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The Pros and Cons of Library Automation in a Resource Challenged Environment: A Case Study of KNUST Library

Henry Boateng
University of Ghana, kofihenry17@gmail.com

Franklin Gyamfi Agyemang

Michael Dzigbordi Dzandu

Abstract

The study sought to ascertain the challenges and benefits of library automation and to recommend how the challenges could be addressed. The study employed single case study techniques as the research design. Semi-structured interview was used for the data gathering. Data was qualitatively analysed using a thematic approach.It highlights retrospective conversion, lack of local experts, lack of trained staffs, unstable power supply, desert of job, attitudinal problems as the challenges confronting the library. The study also shows that as a result of automation, the library is faster and efficient than before in its operations.

Keywords: Library automation, KNUST, Library financing, Challenges

Introduction

The evolution of Information, Communication and Technology (ICT) has course a paradigm shift in every facet of life. Most organizations both public and private have adopted ICT in their operations. Libraries have also embraced the technology to manage, and deliver prompt information to their clients. According to Mohammed (2006), the inadequacy of traditional library services and tools in coping with the detailed requirements of identifying information pertinent to a given problem has forced libraries to automate their functional service areas. Against this background, Raiz (1992) observes that heavy influx of document added new dimension to users' need. It is ICT which can ensure improved and quick service. For example, the manual work of housekeeping such as acquisition, cataloguing, circulation, serial control, etc. can be done with greater speed and efficiency with no arrears or backlog kept pending (Raiz 1992). He argues that various factors have contributed to bringing change from conventional to automate library operations. Broadly speaking, the main reasons behind this change are: growth

of document and new dimension of user's needs. Suku and Mini (2005) observe that the factors necessitating automation of university libraries as explosion of knowledge resulting in numerous specializations and flow of almost non-stop information; inability of users to explore unlimited literature; wastage of enormous precious time in handling routine and repetitive library operations; even the largest of the libraries cannot acquire and make available the entire published materials; and to facilitate easy, fast, and reliable sharing of resources between libraries, cutting across space and time. Rajput and Jain, (2006) argue that the justification for library automation must be logical and convincing. Notwithstanding, automated libraries faces a lot of challenges which may range from inadequate experts to power fluctuations. These challenges must be identified and address accordingly. However, the issue has received very little attention from scholars. Thus there is paucity of literature on the subject especially in the developing world like Ghana (Amekuedee, 2005; Manuh and Budu, 2007; Ahenkorah-Marfo, and Borteye, 2010). Elsewhere studies have been conducted (eg. Adogbeji and Adomi, 2005; Nok, 2006; Neelakandan et al., 2010; Mutala, 2012). Most of these studies have adopted a quantitative approach. It will be prudent therefore to study the issue from a qualitative approach in order to have a detailed insight into the benefits and challenges of automation and how they can be addressed. It is in this regard that this study seeks to build on the extant literature by identifying the challenges of library automation at KNUST and provide recommendation as to how these challenges can be addressed. The rest of the study is divided into four sections. Section one reviews pertinent literature on the subject while section two focuses on the methodology employed. Section three presents the findings and discussions and the last section provides some recommendations.

AUTOMATION AND AUTOMATION PRIORITIES IN LIBRARIES

Library automation may be defined as the application of ICT in the day to day operations of the library. Jayaprakash and Balasubramani, (2011) note that most of the libraries, in initial stage of their computerization, assign priorities on library house-keeping activities, as these activities are most rudimentary to make the foundation of automation stronger and the success of other advanced services depends heavily upon these activities. Rao (1995) states that depending on the type of library, all or some of these library housekeeping operations may be computerized according to their priority. Circulation control may be given first priority in a public library while serials control may be given a top priority in a special library. Similarly, acquisition may be computerized first in a university library. However, cataloguing is important for any library and its computerization must be one of the ultimate aims of the automation programme**.** In contrast, Amekuedee (2005) argues that the cataloguing operation is the first library housekeeping operations to be automated when a library decides to automate. Saffady (1989) on the other hand claims that the circulation control is one of the most widely automated library housekeeping operations, and it is often the first and simplest activity to be automated in a given library, possibly because circulation control systems bear an obvious resemblance to inventory management, retail charge card operations, and other transaction processing activities which have been successfully automated in general business applications. Sahu, et al. (2005) point out that those library operations should be automated in order of priority. However, in prioritizing the library housekeeping operations, processes that are repetitive, occupy large amounts of staff time, require retrieving information from large, unwieldy files, or are high-profile functions should be prime in automation for example public catalogue. Mutala (2012) states that cataloguing and acquisition are the two modules which are labour intensive. In addition,

cataloguing forms the foundation of any bibliographic record, while acquisitions require highly accurate records for purchasing purposes. As a result, the two must be prioritized when automating a library. Given these diverse opinions librarians should be cognizant and plain with their priority concerns and reasons for automating, as this would help them opt for or design a system that supports their priority operations and make an effective use of frequently scarce funding.

Automation in Housekeeping Operations

Library services are divided into two categories: library housekeeping routines and information retrieval. Housekeeping routines include acquisition, cataloguing, circulation and serials control (Ayub and Ghazanfa, 1994; Raiz 1991). All housekeeping operations such as; acquisition, cataloguing, circulation, and serial control of the library can be automated (Khalid, 1991; Raiz, 1991; Bhanja and Barik, 2009). Automation can be applied profitably in the following library housekeeping operations; acquisition, classification, cataloguing, stock-taking, serial control and circulation (Rajput and Gautam 2010). However Rao (1995) and Neelakandan et al., (2010) observe that the most commonly known housekeeping operations which can be automated are acquisition, serials management, cataloguing and circulation. In order to improve efficiency of library housekeeping operations Veer, et al., (2010) note that library should be automated in the following manner; automated acquisition system, automated cataloguing system, automated circulation system and automated serial control system. Acquisition of library materials is an essential library task which can be computerized. Khalid (1991) states that selection of material, bibliographic verification, ordering, budgeting and file management in the acquisition process can be computerized. The primary objectives of automating the acquisition process according to Rao (1995) are likely to be towards cost containment, speeding up of the receipt of materials,

improving fund control and developing single function systems into integrated systems. Manual acquisitions operations are labour and paper – intensive, slow, and usually produce only a limited amount of management information. Devi and Haritha, (2010) recognize this position with the assertion that 'the primary motive to automated acquisitions, therefore, appear to be the hope of realizing cost containment, materials receipt monitoring, improving budget control, and expanding function systems into integrated system'. Kochar and sudarshan (2007) share this in asserting that most automated library acquisition systems are designed to handle the considerable amount of paper work involved in buying books. Peyala (2011) asserts that the computerization of acquisition unit enhances funds control, quick checking of approved books devoid of duplication and manages labour intensiveness in the manual system. Flowers (1989) notes that the preparation towards an automated acquisition system especially in consortium environment is time consuming process whether the system is developed or purchased. However, Raiz (1992) observes that automated acquisition provides the base to computerize other library activities without much labour. Wijayaratne (2005) notes that the success of an automated circulation control system depends considerably on the accuracy and the comprehensiveness of the resource database and borrower database as well as the power and the capacity of circulation interface of the software system. Rao (1995) notes the scope of an automated circulation control can be traditional; charging and discharging or broader depending upon the design objectives established by the library. However, every automated circulation system records and manipulates these three kinds of information: Information about the borrower, Information about the document and Information about the transactions. Nasim (1988) explains that automated circulation ensure proper checking-in and checking-out; reservation of books; calculate fines; and prepare statistical reports of transactions.

Rao (1995), notes the primary objective of an automated cataloguing system is to create user access catalogues either by online or CD-ROM or microform. Automated catalogue facilitates better access points and multidimensional searches to materials other than books alone in the library holding. Therefore, automated catalogue has more flexible access mechanism than the card catalogue, and hence it makes possible linking of data at the 'post-coordinate' stage (Singh, 1999). Wasserman (2006) states the three important standards that relate to cataloging with an automated system are: MARC, Z39.50 protocol, and the Unicode standard. MARC, M-A-R-C, is an acronym. It stands for Machine Readable Cataloging record. "Machine-readable" means that a machine in this case, a computer, can read and interpret the data in the catalog record. "Cataloging record" means a bibliographic record, or the information traditionally shown on a catalog card. Z39.50 is a computer protocol that can be implemented on any operating system and that defines a standard way for two computers to communicate for the purpose of information retrieval. The Unicode system is the international standard for the representation, transmission, interchange, processing, storage, input and display of the written form of all the diverse languages of the world, including Cyrillic, Han and Chinese.

CHALLENGES OF LIBRARY AUTOMATION

Every institution faces problems whenever new services are introduced and policies are implemented (Jayaprakash and Balasubramani, 2011). Hopkinson (2009) as cited in Mutala (2012) points out that the laggard status of sub Saharan African universities in library automation was attributed to among other factors prolonged adverse economic conditions, budgetary constraints, high cost of ICT facilities, inadequate ICT skills, inefficient

electricity/telecommunication infrastructure, and lack of ICT strategies/policies. In a survey of the status of university libraries of Tamilnadu, et al. (2011) identify paucity of funds for initiating computerization, lack of trained staff, hesitancy in learning computer, and lack of administrative support as pre-implementation challenges. Rajput and Gautam (2010) in an investigation of special library in Indore note the same pre-automation problems; paucity of funds, lack of administrative support, lack of trained staff, hesitancy in learning computers and lack of space. Chisenga (2004) also in a survey of ten countries in Anglophone Africa identifies the initial challenges facing library automation projects in sub Saharan Africa to include; lack of budgets, inadequate ICT facilities, lack of ICT strategies, low skills levels of users, lack of qualified staff in ICT, lack of commitment by institutional management, and reluctance among staff to use ICT. In a Case of Kashim Ibrahim Library, Ahmadu Bello University, Nok (2006) concludes that lack of funds and lack of information resources have been problems for academic libraries in Africa for many years. In the midst of all these challenges confronting library automation, Mutala, (2012) argues that lack of budget for automation in most university libraries has been attributed partly to the inability of library staff to adequately articulate benefits to be derived from investing in ICT to the authorities.

Jayaprakash and Balasubramani (2011), note the following as post-automation problems confronting libraries of Tamilnadu: Computerization not up to expectation of users, paucity of funds for improvement, paucity of funds for staff training, library staff not willing to go for training, software is not user friendly, lack of awareness among users, lack of standardization and incompatibility of hardware, and computerization not up to expectation of organization. Rajput and Gautam (2010) in an investigation of special library in Indore identifies paucity of funds for improvement, lack of attitude of authority for staff training, computerization below

expectation of users and organization, serious technical problems encountered, paucity of funds for staff training, software is not user friendly, lack of awareness among users, and Lack of standardization and incompatibility of hardware as the post-automation problems. However, Nok (2006) observes automation of information resources and services pose new problems. These include the acquisition, selection, and cataloguing of online information resources, the construction of databases, providing information literacy education for library users, and the new skills required by, and continuing education for librarians. A critical review shows that most libraries in Africa faced automation problems of lack of funds, reluctance among staff to use ICT, lack of trained staff as well as erratic power supply. On the other hand, in a few libraries are faced with challenges such as lack of commitment by institutional management, serious technical problems encountered and software not being user friendly.

BENEFITS OF LIBRARY AUTOMATION

In spite of the challenges automation brings, its benefits quite outweigh its disadvantages. It is a known fact that automation enables easy access to library materials, and allows staff to better serve users and facilitate a multitude of tasks such as acquisitions, cataloging, circulation, and reference (Egunjobi and Awoyemi, 2012). Library automation comes with a lot of benefits to both the users and the librarians who man the libraries. In the course of library automation materials in poor condition are repaired so that at the end of the process materials will not only be available but also in good condition. It also enables reconciliation of call numbers so that copies of the same title will not be located at different places in the library. It facilitates weeding of books that have outlived their usefulness (Ahenkorah-Marfo, and Borteye, 2010). A survey of automation in university libraries in Tamilnadu et al. (2011) observe the following benefits:

economy in expenditure, increased use of collection, increased productivity in terms of work output and information retrieval, helped in extending library services enhanced the prestige of the library and increased user satisfaction. Delsey (1990) spectacles that library automation increased access; that is users are able to search for materials within the library and from remote locations via search items as author, title, subject, call number and keyword. It also ensures that machine-readable catalogue can be accessed and displayed in a multitude of ways that simply are not possible with a manual catalogue. Automation of the traditional library house-keeping activities make materials easier for patrons to locate as well as allowing staff to perform better user services by facilitating a multitude of staff tasks such as acquisitions, cataloguing, circulation and reference (Bhanja and Barik, 2009). Tamuno and Ojedokun (1997) observe that once a library system is automated there are some intangible benefits that staff and students gain such as computer literacy, introduction of new services, and internet and online database searches. Kadiri (2004) also assert that library automation will address the problem of manual processing of materials overcoming the problems of filling and typing errors, retrieval errors, and the time involved. He further noted that the advantages of library automation includes less drudgery, easy generation of records, space conservation, improvement of information services, and easy retrievals. Obaseki (2011) library automation has tendency of jobs creation in the areas of web development, and system maintenance. Ahenkorah-Marfo, and Borteye, (2010) discovered that libraries are also able to conduct inventory during automation exercises. Owed to the automation, circulation is one of the most affected area of library services, which saved a lot of time of users as well as staff; With the help of WEBOPAC, users can search information from anywhere at any time; Users can easily do the reservation of library sources and It helps to avoid the theft of library resources with Radio Frequency Identification (RFID) system (Parvez, 2011).

From the scholarly review, this shows that the benefits of library automation can even be reaped during the process of automating a library as well as its aftermath.

METHODOLOGY

This study is qualitative in nature and consistent with qualitative approach a case study design was employed. Yin (2003) as noted in Saunders et al. (2009) distinguish between four case study strategies based upon two discrete dimensions; single case and multiple case; holistic case and embedded case. The single case study design was employed. Creswell, (1998) and Saunders et al, 2009) assert that a single case may be selected because it is typical or because it provides you with an opportunity to observe and analyse a phenomenon that a few have considered before. The selection of a single case is also consistent with Cavaye (1996, p. 236) who stated that the "study of a single case enables the researcher to investigate a phenomenon in depth…enabling a rich description and revealing its deep structure." Fifteen staff were selected purposively and cautiously. The selection was also in strict conformity to Creswell's (1998) suggestion that in qualitative research selection of subjects should be purposeful and informants should be subjects who will best answer the research questions but no attempt should be made to randomly select informants. The informants selected are the university librarian, two system librarians, three staff from cataloguing department, three from the circulation section, three from acquisition section and three from the serial control unit. Semi-structured interview guide was employ as the data collection instrument as most qualitative studies have adopted the technique (Creswell, 1998). For the purposes of the study, the thematic data analysis technique was employed to analyse the data.

PRESENTATION OF FINDINGS

Challenges of Automation

The study noted several challenges that the KNUST library is facing. Following the extant literature, these challenges were grouped under pre-automation and post automation.

Pre-automation Challenges

Respondents noted that the contractor half way during the implementation abandoned the job: *"we got funding, we cannot say we had challenge; the challenge attached to the funding was the contractor; at a certain time he abandoned the job and we have not seen him"*. One respondent noted that the contractor was not happy with the terms of the contract; and that could be the reason for the desert. Respondents noted that the abandonment of the project has given a library a setback. As one respondent noted, *"the man started working on the automation process but somewhere along the line he vanished; that has actually given us a setback"*.

Respondents observed that the implementation of an automated system generated a backlog of bibliographical information that needed to be keyed: *"We had a backlog of the manual ones in thousands of cards in the cabinet; what it meant was that we had to convert all into the system"*. One respondent noted that to be to deal with the backlog, task force had to be formed to do the upload; *"The challenge we had during the implementation was we had to create some staffs task force here to do the information upload. So about five or six of them were here; constantly, they were doing the upload of the data onto the platform"*. However, another respondent observed that the keying of the backlog generated a lot of errors; *" you know when you do something repeatedly for some time, you begin to make mistakes; so that was the challenge we had; there is a lot of mistakes but we are correcting them gradually"*.

Respondents also observed that there weren't enough experts around to execute the automation project; and that the contractor who abandoned the work was the only expert around. As one respondent noted, *"……. incidentally, he seemed to be the only expert around"*.

In addition**,** one respondent noted that the automation of the library implied that there should be re-accessioning of materials; replacing accession numbers with barcodes and this pose as a challenge to the library: *"Because of automation the whole library started re-accessioning"*. Respondents noted that the barcodes are now being used to replace the accession numbers. Another respondent however noted that not all books were re-accessioned because of some of them lost and some borrowed but not returned: *"…….some books were not captured; some lost and some not returned to the library"*.

Furthermore**, r**espondents admitted that because the automated system is a new system, there had to be staffs' training to be able to use the system: *"we had to be trained and retrained before we could use the system"*. Another respondent noted that some of the staffs had never used computer before, therefore was computer phobia: *"since it was a new system, breasting with it was a challenge; some workers were computer shy, some workers level of computing was very slow; so we had to train them"*. One respondent however noted that staff were used to old system, therefore switching became a problem: *"staff training became a problem because we were used to the old system"*.

Post-automation challenges:

The study found several post-automation challenges and these have been presented as follows. The employees attitudes towards automated was noted as one of the post- automation challenges. One respondent noted that most of the staffs had forgotten what they had been trained to do.

"….most of them has forgotten the things they were trained to do; that's others functionalities of the software; once a while, one will come and say I wanted to do this but I couldn't do it. You have to go back and train the person. In some three or four weeks another person will come with the same problem. We have tried to do refresher training for them but still it persists". Another respondent also explained how frustrating human attitudes had retarded the progress of the automated system: *"Those who did the entering; we told them if you see a book that had been keyed already, don't type the same information just add a copy; but they were doing it, as a human institution, some of them through laziness or intention were doing the wrong thing".* Another respondent noted that staffs at times refuse simply to do what is expected of them: *"……..it is the person who was at the issuing desk; he didn't discharge the person; he just collected the book instead of going to system to discharge the person, he didn't do so".*

Another post- automation challenge observed was power fluctuations. Respondents observed how problematic the instability of the light has been: *"After the automation, I will say the lights out has been a problem".* Respondents observed that the erratic power supply hinder the smooth running of library operations. As one respondent noted*, "when there is light out, students cannot borrow so you have to let them go".* Respondents however noted that there is an alternative source of power generation but the challenge was fuelling it: One respondent put it; *"somehow we manage to secure our own generator, however we are also occasionally frustrated with lack of funds to fuel it".*Last but not least Oversight in data capture emerged as one of the post-automation challenges.

Respondents observed that some books were not capture into the system. As one respondent noted, *"there are some books on the shelves which we do not have records".* Another respondent noted that the lack of records obstruct the borrowing of those books; *"a student will come to*

borrow and we will scan and it will tell you that it is not in the system; that is it has not been keyed". Respondents noted the oversight of data entry created another task for them. As one respondent noted, *"so we tried to find out those books which have been not keyed. So we went shelf by shelf with a scanner to scan one by one find out those which are not in the system and add them in the system"*.

BENEFITS OF AUTOMATION

The study also sought to ascertain the benefits that the KNUST library has accrued as a result of automation. It was noted that, automation has increased the speed of operation of the library. Respondents observed that the performance of the entire library operations has become faster than when it was manually operated; "in the first place, it has led to speedy transaction; those things that we were doing manually, now automated it is very faster". One respondent noted that automation of the library has made the time spent in borrowing and submitting books very short; *"short time is used in charging and discharging books"*. Another respondent also noted that the automation of the library has made the search of materials faster; *"our users are able to search materials faster……."* One respondent noted how slow cataloguing was before automation; *"prior to automation, cataloguing was very slow because a typist had type everything"*.

Respondents also observed that it was very tiresome and frustrating to register clients with the manual system. As one respondent noted, *"for registration, formerly when we were using the manual system, we had to register all our clients and it was a very tedious work"*. Now that the library is automated, respondents noted how easy work has become: *"Registration has been very easy …….., we can use a very short time to register all the students, instead of formerly doing it manually; so registration also has been easy for us"*. One respondent explained that automation has made cataloguing easy; *"it is easy to assign a class number"*. Another

respondent explained how laborious borrowing was before the automation; *"formerly it was manual, you had to bring your card; There were slips you had to fill; the title of the books, the author, all the necessary information before you could borrow"*.

Furthermore, respondents explained how accessible the automation has made the resources of the library to users; *"people can have access from different angles; we now have the OPAC which people from the whole campus can access our records from their offices or a computer connected to the university's network"*. Last but not least respondent noted the automation has enabled users to do their own search without having to consult a librarian: *"when they come and realize that the system is automated and can do their own search; it excites them and save we librarians the time to go round shelves helping them to search"* .From the findings it can be concluded that automation is very critical to the operations of libraries in this information age.

DISCUSSION OF FINDINGS

Parvez (2011) notes that owed to the automation, circulation is one of the most affected area of library services, which saved a lot of time of users as well as staff; with the help of web OPAC, users can search information from anywhere at any time; users can easily do the reservation of library sources and It helps to avoid the theft of library resources with Radio Frequency Identification (RFID) system. In the confirmation to Parvez's (2011) point the respondents revealed that borrowing time was short and the OPAC has made library resources accessible from different angles. However, the study could not confirm that Radio Frequency Identification (RFID) avoided theft in that it wasn't operational because the contractor did not finish installing and he abandoned the job. The study confirmed Bhanja and Barik (2009) who notes that automation of the traditional library house-keeping activities make materials easier for patrons to locate as well as allowing staff to perform better user services by facilitating a multitude of staff

tasks. Consistent with Egunjobi and Awoyemi (2012) and Delsey (1990), the study note that automation enables easy access; that is users are able to search for materials within the library and from remote locations via search items as author, title, subject, call number and keyword and allows staff to better serve users and facilitate a multitude of tasks. The study revealed that, the filling of slips for charging of books were things of the past; books are just scanned during borrowing. As noted by Kadiri (2004) that library automation will address the problem of manual processing of materials overcoming the problems of filling and typing errors, retrieval errors, and the time involved. Despite these libraries are faced with a lot of challenges and these challenges emanate during and after automation. Adogbeji and Adomi (2005) notes retrospective conversion of data as a constraint in the process of automating the library operations of the Delta State University in Nigeria by staff. Rajput and Gautam (2010) in an investigation of special library in Indore noted the lack of trained staff as an obstacle to the smooth process of automating the library. Among those constraints' the study revealed that, abandonment of job and re-accessioning were serious challenges. Even though, a review of literature showed that almost all libraries were faced with either lack of funds or lack administrative support, the study found that this was not the case in that the library had funding from the World Bank. Again, the library had all the necessary support from the administration. Consistent with Adogbeji and Adomi, (2005), Mutula, (2012)and Nok (2006), the study notes that epileptic power supply is always frustration factor for automation and constitute a serious bottleneck to automation. Aside that, the study revealed human attitudes and oversight in data entry as post-automation challenges.

RECOMMENDATIONS

As a matter of urgency, the acquisition and the serials units of the 'KNUST' Library should be assisted in terms of personnel to help in the clearing of backlog, because university libraries in Ghana are lagging behind in terms of automation of library process compared to libraries in the developed countries. Since there is lack of local automation experts in Ghana, the university authority should engage the services of a foreign expert to help deal with the uncompleted areas like RFID, acquisition unit and serial unit. This will help the full benefits of automating the 'KNUST' Library to be realized. Subsequently the university authority should report the former contractor who duped the university library to the police. Adequate IT manpower should be recruited by the authority of the university concerned: Staffs in the university library should be granted study leave with pay, to acquire training in IT with a focus on library automation.

Retrospective conversion of the documents in the acquisition and serial units should be outsourced to complete the automation of the library. There is a need for sensitization programme and refresher courses on all aspects of automation so as to alleviate the negative human attitudes exhibited by staffs in the discharge of their duties.

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