Conference on the Open Acess Movement and the future of Africa's Knowledge Economy, Dakar, Senegal, March 30 to April 1, 2016.

Covey, D. (2011). Recruiting content for the institutional repository: The barriers exceed the benefits. University Libraries. Retrieved 10-10-2018 from http://repository.cmu.edu/lib_science

Crow, R. The case for institutional repositories: A SPARC position paper (2002).Retrievedfromwww.arl.org/sparc/IR/ir.html

Cullen, R., & Chawner, B. (2011). Institutional repositories, open access, and scholarly communication: A study of conflicting paradigms. Journal of Academic Librarianship, 37(6), 460–470. http://dx.doi.org/10.1016/j.acalib.2011.07.002

Davis, P.M., &Connolly, M.J.L. (March / April 2007).Institutional repositories: Evaluating the reasons for non-use of Cornell University's installation of DSpace.D-Lib Magazine, 13 (3/4).Retrieved from:http://www.dlib.org/dlib/march07/davis/03davis.html.

Davis-Kahl, S. (2016). Faculty self-archiving. In Callicott, B., Scherer, D. and Andrew Wesolek, A. (eds) Making Institutional Repositories Work. Charleston Insights in Library, Archival, and Information Sciences, West Lafayette, Indiana: Purdue University Press.

Dubinsky, E. (2014). A current snapshot of institutional repositories: growth rate, disciplinary content and faculty contributions. Journal of Librarianship and Scholarly Communication, 2(3), eP1167. http://dx.doi.org/10.7710/2162-3309.1167

Frieda, N. &Yule, W. (2019), "Usage and impact of the Institutional repository at the university of Namibia", Research Journal of Library and Information Science, Vol. 3 No. 4, pp. 12-20.

Fuhr, N., Hansen, P., Mabe, M., Micsik, A.,&Sølvberg, I. (2001). Digital libraries: a generic classification and evaluation scheme. Lecture Notes in ComputerScience,2163, 187-199.

Giesecke, J. (2011). "Institutional Repositories: Keys to Success" Faculty Publications, UNL Libraries. 255.

Jain, P., Bentley, G. and Oladiran, M. (2009), The Role of Institutional Repository in Digital Scholarly Communication, University, Gaborone.

Kanto, N. (2005) A project report (NII-IRP) on testing repository software platforms Retrieved, 10-10-2018 fromhttp://www.nii.ac.jp/metadata/irp/NII-IRPreport.pdf

Karanja, M. (2017). Development and management of institutional repositories in selected university libraries in Kenya. (Unpublished master's thesis). Kenyatta University, Nairobi, Kenya.

Kaur, H. (2017). Managing institutional repositories in India: Benefits and challenges. Proceedings of 79thTheIRES International Conference, Toronto, Canada, 28th-29th August 2017.

Lynch, C.A. (2003). Institutional Repositories: Essential Infrastructure for Scholarship in the Digital Age. ARL Bimonthly Report (226), 1-7.

McDowell, C. (2007) Evaluating institutional repository deployment in American academe since early 2005: repositories by the numbers, Part 2, D-Lib Magazine 13(9). Retrieved 10th July 2018 fromhttp://www.dlib.org/dlib/september07/mcdowell/09mcdowell.html

Mutula, S. (2012). Library automation in sub Saharan Africa: Case study of the University of Botswana.Program, 46(3), 292-307.https://doi.org/10.1108/00330331211244832

National Institute of Informatics. The future of institutional repositories: Seeking major advances in quantity and quality. NII Institutional Repositories Program, Phase 3 Report, March 2014.

Njagi, P. R. & Namande, B. (2018). The status of implementation of institutional repositories in selected newly established universities in Kenya. Regional Journal of Information and knowledge management, 3(1), 30-40.

Okumu, O. (2015). Adoption of institutional repositories in dissemination of scholarly information in Universities in Kenya with special reference to United States International University Africa (thesis dissertation department of library and information science, university of Nairobi)

Omeluzor, S.U. (2014) Institutional Repository (IR) Awareness and Willingness of Faculty Staff to Deposit Research Work: A Study of Faculty Staff in Selected Public and Private University in Nigeria. Open Access Library Journal, 1: e1139. http://dx.doi.org/10.4236/oalib.1101139

Poynder, R. (2006). Clear blue water. Retrieved 20th August fromhttp://poynder.blogspot.com/2006/03/institutional-repositories-and-little.html

Richardson, J., &Wolski, M. (2012). The importance of repositories in supporting the learning lifecycle. Proceedings of ICERI.

Salo, D. (2008). Innkeeper at the Roach Motel. Library Trends, 57(2), 98-123.

Saracevic, T. (2000). Digital library evaluation: toward an evolution of concepts. Library Trends, 49(2), 350-369.

Saracevic, T., & Covi, L. (2000). Challenges for digital libraryevaluation. Proceedings of the 63rd ASIS Annual Meeting, 37, 341-350

Sarker, F., Davis, H., Tiropanis, T.: A Review of Higher Education Challenges and Institutions' Data Infrastructures Response to those Challenges, International Conference of Education, Research and Innovation (ICERI2010, Madrid, Spain (accepted, 2010).

Schonfeld, R. C., & Houseright, R. (2010). Faculty survey 2009: Key strategic insights for libraries, publishers, and society. Retrieved from http://www.ithaka.org/ithaka-s-r/research/facultysurveys-2000 2009/Faculty%20Study%202009.pdf

Shreeves, S. L., & Cragin, M. H. (2009). Institutional Repositories: Current State and Future. Johns Hopkins University Press.

Shukla, P., &Ahmad, N. (2018). Impact of institutional repositories on scholarly practices of scientists. *Library Philosophy and Practice* (e-journal), 1631.https://digitalcommons.unl.edu/libphilprac/1631

SPARC (2002). SPARC Institutional Repository Checklist &Resource Guide. Retrieved 20th August 2018 fromhttp://www.arl.org/sparc/IR/IR_Guide.html#management

Talam, P. (2014). Integration and use of institutional repositories in public universities: the case of the university of Nairobi (Master's thesis, department of library and information science, university of Nairobi)

Tsunoda, H., Sun, Y., Nishizawa, M., Liu, X. (2016): A study on the academic and research impact of shared contents in institutional repositories in related to performance indicators of university rankings. Proceedings of the Association for Information Science and Technology, 53(1), 1-6 .https://doi.org/10.1002/pra2.2016.14505301084.

University of Nottingham (2008). The directory of open access repositories-OpenDOAR {online}. Available via; http//www.opendoar.org/index.html (accessed 7 February 2009).