

## A Delphi Study on the Management Information Systems (MIS) for Decision-Making for Administrators' of South – East Nigeria Universities

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### Abstract

The specific design was a panel study used to determine the decision-making areas of Management Information Systems (MIS) for university administrators in South-East Nigerian universities. This study was conducted in the ten public universities in South-East, Nigeria. One research question and one hypothesis guided the study. The population of the study was made up of 589 university personnel consisting of Heads of Departments, Deputy Registrars and Directors of Management Information Systems (MIS)/Information and Communication Technology (ICT) Units in the universities. The sample of the study was made up of 30 respondents Data were collected using a 15-item questionnaire developed by the researchers and titled: "Management Information Systems Decision-Making Questionnaire" (MISDMQ). Three experts from University of Nigeria, Nsukka validated the instrument. A reliability coefficient of 0.88 was obtained for the instrument. During the two round surveys, the 15-item questionnaire was administered to the respondents twice. Fourteen items reached the panelist consensus in the both rounds while one item did not reach panelist consensus in the round two survey. The mean score was used to answer the research question. t-test was used to test the hypothesis. The following were the major results of the study; 14 decision-making areas were accepted. There was no significant difference between the mean responses of administrators and MIS experts regarding decision-making areas. Based on the findings of the study, one major educational implication was that the MIS has a high potential for making relevant information available for decision - making process. It was recommended that universities in South-East, Nigeria should adopt the MIS decision-making areas identified for efficient and effective decision-making in the universities.

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**Keywords:** Information and Communication Technology (ICT), Management Information Systems (MIS), Decision-Making Process, National Universities Commission (NUC), National Universities Management Information Systems (NUMIS)

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### INTRODUCTION

Management Information Systems (MIS) involves the collection, processing, analyzing and dissemination of educational data and information and making them available to educational administrators on a timely, routine, reliable and predictable basis for decision-making. MIS, according to Lucey (1), is a system using formalized procedures to provide the management at all levels in all functions with appropriate information, based on data from both internal and external sources to enable them to make timely and effective decisions for planning, directing and controlling the activities for which they are responsible. Similarly, Boorne (2) defined MIS as a structured, interacting complex of persons, machines and procedures designed to generate an orderly flow of information for use as the basis for decision-making in an organization. MIS, therefore, is a system that collects, processes, analyses, stores and disseminates information for

educational planning and decision-making in the universities.

The growth of information systems services in Nigerian universities began about 1990 with the World Bank intervention to improve the institutional capacities of Nigerian universities (National Universities Commission (NUC) (3). The specific focus of the intervention was on Management Information Systems (MIS), specially designed to meet the information needs of the managerial staff as they make a variety of decisions for the effective administration of the universities. In Nigerian universities, MIS is designed to achieve the following objectives: to standardize the system of obtaining reports and statistical information, ensure that such information are accurate and timely, and organize such information for planning and decision-making in order to improve utilization of resources [4].

University administrators need continuous flow of information in order to make appropriate decisions. Effective decision-making in the universities depends to a large extent, on accurate, timely and relevant information available to the administrators. According to Moorthy (5), MIS is a decision-making instrument used by top management comprising of a set of controls. Effective decisions are decisions based on data and information analysis to eliminate the root cause of problems, so that quality problems can be resolved effectively and efficiently [6].

In Nigerian universities, decision-making is the backbone of administrative functions [7]. This is because decisions direct management actions. Good and effective decisions can only be made when the right information is made available at the right time to the right officer. According to Turban, Aronson & Liang (8), decision-making is a process of choosing among alternative courses of action for the purpose of attaining a goal or goals. Decision-making consists of a number of steps or stages, such as recognition of a problem, formation and generation of alternatives, information search, selection of best alternatives and action. In this study, decision-making is the process leading to the selection of a course of action among alternatives by the university administration based on the available information.

Information for decision-making in the universities cannot be provided from people's often deficient memories. The importance of management information systems in decision-making lies in its ability to change the direction of the management team and the entire organization [9]. According to Aminu (10), information resources are one of the major issues for and indices of planning and administration of universities. Information is the additional knowledge the users desire about the functions under their responsibilities to enhance planning, programming, monitoring, evaluation and decision making in the universities. Information for decision-making is dynamic and needs to be constantly updated [11].

Information is the chain of understanding that binds all including universities from top to bottom and from side to side. To stay well informed, and build-up their knowledge base, a university needs to feed on a balanced diet of high-quality information supplied through a varied menu of information products and services [12]. In this study, information is data that has been put into the forms that are useful to the university administrators for decision-making. Information is usually available or disseminated through various information systems.

### **Statement of the Problem**

The inefficiency of the MIS in the universities is mainly due to inadequacies of the NUMIS data

management component. Nigeria university administrators are often concerned about the alarming rate of misplacement or loss of vital data and the slow speed at which needed data are retrieved from storage. Similarly, Atulomah (13) observed that universities in Nigeria generate large quantity and quality data in their day-to-day activities; but a lot of files are duplicated in numbers within and across units without control over their creations, causing data redundancy and wasteful spending due largely to the inefficiency of the Management Information Systems in these universities.

Therefore, the collection, processing, organization and reporting of data are major issues of the NUMIS. These facts amongst others show the inability of most universities in Nigeria to put up sound Management Information Systems infrastructure to guide the generation, processing, storage and retrieval of information for decision-making process. There seems to be no specific and appropriate MIS Model with proper data management component to provide the relevant information to guide and assist university administrators in South-East, Nigeria in decision-making.

### **Purpose of the Study**

The purpose of this study was to determine the decision-making areas of the Management Information Systems (MIS) for decision-making by administrators of universities in South-East Nigeria. Specifically, the study intended to:

1. determine the various decision-making areas for Management Information Systems (MIS) by administrators of South-East Nigeria universities.

### **Limitation of the Study**

The scope of the study was on the use of Management Information Systems (MIS) for decision-making process in South-East Nigeria Universities. The study was limited to the 10 (ten) Public Universities in South-East Nigeria.

### **Research Question**

The following Research Question guided the study:

1. In what decision-making areas should MIS be implemented for decision-making by administrators of South-East Nigerian universities?

### **Hypothesis**

The following null hypothesis was formulated to guide the study and was tested at 0.05 level of significance.

HO<sub>1</sub>: There is no significant difference between the mean responses of administrators and MIS experts on the decision-making areas for MIS by administrators of South-East Nigerian universities.

## **METHOD**

### **Design of the Study**

The design of the study was a survey research. The specific design was a panel study. The Delphi technique was used in data collection. The Delphi technique uses experts' opinions to obtain reliable responses on more than one occasion Grisham, (14). The technique is a method for structuring a group/panel communication process to facilitate problem-solving and to structure models. This technique permits experts' opinion to be pooled on a series of questions. A Delphi study is a virtual panel of experts gathered to arrive at an answer to a question, and therefore a form of panel survey.

### **Area of the Study**

This study was conducted in the ten public universities in South-East, Nigeria. The choice of South – East for this study was based on certain observations and personal interviews by the researchers with the staff, students and other stakeholders in the universities in these zones. The administrators and the MIS experts may seem to disagree on what data to collect, how to process and disseminate data and areas for which the data are to be used for decision-making in the universities. The researchers having observed these problems, decided to domicile this project work in South -East Nigeria, believing that the effective use of the MIS in these universities will minimize these problems and thus, enhance data-based decision –making process and improve university administration.

### **Population of the Study**

The population of the study was made up of 589 university personnel consisting of Heads of Department, Deputy Registrars and Directors of Management Information Systems (MIS) / Information and Communication Technology (ICT) Units in the universities. The sample of the study was made up of 30 experts selected from the ten public universities in South-East Nigeria. According to Clayton (15), sample size in a Delphi study ranges from 15 to 30 people in a homogeneous group.

A purposive sampling technique was used to select 10 Heads of Departments out of 499 Heads of Departments and 10 Deputy Registrars out of 80 Deputy Registrars from the ten public universities. Random sampling was used to select one Head of Department and one Deputy Registrar from each of the ten public universities in South-East, Nigeria. The 10 Directors of MIS/ICT Units in the ten public universities in South-East, Nigeria were selected. Heads of Department and the Deputy Registrars selected satisfied the following criteria: selected; have two or more professional years of experience in their present positions; were highly knowledgeable in Management Information Systems and decision-

making process in the universities and were willing to participate in the study.

### **Instrument for Data Collection**

The instrument developed by the researchers for the collection of the data was MIS Decision-Making Questionnaire (MISMQ). The instrument contains two sections. Section A deals with personal data of the experts. Section B contains the decision-making areas with 16 items and were attached with a 4-point rating scale of; Very Appropriate = 4, Appropriate = 3, Inappropriate = 2, Very Inappropriate = 1, which was used to elicit responses from the respondents for data analysis.

### **Validation of the Instrument**

The face validation of the instrument (MISMQ) was achieved through three experts, one each from Educational Administration and Planning, Measurement and Evaluation, and a Director of MIS Unit from a public University in Nigeria. The experts were required to determine their clarity, appropriateness of language and their ability to elicit the required information from the respondents. Their suggestions were used to improve the quality of the instrument.

### **Reliability of the Instrument**

The reliability of the instrument was determined through trial-testing of the questionnaire on 17 respondents, made up of seven senior academic staff including Heads of Department, nine senior administrative staff and the Director, Digital Centre at Kogi State University, Anyigba, Kogi State, which is outside South-East, Nigeria. The resulting scores were collated and the data were utilized to compute the reliability estimate using Cronbach alpha method. The result of the analysis showed reliability co-efficient of 0.98 for the instrument.

### **Method of Data Collection**

The researchers trained two research assistants on questionnaire administration using the Delphi technique. These research assistants were postgraduate students in Educational Administration and Planning in their respective universities. The researchers made use of the two research assistants in the distribution and collection of the questionnaire from the respondents. The copies of the questionnaires were administered directly to the respondents by the trained research assistants and the researcher. This process of questionnaire administration was carried out within a period of three months for the two rounds of the survey. At the end of the final round, the researchers collected back the questionnaire from the research assistants and the responses were collated for data analysis.

**Method of Data Analysis**

During the round one survey, 30 copies of the questionnaire were distributed to the respondents. All the 30 copies of the questionnaire were returned completed. In the second-round survey, the same 30 copies of the questionnaire were redistributed to the respondents. All the 30 copies of the questionnaire were returned completed by the respondents. The returned copies of the questionnaire were cross-checked for completeness of responses. The responses were transformed into scale values. The data were analyzed using Statistical Package for Social Sciences (SPSS).

‘consensuses were achieved through the mean and standard deviation of the questionnaire items. A mean score of greater than or equal to 3.00 (Appropriate) with standard deviation of less than 1.00 indicated agreement among the panelists in the study. According to Eighmy(16), this is a high standard for consensus of panelists in a Delphi Study. t-test was used to verify the null hypotheses at 0.05 level of significance.

**Research Question 1:** In what decision-making areas should data be provided by the MIS for administrators of South-East Nigerian universities?

The mean and standard deviation scores of the items were used to answer the research question. Panelists

Table 1: Mean responses on the decision – making areas of the MIS Data model (N=30)

S/N	Decision-making areas	X	SD	Decision	Rank
1.	Managing physical facilities	3.97	.18	AP	1
2.	Examination administration	3.87	.57	AP	2
3.	Staff appraisal	3.80	.41	AP	3
4.	Analyzing students’ retention & drop out	3.53	.51	AP	4
5.	Undertaking new physical projects in the universities	3.53	.63	AP	5
6.	Managing materials/equipment	3.53	.63	AP	5
7.	Taking decisions on students’ enrolment	3.50	.51	AP	7
8.	Allocating courses to students/Lecturers	3.50	.57	AP	8
9.	Determining students’ academic performance /advancement	3.47	.63	AP	9
10.	Approving new academic programmes	3.40	.62	AP	10
11.	Allocating lecture Halls/theaters in the universities	3.40	.68	AP	11
12.	Allocating Hostels to students	3.37	.56	AP	12
13.	Allocating residential quarters and offices to staff	3.20	.71	AP	13
14.	Financial management	3.13	.78	AP	14
	Cluster	3.51	.17	AP	

**AP Appropriate**

Data on Table 1 reveals that all the listed items on decision- making areas reached the experts’ consensus. Each of these mean scores is greater than the criterion mean of 3.00. These show that the items reached the experts consensus. The cluster means score is 3.51 which is above the criterion mean of 3.00, This shows that the items in the decision-making areas are appropriate for MIS utilization. The standard deviation values for the first five ranked items range from .18 to .63. These values show that the opinions of the respondents are close in relation to the mean. The decision-making areas most favoured by the respondents include; managing physical facilities (X = 3.97, SD = .18, Rank =1), examination administration (X = 3.87, SD =.57, Rank =2), Staff Appraisal (X =3.80, SD =.41, Rank =3), Analyzing students retention and drop out (X = 3.53, SD = .51, Rank =4), undertaking new physical projects in the universities (X = 3.53, SD = .63, Rank =4), managing materials/ equipment (X=3.53, SD =.63, Rank =4), taking decisions on students’

enrolment (X = 3.50, SD = .51, Rank =7), allocating courses to students and lecturers (X = 3.50, SD = .57, Rank=8).

**Hypothesis**

HO<sub>1</sub>: There is no statistically significant difference between the mean responses of the administrators and MIS experts regarding the decision-making areas in using the MIS for decision-making for administrators of South- East Nigerian universities.

Data on Table 2 shows the results of independent t-test conducted to compare administrators and MIS experts’ responses on the decision-making areas of the MIS. Items 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 and 14 have ‘t’ values of 1.000, -1.028, 1.018, .203, 1.18, -1.032, .000, 1.222, .000, 1.168, -.405, -.835, .203, .880 respectively. The Cluster has ‘t’ value of .258. These values are not significant at p < 0.05.

Table 2: Results of t-test of the mean responses of administrators and MIS experts regarding the decision-making areas in using the MIS.

S/N	Item	Administrators (N <sub>1</sub> )		MIS Experts (N <sub>2</sub> )		t	P
		Mean	SD	Mean	SD		
15.	Managing physical facilities	4.00	.00	3.90	.32	1.000	.342 NS
16.	Managing materials/equipment	3.45	.65	3.70	.48	-1.028	.313 NS
17.	Taking decisions on students enrolment	3.60	.50	3.40	.52	1.018	.317 NS
18.	Determining students' academic performance /advancement	3.45	.61	3.40	.70	.203	.841 NS
19.	Analyzing students' retention & Dropout	3.60	.50	3.40	.52	1.018	.317 NS
20.	Allocating Lecturer Halls/theaters in the universities	3.35	.67	3.60	.52	-1.032	.31 NS
21.	Financial management	3.10	.79	3.10	.74	0.0001	.00 NS
22.	Examination administration	3.85	.67	3.90	.32	1.222	.26 NS
23.	Staff appraisal	3.80	.41	3.80	.42	0.000	1.000 NS
24.	Allocating Hostels to students	3.50	.69	3.60	.52	-.405	.689 NS
25.	Approving new academic Programmes	3.30	.66	3.50	.53	-.835	.411 NS
27.	Allocating courses to students/lecturers	3.45	.51	3.20	.63	1.168	.253 NS
28.	Undertaking new physical projects in the universities.	3.45	.61	3.40	.70	.203	.841 NS
27.	Allocating residential quarters and offices to staff.	3.25	.85	3.00	.67	.880	.388 NS
Cluster		3.51	.16	3.49	.19	.258	.799 NS

NS = Not significant

N1 = administrators = 20,

N2 = MIS Experts = 10

There is no significant difference in the mean scores of administrators and MIS experts on each of the items and the cluster. The hypothesis of no significant difference between the mean scores of administrators and MIS experts regarding the decision-making areas of the MIS is not rejected. Therefore, the opinions of the administrators and the MIS experts regarding the decision-making areas of the MIS are not different.

## DISCUSSION

The results of the study indicated that 14 items on decision-making areas were considered appropriate for MIS usage by the experts. The identified major decision-making areas include; managing physical facilities, examination administration, staff appraisal, undertaking new physical projects in the universities, managing materials/equipment, analyzing student's retention and drop out, taking decisions on students' enrolment and allocating courses to students and lecturers. The use of data/information from MIS in the universities is a management process. Utilization of MIS outputs in the universities brings about organizational change that affects people and changes their work style increasing their productivity. According to ISDA Alter (17), the database for effective Management Information Systems (MIS) for the universities should be suited to the universities' particular goals and requirements to enhance decision-making in the universities. The database for university MIS is usually subdivided into different categories to enhance decision-making process. The categories include personnel, academic

information, students, facilities and financial domains. Personnel domain enhances decisions relating to staff biographical records, staff publications, salary, and other staff benefits. Academic domain provides information relating to courses, degree/postdegree programmes and research projects. Records on lecture timetables, lecture halls, examination records and evaluation of existing new academic programmes are within the academic domain of the MIS database. MIS provides data for decisions to be taken in these areas in the universities. The students' domain provides data relating to admissions, academic records, scholarship, dropout/retention, and medical records. The student domain also provides data on students' achievement before and after graduation and can serve as a key variable in the evaluation of the university's educational programmes. Facilities domain provides data relating to inventories on land, buildings, equipment, libraries and laboratories in the universities. The information on these facilities assists university administrators to make decisions to determine their optimal utilization in the universities. The financial domain provides data on the university budget, subventions, internally generated revenue, grants and other financial activities of the university.

The findings of this study are in line with the findings of Ebuara & Mbon (18), that the use of MIS in managing students' records, examination conducts, staff appraisal and library services make the university system more effective. Effective and efficient decision making ensures goal attainment. The findings of the study also agreed with the findings of

Al-Dhmour (19) that MIS and quality information has a direct positive influence on administrative decision-making in the universities. Therefore, using MIS in the universities ensures effective decision-making process. The findings of the study are also in congruent with the findings of Abdulkareem, Alabi.Fashiku, & Akinnubi, (20), who noted that MIS outputs could be utilized in making decisions relating to students' academic record management such as admissions, examinations, timetables, record processing and storage, university inventory, staff accommodation, lecture rooms/halls and in making financial decisions. University administrators require accurate and timely information to base their decisions to achieve the university goals.

There is no significant difference between the opinions of administrators and MIS experts on decision-making areas of the MIS for decision-making for administrators of South-East Nigerian universities. The two groups of staff are from the public universities in South-East Nigeria. The staff is likely to possess similar qualifications, experiences and may be exposed to similar MIS/ICT workshops and seminars by relevant government agencies like NUC and federal ministry of education and donor agencies. Their views are therefore likely not to differ on the decision-making areas of the MIS data output as they work and interact within the same environment. The findings on the decision-making areas identified among others; managing physical facilities, examination administration, staff appraisal and undertaking new physical projects in the universities.

The findings of the study have some educational implications. The findings on the decision-making areas identified among others; managing physical facilities, examination administration, staff appraisal and undertaking new physical projects in the universities. These areas have implications for the university administration as these are the implementation areas for the MIS implementation in the universities.

#### RECOMMENDATION

Based on the major finding of this study, it was recommended that University administrators should use MIS outputs for decision-making in the identified areas in the universities. Decisions in these areas will be facilitated and supported by the information generated from MIS activities.

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