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ORIGINAL

The use of open-source software by library users in some private universities in Ghana

El uso de software de código abierto por parte de los usuarios de las bibliotecas de algunas universidades privadas de Ghana

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ABSTRACT

Introduction: this study explores the use of open-source software (OSS) by library users at Pentecost University (PU) and Central University (CU) with a focus on the ease of use, and barriers encountered. This study adopted the Technology Acceptance Model (TAM) as its framework.
Method: a descriptive survey design was employed and targeting registered undergraduate library users at both institutions.
Result: 134 PU library users (88,2 %) indicated that unstable internet connectivity on campus is a significant barrier to using open-source software in the Pentecost University library.
Concerning library users in Central University (CU), 120 respondents (90,2 %) indicated that the lack of support and training is a significant barrier hindering the use of open-source software in the Central University library.
Conclusion: the study identified a divergence in the frequency of use, with CU users engaging with open-source software daily, while PU users employed it several times a week. Both CU and PU users found open-source software easy to use and interact with, contributing to a positive user experience. User-friendliness emerged as a critical factor influencing the extent of open-source software adoption. The study identified barriers that impede the effective use of open-source software, including unreliable internet connectivity at PU and inadequate resources in support and training at CU. Hence, the library administration should adopt strategies and regulations to address the difficulties faced when utilising Open-Source Software, such as providing guidance, assistance, and instructional resources.

Keywords: Open-Source Software; Library Users; Private Universities; Automation; Academic library; Ghana.

RESUMEN

Introducción: este estudio explora el uso de software de código abierto (OSS) por parte de los usuarios de las bibliotecas de la Universidad Pentecostés (PU) y la Universidad Central (CU), centrándose en la facilidad de uso y las barreras encontradas. Este estudio adoptó como marco el Modelo de Aceptación de la Tecnología (TAM).
Método: se empleó un diseño de encuesta descriptiva dirigida a los usuarios registrados de las bibliotecas universitarias de ambas instituciones.
Resultado: 134 usuarios de la biblioteca de la UP (88,2 %) indicaron que la inestable conectividad a Internet en el campus es una barrera significativa para el uso de software de código abierto en la biblioteca de la Universidad de Pentecostés.

En cuanto a los usuarios de la biblioteca de la Universidad Central (UC), 120 encuestados (90,2 %) indicaron que la falta de apoyo y formación es una barrera significativa que dificulta el uso de software de código abierto en la biblioteca de la Universidad Central.
Conclusión: el estudio identificó una divergencia en la frecuencia de uso, ya que los usuarios de la UC utilizan el software de código abierto a diario, mientras que los usuarios de la UP lo emplean varias veces a la semana. Tanto los usuarios de la UC como los de la UP consideran que el software libre es fácil de usar y de interactuar con él, lo que contribuye a una experiencia de usuario positiva. La facilidad de uso se reveló como un factor crítico que influye en el grado de adopción del software de código abierto. El estudio identificó barreras que impiden el uso eficaz del software de código abierto, como la conectividad poco fiable a Internet en la UP y los recursos inadecuados de apoyo y formación en la UC. Por lo tanto, la administración de la biblioteca debería adoptar estrategias y normativas para abordar las dificultades a las que se enfrenta la utilización del software de código abierto, como proporcionar orientación, asistencia y recursos de formación.

Palabras clave: Software de código abierto; Usuarios de bibliotecas; Universidades privadas; Automatización; Biblioteca académica; Ghana.

INTRODUCTION

Academic libraries stand as integral elements within higher education institutions, furnishing vital academic resources essential for teaching and learning.[1,2,3] These libraries offer facilities that enable students and faculty to actively participate in research endeavors, fostering the expansion of their knowledge across various disciplines. Historically, library services and collections functioned without the reliance on Information and Communication Technology (ICT) tools and equipment. However, the current scenario has witnessed a transformation in this regard.[4,5,6,7,8] Consequently, libraries have transitioned from delivering conventional lending services to providing modern information services. The incorporation of Information and Communication Technology (ICT) into library operations has brought about a profound transformation in the execution of library services in the 21st century.[9,10,11] Presently, the internet, electronic resources, and computer software have significantly improved information services.[12,13,14] As a result, the pervasive technological changes have significantly influenced nearly all aspects of library operations, encompassing functions like acquisition, processing, maintenance, and dissemination. Academic libraries are increasingly required to adjust to these changes, aiming to fulfil the changing information requirements of the scholarly community in a way that is both effective and efficient.[15,16,17,18]

Open-Source Software (OSS) has garnered considerable popularity in recent times because of its various benefits in comparison to proprietary software.[19,20,21,22,23,24,25,26] As per the definition provided by Reddy and Kumar,[4] OSS refers to computer software with freely accessible source code under a license that allows users to modify, distribute, and study the code. A key advantage of open-source software lies in its capacity to promote collaboration and stimulate innovation.[27,28,29,30] With the source code freely accessible, developers from around the world can collaborate and contribute to the software's development. This collaborative approach often results in faster development cycles, improved software quality, and enhanced security.[31,32,33,34,35,36,37] Another advantage of OSS is its cost-effectiveness. Unlike proprietary software, OSS typically does not entail licensing fees.[6] Users possess the autonomy to alter and disseminate the software without incurring any supplementary expenses. This feature is especially beneficial for libraries that have limited financial resources for software and technology.[38,39,40,41] OSS offers notable advantages in terms of flexibility and customisation. Users can customise the software to meet their specific requirements by modifying the source code. The level of customisation offered is extremely valuable for libraries that have distinct requirements or specific workflows.[42,43,44,45,46] The widespread recognition of Open Source Software (OSS) within libraries is attributed to technological advancements and the challenges associated with integrating traditional and evolving formats, as noted by Amekuedee.[7] The simultaneous existence and growth of open-source software (OSS) in tandem with the rapid progress in web technologies present significant prospects for library professionals. Open-source software (OSS) is easily available for download, and its source code can be acquired without any financial expenditure.[47,48,49,50] This provides the opportunity to save money and decrease dependence on software that is owned by a specific company. Given this context, it is imperative to explore the primary classifications of open-source software (OSS) implemented in academic libraries in Ghana.[51,52,53,54,55] As highlighted by Ray and Ramesh, the significance of open-source software (OSS) lies in its simplicity and its ability to seamlessly integrate with other systems. Notable examples of open-source software (OSS) employed in the library domain include Koha, Greenstone Digital Library (GSDL), Open Journal System (OJS), and DuraSpace (D-space). Therefore, conducting a comprehensive investigation is crucial to evaluate the utilization of Open-Source Software (OSS)

in academic libraries.[8,56,57,58,59,60]

Open Source Software is not widely adopted in many educational institutions throughout Africa, including Ghana. The inadequate utilization of library software can be ascribed to inadequate funding, restricted adoption of cutting-edge technology, a dearth of expertise among library personnel, and irregular power supply.[9] Numerous research endeavors[10,11,12,61,62,63] have examined the usage of open-source software by library users in public academic institutions. However, there is a dearth of research that specifically concentrates on private academic institutions. The emergence of technology has resulted in a substantial shift in the notion of libraries, moving from a primary focus on physical collections to the facilitation of information access. While print collections are still maintained, academic libraries are progressively replacing them with electronic collections due to the numerous advantages they offer. The shift depends significantly on the crucial role played by open-source software (OSS).[64,65] Open-source software (OSS) offers a multitude of advantages, such as easy retrieval of information, efficient storage and organization, cost-effective access to vast amounts of information, efficient distribution of information, seamless updates, strong search capabilities, portability, and the ability to handle large amounts of data. These advantages, as highlighted by researchers such as,[13,14,15,16,17,66,67] contribute to the increasing adoption of OSS in academic libraries and its role in reshaping the library concept from physical repositories to platforms for accessible information.

Academic libraries dedicate substantial resources to cover storage fees and to promote open-source software, to inform and encourage users to utilise it. Hence, library patrons need to possess competence in and effectively employ the open-source software offered by the library to fulfil their information needs. By doing so, the library can optimise the return on its investment in these resources. Studies conducted by[18], and[19] emphasize the importance of user engagement with library open-source software to reap the benefits of these investments. Although open-source software offers numerous benefits for academic libraries, there has been a lack of focus on its utilisation by library users in private universities. Thus, the objective of this research was to find out the perceived ease of use of open-source software and the challenges that impede library users at Pentecost and Central University from using open-source software.

The study was significant for university administrators as it aims to shed light on organizational inefficiencies that impede the seamless utilization of open-source software in private academic libraries. This study aims to fill the lack of literature regarding the utilisation of open-source software in private academic libraries.

METHOD

The study utilized a descriptive survey research design. The researcher chose a descriptive survey as the appropriate methodology for this study, as it allowed for a precise depiction of the utilisation of open-source software by library users in private universities in Ghana. Turkson proposes that quantitative research methods can be employed by researchers when conducting a descriptive survey.[20]Therefore, questionnaires were utilized to collect data for this study. The study specifically targeted the library users of Pentecost and Central University Library (Miotso Campus). The rationale for choosing this specific population is the shared characteristic of being privately-owned academic libraries, namely Pentecost and Central University, which have both adopted open-source software for resource management. The number of undergraduate students at the two universities is as follows: PU (609) and CU (531), resulting in a combined total of 1140. In the context of this specific research, given constraints related to time and available resources, the researcher chose twenty-five percent (25 %) of the population for sample size based on Nwana's[21] as cited in Kuranchie[22] assertion that a population of few thousand, 25 % sample size is chosen from the target population.[23] Therefore, the sample size for the students was 285. The researcher utilised the simple random sampling technique to choose the participants. A questionnaire was chosen as a method to optimise efficiency and minimise expenses, given the substantial number of respondents.[24] The questionnaire was formulated in alignment with the study's objectives. The quantitative data collected were analysed using the Statistical Package for Social Sciences (SPSS) version 25.0 through statistical analysis. The findings were presented using various statistical measures such as frequencies, percentages, tables, and bar charts. The factors were ranked to identify the factors that library users in both institutions consider as most important to those they consider as least important. To do this, the data was analyzed using the Friedman test. The test is used when the intention is to arrange several variables based on their importance or rank.

RESULTS

Perceived Ease of Use of Open Source Software by Library Users

The first objective of the study is to determine the perceived ease of using open-source software by library users in PU and CU. The findings of the study indicate that library users in the two institutions reported that the open-source software in the library is highly user-friendly. According to the study, library users of the two institutions libraries identified "user-friendly" as the most significant attribute of open-source software in the library. The perception of open-source software as user-friendly and engaging by library patrons suggests that

it enhances their overall user satisfaction.

This finding aligns with the research conducted by Dei et al. which demonstrated that the user-friendliness of a software or programme significantly influences its adoption rate. Regarding the Technology Acceptance Model (TAM), if a system is user-friendly, there is a likelihood that users will utilise it more frequently. Similarly, if the open-source software (OSS) utilised by library management is easy to use, its usage will probably expand. [25]

Table 1. Friedman Test Ranks

Ease of use	PU N=152 Mean rank	CU N=133 Mean rank	X^2	Degrees of Freedom	Significance
The open-source software available in the library is designed to be easily used by individuals.	2,87	2,27	6,9570	3	0,0000
The use of the OPAC (online catalogue) is easy.	2,40	2,23	4,9109	3	0,0004
Accessing information from the institutional repository is easy.	2,02	2,58	2,9202	3	0,0000
The library open source software provides adequate information on what I need	2,17	2,20	7,5897	3	0,0003
The open-source software available in the library is designed to be easily used by individuals.	2,23	2,01	3,2848	3	0,0101

Major Barriers to the Use of Open-Source Software

Every software has unique limitations that need to be resolved to ensure maximum efficiency and effectiveness. Table 2 outlines the barriers that hinder the use of open-source software among library users in Pentecost and Central University. As shown in table 2, 134 PU library users (88,2 %) indicated that unstable internet connectivity on campus is a significant barrier to using open-source software in the Pentecost University library.

Concerning library users in Central University (CU), 120 respondents (90,2 %) indicated that the lack of support and training is a significant barrier hindering the use of open-source software in the Central University library. The study found that among library users at CU, the primary obstacle impeding their use of open-source software is the absence of support and training. This means that users at CU Library encounter challenges related to receiving the necessary assistance and training needed to effectively use open-source software in their library activities. This corresponds with the results of Okewale and Adetimirin's (2011) study, which emphasised the diverse obstacles encountered by libraries when adopting open-source software and other technologies, such as poor internet connectivity. Nevertheless, the results of the study conducted by Ncube (2015) corroborated the fact that most students dedicate over 18 hours per week to internet usage. This implies that library users tend to postpone information retrieval and the utilisation of open-source software for different purposes.

Table 2. Barriers to the Use of Open-Source Software

Barriers	PU N=152		CU N=133		Total N=285	
	no	%	no	%	no	%
Unstable internet connectivity	134	88,2	117	88,0	251	88,1
Lack of support and training	132	86,8	120	89,5	252	88,4
Lack of time	131	86,2	114	85,7	245	86,0
I lack searching skills	125	82,2	97	72,9	222	77,9
Lack of supervision	119	78,3	51	38,3	170	59,6
Lack of Technical Support	111	73,0	30	22,6	141	49,5
Unstable power supply	105	69,1	12	9,0	117	41,1
Lack of user-friendly interfaces	7	6,7	2	1,5	9	3,2

*Multiple-choice responses

CONCLUSION

Library users in both institutions found open-source software easy to use and interact with, contributing to a positive user experience. The level of open-source software use is significantly influenced by user-friendly. The library users in PU reported that unstable internet connectivity was a significant challenge. Furthermore,

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library users in CU commonly encountered the challenge of insufficient support and training when utilising open-source software. Nevertheless, the results also indicated that inadequate oversight, insufficient technical assistance, and limited ongoing training on the utilisation of the open-source software (OSS) were the minor obstacles impeding library users in both establishments. Failure to address these challenges will prevent library users in both institutions from fully capitalising on the advantages of utilising open-source software in libraries.

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CONFLICT OF INTEREST

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