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Addressing online information resources' access challenges: potentials of resource discovery tools' application

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This study was designed to assess the awareness and usage of a discovery tool known as LibHub among undergraduate students in their research projects' undertakings. The study involved respondents who were randomly selected from purposively chosen four degree courses in the Faculty of Agriculture at the Sokoine University Agriculture in Tanzania. Copies of semi-structured questionnaire were distributed to 200 respondents for self-administration. Of the returned copies of the questionnaire, 158 (79%) were found complete and useful for further analysis. The findings of the study indicate that majority of respondents who knew and used LibHub were those who previously attended information literacy trainings at the University as compared to those who had never attended such trainings. Respondents who acknowledged to have used LibHub in their online information search endeavours cited ability to access information from various sources using a single authentication as the major advantage of this research tool. They also pointed out that a single search interface provided by LibHub saved time they spent in searching literature. However, respondents complained of limited number of computers at the University, few wireless points for internet access, and low internet speed as hindrances for effective utilisation of the LibHub in accessing online information resources. The study recommends more institutions to consider adoption of discovery tools in fulfilling their campaigns to foster the utilisation of online information resources.

Keywords: Information literacy; LibHub; Online information resources; Resource discovery tools; Sokoine University of Agriculture

Introduction

Libraries have existed for centuries in order to serve their user information needs. Developments in information and communication technologies (ICTs) have opened opportunities as well challenges for libraries to meet information needs of their clients. On one hand, ICTs have opened a window for easing documentation, organisation and retrieval of information but on the other hand information overload brought by developments in information and communication technologies have resulted into difficulties on the part of users to access information of their choice. It is acknowledged for example that despite libraries investing heavily in modern information infrastructure and subscription to expensive electronic scholarly content, usage of such electronic resources by the expected user community is normally below the expectations[1,2]. A well resourced library is useless if its resources are not put into use to the maximum by its intended user community[3,4]. The limited utilisation of information resources have partly been attributed by information overload and unawareness on the available resources as well as limited user skills[1,5–7]. Libraries the world over have thus been struggling to ensure that their user communities exploit to the fullest the available information resources at their disposal. Various approaches such as information literacy classes to target user groups and marketing of e-resources using traditional strategies including person visits, brochures and displays as well as library websites have been used by libraries in order to improve the usage of library subscribed resources. While such strategies have been helpful but more innovative approaches are considered necessary for libraries to witness a revamp on usage information resources under the current online environment. Investment in information discovery tools is among the approaches that have been employed by libraries over the years in an attempt to improve accessibility and usage of information resources by their user community.

The Sokoine University of Agriculture, based in Tanzania is among few institutions from East African countries implementing a resource discovery tools known as LibHub. This study was designed to assess the awareness and usage of LibHub among undergraduate students in their research projects' undertakings.

Objectives of the study

- To find out the awareness of LibHub among undergraduate students;
- To find out the extent of LibHub usage by undergraduate students;
- To determine factors behind the motivation of LibHub usage by the undergraduate students; and
- To find out mechanisms to enhance the adoption of LibHub across the university community.

Literature review

Traditionally, card catalogues were used as key information discovery tools but later as technology improved, libraries migrated to Online Public Catalogues (OPACs) in an attempt to improve the discovery of information resources held in library collections. OPACs offered many ways of discovering information resources held in libraries than traditional card catalogues[8]. However, due to technology advancement, the internet brought more opportunities of information discovery than OPACs could offer. In order to remain relevant to the user communities, libraries had to move another step by migration of their OPACs into the so called federated search tools or meta-search engines. Federated search engines allows users to concurrently search information resources held in their local libraries as well as from other external databases subscribed by their libraries[6,9,10]. Discovering information resources from various sources using a single search interface was considered as an important progress for making libraries to remain relevant to their users. However, the evolution of the internet coupled with the development of search engines like Google which further eased discovery of information content by scholars much easier brought additional challenges to libraries. Indeed, federated search engines failed to compete with smart search engines such as Google and Google scholar for reasons including usage difficulties, slow speed, duplicate of results as well as poor ranking of retrieved results[6,9,11]. This is probably the reason why Google remain the first stop centre for many information seekers. Several studies show that Google preference by many scholars is due to its user friendliness[1,6,7,9,10,12,13]. For many users ease and quick finding of information is more important than quality and reliability of information[6]. This view is also supported by Bhat[1] (p. 534) who opined that most users are trapped into the "Law of Least Effort" and thus use Google in their information search at the expense of costly scholarly databases. Libraries should thus continue embracing Ranganathan's fourth law which insist on "saving the time of the reader," by designing proper information resources discovery tools ensure high quality library resources are effectively utilised to justify expenditure of tax payers money. Indeed, libraries are recommended to follow the Google approach of changing its information discovery approach in order to match with user information seeking behaviour[7]. It is for this reason that many libraries are currently implementing the so called Web-scale discovery services or simply discovery tools (WSDSs), which provide unified resource discovery functionality in the style of Google as an improvement from federated search engines[3,5,7,14–16] . According to Zhang and Chen[17], these tools are designed to be "one-stop" search platform for a wide range of library collections and resources. Simply defined, web-scale discovery tools or simply "discovery tools" as used in this study, are web-based applications that search in a unified index of metadata from article databases, library catalogues, digital repositories, digital collections, and other scholarly information resources (free and subscribed)[5,7,17]. According to Way[5] (p. 214), "unlike federated search tools which search across a limited number of individual resources simultaneously, these web-scale resources pre-harvest content into one single index, allowing users to search across a greater amount of content". Contrary to federated search engines, web-scale discovered tools are considered superior in terms: ease of use, speed, ranking of search results, search across many sources as well as avoid duplicates of search results[6,8]. Should web-scale discovery tools compete with Google and Google scholar in terms of user friendliness, then chances are many users would go for the former due to the fact

that the later tools do not guarantee access to full-text. Some of the common web-discovery tools in use by many libraries include: EBSCO Discovery Service (EDS), ExLibris' Primo Central Index, and OCLC's WorldCat Local, and Serial Solutions' Summon Service (commercial sources) and VuFind, Blacklight, and eXtensible (open sources).

Studies on discovery tools have attracted the attention of many authors in recent years. The attention of many of these studies has been on usability tests of single or multiple discovery tools[8,11,12,15,18,19]. Evident from such studies is that different discovery tools offer a variety technical capabilities and features making it necessary for libraries wishing to implement such technologies to invest adequate time of studying the tools in question for proper choice. Some other studies attempted to assess the effect of discovery tools on usage of library and other online information resources[3,5,12]. These studies reveal that web discovery tools adoption result into improved usage of libraries' subscribed information resources. It is however evident from the documented literature that few (if any) of studies have examined library patrons' awareness and usage of web discovery tools.

Methodology

This study was conducted at Sokoine university of Agriculture (SUA) which was chosen because it was a pioneer of introducing and using LibHub in Tanzania. The study targeted 200 respondents from a population of 357 third year undergraduate students from four among the eight degree programmes which had the Information and Communication Management (CIT 300) in their lists of elective courses during 2014/2015 academic year. The four main campus based degree programmes namely: Bachelor of Science (BSc.) in Agricultural General, Bachelor of Science (BSc.) in Animal Science, Bachelor of Science (BSc.) in Food Science and Technology, and Bachelor of Science (BSc.) in Aquaculture were purposively selected for the study as they had proportionally a large number of students who opted to study the CIT 300 course which had a component of information literacy training. The systematic random sampling approach was used to select 200 respondents from existing degree programme students' lists by ensuring inclusion of 50 students from each group. The self-administered semi-structured questionnaire was employed to collect data from the selected respondents. From the distributed copies of questionnaire, 163 copies were returned of which 158 were found useful for further analysis. The response rate was thus 79% which is considered more than adequate. According to Brian, Evans and Demark-Wahnefried[20] the standard and acceptable response rate for most surveys is 60%. Data was analysed using the Statistical Package of Social Sciences (SPSS) version 16. The following section presents and discusses the emerging study findings.

Results and discussion

This section presents and discusses the findings of the study. Respondents' biographic details are presented before the detailed study findings. Study findings are presented and discussed basing on thematic topics derived from the study objectives. Key conclusions and recommendations of the study are presented lastly.

Respondents' profile

Respondents' background information is presented in Table 1. It is observed that respondents from BSc. Agricultural general had the overall highest response rate (27.8%) while those from BSc. Animal science were least represented (19%). Respondents from BSc. in Food Science and Technology predominated CIT 300 course subscribers. This scenario seems to have happened by chance since respondents were selected blindly regardless of whether or not they were CIT 300 course subscribers. It can also be noted that in terms of respondents' distribution by sex, there were more males (55.1%) than females (44.9%). The variation in the distribution of respondents by sex is partly attributed by high admission of male than female students in high learning institutions in Tanzania. The largest group of the respondents (62.6%) were aged between 19-25 years as compared to those aged above 30 years. This situation is also due to the fact majority of students who join higher learning institutions are those from advanced level secondary schools commonly at 19 years of age implying that by their final year of their undergraduate degree they are not expected to be aged above 25 years.

Awareness of LibHub

Users have a variety of options including LibHub to access online information resources while at the Sokoine University of Agriculture premises. Researchers were interested to know the extent of users' awareness of LibHub in accessing online scholarly content. From among 158 respondents, 85 (53.8%) from CIT 300 subscribers indicated to be aware of the LibHub as compared to 40 (25.3%) non CIT subscribers who also claimed of being aware of the discovery tool in question. A significant percentage of the respondents (19.9%) from non CIT 300 subscribers acknowledged of not being aware of LibHub in comparison to only 1.3% of the CIT subscribers. Respondents were further requested to indicate sources through which they became aware of LibHub. Table 2 present results from such an investigation. Results indicate that instructors were the main source for LibHub awareness by majority of the respondents (60%), followed by friends (20%), librarians (18.4%), website (12.8%) and lastly, notice boards (8%). These results suggest that instructors significantly contributed in making students aware of LibHub. It can also be noted that respondents from both categories (subscribers and non CIT 300) also pointed out instructors as their main source for Libhub awareness. A study by Kwadzo[21] reported similar results revealing instructors as the main source of information for students awareness of online information resources. Therefore, well informed instructors on the available e-resources may have an impact on students' awareness and possibly usage of online information resources.

Usage of LibHub in information access

Researchers were also interested to find out whether or not the respondents were using LibHub as their information search tool. The study revealed that among 156 respondents to this question, 60 (38.5%) and 15 (9.6%) of the respondents from CIT 300 subscribers and non subscribers respectively reported to use LibHub as their information search tool. These results are comparable to 25 (16%) and 56 (35.9%) of non LibHub users from the two groups of the respondents respectively. These results suggest that information literacy training that was conducted through CIT 300 had some impact on usage of e-resources through LibHub. Indeed, LibHub usage

Table 1—Respondents' profile (N = 158)

Variables	CIT 300 subscribers	Non CIT 300 subscribers	Total
	Freq. (%)	Freq. (%)	Freq. (%)
BSc. Agriculture General	21(13.3)	23 (14.5)	44 (27.8%)
BSc. Animal Science	17 (10.8)	13 (8.2)	30 (19%)
BSc. Aquaculture	15 (9.5)	24 (15.2)	39 (24.7)
BSc. Food Science and Technology	31 (19.6)	11 (7)	42 (26.6%)
Sex			
Male	63 (39.9)	24 (15.2)	87 (55.1%)
Female	40 (25.3)	31 (19.6)	71 (44.9%)
Age of respondents			
19-25 Years	59 (37.3)	40 (25.3)	99 (62.6%)
26-30 Years	18 (11.4)	23 (14.6)	41 (26%)
Above 30 Years	8 (5.1)	10 (6.3)	18 (11.4%)

Table 2—Sources for LibHub awareness (N =125]

Source	CIT 300 subscribers	Non CIT 300 subscribers	Total
	Freq. (%)	Freq. (%)	Freq. (%)
Friends	12 (9.6)	13 (10.4)	25 (20)
Librarians	17 (13.6)	6 (4.8)	23 (18.4)
Web site	11 (8.8)	5 (4)	16 (12.8)
Instructors	60 (48)	15 (12)	75 (60)
Notes board	3 (2.4)	7 (5.6)	10 (8)

Table 3—Information search strategies used by undergraduate students (N = 158]

Search strategy	CIT 300 subscribers	Non CIT 300 subscribers	Total
	Freq. (%)	Freq. (%)	Freq. (%)
Keyword searching	64 (40.5)	66 (41.7)	130 (82.3)
Phrase searching	43 (27.7)	37 (23.4)	80 (50.6)
Boolean searching	36 (22.7)	15 (9.5)	51 (32.5)
Field searching (Author, title)	33 (20.9)	32 (20.2)	65 (41.1)

statistics normally rise up soon after training[22]. It is also noted that LibHub usage was a bit low as compared to its awareness among the respondents. This is not strange as other studies have reported low usage of e-resources despite high user awareness[21,23]. According to Kwadzo[21] for example, the study established that despite 96.9% of the respondents having found to be aware of the available online information resources, 93.80% of them actually used such information resources. There is also a high likelihood that most of the LibHub non users were those who were not aware of the existence the discovery tool in question. More campaigns aimed at raising the availability and importance LibHub among the university community is thus necessary. A similar view is was shared by Manda[24] who emphasised the need for libraries to improve their marketing strategies if usage is to be increased, and to address the disparity between students and academics.

Information search strategies commonly used by undergraduate students

An assessment was done to establish how the respondents approached their information search endeavours using various online tools including Libhub. This kind of investigation was considered important in order to determine whether or not students were able to access online information effectively. Results from this investigation are reported in Table 3. Results reveal that majority of the respondents (82.3%) used keyword search strategy in discovering information of their choice. It is also observed from Table 3 that Boolean search strategy was a least used approach mostly by non CIT 300 subscribers. Overall, CIT 300 course subscribers seemed to have more advanced information search skills than non subscribers of the course in question. It is probably based on similar understanding that several studies recommended the need for information literacy for undergraduate students to fully utilize online resources[19,21,23,25–27].

Perceived LibHub usefulness

An assessment was also made to establish how the respondents perceived Libhub usefulness. As it can be noted from Table 4, research findings reveals that the majority of the respondents (47.5%) considered a single search interface for discovery of information resources from several online databases a key selling point for LibHub. Other respondents (42.3%) pointed out that LibHub made it easy for them to obtain literature. Equally important, a significant percentage of the respondents (37.3%) viewed time saving in literature search as another credit to LibHub. The possibility of accessing the University's subscribed online information from remote locations (outside the University Local Area Network) followed by LibHub being accessible without user credentials within university localities were the other benefits of the discovery tool in question. Furthermore, LibHub user friendliness as well as the need for only single user credential to access literature from across several sources are other selling points of LibHub that were cited by the respondents. An insignificant percentage of the respondents (8.1%) viewed the ability of saving search results and reliability and focused search results as the other advantages of using LibHub. The overall results suggest that CIT 300 course subscribers viewed LibHub more beneficial as compared to non subscribers of the course in question. This is logical since individuals can realise benefits from something they have put into practice than otherwise. The mentioned LibHub benefits are in line with those reported from other discovery tools in several studies[4,6,9,10,14,15,17,18,28,29].

Challenges and measures to improve accessibility to online information resources

Researchers considered equally important to request the respondents mention challenges (if any) they faced in accessing online information resources. The respondents were also required to propose

Table 4—Perceived LibHub usefulness (N = 158)

Perceived usefulness	CIT 300 subscribers	Non CIT 300 subscribers	Total
	Freq. (%)	Freq. (%)	Freq. (%)
LibHub links information users with several sites or databases in a single search box	46 (29.1)	29 (18.4)	75 (47.5)
LibHub enables ease availability of relevant literature for studying	50 (31.6)	17 (10.7)	67 (42.3)
LibHub save time because there is no need to open many sites for information search	39 (24.6)	20 (12.7)	59 (37.3)
Users can access Libhub anywhere [remotely] as long as they has a SUASIS Account	37 (23.4)	13 (8.2)	50 (31.6)
No need for user credentials to access online information through LibHub using SUA LAN	22 (13.9)	7 (4.4)	29 (18.3)
Libhub is simple to search [User friendly search interface]	10 (13.3)	4 (5.3)	14 (18.6)
A single user name and password is required to access several databases through LibHub	19 (12)	9 (5.7)	28 (17.7)
Through LibHub it is possible to save documents in to Kiox for future use	8 (5.5)	4 (2.5)	12 (8.1)
LibHub is reliable and gives more focused search results [few hits per search]	8 (5.5)	4 (2.5)	12 (8.1)

Table 5—Measures for online information resources' access and usage at SUA (N = 158)

Recommendation	CIT 300 subscribers	Non CIT 300 subscribers	Total
	Freq. (%)	Freq. (%)	Freq. (%)
SNAL Management should provide/ conduct training on how to use Libhub to all students	25 (15.8)	44 (27.8)	69 (43.6)
SUA Management should improve internet and wireless accessibility	23 (14.6)	15 (9.4)	38 (24)
Provision of enough computers	15 (9.4)	8 (5.1)	23 (14.5)
CIT 300 course should be a core course to all students	8 (5.1)	9 (5.6)	17 (10.7)
Ensuring power supply	5 (3.2)	6 (3.7)	11 (6.9)

measures that would improve the accessibility of online scholarly information at the University. Among the 158 respondents, 49% cited unreliable power supply, 46% slow internet connectivity, 34% inadequate information search skills and shortage of computers as the main challenges they faced in accessing online information resources at the Sokoine University of Agriculture. The issue of inadequate information searching resources or information literacy is also supported by Dadzie[30] who assessed the readiness of Ghanaian universities. This author also identified a number of problems that can hinder the implementation of information literacy programs such as inadequate technological infrastructure/ computers, inadequate electronic resources and inadequate human resources. These challenges were also echoes by other researchers including Kinengyere[23] and Sinha[27] implying that such problems are common to most of the developing countries.

Some of the proposed measures to overcome the cited challenges are presented in Table 5. It can be noted from Table 5 that the majority of the respondents (43.6%) considered it important for the

library management to training on LibHub usage to all students. Internet connection improvement including provision of wireless accessibility was another recommendation supported by 24% of the respondents. Provision of enough computers, making CIT 300 a core course to all undergraduate students, and ensuring stable power supply were the other recommendations provided in order priority by the respondents in order online information access and usage at the University.

Conclusion and recommendations

While the introduction of web-scale discovery tools have a potential of improving access and utilisation of online information resources, concerted efforts are required by libraries for adoption of such facilities by their indented user communities. The findings from this study revealed unexpectedly low usage of LibHub despite the students' awareness on the availability of the discovery tool in question. Apart from improving the discovery of the available content, other factors such as supportive information technology infrastructure as well as good levels of information literacy of users are important for effective exploitation of discovery tools. Moreover, infrastructure and training, programmes are essential for better use of electronic resources university-wide.

Based on the finding, this study thus recommends as follow:

- Apart from acquiring web resources discovery tools, universities and other research centres from developing countries should ensure that there are sufficient networked computers with fast Internet connectivity and power supply. This will ensure the faster internet access and usage of discovery tools.
- Universities and research institutions should adequately invest on information literacy skills targeted to all user communities for effective usage of the discovery tools. Without this, it is as good of having a technology without people. This will go a long way in increasing the knowledge level of the learners regarding the use of electronic resources.
- Unless instructors are aware and use discovery tools it is unlikely that they will direct their students to use such tools. It is thus important for libraries to ensure instructors are considered as primary target of their discovery tools awareness creation campaigns
- A study based on citation analysis to establish information use pattern among subscribers and non subscribers of information literacy programme is recommended as a follow up to verify self-reported results of this research.

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