

Challenges to Strategy Implementation of ICT, Computer Based Management and Educational Support Systems in the Universities in Kenya

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Abstract

Use of ICT and computer based systems to support learning, teaching and research is one of the key strategies in advancing training, innovation and technology in the university. Many universities in Kenya are laying down strategies of implementing computer based systems to support training and enhance service delivery owing to perceived benefits that accrue due to effective implementation of ICT strategies. Some Kenyan universities have even gone ahead to initiate E-learning in their institutions. This has a twofold focus, to reach out to students that are too busy to be in class as well as supplementing traditional training methods to those that study within the campus. E-learning also leads to increased enrolment with less additional resources now vital considering the pressure that universities are experiencing due to increased number of students that qualify for university enrolment. To fully realize the benefits of ICT and computer based systems effective strategy formulation and implementation are necessary. Most of the universities are experiencing challenges in implementing these strategies particularly those university colleges that have been converted from middle level colleges to meet the demand for increased university enrolment. This paper investigates the challenges to strategic implementation of ICT and computer based systems in the university. The researcher surveyed application and management of ICT in the university and purposively selected Mombasa Polytechnic University College (MPUC) as one of the university colleges that was upgraded from tertiary institution status. The paper empirically analyses the challenges and further offers recommendations on successful implementation of strategy to fully exploit the benefits of ICT and computer based information systems.

Key words: Strategy, ICT, IT

1.0 Introduction

Universities in Kenya are currently constrained to expand their operations to handle the increasing number of students particularly due to increased enrolment following free primary and highly subsidized secondary education (Njuguna, 2012). All the public universities are addressing this challenge by collaborating with middle level colleges and offering their academic courses in these colleges. Others are opening new branches in major towns to win students country wide. The challenges to university management include expanding their revenue base to provide facilities for increased enrolment, expanding the academic programmes to provide students with diverse career options, training personnel as well as research and innovation (Njuguna, 2012). Demand for better trained manpower in organizations and pressure to compete favourably in the labour market has caused many employees to rush back to the university to add qualifications and meet the industrial requirements. This has led to the introduction of evening programmes to cater for working students. All these factors are putting pressure on the already strained capacities coupled with the demand for quality training as institutions seek to benchmark with world-class universities. Rapid innovation becomes necessary to address the pressing issues and still provide better services to the customers. Use of ICT and computer based systems can effectively aid the institutions in meeting the training demands.

1.2 General objective

To investigate the challenges that the university colleges face in implementation of strategy of ICT, computer based management and educational support systems.

1.3 Specific objectives

1. To examine the extent to which the university college has provided IT facilities for training and research
2. To investigate the extent to which lecturers use IT facilities in the delivery of their work and the problems that they face in facilitating their work using ICT
3. To investigate the extent to which IT facilities are maintained and made available to staff and students and assess the challenges encountered
4. To examine the extent to which operational and functional hindrances challenge successful implementation of IT strategy in management and training.

1.4 Research questions

1. To what extent has the university college provided IT facilities for training and research?
2. To what extent are ICT facilities applied in training and research?
3. To what extent are IT facilities maintained and made available to staff and students?
4. To what extent do operational and functional hindrances challenge successful implementation of IT strategy in management and training?

2.0 ICT and computer based management and educational support systems

Information and communication technology (ICT) refers to the hardware, software, and telecommunications networks (Ward & Peppard, 2002). This includes both tangibles e.g. computers, routers and network cables and intangibles (software). IT facilitates the acquisition, processing, storing, delivery and sharing of information and other digital content. Wanyembi (2002) noted that colleges and universities in Kenya, like other business organisations, have experienced the pressure to invest in computer-based information systems to manage their business processes and huge data that they handle. Accordingly, ICT resources in Kenya continue to increase in number, value and sophistication as more and more institutions invest in ICT. In the universities, information resources and tools are integrated and made accessible to facilitate learning, teaching, research and management of all aspects of the institution (University of Bristol, 2008). Appropriate use of ICT can improve the quality and quantity of educational provision (Balasubramanian et al, 2009). Selwyn (2007) observed that despite all the potential benefits of ICT as a central tenet of university teaching and learning, many university students and faculty members make only limited formal academic use of computer technology.

In Kenya, universities use ICT to manage processes such as payroll, exams, enrolment and other management functions. Use of ICT as a pedagogical tool is limited in Kenya. For instance Kenyatta University has virtual university facilities and programmes but there is limited scope of E-learning in most of the universities in Kenya. Benefits of ICT application in the universities are enormous as outlined by Balasubramania et al (2009). The benefits include learning and course management systems that are used for generating learning support services and products such as course outlines, digitally recorded classroom material, laboratory manuals, lecture notes, live lectures for later viewing and reviewing, connections to specific course websites, online- tutorials, E-libraries etc. Virtual libraries support learning and reduce the cost of acquiring expensive textbooks, journals and other reference materials (Balasubramania et al, 2009). ICT could enhance both academic and business research by university lecturers (Obeng, 2004). Through the Internet, researchers have the opportunity to

access information for various assignments in a more innovative way. By a click of a mouse, researchers can have access to wide spectrum of information and even know relevant areas of critical concern and interest. It also offers them the chance to know the requirements of industry and carry out research to meet industry's needs and expectations. It is worth noting that a Nation without systematic, coherent, innovative and well-coordinated research culture rarely develops scientifically and economically. Doubtless the Universities are research centres and innovative research can best be accomplished by the effective use of ICT. Students also enjoy full access to all kinds of information for their study and writing of dissertations and thesis particularly where Universities have resourceful internet portals and subscription to other universities and research centres internet resources such as Emerald journals, Wiley online library etc.

IT strategy for application in universities should include systems to support corporate, faculty and departmental needs, learning and teaching and to facilitate research (University of Bristol, 2008). They also require services- support training, systems development and analysis and project management. Finally there is need for infrastructure-networking and IT facilities (machinery). Effective use of systems also helps to facilitate all the other business strategies of the university. Efficiency and effectiveness of organizational processes are improved (Bakos & Treacy, 1986). Communication systems such as intranet facilitate sharing of information and quick access of data thereby expediting decision making.

To expand knowledge, lecturers and students can access notes and reference materials from well-established universities such as Oxford and Harvard through internet. Universities such as Massachusetts Institute of Technology, Open University of Nigeria etc have courseware with lecture notes on almost every course and can be accessed without a password. Thus giving students and lecturers access to internet can facilitate their work and match their standards with those of renowned universities. All these systems require efficient servicing and maintenance to remain available and effective to the students and staff.

2.1 Challenges of implementing and managing ICT and computer based educational support systems

In order to exploit to the full potential the perceived benefits of ICT and computer based systems in the University in furtherance of academic and management objectives, good strategy and careful implementation programme is required. There are challenges to this effort that limit the potential use of ICT in universities. The challenges include the high cost of acquiring, installing, operating, maintaining and replacing ICTs. The facilities that universities use in Kenya are inadequate to enable students enjoy full benefits of ICT. This may require every student to have a laptop for uninterrupted access to technology. Most students depend on the institutions' facilities which are limited. This limited accessibility limits the lecturers' use of the internet in supplementing the traditional lecture methods. Another impediment to effective use of IT in learning in Kenyan institutions is misuse of the internet. Other than students using internet for their academic needs, they use it for social networks such as Facebook.

In addition to the initial cost of acquiring the facilities for IT, maintenance is also a challenge. It is common to see many computers in computer laboratories which are not operational. There should be very strict procedures of procuring computer hardware and software to curb this problem (selecting dependable vendor). Efficient and highly committed personnel is needed to keep the IT facilities working and available to staff and students. Another challenge to ICT application in the learning institutions includes some members of teaching

staff not sufficiently proficient in the use of computers Njuguna (2012). Useful applications such as power point, email, e-books and other web based reference materials are ignored.

Chacha (2004) while contributing on ICT training in higher educational institutions in Africa noted that there has been insufficient training and re-skilling of end users as well as technical staff that support the systems in higher educational institutions. This is coupled with the inability of many institutions to recruit and retain qualified information systems staff.

In some institutions, technological complexity is an overwhelming challenge to be countered with critical issue being the security concerns for the data and the systems, especially where students have to access the institutional systems. Nyandiere (2006) noted that without proper controls, students can hack into the system and change on examination grades, fees balance status or other modifications which could have serious ramifications on the institution.

Another challenge in the application of ICT is the institutions not having adequate bandwidth. In some institutions the data traffic is so high that the systems are down most of the time and thereby offering limited internet access to the users.

O'Brien (1999) noted that system implementation is far from being just a software project: it is a serious organisational change project. The projects requires co-operation, teamwork, and planning for organisational change and are difficult to implement when senior management is too busy to give the project adequate attention. The projects involve major organisational changes as they consist of many functional modules that can span the whole organisation and yet use the same database.

The current study explored the challenges faced by MPUC in facilitating effective use of ICT and the possible hindrances in the key perspectives of IT strategy implementation which include systems, services and infrastructure.

3.0 Research methodology

This is a descriptive study. The researcher used this design to capture the challenges that the university colleges face in implementation of ICT, computer based management and educational support systems. The case of MPUC was chosen as among the largest university colleges in Kenya and strategically placed in coastal region of Kenya with opportunity of offering courses not offered in other universities such as Marine Engineering and maritime studies. The researcher collected both qualitative and quantitative data to exhaustively obtain all the pertinent data and draw valid conclusions and offer recommendations.

3.1 Target population

The target population for the study was all the academic departments of MPUC. The MPUC has thirteen academic departments namely Mechanical and Automotive Engineering department, Building and Civil Engineering, Electrical and Electronics Engineering, liberal studies and community development, Business Studies, Hospitality and Tourism, Medical Engineering, Pure and Applied Sciences, Mathematics and Physics, Computing, Environment and Health Sciences, Media and Graphic Design and Medical sciences department. The population includes members of staff and students numbering about 7500 people.

Table 1 the population for the study

	POPULATION	SAMPLE SIZE	PERCENTAGE
Staff	500	30	6
Students	7000	50	0.7
Total	7500	80	1.1

3.2 Sampling frame

Using simple random sampling the following five departments were selected for the study; Mechanical and Automotive Engineering, Computing, Electrical and Electronics Engineering, Building and Civil Engineering and Business studies. All the academic departments are crucial in establishing the study programmes undertaken in the university college and shoulder the challenges that the university contend with in implementing its objectives. Five departments are representative bearing in mind that funding and resource distribution is done across all the departments and they face similar challenges though extent may differ depending on the courses undertaken in each department.

3.3 Sample and sampling technique

The researcher used stratified sampling technique to select six members of staff and ten students in each of the departments selected for the study. This gives a total of eighty people. This is a good sample size since statistically a sample size should not be less than thirty for a large population (Anthony & Michael, 1999).

Table 2 Sample for the study

SAMPLE		
Department	Students	Staff
Mechanical and Automotive	10	6
Electrical and Electronics	10	6
Computing	10	6
Building and Civil	10	6
Business	10	6
Total	50	30
Grand total	80	

3.4 Data collection instruments

The study used primary data obtained by use of structured and semi structured questionnaires with the selected members of staff and students. Both closed and open ended questions were used and a four point assigned number questionnaires. The four point scale was an improvisation of likert scales (Oppenheim, 1982). The survey measurement scale of 1-4 was used to indicate the extent to which each of the variables under test has been accomplished. Part I was to identify the general information about the respondent. Part II featured the challenges that are encountered in the departments.

3.5 Data collection procedure

The questionnaires were distributed by a field assistant to the respondents in the selected departments, namely Mechanical and Automotive Engineering, Electrical and Electronics Engineering, computing, business studies and Building and Civil Engineering. The questionnaires were issued to the respondents and collected later.

4.0 Findings of the challenges of ICT application and management in MPUC

The objective was to establish the extent to which the challenge of ICT application and management affects strategic implementation at MPUC. The researcher explored inherent management and application difficulties and possible success factors to gather students and

staff's views to understand the challenges posed to strategy implementation by this independent variable. The results of the findings were as in tables 3 and 4 in the appendix.

4.1 Discussion of the findings

The results showed that 46.9% of the students confirmed that their departments do not have sufficient computers for student training and research. 20.4% of the students agreed that to some extent their departments have sufficient computers. Only a meagre 10.2% of the students confirmed to have sufficient computers in their departments. The mean score was very low being 1.96 indicating that the computers are not enough.

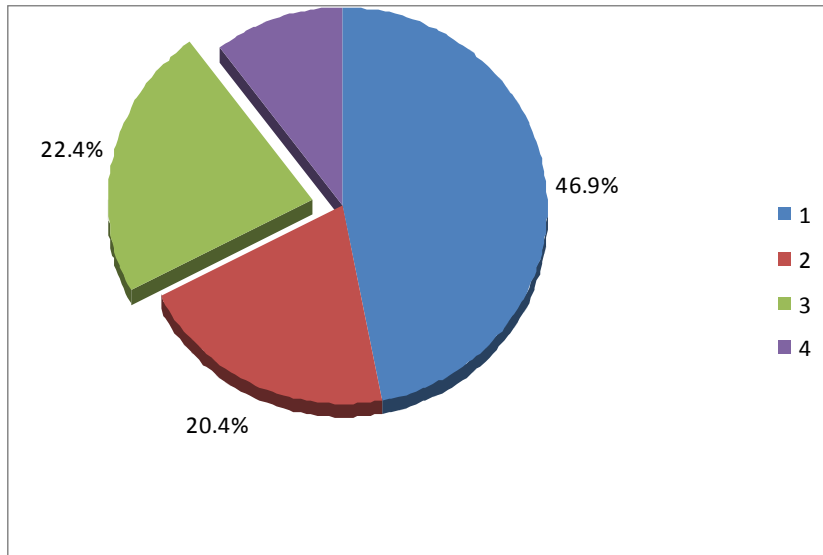


Figure 1. Our department has sufficient computers for training and research: 1- to no extent 2- to some extent 3- Moderate 4- to a large extent

Some departments have enough computers and hence the variability indicated by the large standard deviation of 1.060. It was also evident that most lecturers do not use internet and email in training the students. 53.1% of the students confirmed this. Only 8.2% acknowledged that their lecturers use internet. The mean score was 1.73 which is very low indicating that most of the students affirm that their lecturers don't use internet. The standard deviation of 0.953 shows agreement across the board. The students would not accept to acknowledge their misuse of internet except 30.6% which still serves to indicate students' common usage of internet in social sites such as Facebook.

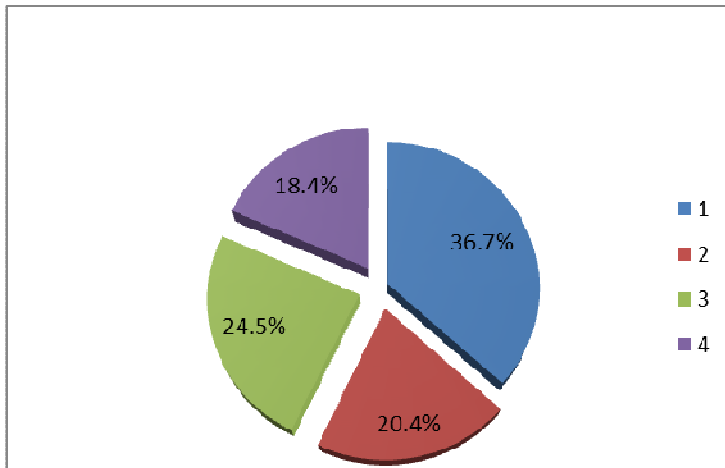


Figure2. Students' computer centre has minimum problems of internet failure

It was noted that the computer centre experience operational problems such as internet failure this being confirmed by 57.1% of the students. A good percentage still accepted experiencing minimal problems. The researcher noted that some departments have small computer centres and this could be the reason for the variability indicated by the large standard deviation of 1.146. In regard to library use of internet 36.7% of the students confirmed not having access to digital library facilities. Still 32.7% confirmed access. This resulted to the large variability in consensus indicated by the large standard deviation of 1.29. Mean score of 2.41 indicate low use of digital library facilities. 44.9% of the students agreed that the computers in their departments have maintenance problems such as viruses. Only 14.3% confirmed no maintenance problems of their computers. Again this may vary depending on each department. 53.1% of the students agreed that their departments provide sufficient computer training. 20.4% said to no extent showing that there are some departments that don't offer sufficient computer training to their students. 26.9% of the staff uses internet technology in doing research. 38.5% use internet for research only to some extent. These figures indicate low use of internet as a tool for research which may further impress low level of research. The mean score of 2.81 is low showing low use of internet. 30.8% of the lecturers agreed that they don't use internet in giving lecture notes to their students. Only 3.8% of the respondents confessed to apply internet in giving notes. The mean score was a low one of 1.92 and there was no variability in this issue as seen in the low standard deviation of 0.796. This indicates unanimity among members of staff on their negligence of internet facilities or lack of it thereof.

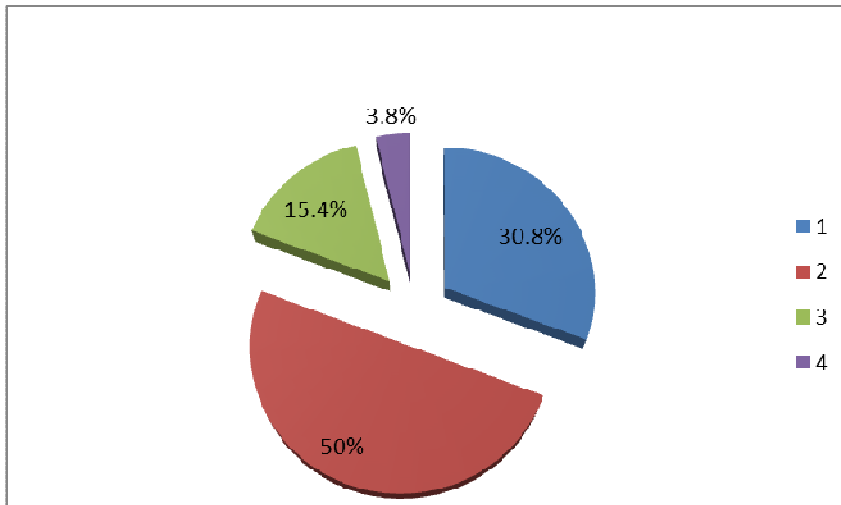


Figure 1. Lecturers use internet in giving notes to students

84.6% of the members agreed that MPUC does not have dependable internet providers. No one agreed that they don't experience internet failures. There was a consensus on poor internet service provider as shown by low standard deviation of 0.628. It was as well clear that no single lecturer that accepted that MPUC lecturers have access to computers and use them for their day today teaching activities. Only 34.6% confirmed moderate access to computers. The findings show that lecturers don't have challenges of using IT due to negative attitude to computers. Only one member of staff submitted to negative attitude to computers i.e. 3.8% of the members. It was also clear that most of the members of staff are familiar with the soft wares applied in teaching. However 11.5% of the members of staff submitted to unfamiliarity with the soft wares commonly applied in teaching. Most of the members confirmed that use of internet in MPUC is hindered by poor maintenance of the facilities, 30.8% acknowledging this absolutely and 53.8% submitting to some extent and moderately. 38.5% of the members of staff agreed that to no extent does MPUC library give lecturers access to digital library facilities and electronic teaching materials. Only 15.4% of the respondents confirmed use of electronic library facilities.

5.0 Conclusion

The research findings explicitly reveal the challenges to strategic implementation of ICT, computer based management and educational support systems in the university college.

The results revealed that most of the lecturers don't use internet and browser technology in facilitating their work. Accessibility to computers among lecturers and students is also limited showing insufficient resource capabilities. The library has not updated to the modern digital library facilities and most of the respondents attested to this. It was also clear that there is a problem with the internet servers most of the respondents reporting frequent internet failure. The maintenance of the IT facilities was also found wanting with most respondents reporting computer breakdowns and virus interference. Members of staff are familiar with use of IT and have positive attitude to computers, all that is needed is to resource the institution with the facilities.

6.0 Recommendations

The challenge of ICT application and management can be addressed by investing more in IT facilities and employing more efficient servers (better vendors). This can be an expensive

project that may involve approaching donors and industrial partners to fully equip the institution with all the IT facilities required for training. Just as students who do engineering are required to start their studies with equipments such as drawing instruments there should be a requirement for students to have laptops. Government can subsidize this for students to have uninterrupted access to computer facilities. The library should be updated to modern digital capabilities including interacting with other universities to have their passwords and help lecturers and learners access journals, e books etc as happens in JKUAT library. Maintenance of facilities to improve their availability and performance can be enhanced by employing qualified technicians and streamlining management to be more sensitive to internet lapse and other technical hindrances. Issues of viruses can be handled by installing internet security and antivirus to all the computers e.g. Norton. Lecturers should also be inducted on use of IT in training and research. To improve service delivery lecturers need to join hands and prepare good course ware with well researched course materials for all the units offered. These can be put in a college intranet for students to access and supplement class work. Live lectures videos can also be included for the students to review. Interaction with the students can also be enhanced by providing a forum in which students can send queries of areas that need further explanation and lecturers can respond on line. Tutorial fellows can be hired for interacting with students online and assisting students in doing calculations and other technical areas that pose difficulties to the students. This is actually extending the ordinary work of tutorial fellows to include on line interactions.

Appendix

Table 3 Students’ response data on the challenge of ICT application and management

VAR IAB LE	SCALE ITEM	To no extent		To some extent		Moderate		To a large extent		Mean	Standard deviation σ
		1		2		3		4			
		F	Rate %	F	Rate %	F	Rate %	F	Rate %		
ICT1	Our department has sufficient computers for student training and research	23	46.9	10	20.4	11	22.4	5	10.2	1.96	1.060
ICT2	Our lecturers use internet and email in giving lecture notes and assignments	26	53.1	14	28.6	5	10.2	4	8.2	1.73	0.953
ICT3	Students in our department use computers for other purposes such as face book, U-tube etc other than academic purposes	20	40.8	7	14.3	7	14.3	15	30.6	2.35	1.300
ICT4	The computer centre that students use for browsing has minimal problems of	18	36.7	10	20.4	12	24.5	9	18.4	2.24	1.146

	internet failing (network failure)										
ICT5	MPUC library gives us access to internet material (digital libraries) and we have a list of sites and passwords by which we can access additional course materials	18	36.7	9	18.4	6	12.2	$\frac{1}{6}$	32.7	2.41	1.290
ICT6	Some of the computers in our department are not operational or have viruses and offer limited use in the learning process	7	14.3	12	24.5	8	16.3	$\frac{2}{2}$	44.9	2.92	1.134
ICT7	Our department provides sufficient computer training to all the students in the department	10	20.4	13	26.5	$\frac{1}{6}$	32.7	$\frac{1}{0}$	20.4	2.53	1.043

Table 4 Staff response data on the challenge of ICT application and management

VARIABLE	SCALE ITEM	To no extent		To some extent		Moderate		To a large extent		Mean	Standard deviation σ
		1		2		3		4			
		F	Rate %	F	Rate %	F	Rate %	F	Rate %		
ICT1	Most lecturers use internet and browser technology in doing research	2	7.7	8	30.8	9	34.6	7	26.9	2.81	0.939
ICT2	Most lecturers in MPUC use email and internet to give lecture notes	8	30.8	13	50	4	15.4	1	3.8	1.92	0.796
ICT3	MPUC has dependable internet providers and rarely do we have internet lapse or failure	6	23.1	16	61.5	4	15.4	0	0.0	1.92	0.628

ICT4	All lecturers have access to computers and use the facilities for their day today teaching activities such as presenting lectures using power point	6	23.1	11	42.3	9	34.6	0	0.0	2.12	0.766
ICT5	Some lecturers have challenges of using information technology due to negative attitude to computers	15	57.7	8	30.8	2	7.7	1	3.8	1.58	0.809
ICT6	Some lecturers fail to use IT due to unfamiliarity with the soft wares that can help them in teaching and learning activities	11	42.3	9	34.6	3	11.5	3	11.5	1.92	1.017
ICT7	Use of IT is hindered by some of the computers being rendered ineffective by viruses and breakdown	4	15.4	11	42.3	3	11.5	8	30.8	2.58	1.102
ICT8	MPUC library has given the lecturers access to digital libraries and passwords for accessing useful sites for journals and teaching materials	10	38.5	9	34.6	3	11.5	4	15.4	2.04	1.076

Abbreviations

IT...Information technology

ICT...Information and communication technology

MIT... Manchester institute of technology

MPUC... Mombasa Polytechnic University College

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