

Implementation and Usage of Management Information System for Academic Processes at Mount Kenya University, Rwanda

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ABSTRACT

The present study sought to find out how both staff and students of Mount Kenya University, Kigali, Rwanda used the management information system (MIS) to benefit from academic processes and how execution of academic processes affected by MIS functionalities. A case study research design was used. Sample size of 164 staffs and 354 students were obtained from target populations of 251 staffs and 3,072 students, respectively. The coordinator of information and communication technology and librarian were interviewed as well. Questionnaire and interview instruments were used to collect data using stratified random and purposive sampling, respectively. Quantitative data was analysed using Statistical Package for Social Sciences (V.16.0) and presented using frequencies, percentages, weighted means, standard deviations and multiple regressions to determine the correlation between variables. Findings revealed that majority of both staff and students agreed that the MIS was helpful in registration and retrieval of information. It was also found that MIS reduced long queues for services as revealed by both staff (92.07%) and students (85.01%). Moreover, multiple regression analysis determined that R , the coefficient of correlation, was 0.97, signifying a very strong, positive, multiple correlation between the usage of the MIS by staff and the implementation of the university's academic processes. The coefficient of determination $R^2 = 0.955$ indicated that 95.50% of the variability in execution of academic processes depended on stochastic model developed, whereas the remaining 4.50% was due to factors beyond the control of the study. On the other hand, R , the coefficient of correlation, was determined to be 0.901 also signifying a very strong, positive, multiple correlation between the usage of the MIS functionalities and the implementation of the university's academic processes by students. Similarly, the coefficient of determination $R^2 = 0.812$ indicated that 81.20% of the variability in the implementation of academic processes depended on the stochastic model developed, whereas the remaining 18.80% was attributed to factors beyond the control of the study. The two coefficients of correlations were found to be significant at the 95% confidence level. Recommendations of the study included the provision of uninterrupted connectivity to the Internet as well as increase of the available bandwidth. This is because

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disruptions in connectivity to the Internet tended to inconvenience the MIS users. Provision of formal and informal training on MIS functionalities should also be offered more frequently to minimise inefficiencies in MIS usage. In addition, communication via MIS should be improved to make the system more interactive the individual use by posting timely notifications and providing the option for feedback, provision of an active electronic link to the library online public access catalogue and other informational services of the university such as the electronic newsletter, electronic prospectus, audio and video streaming of teaching and learning materials, including provision of downloads of electronic lecture notes as well as uploads of assignments in electronic form.

Keywords: Management information system (MIS), MIS usage, MIS functionalities, Information, Management, System Academic processes, Mount Kenya University, Rwanda

INTRODUCTION

Universities are organisations that traditionally have been capturing, processing, storing, and retrieving, reporting and managing data manually. Previously, the source of information tended to be unreliable, as information was provided by supervisors, subordinates or other staffs of organisation. This method intensified unreliability of accuracy of information because it was often not supplied in real time (Talebian *et al.*, 2013). Organisations like universities, companies, businesses recently have been struggling for better performance, effectiveness and efficiency. All the accountability of institutions can only be done by skilled human resource and implementation of a management information system (MIS). Institutional MISs should be designed to achieve the following: enhance communication among employees, deliver complex materials throughout the institution, provide an objective system for recording and aggregate information, reduce expenses to labour intensive manual activities, support the organisations strategic goals and direction (Munirat *et al.*, 2014).

MIS helps to provide the necessary information to make decisions with the effectiveness, efficiency and as far as accuracy, comprehensiveness and timeliness in providing information increase. The efficiency of those decisions leads to improved performance (Altaany, 2013). Many organisations and educational institutions are utilising technology as an effective tool for monitoring and improving organisation's performance (Kitcharoen, 2007). Performance management is a systematic process for improving organisational performance by developing the performance of individuals and teams. It is a means of getting better results by understanding and managing performance within an agreed framework of planned goals, standard and competency requirements (Armstrong, 2009). There is existing relationship between MIS and staff job performance; this was argued by Abdulkareem *et al.* (2012).

In Rwanda, the use of information and communication technology (ICT) in education was considered to be at the heart of the entire education system (Rwanda Ministry of Education, Science, Technology and Scientific Research, 2003). MISs were first introduced in universities such as University of Rwanda (UR), Kigali Independent University (ULK) and Adventist University

of Central Africa (AUCA). Modules used included online registration, examination results and timetable. Some institutions of higher learning lagged behind in the adoption due to heavy investment in labour intensive manual activities, leading to uncertainty in accuracy of information and information integration of growing schools and number of students as well as campuses.

Mount Kenya University is a privately funded tertiary institution whose headquarters are located at Thika town, Kenya. It is ISO9001:2008 certified and is a member of the Inter-University Council of East Africa (IUCEA), *inter alia*. The university established campuses mostly in Kenya. In addition, it provides cross-border delivery of various higher education programmes in its campuses in neighbouring countries such as Rwanda and Somaliland, respectively. The campuses in Kenya are Main Campus Thika, Mombasa Campus, Nairobi Campus, Virtual Campus, Nkubu/Meru Campus, Nakuru Campus, Kisii Campus, Eldoret Campus, Kisumu Centre, Kitale Campus, Lodwar Centre, Kakamega Campus, Kabarnet Campus, Hargeisa Somaliland and Kigali Campus, Rwanda. Mount Kenya University is the leading private university with the largest footprint in terms of the establishment of campuses in East Africa (Mount Kenya University, 2014). Mount Kenya University schools are business and economics, nursing, education, health science, pure applied sciences, social sciences, law, pharmacy, medicine and postgraduate studies. Schools' academic programmes are coordinated by coordinators who report to the principals of campuses, and principals report to deputy vice chancellors who in turn report to the vice chancellor, then to the university council and finally to the board of directors (Mount Kenya University, 2015).

Mount Kenya University, Kigali Campus in Rwanda has the following schools business and economics, pure and applied sciences, nursing, pharmacy, health sciences, education and social sciences. These schools are coordinated by coordinators who report to the Principal of Mount Kenya University, Kigali Campus, Rwanda. In 2014, Mount Kenya University in Kigali, Rwanda found it necessary to implement the university's MIS to address the problems of labour intensive manual activities, uncertainty in accuracy and delay of information in students attendance evaluation, timetable posting, registration, grading, recording and transmission of marks, notification, and management of finances, monitoring and control of staff performance and generation of documents that in turn affect academic processes (I. Gathangi, Personal communication, 25 March 2015). These functionalities are taken as tasks and documents generation. It was envisaged that the uniformity in executing academic processes—standardisation of teaching, monitoring and evaluation, record keeping, controlling, reporting, efficient information sharing and decision-making—could be achieved in the short-to-medium term. All this was supposed to be actualised in a safe and secure, IT-based, networked environment.

Statement of the Problem

Universities over the world faced labour intensive manual activities in carrying out academic processes, uncertainty in accuracy and delay of information in students' attendances evaluation, timetable posting, registration, recording and grading of marks, notification and management of finances. Moreover, monitoring and control of staff performance and generation of documents

were cumbersome and time consuming. The development of an education MIS (EMIS) involved nurturing a new management culture more than establishing a data and information system. The process of data collection, integration, analysis and dissemination was important, but even more critically; it was the culture of data sharing, information use and organisational management that led to the effectiveness of the EMIS development. This research was carried out at Harvard University by Hua and Herstein (2003). South African higher education institutions continue to invest heavily in IT and information systems; MIS in higher education have been adopted to input and output relevant information as well as to manage an institutional decision-making effectively (Phahlane and Kekwaletswe, 2014).

Similar difficulties led Mount Kenya University to put in place MIS so as to benefit in academic processes (I. Gathangi, Personal communication, 25 March 2015). Without effective MIS functionalities, there was an exponential increase of labour-intensive manual activities, uncertainty in accuracy and delay of information, persistent complaints by both staff and students of errors in processed data, emanating in differences in the interpretation of the laid down policies and procedures of the university. This often caused delays in graduation, inaccuracy, inconveniences of missing marks and inconsistencies in academic processes. Despite the introduction of a fairly versatile MIS, a number of staff still opted to manually process data particularly when the stakes in terms of required degree of accuracy were high. The research therefore sought to assess the effect of the MIS on the execution of academic processes, by considering Mount Kenya University, Kigali Campus as a case study.

Objectives of the Study

The following objectives are guided the study:

The general objective was assessment of the effects of MIS on the execution of academic processes in Mount Kenya University, Kigali campus, Rwanda.

The Specific objectives of study were as follows:

- (i) To determine how staff used the MIS to execute academic processes at Mount Kenya University, Kigali Campus, Rwanda.
- (ii) To determine how students used the MIS to benefit from academic processes at Mount Kenya University, Kigali Campus, Rwanda.
- (iii) To determine how usage of MIS by both staff and students affected the implementation of academic processes at Mount Kenya University, Kigali Campus, Rwanda.

REVIEW OF RELATED LITERATURE

DeLone and McLean (1992) – information system success model was built on the communication theory (Shannon, 1948). DeLone and Mclean proposed updated information system success model.

The updated model consisted of six interrelated dimensions of information system success (information system success model: information, system, service quality subsequent or intention to use, user satisfaction and net benefits. As a result of using the system, certain benefits were achieved; the net benefits were to influence user satisfaction and the further use of the information system). In addition, technology acceptance models 1, 2, 3 and unified theory of acceptance and use of technology (UTAUT) explain how users accept to use the MIS (Davis *et al.*, 1989). Technology acceptance model 3, advancing the technology acceptance model with a focus on interventions, gives factors at which users can accept a system for usage (Venkatesh and Davis, 2000). UTAUT provided a useful tool for managers needing to assess the likelihood of success for new technology introductions and helped understand the drivers of acceptance to proactively design interventions (including training, marketing etc.) targeted at populations of users that may be less inclined to adopt and use new systems (Venkatesh *et al.*, 2003).

Management Information System used at Mount Kenya University

Data access levels involve students and staff as the principal actors, where staff can input data, and both students and staff can retrieve information like statements of marks, notification, clearance and student cards and access of fee accounts, whereas staff like the school coordinators or deans check on some information like timetable to know the specific time and lecture room to supervise lecturers. Student admissions and examinations processing can be coordinated online through the MIS, thereby giving the staff in the relevant staff to generate the required reports whenever they are required.

Quality Assurance Directorate downloads assessment sheets for evaluation, after assessment of lecturers and student attendances. This scenario is diagrammatically represented in Figure 1.

The university's MIS gives information after a thorough process of data analysis. It can be evolved after systematic planning and analysis of academic processes, management views, policies, organisation culture and the management style.

In Rwanda, there was a dearth of studies done on MIS usage in a university, particularly concerning the execution of university academic processes. The gap identified was the lack of awareness and knowledge of the influence of using MIS on the execution of academic processes. This called for assessment of MIS on the execution of university academic processes in Mount Kenya University, Kigali Campus, Rwanda. It was hoped that this study would be the precursor to similar studies in other universities and higher learning institutions in Rwanda.

Conceptual Framework

Conceptual framework shows the relationship between the independent and dependent variable of interest to the study. Independent variables involved the combined MIS functionalities used by staff and students based in turn affected the implementation of academic processes. The dependent variable was the implementation of university academic processes like admission, teaching, learning

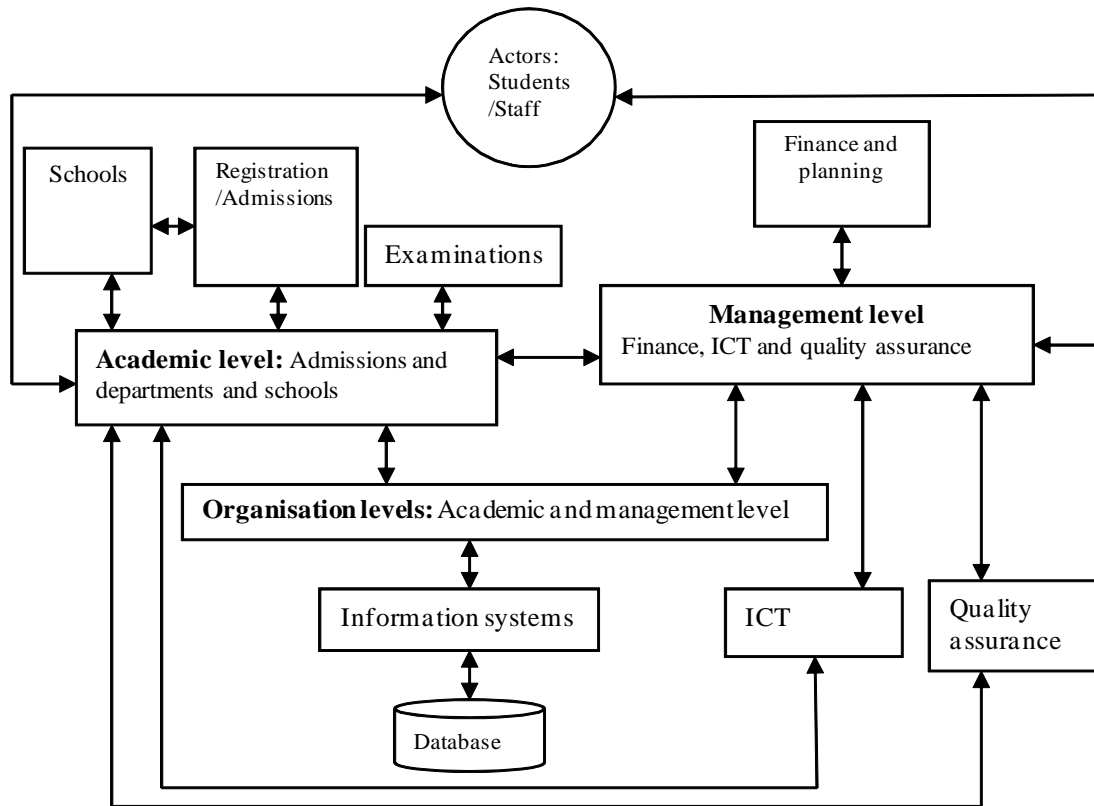


Figure 1: Representation of Mount Kenya University MIS

Source: I. Gathangi, Personal communication, 25 March 2015.

and examination processing. All these were measured using the data-collection instruments developed for the study.

RESEARCH METHODOLOGY

Research methodology encompassed a comprehensive description of the research design, target population, sample size, sampling technique, data collection methods, data collection instruments, administration of data collection instruments, data analysis, *inter alia*.

Research Design

Study employed a case study research design. A case study involved field research which gave deeper description and analysis of study problem rather than generalising the findings of the problem statement (Brecher and Harvey, 2002) (Figure 2).

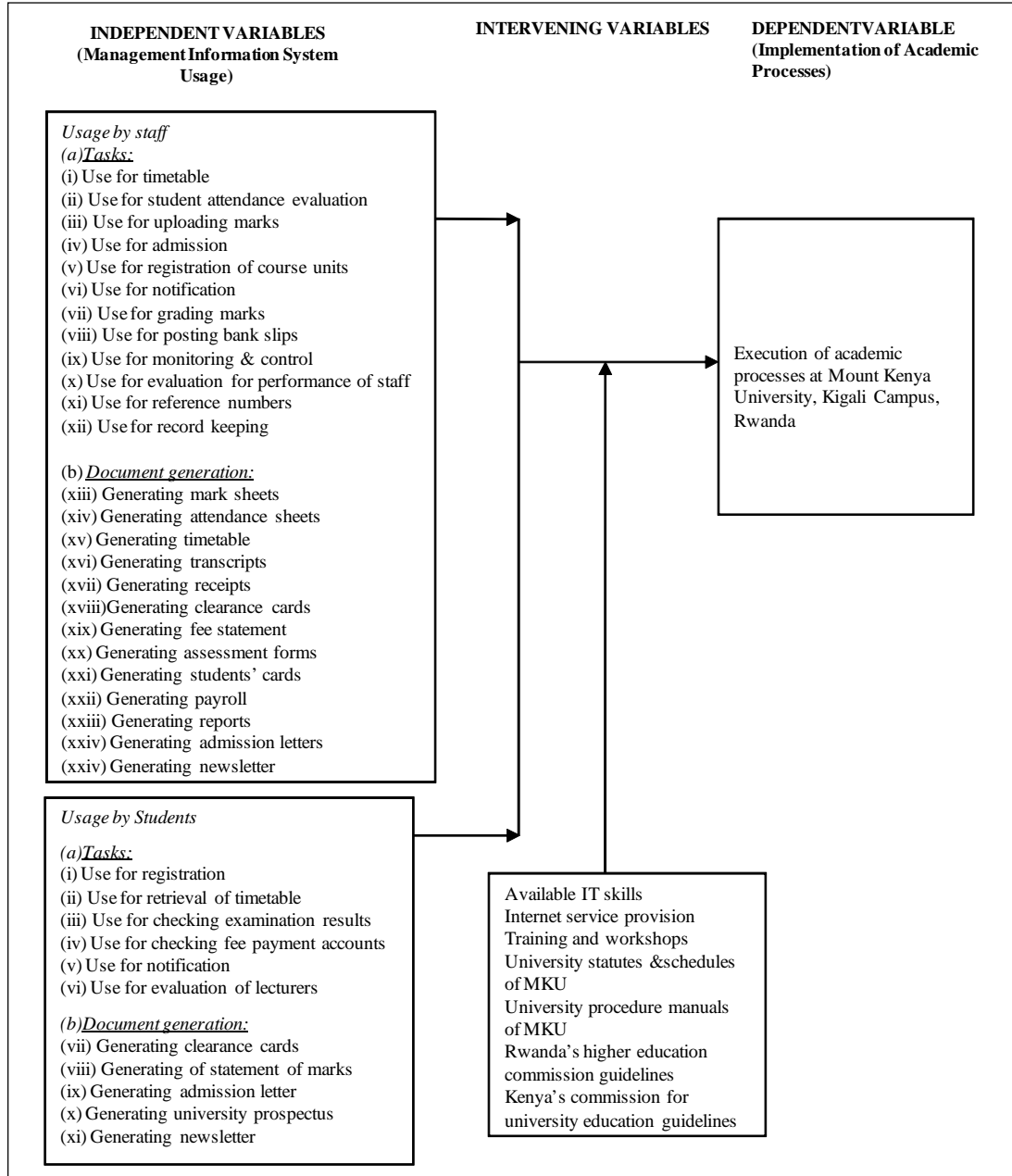


Figure 2: Conceptual Framework

Source: Mukuru (2015)

Target Population

Target population as January 2014 to April 2015 was distributed as follows: the total number of staffs was 251, and for students, it was 3,072. The 251 staffs were segmented into 40 full-time teaching staffs, 187 part-time teaching staffs, 9 admissions staffs, 7 staffs in charge of finance, 3 staffs in charge of examinations, 2 staffs in charge of quality assurance, 3 staffs in charge of teaching programmes at Mount Kenya University, Kigali Campus, Rwanda (F. Mwangi, Personal communication, 15 March 2015). Target population of students 3,072 was distributed among the various schools: 826 students from school of education, 483 students from the school of pure and applied sciences, 246 students from the school of social sciences, 492 students from the school of health sciences, 786 students from the school of business and economics, 125 students from the school of pharmacy and 114 students from the school of nursing (R.W. Ongus, Personal communication, 11 March 2015).

Sample Design

The sample sizes for both the staff and students were determined using Yamane's (1967) simplified formula for determining sample size:

$$n = \frac{N}{1 + N * e^2}$$

Where N is the sample size, N is the total population and e is the margin error—a statistic expressing the amount of random sampling error in a survey's results (0.05). Thus, sample sizes of 164 staffs and 354 students were duly selected using simple random sampling and purposive sampling techniques, respectively.

Data Collection and Analysis

The data collection instruments employed comprised questionnaires and interview. Questions used in the questionnaires included both closed and open-ended questions to have quantitative and qualitative data. Interview questions were open ended eliciting the collection of qualitative information and reliable with information from respondents. Quantitative data was analysed using frequencies, percentages, weighted means, standard deviations and multiple regression. Conversely, qualitative data was analysed using content analysis.

RESEARCH FINDINGS AND DISCUSSION

Findings showed that 51.87% of the respondents used the MIS many times a day, whereas the next largest proportion (47.84%) of the respondents used the MIS several times a week.

MIS Usage by Staff in Carrying out Academic Processes

In Table 1, staff gave their views on how they used the university's MIS functionalities with respect to the execution of various academic processes.

Table 1: Execution of academic processes by staff using management information system

Effect	N	Strongly Agree 5	Agree 4	Not Sure 3	Disagree 2	Strongly Disagree 1	Weighted Mean	Std. Dev.
Faster registration	164	147 (89.63%)	13 (7.93%)	0 (0%)	1 (0.610%)	3 (1.83%)	4.83	0.633
Retrieval of required information	164	148 (90.24%)	14 (8.54%)	0 (0%)	2 (1.22%)	0 (0%)	4.88	0.426
Document generation	164	150 (91.46%)	8 (4.88%)	4 (2.44%)	2 (1.22%)	0(0%)	4.87	0.489
Reduction of queues	164	151 (92.07%)	9 (5.49%)	0 (0%)	4 (2.44%)	0 (0%)	4.87	0.514
Feedback	164	102 (62.20%)	31 (18.90%)	16 (9.80%)	3 (1.83%)	12 (7.32%)	4.27	1.178
Audio streams	164	1 (0.61%)	4 (2.44%)	32 (19.51%)	43 (26.22%)	84 (51.22%)	1.75	0.896
Library's electronic information resources	164	99 (60.37%)	36 (21.95%)	2 (1.22%)	22 (13.41%)	5 (3.05%)	4.23	1.175
Lecture notes	164	2 (1.22%)	6 (3.66%)	7 (4.27%)	102 (62.20%)	47 (28.66%)	1.87	0.756

SD <0.5 or close to zero – Unanimity: Respondents' views were crowded around the weighted mean and SD >0.5 or high – Divergent opinions: Respondents' views were dispersed from the weighted mean.

Source: Primary data.

Findings in Table 1 summarise how MIS functionalities affected execution of university academic processes, as perceived by sampled staff of Mount Kenya University, Kigali Campus, Rwanda. The following was evident:

(i) Faster Registration: MIS was used for registration and made registration faster as indicated by weighted mean of 4.83 and standard deviation 0.633. This meant that the respondents were somewhat divergent on their opinions, although the majority of opinions fell between strongly agree and agree.

(ii) Retrieval of Required Information: MIS was used for retrieval of required information as indicated by weighted mean of 4.88 and standard deviation 0.426. This meant that respondents' views were crowded around the weighted mean, signifying unanimity in that regard. Nevertheless, the majority of the opinions fell between strongly agree and agree.

(iii) Document Generation: MIS was used for document generation as indicated by weighted mean of 4.87 and standard deviation 0.489. This meant that respondents' views were crowded

around the weighted mean, signifying unanimity in that regard. Nevertheless, the majority of the opinions fell between strongly agree and agree.

(iv) *Reduction of Queues for Services:* MIS was used to reduce long queues for services as indicated by weighted mean of 4.87 and standard deviation 0.514. This meant that the respondents were somewhat divergent on their opinions, although the majority of the opinions fell between strongly agree and agree.

(v) *Option to Elicit Feedback by Staff:* MIS was used for option to elicit feedback from staff, as indicated by weighted mean of 4.27 and standard deviation 1.178. This meant that the respondents were somewhat divergent on their opinions, although the majority of the opinions fell between strongly agree and agree.

(vi) *Audio and Video Streaming of Lectures:* MIS was not used for audio and video streaming of lectures as indicated by weighted mean of 1.75 and standard deviation 0.896. This meant that respondents were dispersed from the weighted mean in that regard. Nevertheless, the majority of the opinions fell between disagree and strongly disagree.

(vii) *Library's Electronic Information Resources:* MIS was connected to electronic library as indicated by weighted mean of 4.23 and standard deviation 1.175. This meant that the respondents were somewhat divergent on their opinions, although the majority of the opinions fell between strongly agree and agree.

(viii) *Online Lecture Notes:* MIS was not used to access lecture notes as indicated by weighted mean of 1.87 and standard deviation 0.756. This meant that respondents were dispersed from the weighted mean in that regard. Nevertheless, the majority of the opinions fell between disagree and strongly disagree.

MIS Usage by Students in Carrying out Academic Processes

In Table 2, students gave their views on how they used the university's MIS functionalities with respect to the execution of various academic processes.

The findings in Table 3 showed that *Faster Registration, Retrieval of Required Information, Document Generation, University Awareness of University Programmes, Reduction of Queuing for Services* all had high weighted mean, signifying that the students used the MIS for the mentioned attributes, even though the responses were dispersed from the mean, thereby indicating a lack of unanimity in the same. Conversely, *Options to Elicit Feedback by Students, Audio Streams for Lectures, Library's Electronic Information Resources and access to Lecture Notes* were not available for usage by students, as indicated by their low weighted means. Standard deviations of less than 0.5 for each of these attributes meant that the respondents' views were crowded around the weighted mean and therefore unanimous.

Table 2: Execution of academic processes by staff using management information system

Effect	N	Strongly Agree 5	Agree 4	Not Sure 3	Disagree 2	Strongly Disagree 1	Weighted Mean	Std. Dev.
Faster registration	347	306 (88.18%)	25 (7.20%)	8 (2.31%)	5 (1.44%)	3 (0.86%)	4.80	0.629
Required information	347	325 (93.66%)	8 (2.31%)	0 (0%)	12 (3.46%)	2 (0.58%)	4.85	0.637
Document generation	347	301 (86.74%)	30 (8.65%)	12 (3.46%)	4 (1.15%)	0 (0%)	4.80	0.608
Awareness of university programmes	347	331 (95.39%)	11 (3.17%)	2 (0.58%)	3 (0.86%)	0 (0%)	4.93	0.358
Reduction of queues	347	295 (85.01%)	49 (14.12%)	0 (0%)	1 (0.29%)	2 (0.57%)	4.83	0.480
Feedback	347	33 (9.51%)	59 (17.00%)	108 (31.12%)	64 (18.44%)	83 (23.92%)	2.70	1.267
Audio & video streams	347	0 (0%)	0 (0%)	203 (58.50%)	98 (28.24%)	46 (13.26%)	2.45	0.717
Library's electronic information resources	347	0 (0%)	40 (11.53%)	66 (19.02%)	53 (15.27%)	188 (54.18%)	1.88	1.087
Lecture notes	347	0 (0%)	12 (3.46%)	0 (0%)	298 (85.88%)	37 (10.66%)	1.96	0.494

SD <0.5 or close to zero – Unanimity: Respondents' views were crowded around the weighted mean. SD >0.5 or high – Divergent opinions: Respondents' views were dispersed from the weighted mean.

Source: Primary data.

How Execution of Academic Processes is Affected by Usage of Management Information System

Multiple regression analysis models were used to represent the envisaged correlations between MIS usage and execution of academic processes by both staff and students of Mount Kenya University, Kigali Campus, Rwanda. The analysis was done as in the following subsections.

MIS Usage by Staff

The multiple regression stochastic model for analysis of MIS functionalities and their effect on execution of academic processes by staff were represented in Table 3.

$$Y = b_0 + b_1X + b_2X + L + b_kX_k + \varepsilon$$

$$b_0 = -0.136, b_1 = 0.126, b_2 = 0.904 \text{ and } \varepsilon = 0.321$$

$$Y = -0.136 + 0.126X_1 + 0.904X_2 + 0.321$$

Table 3: Multiple regression analysis model for staff

Model	<i>b</i>	Std. Error	Sig.
Constant	-0.136	0.076	0.072
Tasks	0.126	0.031	0.000
Document generation	0.904	0.033	0.000

Dependent variable: Implementation of academic processes by staff.

Source: Primary data.

Table 4 depicts the model summary of the findings.

Table 4: Model summary for staff

Model	<i>R</i>	<i>R</i> Square	Adjusted <i>R</i> Square	Std. Error of the Estimate
1	0.977 ^a	0.955	0.954	0.321

^aPredictors: (Constant), tasks (admission, course units registration, timetable and workload, uploading of marks, grading of marks, students' attendance, record keeping, examination results, payment, notification and evaluation, monitoring, evaluate performance of lecturers, posting bank slips, generate fee accounts, reference numbers, generate evaluation forms) and documents generation (mark sheets, attendance sheet, timetable, students cards, clearance card, receipts, fee statement, payroll, statement of marks, reports generation, evaluation forms generation, admission letter, university prospectus and newsletter generation).

Source: Primary data.

In Table 4, findings showed that the correlation coefficient, $R = 0.977$, this meant that there was a very strong, positive multiple correlation between independent variables, namely the collective tasks done by staff (admission, course units registration, timetable and workload, uploading of marks, grading of marks, students' attendance, record keeping, examination results, payment, notification and evaluation, monitoring, evaluate performance of lecturers, posting bank slips, generate fee accounts, reference numbers, generate evaluation forms) together with documents generation (mark sheets, attendance sheet, timetable, students cards, clearance card, receipts, fee statement, payroll, statement of marks, reports generation, evaluation forms generation, admission letter, university prospectus and newsletter generation) and the dependent variable, namely the implementation of academic processes. $P < 0.05$ signifies statistical significance in the same by staff. NB: The tasks and document generation in this case are performed exclusively by staff members.

In the same table, it was revealed that the coefficient of determination $R^2 = 0.955$ for the same scenario, which meant that 95.5% of total variation in y (execution of academic processes by staff) could be explained by the stochastic multiple regression model that was developed for this study, and the remaining total variation of 4.5% was due to unexplained factors.

MIS Usage by students

Table 5: Multiple regression analysis model for students

Model	<i>b</i>	Std. Error	Sig.
Constant	-1.330	0.234	0.000
Tasks	0.576	0.059	0.000
Document generation	0.757	0.031	0.000

Dependent variable: Implementation of academic processes.

Source: Primary data.

The multiple regression stochastic model for analysis of MIS functionalities and their effect on execution of academic processes by students were represented in Table 5.

$$Y = b_0 + b_1X_1 + b_2X_2 + L + b_kX_k + \varepsilon$$

$$b_0 = -1.330, b_1 = 0.576, b_2 = 0.757 \text{ and } \varepsilon = 0.656$$

$$Y = -1.330 + 0.576X_1 + 0.757X_2 + 0.656$$

The general form of the equation to predict execution of academic processes from tasks (registration, timetable, examination results, payment, notification and evaluation) and documents generation (clearance card, statement of marks, admission letter, prospectus book and newsletter) is execution of university academic processes = -1.330 + 0.576 tasks (registration, timetable, examination results, payment, notification and evaluation) + 0.757 documents generation (clearance card, statement of marks, admission letter, prospectus book and newsletter) + 0.656.

Table 6 depicts the model summary from SPSS analysis.

Table 6: Model summary for students

Model	<i>R</i>	<i>R</i> Square	Adjusted <i>R</i> Square	Std. Error of Estimate
1	0.901 ^a	0.812	0.811	0.656

^aPredictors: (Constant), tasks (registration, timetable, examination results, payment, notification and evaluation) and documents generation (clearance card, statement of marks, admission letter, prospectus book and newsletter).

Source: Primary data.

In Table 6, the correlation coefficient $R = 0.901$ was shown. This meant that there was a very strong, positive, multiple correlation between the independent variables, namely tasks (registration, timetable, examination results, payment, notification and evaluation) and the dependent variable, namely documents generation (clearance card, statement of marks, admission letter, prospectus book and newsletter) and the dependent variable, namely the implementation of academic processes. It was also revealed that the coefficient of determination $R^2 = 0.812$, which meant that 81.2% of the total variability in Y could be explained by the stochastic multiple regression model developed

and the remaining total variation of 18.8% was attributed to unexplained factors. $P < 0.05$ signifies statistical significance in the same by students.

Findings from Interview Guides

The respondents who were interviewed included (a) the ICT coordinator and (b) the campus librarian. The respondents gave candid responses to the questions posed using suitably designed interview guides. The same were analysed using content analysis. The respondents generally complemented information elicited by the questionnaire. In particular, they suggested that for better functionality of MIS along with its integration with open-source software such as KOHA, unfettered supply of the Internet was necessary to end inconveniences caused, thereby reducing complaints from all concerned.

SUMMARY OF FINDINGS

(i) Management Information System Usage by Staff in Academic Processes

Findings from quantitative analysis and qualitative analysis showed the staff benefitted from being able to perform academic tasks and generate relevant documents. Respondents indicated that MIS has reduced manual work, reduced long queuing for services and made document generation and keeping records easy and faster but cited that MIS slows down whenever Internet downtimes were experienced.

(ii) Management Information System Usage by Students in Academic Processes

Findings showed that students benefitted from tasks and document generation; registration was done easily; timetables, examination results, fee account checking features were accessed, used for notification, generating of clearance cards, in generation of statement of marks and in evaluation of lectures' performance, reduced long queuing for services. From qualitative analysis, respondents confirmed that MIS has helped in easy registration of course units, checking of examination marks, checking of fee payment accounts and reduced long queuing for services (reduced manual work) and facilitated in generation of clearance cards and statement of marks. Students cited that MIS slows down whenever there was an Internet shortage or problem.

(iii) How Management Information System Affected Execution of Academic Processes

The multiple regression analysis was carried out to determine the relationship between the MIS usage (independent variable) and execution of academic processes (dependent variable) both by staff and students. It was showed that the multiple correlation coefficient $R = 0.977$ for MIS usage by staff in the implementation of academic processes indicated a very strong, positive correlation between the independent and dependent variables of interest. Similarly, $R = 0.901$ for MIS usage by students in the implementation of academic processes indicated an equally good

level of prediction by the regression model concerned. The correlations were found to be statistically significant in both cases.

CONCLUSION

It was determined that MIS at Mount Kenya University helped to ease the marking of students' attendance online, preparing of mark sheets. The MIS was used to upload examination results, record keeping, generating transcripts and report, monitoring teaching programmes and evaluation of performance of lecturers, generation of fee payment accounts and receipts, respectively. It was very helpful in registration, in generation of admission letters and students cards, in the evaluation of staff performance and generation of staff assessment forms. In due course, the MIS reduced long queues for services. MIS functionalities also benefitted students in the complying with university academic requirements and generation of relevant documents. Tasks (registration, accessibility of examination results, fee payment account checking and awareness of the university programmes) reduced long queues for services. Document generation included the production of clearance cards and academic transcripts. From the two multiple regressions run, it was determined that there was indeed a very strong, positive, multiple correlation between the usage of MIS (independent variables) and the implementation of academic processes (dependent variable) at the Mount Kenya University campus in Kigali City, Rwanda. Moreover, the correlation was statistically significant, regardless of status – members of staff or students.

RECOMMENDATIONS

The study recommended that

- (i) The university management should provide uninterrupted Internet connectivity to avert unnecessary inconveniences to MIS usage by users.
- (ii) The university management should provide formal and informal training on the usage of various MIS functionalities to reduce inefficient usage of the same.
- (iii) The MIS developers should improve communication capabilities via MIS, due to effectively increase internal notifications and make the system more interactive by introducing options for eliciting feedback.
- (iv) The MIS developers should enable and activate an electronic link to the library's electronic content as well as the online public access catalogue via the KOHA open-source software. This would enable users to access materials such as the electronic newsletter, electronic version of the university prospectus, audio and video streaming teaching and learning materials.
- (v) The MIS developers should provide the capacity to download electronic lecture notes and upload assignments as and when needed.

SUGGESTIONS FOR FURTHER STUDY

- (i) A study should be carried out on the integration of MIS functionalities and electronic information resources provided by the library (including audio and video streaming options).
- (ii) A study should be carried out on MIS functionalities and execution of electronic learning or virtual learning.
- (iii) A study should be carried out on causes of failures of MIS functionalities and the need of upgrading of the system including the enhancement of its security features and the provision of better functionalities for notification and feedback mechanism.
- (iv) Being a case study, a more general study should be carried out to understand the usage of MIS in other universities in Rwanda and beyond.

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