

An Assessment of the Impact of the Centralised Electronic Student Records Management System at Africa University, Mutare, Zimbabwe

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Abstract

This research was carried out to assess the impact of the centralised electronic student records management system at Africa University, Mutare, Zimbabwe. The research questions aimed at assessing whether the current Student Information System (SIS) at Africa University is adequate, consistent, and reliable. Questionnaires were administered to students and staff who use the system. Findings indicated that the SIS at Africa University is only centralised in

theory since there is no interaction between the accounts office, accommodation services, registration, library and the virtual classroom. Moreover, students are frustrated by the time and extra effort they have to put in whenever they have to register and make enquiries about fees as they have to stand in queues for hours.

Keywords: Database Management Systems (DBMS), Students Information Systems (SIS), Enterprise Resource Planning Systems (ERPs), Systems Integration, Service Delivery

1. Introduction

A Student Information System (SIS) is a software application used for the purpose of managing students and school data in educational institutions. Student information systems provide capabilities for entering testing and other assessment scores, building student schedules, tracking student attendance, and managing many other student-related data in a school, college or university. A SIS is equivalent to an Enterprise Resource Planning (ERP) system for a corporate customer. According to Ragowsky and Somers (2002) an ERP is a comprehensive packaged application software designed to integrate the core corporate activities of an organization. Yen et al. (2002) have noted that Enterprise Resource Planning (ERP) systems have evolved to become the backbone of e-business implementation. Since an ERP system is multi-module application software that helps a company manage its important business functions, it should be versatile enough to automate every aspect of business processes, including e-business (Yen et al. 2002). In Zimbabwe Student Information Systems have been implemented by a number of universities, if not all. In 2006 Africa University decided to move from the Africa University Student Management System and embrace a centralised electronic student records management system. The centralised electronic student records management system software package, namely Students Central Database (SCD), was implemented in August 2007. One of the important features of the Student Information Systems (SIS), is that it integrates all the university students operations. This study aims at assessing the extent to which the centralized electronic student records management system at Africa University meets its goals and demands of its clients.

2. The Research Problem

In 2006 Africa University decided to move from the Africa University Student Management System and embrace a centralised electronic student records management system. The new software package, namely, Students Central Database (SCD), was implemented in August 2007. One of the most important features of the Student Information Systems (SIS), is that it integrates all the university students operations. However, the reality on the ground indicate that accounts office and registry are cut off from students' direct interaction with the current student information systems. Students have to be physically present when making enquiries in the accounts office and also when they have to register. The question is whether bottlenecks in the systems emanate from the way the system was introduced, the lack of equipment, inadequate skills of users or the complexity of the system itself.

3. Literature Review

There is no agreed-upon definition for a Students Information System (SIS). Visscher et al. (2001) pointed out that it is difficult define a Student Information System (SIS) because the technology on which it is based is changing continuously. The best strategy to define a SIS or any information system (IS) is first to define a system and then point out to the main characteristics of an information system. According to O'Brien and Marakas (2010) a system is a set of interrelated components, with a clearly defined boundary, working together to achieve a common set of objectives. Henceforth, using this definition everything you can think of is a system, and one system can be made up of other systems or be part of a bigger

system (O'Brien & Marakas, 2010). Some authors have advocated a systems's approach to natural and human-made processes leading to the concept of "systems thinking" (Bertalanffy, 1968; Checkland, 1981; Bigirimana, 2011). "Systems thinking" has emerged as a crucial and efficient decision-making and problem-solving tool (Cabrera & Cabrera, 2015). An information system (IS) therefore can be any organized combination of people, hardware, software, communication networks, data resources, and policies and procedures that stores, retrieves, transforms, and disseminates information in an organization (O'Brien & Marakas, 2010). O'Brien and Marakas (2010)'s definition concur with an earlier definition where Visscher et al. (2001) defined Information Systems as systems that support the computer-assisted production, storage, and manipulation of data.

A Student Information Systems (SIS) therefore would allow (1) the examination by users of the functioning and impact of existing school program, (2) the monitoring of key school "health" indicators, (3) the planning, guiding and examining of new instructional improvement initiatives (Burstein et al., 2008). A Student Information System (SIS) as Visscher et al. (2001) stated serves not only the purpose of assisting school managers but also SISs are for use by clerical staff in registration, processing and outputting student finance, personal and other data for day to day routine work. Bigirimana, Jagero and Daudi (2015) have studied the impact of such as system on the enrollment, registration, examination clearance, and access to results by students at Africa University in Mutare, Zimbabwe. They found that during these procedures long queues are the order of the day. Moreover, Students are very dissatisfied with these processes that they described as "cumbersome." Reasons militating for this situation include lack of skilled manpower, resistance to change, and low employee morale. They recommended that an integrated system be put in place and that holistic approach to service. In the same context, Bigirimana, Jagero and Chizema (2015) studied the effectiveness of electronic records management at Africa University in Mutare, Zimbabwe. They focused on aspects such as electronic records creation, distribution, use, storage, securing, backup, and disaster recovery systems and procedures. The study revealed that there is no effective maintenance of electronic records at Africa University. Staff are not aware of existing policies and procedures although access to the server room is restricted. The staff are aware of the importance of security measures such as security databases, upholding passwords and keeping off site backup systems. However, at the implementation level, there are discrepancies in the regularity of backup which indicates that either there is clear policy or the policy which is not there is not consistently implemented. Most staff are not aware of the existence of a disaster recovery plan (Bigirimana, Jagero & Chizema, 2015).

Some studies focused on issues such as security (Gagliardi, 2014; Langsdale, 2014) and cost (EDUCAUSE, 2015) while others studies focused on decision-making (U.S. Department of Education Office of Planning, Evaluation and Policy Development, 2009) and the risk of data analysis errors (Rankin, 2013). Infrastructure was studied in the context of E-business in general (Okoli, 2009). However, it important to distinguish SISs from Learning Management Systems (LMSs). The external school systems designed for feeding back school performance data including Schools' performance data compared with that of other schools are sometimes called SISs (Fitz-Gibbon, 1996). Integrated Learning Management Systems (LMS) operate

on the behaviourist model of learning that uses drill and practice to deliver a core curriculum of knowledge and skills, through individual tutoring and practice. These systems support teaching-learning processes instead of the clerical and managerial activities.

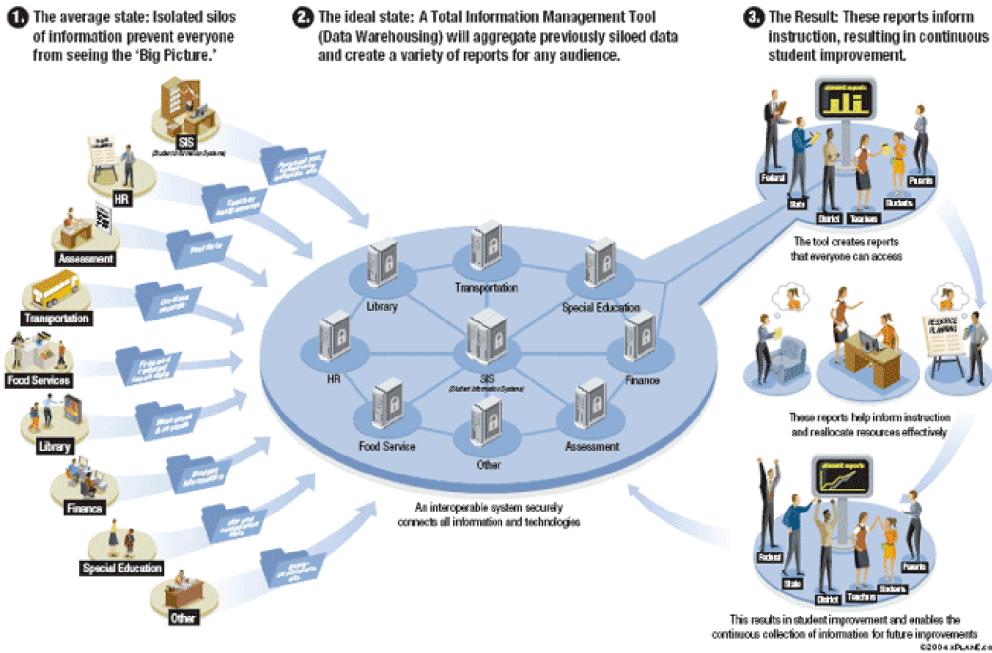
The Commonwealth Higher Education Management Service (CHEMS) provided a guide on how to introduce Management Information Systems (MIS) in universities (The Commonwealth Higher Education Management Service, 1997). Nowadays, SISs are common in almost all levels of educational institutions. They vary in terms of size, scope and capability depending on how much the system is to cover, that is a relatively small organisation to cover student records alone or maybe multi-campus organisation/institutions. The common functions of a SIS support the maintenance of personal and study information relating to: (1) Handling inquiries from prospective students, (2) Accounting and budgeting services, (3) Human resources services, (4) Providing statistical reports, (5) Handling the admissions process, (6) Student health records, (7) Special Education/Individual Education Plan (IEP) services, (8) Communicating student details to parents through a parent portal, (9) Maintenance boarding house details, (10) Handling records of examinations, assessments, marks, grades and academic progression, (11) Maintaining records of absences and attendance (12) Enrolling new students and storing teaching option choices, (13) Automatically creating class & teacher schedules, (14) Recording communications with students, (15) Maintaining discipline records. Bozeman (1985) for instance outlined the use of Management Information Systems in education in terms of Computer-Managed Instruction (CMI) that assists in the control, prescription, and direction of the learning activities. He argued that CMI systems “are generally considered MISs designed to support certain management functions of instruction such as planning, scheduling, coordinating and reporting”. Therefore Bozeman (1985)’s CMI systems are SIS as contrasted with Learning Management Systems (LMS). CMI play the role of Sis because they manage recordkeeping of student achievement and progress but have the ability to go far beyond those functions.

An ideal SIS can be represented as follows:

Improving achievement through Student Data Management

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On average, there is little aggregation of student data in today's school systems. Information is siloed, redundant and difficult to share. The technologies used — if any — are aging and frequently incompatible. An ideal state has complete aggregation and alignment. It is easier to ensure that students meet challenging standards, teachers target instruction, parents know teachers are helping their children, school districts know how to allocate resources effectively and the government knows how schools are doing.



Source:

Extracted

from:

<http://www.ed.gov/about/offices/list/os/technology/plan/2004/site/theplan/edlite-TearDownThoseWalls.html>
Website from the US department of Education Category:Information systems accessed on February 24, 2016.

SISs work through modules that are integrated into a common, centralised database. Nowadays, most SISs are server-based with the application residing on a central computer server, and being accessed by client applications at various places within and even outside the school. However, most SISs have been moving to the web since the 1990s, replacing the older systems server-based systems. Barry (1994) states that the use of Student Information Systems dates back to the 1960s. In the mid- 1950s, many large schools began using some form of electronic data processing and by the mid- 1960s data processing had become widespread in education. The computerised student information systems used in the early experimentation were modelled after existing large business models (Management Information Systems). Visscher, a cofounder of the worldwide organization Information Technology Educational Management (ITEM), also attributed the initial school information system movement to the 1960s in the United States, although he claimed that between 1970 and 1980, the United States somewhat lost its edge (Visscher et al., 2001).

Nonetheless, there is a parallelism between the evolution of SIS and the evolution of Management Information Systems (MIS) in general. O'Brien and Marakas (2010) have noted that information systems evolved in seven stages. The first stage consisted of electronic data processing systems in the 1950s and in the 1960s. These systems focused mainly on transaction processing, record-keeping, and traditional accounting applications. The 1960s and 1970s were dominated by Management Information Systems (MIS) which focused

mainly on management reports of prespecified information to support decision-making. The next decade (the 1970s and the 1980s) was dominated by Decision Support Systems (DSS) i.e. interactive ad hoc support of the managerial decision-making process. The 1980s and 1990s focused on strategic issues and end-user support. Four types of information systems dominated this era, namely (1) end-user computing systems which provided direct support for end-user productivity and workgroup collaboration; (2) executive information systems which generated critical information for use by top management; (3) experts systems which were able to provide knowledge-based expert advice for end users; and (4) strategic information systems which provided strategic products and services for competitive advantage. The last and current era (2000s and 2010s) is the decade of (5) Enterprise Resource Planning (ERP) and Business Intelligence i.e. enterprise wide common-interface applications, data mining and data visualization, customer relationship management and supply chain management.

There are many types of Student Information Systems that are available and educational institutions have the freedom to choose the system they want depending on their requirements. Some SISs are commercial and others are tailor made. Commercial SISs are systems that the institution has to buy from an Application Service Provider (ASP). The institution might have to customize and at times modify the system to fit its needs. However, customising this software might not match the exact procedures that the university has to go through to perform particular tasks. The normal workflow will now be disrupted and might even cause confusion. Tailor made systems are those systems that are specifically developed for an institution to meet its needs. There is no consensus on the link between success or failure and outsourcing IT works. Most companies opt for off shore outsourcing but it comes with risks because success or failure depend on factors that go beyond the software design itself (Lacity & Rottman, 2008). Adoption and Use of information systems depend not only on the audience (Lin & Atkin, 2002) but also on the available infrastructure (Librero, 2008).

However, Kearsley (1990) focused on the potential for Information systems to assist school administrators. He specifically identified system management responsibilities of school administrators as including the supervision of routine functions, problem-solving and decision-making. Kearsley (1990) stated that one of the most important ways that computers can improve school productivity is to make information more available, faster to obtain, or easier to understand. The use of SISs brought about a number of benefits to the education/learning environment. According to Visscher et al. (2001), SISs reduce the teacher's time for clerical and record keeping tasks. The automation of these tasks has led to the reduction in workload. Employees working on student data and information in educational institutions can now perform their tasks with minimum complains on clerical and record keeping tasks. SISs enhance student records, improve planning, expand diagnosis and prescription, profile student achievement and curricular evaluation (Bozeman, 1985). It is now easier for the administration to make plans. When they want a student record concerning that student's past achievements, grades or even medical history, they can retrieve it from the SIS.

The use of a centralised database rather than separate files systems in capturing and processing data reduce data redundancy (Kearsley, 1990). Data only needs to be entered once

and can be accessed by authorised persons at any given time. The fact the Student Information Systems use centralised database, Kearsley (1990) states that this allows the generation of a wide variety of reports and directories. Most SISs provide online access to the database and this allows immediate display of the information required. Data accuracy and integrity is vital in educational institutions. The use of computerised SISs has made this possible. When data is entered into the system, it is checked for accuracy, depending with the type of data thereby improving the data accuracy. This has also made it possible to integrate processes and the employees do not have to do a 'double-job'. It implies a reduction in workload. There are several models which explain the impact of SISs on a school environment. DeSanctis and Poole (1994) provide a model for understanding SISs in the context of a school or university environment.

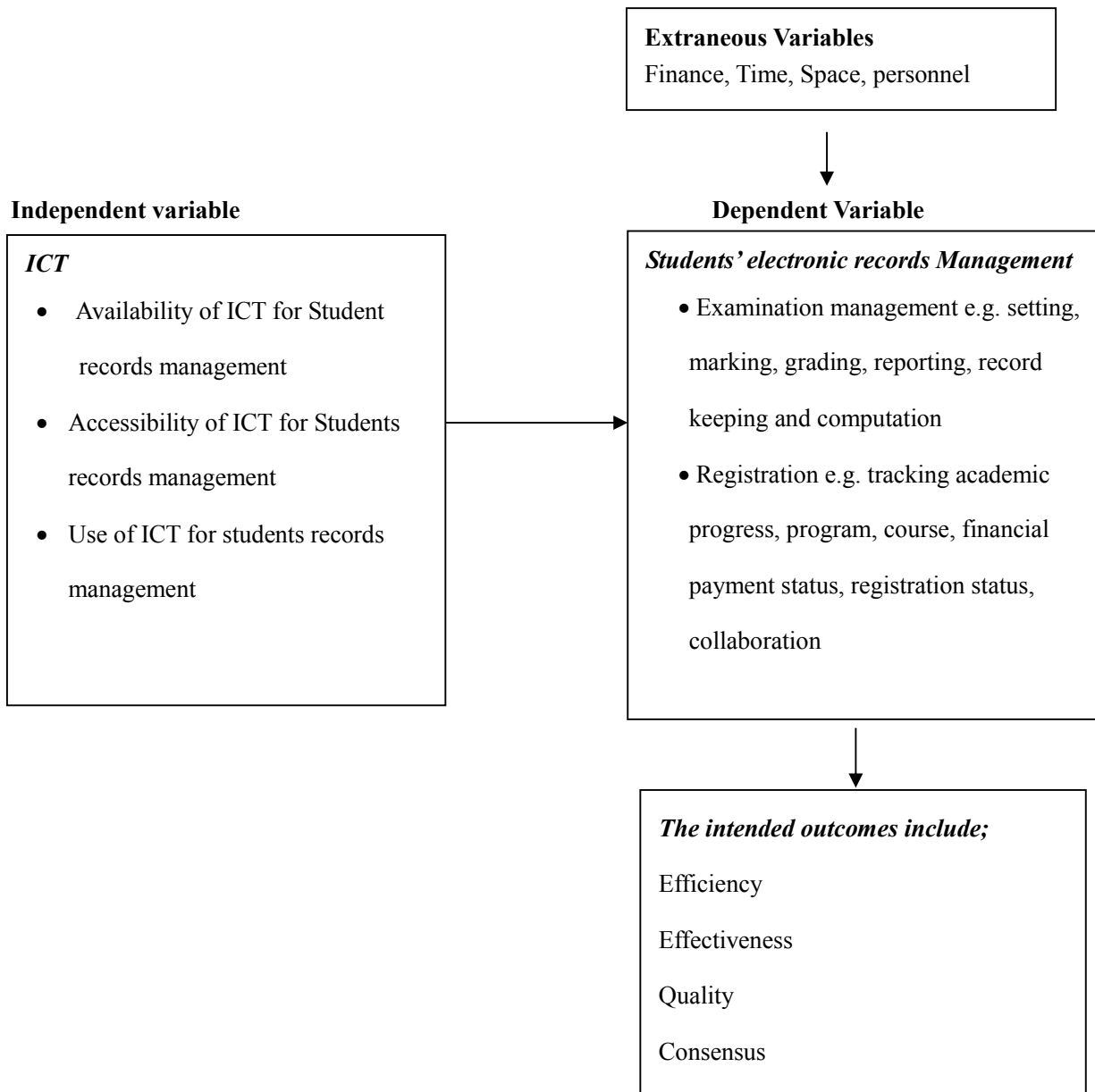


Figure 1. Conceptual framework showing levels, accessibility and use of ICT for management of students' records

Note. Adopted from: DeSanctis and Poole, (1994), Capturing the complexity in advanced technology use: Adaptive Structuration Theory, Organization Science.

The above conceptual framework shows that with the availability of ICT facilities such as computers, networks, Management Information Systems and having access and use of such facilities affect the management of students' electronic records. It is assumed that use of computer based electronic student records management systems can offer many advantages over traditional paper based methods of examination and registration. The MIS would allow effective management of exams and registration and accessibility by the users and students

respectively.

Recording data electronically, storing it centrally, and sharing it with colleagues are vital to reducing workloads through available ICT structures (Devon County Council, 2004). As seen above, this would have a big impact because most of university staff offices, have some ICT facilities and therefore, ICT would have impact on the management of student records electronically and centrally. Centralised electronic student records it increases efficiency and accountability to institutional resources. For cases of missing student results, if efficient MIS is developed and fully put to utilization, such problems would be eliminated. Devon County Council (2004) also points out that in respect to management of student records electronically and centrally, there are various types of information systems that can be available in making informed decisions at all levels and in improving efficiency of operations, such as executive decision making Management Information System, Collaborative Information Systems, Electronic Messaging Systems, Group Decision Support System. These would enable multiparty participation in the University activities through sophisticated information management (Huseman & Miles, 1988). For this case Africa University needs to improve the current system so that it can handle students' academic and personal records centrally.

Taking into consideration the transcript section, which determines the ability of students to get job opportunities, the department is a disaster. After graduation, many students look forward to getting employed in the nearby future but their dreams get shattered most times (Auma, 2006). A lot of students will leave the country back to their home countries. For one to get a copy of a transcript it takes too much time since the transcript has to be printed and send through courier at a cost. A lot of times the students fail to meet the deadlines for their prospective jobs. Due to some deficiencies such huddles remain eminent. If ICT is applied there effectively, speed in processing such documents will become easier.

In addition, marks for assessed work can be recorded within the Virtual Learning Environment. Joint Information System Committee (JISC, 2001) puts across the fact that assessment marks recorded at the module level may be automatically transferred to departmental or institutional level without rekeying. Institutions that provide well-integrated facilities for providing online information about programs, modules and assessed results in which Virtual Learning Environment for individual modules are embedded can be said to provide a Managed Learning Environment (JISC, 2001).

Accessibility to ICT facilities ensures accuracy, timeliness and effectiveness of managing all centralised electronic students' records, that is, it allows easy flow of information and risk monitoring systems that are appropriate British Educational Communication and Technology Agency (BECTA, 2000). Africa University being a model leading University in ICT would greatly be benefiting from the fruits of improving its current ICTs if what BECTA, 2000) put forward was mandatory. It has however been observed contrary to that, the level of accuracy, timeliness, efficiency and effectiveness has not been fully realized despite the existing structures of ICT. Bearing in mind the tasks of manning a big number of students in small examination rooms, the exercise becomes monotonous and at times flawed with records management malpractices, consequent inaccurate student records loss of exam marks yet with

application electronic set exam, there could be an easy monitoring of students and marking coupled with security for results-with electronic databases. Software for managing examinations in School has been developed for use by administrators to play examination roles for administrators, teacher and students. However the level of accessibility to the possible platforms need to established, thus a necessity for this study. For example a teacher can make question banks (also upload them) and can assign tasks to students in their particular groups or individuality for a particular semester. A student can login take the assignment. The automatic timer submits the responses after the time is over and displays the score (this is very possible with the application of electronic blackboard).

At Africa University, registration is one of the tedious exercises to both the Administrators and the students but considering the ICT infrastructures like Management Information Systems, internet and intranet, and computers available, work would be made simpler to make it easy for all students to register from different corners of the University or the world where similar structures exist. ICT is helpful in supporting management functions, for example E-registration enables management of attendance via analysis of data and can be supported by automatic communication to parents via SMS messaging and email (BECTA, 2000). Some institutions within the country like Chinhoyi University of Technology and Midlands State University have tried similar systems to offer similar services and have realized better improvement. For example Utrecht University developed a system called OSIRIS; it is a student registration web based system offering students information and allowing them to register for courses. With OSIRIS, student can access and change their personal information, check for their course schedule and register for courses and exams and it can be accessed at from any computer with an internet connection. Effective Management Information Systems (MIS) provide a tool for leaders to achieve their institutional vision, (Walsh, 2002). Similar results can be realized even here at Africa University if the concerned people are acquainted with the skills required to use those innovative ICT structures.

In their research Geoff et al. (2006), realized that electronic registration could play an important role in helping schools with high rates of absence to improve attendance, it saved time, lesson monitoring was particularly beneficial however initially a significant minority of schools experienced substantial difficulties. To my observation e-registration might be beneficial especially to ICT developed institutions because they have enough facilities, but to developing ICT institutions Africa University inclusive, it might not be beneficial because a few people can have access to ICT structures like internet and computer. Nevertheless, once well established a lot of benefits can be yielded. Notably, Student Information System or SIS incurs such application software designed for educational establishments to manage student data. Student Information Systems provide capabilities for entering student tests and other assessment scores, building student schedules, tracking student attendance as well as managing many other student-related data needs within the institution university. Thus, many of these systems applied in the Benguet State University of Philippines can be scaled to different levels of activity and can be configured by their home institutions to meet local needs.

4. Research Methodology

4.1 Research Design

The design used for this study included both correlation and cross sectional survey design. Correlation design was preferred for its ability to establish the relationship between variables (Amin, 2005), so it would establish the relationship between ICT and management of students' electronic records. On the other hand the researcher also used a cross sectional survey design because data was to be collected at one time from the sampled population. For cross sectional surveys, data are collected at one point in time from a sample selected to represent a larger population.

4.2 Population and Sampling Techniques

The best participants were the users of the centralised electronic student records management system. On the users, the research was limited to a very small number of employees from the university faculties and Academic Affairs department because they are the current main users of the system. Data was also collected from students so that the researcher will be able to analyse whether the services provided by the centralised electronic Student Records Management System needed further improvement.

4.3 Data Collection Techniques

The data collection methods used were participant observation and questionnaires. To gather data on process improvements, interviews were carried out with the registry office and one of the faculties. The other data was collected using a questionnaire which is the research instrument in this study. Stratified sampling method was used to select the participants. The researcher focused on university faculties and the Academic Affairs. The researcher then randomly selected the faculties to give questionnaires and interview. Students were also divided into Graduate and Undergraduate and were then randomly selected.

4.4 Research Instruments

A questionnaire was used in this study as a research instrument. The researcher prepared two questionnaires one for students and the other one for the users of the system. The questionnaires were administered to selected participants.

4.5 Data Analysis

Qualitative data from interviews were analyzed as the study progressed following a logical analysis, a method highly recommended for qualitative research while quantitative data were analyzed using the Statistical Package for Social Sciences (SPSS). Quantitative data were coded and entered into the SPSS computer package for analysis. The analysis of quantitative data included; running descriptive statistics, cross tabulation and the analysis of the statistical relationships.

5. Findings and Analysis

The innovation in the management of the centralised students electronic records at Africa University, still faces a number of problems emanating from the composition of the student population. Africa University is pan-African by design, henceforth, students come from all over the African continent. However, when this study was conducted students could not register online. One had to travel physically to the institution for registration even when the student was in another country on internship.

5.1 Impact of the Centralised Electronic Students Records on Registration

Seven student respondents constituting 35 percent; Agree, 10 student respondents constituting 50 percent; Disagree, 2 respondents constituting 10 percent; Strongly Agree, 1 respondent constituting 5 percent, did not provide an answer. The answer to this question by the respondents is not conclusive as 50 percent, Disagree outright. An aggregate of 45 percent Agree that Centralised Electronic Students Records has significantly changed Registration Service. Five percent of the respondents which is 1 person did not provide an answer. Figure 2 below indicates the impact of the centralised database on students' registration.

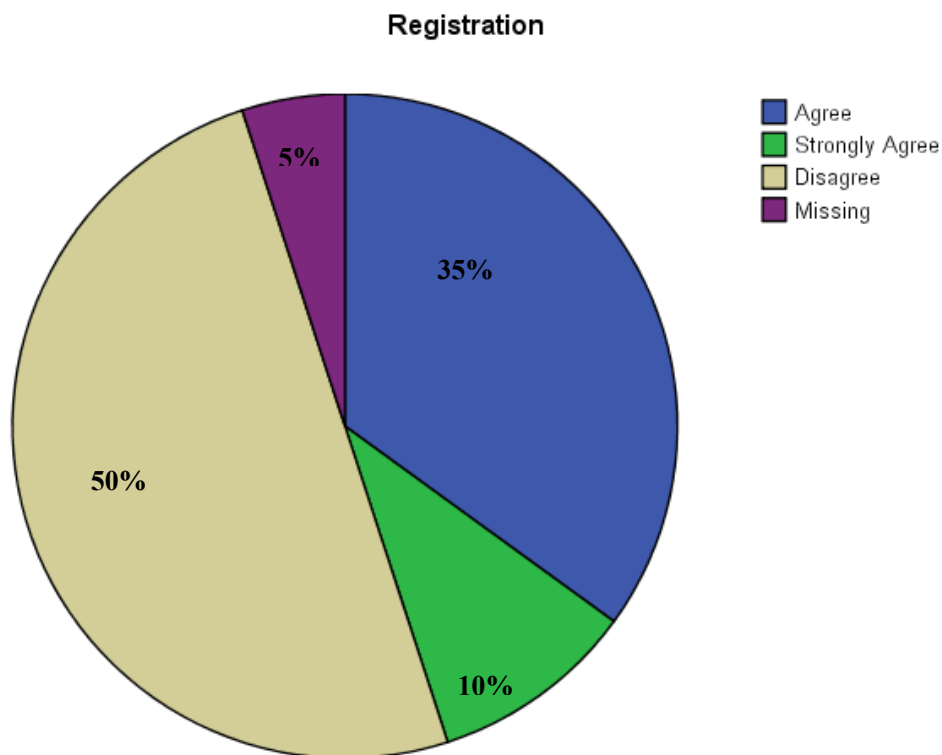


Figure 2. The impact of the centralised database on students registration at Africa University

5.2 Impact of the Centralised Electronic Students Records on Results Publication

Six respondent constituting 30 percent; Agree, 11 respondents constituting 55 percent;

Strongly Agree, 1 respondent constituting 5 percent; Disagree 2 respondents constituting 10 percent; did not provide an answer. An aggregate of 85 percent (6 respondents, 30 percent and 11 respondents, 55 percent Strongly Agree) which is 17 respondents of the 20 sample respondents agree albeit in different degrees that there has been significant change in the Results Publication Service due to the introduction of the centralised electronic records.

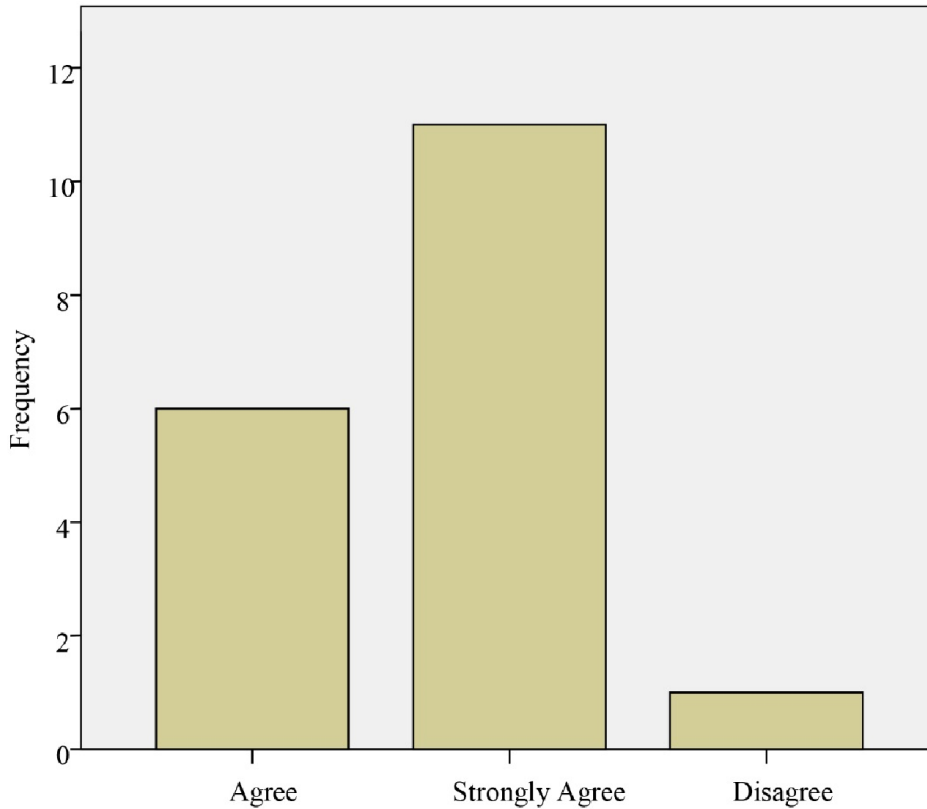


Figure 3. The impact of the centralised database system on results publication

On the question of, Using the Centralised Electronic Students Records use brought about significant change on the Transcript Service. Ten respondents constituting 50 percent; Agree, 2 respondents constituting 10 percent; Strongly Agree, 6 respondent constituting 30 percent; Disagree and 2 respondents constituting 10 percent; did not provide an answer. The aggregate of the respondents in outright agreement is 60 percent made up of 50 percent who, Agree, and 10 percent who, Strongly Agree. From the data it can therefore be reasonably surmised that the centralised electronic records has brought about significant changes on the transcript service.

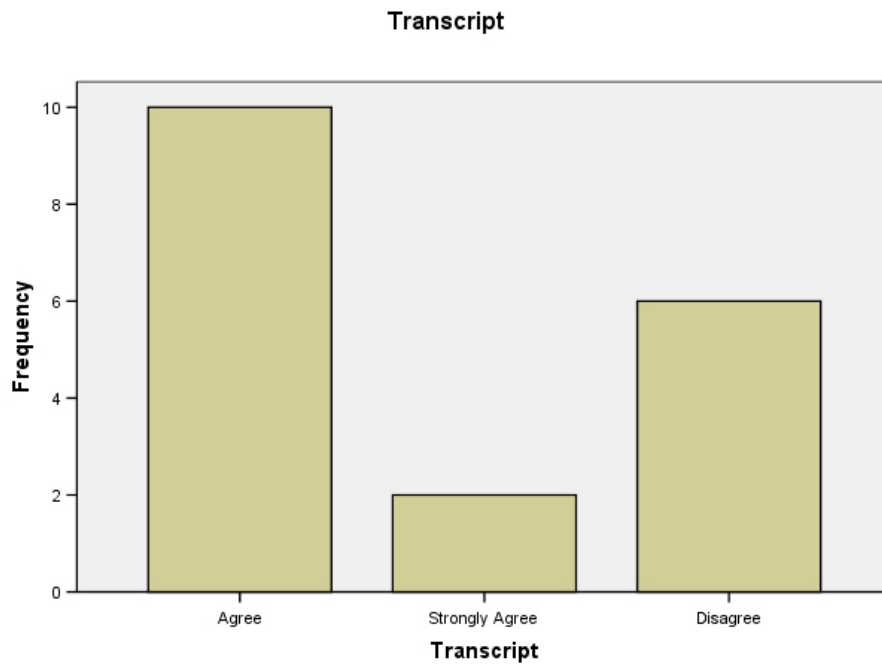


Figure 3. The impact of the centralised database systems on transcript services

5.3 Rating the Centralised Student Records Management System

Four respondents constituting 20 percent Good, 8 respondents constituting 40 percent Satisfactory and 8 respondents constituting 40 percent; Poor. An aggregate of 60 percent of the respondents rated the Centralised Records Management favourably. However it can be from the responses it shows that more can be done.

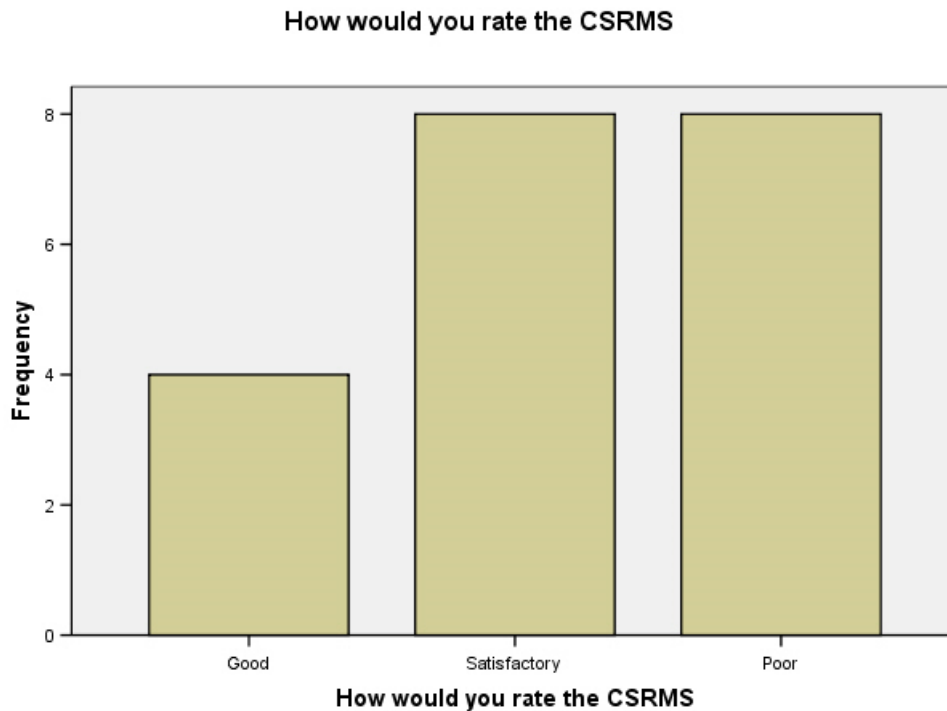


Figure 4. Overall rating of the centralised database system

5.4 Gap between Expectations and Reality on the Ground

Sixteen respondents constituting 80 percent; Yes, 3 respondents constituting 15 percent; No and 1 respondent constituting 5 percent; did not provide an answer. The data from the respondents point to the fact that the Student Information System is falling short of expectation. Problems related to student registration, accommodation and the long queues as well as the general poor interaction between the students body and administrative offices compelled the researcher to question whether the current administration operational set up as well set-up of the information systems in place at Africa University is working efficiently enough in so far as addressing staff and students needs as they concern administrative functions. Opinions were sought through administering questionnaires to sample populations of students and users of the current system. Research findings show that most students and users are dissatisfied with the information system at the university.

Is there a gap between what you expect of the SIS and what is on the ground

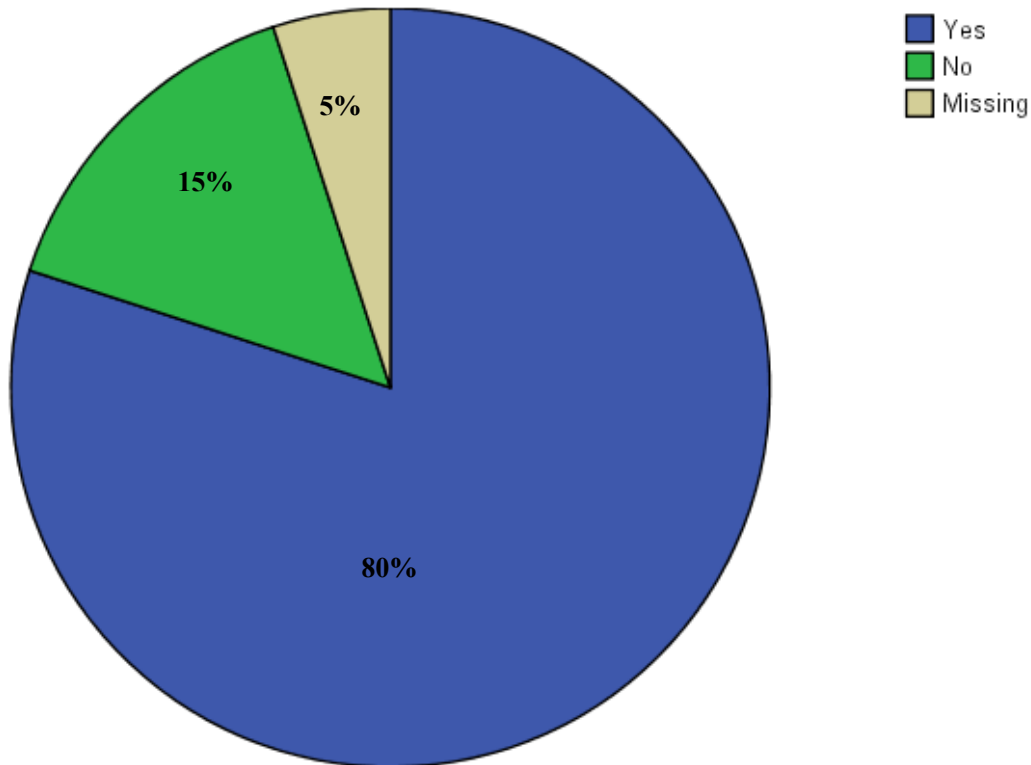


Figure 5. Gap between expectations and reality

6. Conclusion

The current information systems at Africa University are inefficient. Africa University has some isolated non-compatible modules of information systems supporting limited functionality of the university activities. Some of these information systems can be seen to have been implemented spontaneously as a result of divisional heads that wanted to improve their particular sections. The information systems thus have a limited scope from view point of the functional structure of the university. The student information system at Africa University though it is said to be centralised is disintegrated and does not communicate with each other. There is only some partial integration between the Accounting Information System (Pastel Evolution) and the Students Management Information System, the reason being that they use a similar server (MS-SQL Server 2000). Students do not only spend time in the library but do interact with those other departments that continue to be deprived of efficient information systems. Information systems at Africa University were not made using a student centred approach. Findings show that students would rather appreciate the least direct contact with members of the administration and would prefer interaction with the

administration from remote locations like during registration, acquiring accommodation as well as getting exam results. In that regard, students welcomed the idea of having a self service function incorporated in any information system but an analysis of the current information system does not have an allowance for the self-service function, save for one used for the virtual class and the library. There is need to ensure that the ICT infrastructure is utilised to improve the services provided by the SCD. The SCD should also show its benefits to the student so that they will be able to appreciate it. The university must begin to think of expanding the services of the database and then at the same time plan on developing or using a Student Information System that is in line with common and best practices of a SIS. The system's compliance to these standards is essential as it will be adequate to comply with the industry sector. Being an internationally recognised university and gaining international certifications should be dreams that Africa University should have.

References

- Amin, M. E. (2005). *Social Science Research: Conception, methodology and analysis*.
- Auma, J. (2006). *State Should Relinquish Varsity Control*. An article in African Executive Staff Writer.
- Barry, R. (1994). Towards a methodology for requirements definition. *Information Management & Technology*, 27(6).
- BECTA British Educational Communication and Technology Agency. (2000). A Preliminary Report for the DfEE on the Relationship Between ICT and Primary School Standards.
- Bertalanffy, L. (1969). *General System Theory*. New York: George Braziller.
- Bigirimana, S. (2011). Changing paradigms in the information society: From analysis to systems thinking. *The International Journal of Interdisciplinary Social Sciences*, 5, 1-12.
- Bigirimana, S., Jagero, N., & Chizema, P. (2015). An assessment of the effectiveness of electronic records management at Africa University, Mutare, Zimbabwe. *British Journal of Economics, Management & Trade*, 10(1), 1-10.
- Bigirimana, S., Jagero, N., & Daudi, E. (2015). An Inquiry into the Impact of Information and Communication Technologies (ICTs) on the enrolment, registration, examination clearance and access to results of students at Africa University, Mutare, Zimbabwe. *Archives of Business Research*, 3(2), 104-113.
- Bozeman, W. C. (1985). Strategic planning for computer-based educational technology, *Educational Technology*, 24, 23-27.
- Burstein, F., & Holsapple, C. W. (2008). Decision support systems in context. *Information Systems and E-Business Management*.
- Cabrera, D., & Cabrera, L. (2015). *Systems thinking made simple: New hope for solving wicked problems*. Ithaca, NY: Odyssean.
- Checkland, P. (1981). *Systems Thinking, Systems Practice*. Chichester, UK: John Wiley.

- Desanctis, G., & Poole, M. S. (1994). Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory. *Organization Science*.
- Devon. (2004). County Council LEA ICT Strategy for schools 2003-2006.
- Educause. (2015). *We Built, We Bought, We Shared: The Costs of Administrative Service Systems vs. the Academic Mission (EDUCAUSE Review)*. Retrieved from www.educause.edu.
- Fitz- Gibbon. (1996). Decision-making processes: The case of collective movements.
- Gagliardi, N. (2014). *US universities at greater risk for security breaches than retail and healthcare: BitSight*. ZDNet, August 21, 2014. Retrieved from <http://www.zdnet.com/us-universities-at-greater-risk-for-security-breaches-than-retail-and-healthcare-bitsight-7000032843/>
- Geoff, L., Daniel, M., Dimitra, H., & Sue, B. (2006). Evaluation of Capital Modernization Funding for Electronic Registration in Selected Secondary Schools, Centre for Educational Development, Appraisal and Research (CEDAR). University of Warwick, University of Manchester, Institute of Education, Research Report.
- JISC (Joint Information Systems Committee). (2001). JISC MLE and VLE Briefing Papers. Retrieved from <http://www.jisc.ac.uk/mle/reps/briefings/>
- Kearsly, S. K. (1990). *Journal of Computational Chemistry*, 11(10).
- Lacity, M. C., & Rottman, J. W. (2008). *Offshore Outsourcing of IT Work: Client and Supplier Perspectives*, London, Pelgrave MacMillan.
- Langsdale, G. (2014). What It Takes to Keep Student Information Safe in the Digital Age. *The Evollution*.
- Librero, F. (2008). *Digital review of Asia Pacific 2007-2008: Reports on 31 Economies and 2 Sub-Regional Associations*. New Delhi: Sage Publication.
- Lin, C. A., & Atkin, D. J. (2002). *Communication technology and use: Audience adoption and uses*. Cresskill, New Jersey: Hampton Press.
- O'Brien, J., & Marakas, G. (2010). *Introduction to Information Systems*. New York McGraw-Hill Higher Education
- Okoli, C. (2010). *Experts Speak on E-business in Sub-Saharan Africa: A theoretical Model for Doing Business Using the Internet on the Dark Continent* (Saarbruecken, VDM Verlag.
- Ragowsky, A., & Somers, T. (2002). Enterprise Resource Planning. *Journal of Management Information Systems*, 19(1), 11-15.
- Rankin, J. (2013). *How data Systems & reports can either fight or propagate the data analysis error epidemic, and how educator leaders can help*. Presentation conducted

from Technology Information Center for Administrative Leadership (TICAL) School Leadership Summit.

- The Commonwealth Higher Education Management Service. (1997). *Introducing Management Information Systems in Universities*. London: CHEMS.
- U.S. Department of Education Office of Planning, Evaluation and Policy Development (2009). *Implementing data-informed decision making in schools: Teacher access, supports and use*. United States Department of Education (ERIC Document Reproduction Service No. ED504191)
- Visscher, A. J., Wild, P., & Fung, A. C. W. (2001). *Information Technology in Educational Management*. Klumer Academic Publishers.
- Walsh, K. (2002). ICTs About Learning: School leadership and the effective integration of information and communications technology.
- Yen, D. C., Chou, D. C., & Chang, J. (2002). A synergic analysis for Web-based enterprise resources planning systems. *Computer Standards & Interfaces*, 24(4), 337-346.

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