PROPOSING A DSS AND ITS RELEVANCE FOR A UNIVERSITY WITH SATELLITE CAMPUSES: CASE STUDY AT UNIVERSITY OF EDUCATION, WINNEBA-GHANA

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Abstract: *Decision Support Systems (DSS) is an imperative modern-day issue for many establishments and is comparatively a new area in the jurisdiction of information technology. As DSS is a new area, little study has been done regarding the physiognomies of academic data and the intricacy of analyzing such data.The main objective of this paper was to study the existing system used by University of Education, Winneba which is a university with satellite campuses and possibly propose a new system. After the study a new system (DSS) has been proposed. The methodology used was, in order to better understand the problem at University of Education; initial literature review of the study was consideredfollowed by a holistic study of the existing system. Interviews were also conducted with twenty users selected by simple random sampling and who have been involved in the decision making process of the University. If the system proposed is to be accepted and implemented by the university used as the case study, they will now have a better source of information on which to base decision-making and the other major benefits of the proposed Decision Support System (DSS) can be listed as follows:, Retrieving the historical data is quick so users will save time, users can have access to data that are not included in their Information Systems in their satellite campus.*

Keywords: *Satellite Campus, DSS, Information Technology, Data.*

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INTRODUCTION

A satellite campus or branch campus is a campus of a college or university that is actually at a space from the native university or college area. This satellite campus may be positioned in a different urban, state or even country, and is often minor than the main campus of an establishment of an institution. The isolated campuses may be under the same certification and share resources or they share administration but maintain separate finances, assets, and other central bodies.

In many cases, satellite or branch campus are proposed to serve students who cannot travel far from home for college because of family errands ,their jobs, economic limitations, or other factors.

Fonseca and Bird(2007) stated that, the availability of branch campuses may increase higher education enrollment by nontraditional students.

There are a number of universities around the world with satellite campuses. In the United States of America; the University of Michigan has two satellite campuses: one located in Flint and the other in Dearborn. In Africa, countries like Nigeria and Ghana has Universities with satellite campuses. The Lagos state university in Nigeria has its main campus in Ojo and satellite campuses in Epe, Ikeja and Surulere. The Kwame Nkrumah University of Science and Technology in Ghana also operates with satellite campuses. There are other examples of Universities in Ghana with satellite campuses and they include; University of Education, Winneba which is used as the case study of this research, University for Development Studies, Ghana Telecom University, and Valley View University.

The University of Education was time-honored in 1992 with its main campus located at Winneba in the central part of Ghana. Its main purpose is to train professional teachers for the educational system of Ghana. The University has twenty-nine academic departments and centers, seven faculties. It also has 18 distance education regional study centers throughout Ghana. In addition to its main campus in Winneba where its administrative office is located, the University has three satellite campuses in addition to over 20 study centers;

- ❖ The college of Technology Education-Kumasi campus
- ❖ The college of Agriculture education-Mampong campus
- ❖ The college of Languages Education-Ajumako campus.

The three satellite campuses of this university have the same accreditation with the main campus in Winneba, share some educational resources and have the same governing body which is headed by the Chancellor. Even though they share some educational resources, an important resource like Information systems is not share because their systems are not integrated .The university currently do not have a central database which can facilitate the sharing of information within the four campuses and its other study centers throughout the country. Current students cannot access their records at any campus even though is one university with respect to registering for a course .Graduates from the university cannot also apply for documents like academic transcript unless he/she go to their campus of study. This paper seeks to see how best the various information systems at each satellite campus can be integrated so that a DSS can be used to support decision making at the University.

Universities with satellite campuses accrue large capacity of data if the various Information systems are integrated and it can be used to obtain facts on the development and performance of academic activities. The information that can be obtained from academic databases will aid to look for answers to queries such as:

- ❖ Assessment of the total number of academic staff in all programs.
- ❖ Analyze success ratios of students according to their departments.
- ❖ Calculate the number of academic personnel according to their titles in a definite year and program.
- ❖ Compute the total number of credits given to an instructor in a specified program and year.

OBJECTIVES OF THE RESEARCH

- ❖ The researcher objective is to design a DSS which will help to integrate the various Information System from the three satellite campuses into a data warehouse which will make decision support easier. The study is to develop a Decision Support System (DSS) which targets to support the administrative task of planning the university's educational capacity in terms of the number of students that offered courses can accommodate under the specified resources constraints.
- ❖ Specific objectives also include, giving users access to data not included in the current information system in their various satellite campuses.

2.0 RESEARCH METHODOLOGY

This is a single case study done at one of the Universities with satellite campuses in Ghana. At this University, each satellite campus has its own information system which provides services for current needs of the master program of the campus. However, there is no provided solution for the decision making processes yet as there is no centralize database to facilitate this process. Accordingly, this study aims to develop a decision support tool based on data warehouse approach by integrating the various Information systems from satellite campuses.

This study examined some of the data from Wood Technology, Business Education Accounting option, Business Education Human Resource option all at Kumasi campus, Soil Science Education (Mampong campus) and Educational Leadership (Winneba campus) master programs at the Graduate school of University of Education.

The methodology used was, in order to better understand the problem at University of Education; initial literature review of the study was considered followed by a holistic study of the existing system. Interviews were also conducted with twenty users selected by simple random sampling and who have been involved in the decision making process of the University. Thus ten administrative, ten academic staff and thirty students from each satellite campus also selected by stratified sampling. The following are some of the problems reported by the interviewers;

Problem 1

The current system does not give the number of students taking each course over a number of semesters. In order to make resource allocation like how many sections need to be offered in a semester and how many academic personnel are needed to offer the courses, it is important for the administrators to get this information.

Problem 2

Knowing the success ratios of departments according to years is important information for an administrator. It is not possible to reach this information in the currently used system. Especially, Student Affair Department gives several reports every year to the Vice-chancellor of the university and to the supreme authority for the regulation of higher education; Council of Tertiary Education in Ghana, like "Activity Report" and "Inspection Report". Currently, all of these reports' outputs are calculated by human effort.

Problem 3

To see the changes in the number of registered students for a specified academic program and the changes in the number of academic staff in the same years are important for an administrator in order to make resource planning. The current system is incapable of giving this information.

Problem 4

In the currently used system, it is not possible to see the academic staff's course loads and the total number of changes in academic staff according to their titles for a range of years. For there was a big problem example when the chief Executive of Fair wages and salary commission needed a data on the total number of academic staff in the whole University and their course loads to assists the Commission in migrating them into the Single Spine and Salary Structure.

Problem 5

In the current system, students cannot access their record at any satellite campus. For instance, one of the students said "I live in Kumasi but my campus is Mampong and I have to travel to Mampong to register for my courses each semester even though I live close to the Kumasi campus".

Under the lights of these problems, the development of DSS was proposed to answer a wide range of questions about Students, Programs, Academic Personnel, and Courses.

3.0 LITERATURE REVIEW

Decision Making

Decision making is an indispensable part of everyday life. We make hundreds of decisions each day. In order to make a good decision, we have to be informed about alternative options. These options can be in different forms such as numbers, graphics and impressions. Decisions can be group into three as structured, semi-structured and unstructured (Turban, 1995).Structured decisions are repetitive and routing decisions. Unstructured decisions are non-routine decisions so that decision maker has to provide judgment. Semi-structured decisions include some characteristics of both structured and unstructured decisions. Decision maker has to provide judgment only for the parts that do not have an accepted procedure.

Managerial Decision Making

In an organization, the manager is the first and foremost decision maker. This is the same in higher institution. Chancellor, Vice Chancellor, Dean and Department Heads are the ones who make decisions. All managerial activities revolve around decisions-making. However, the rapid change in the management environment result in the decision making process being more complicated today than in the past. The reasons for that can be summarized as follows:

❖ Making errors can be the cause of very big costs because of complexity in an organization.

❖ It is difficult to access information in order to make decision

❖ There are lots of alternative because of improved technology

Therefore decision maker has to make decision quickly especially in higher institutions (Turban,1995)

Decision support systems

A Decision Support System is an integrated set of computer tools allowing a decision maker to interact directly with computer to retrieve information useful in making semi structured and unstructured decisions. Example of this decisions include such things as merger and acquisition decisions, plant expansion, new product decisions portfolio management and marketing decisions.

Decision making is a fundamental managerial activity. It may be conceptualized as consisting of four stages: intelligence, design, choice and implementation.

DSS exist to help people make decisions. DSS do not make decisions by themselves Mallach(1994). They attempt to automate several tasks of the decisions-making process of which the modeling is the core(Turban et al, 1995).To comprehend DSS, a person needs to understand the process of making decisions.

DSS uses data, provides easy user interface and can incorporate the decision maker's own insights. The tables in a decision-support database are heavily indexed, and the raw data is often preprocessed and organized to support the various types of queries to be used.

Purpose of Decision Support System

The purpose of decision support system is to improve the decision making ability of managers by allowing more or better decisions within the constraints of cognitive, time and

economic limits .(Holsapple et al,1996). More specifically, the purposes of a decision support system are:

- ❖ Supplementing the decision maker

- ❖ Allowing better intelligence, design or choice

- ❖ Facilitating problem solving

- ❖ Providing aid for non-structured decisions

- ❖ Managing knowledge

Supplementing the decision maker means that DSS should supplement one or more of a decision makers abilities. DSS should help problem solving and make it more easy, smooth and fast.

Components of Decision Support Systems

A DSS is composed of four fundamental subsystems: Data management, model management, user interface, and knowledge management subsystems.

- ❖ **Data Management System:** A DSS uses one or more data stores to provide relevant information to the decision support system. Some of them are maintained by the DSS itself and some are external data sources. Some database are primarily used and maintained by another information system with its own database management system and some DSS applications may have no separate DSS database. The data is entered into the DSS as needed.

- ❖ **Model Management System:** The model base gives decision makers access to a variety of models and assist them in decision making. It can include the model management system software that coordinates the use of models in a DSS.

- ❖ **Dialogue Subsystem or User Interface:** It allows users to interact with the DSS to obtain information. The user supplies information to the DSS and commands the DSS using this subsystem.

   In addition, the user is considered as part of the system. The user interface is the hardware and software that facilitate communication and interaction between the user and the computer.

- ❖ **Knowledge Management Subsystem:** This is an optional subsystem and can support any of the other subsystems or act as an independent component. Also it provides knowledge for the solution of the specific problem.

Most theories of information management draw distinctions among data, information, and knowledge and there are three phases or process of transforming data into knowledge. It begins with raw data and ends with meaningful knowledge that is used to make decisions. (Breiter and Light, 2004).They are the following:

Data exists in new state. They do not have meaning itself, and therefore, can exist in any form. It changes according to person looking at it and turns into information.

❖ Information is data that is given meaning when connected to a context.

❖ Knowledge is the collection of information considered to be useful and used to guide action.

There are six steps in the process of data transformation into knowledge (Ackoff.R, 1989). In Figure 1, the process of transforming data into knowledge can be seen.
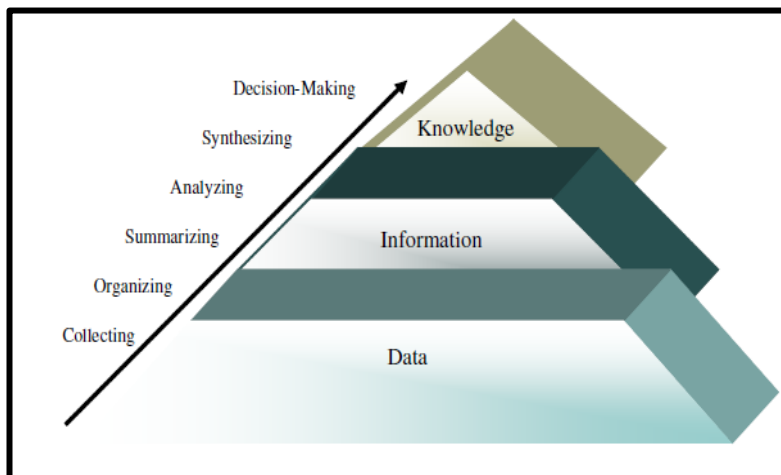

Figure 1 the process of transforming data into knowledge (Ackoff. R, 1989)

The transformation process starts with collecting and organizing data, along with summarizing, analyzing and synthesizing information to make decision. At the end of this process, the raw data becomes meaningful. A part from these subsystems, there is a new subsystem referred to as message management subsystem, which is used to manage data captured from electronic mail and electronic discussions groups (Sauter 1997). A schematic view of a DSS and its components is shown in Figure 2.
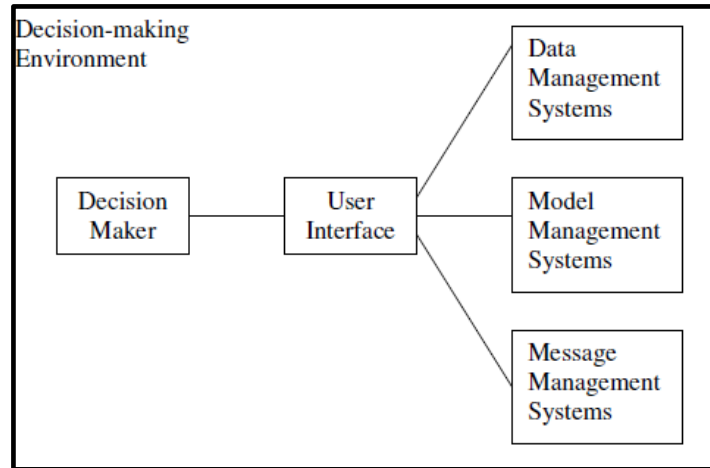
Figure 2 Components of DSS (Ackoff. R, 1989)

The users are not alteringthe data or information, the data is changed only by intermittent, majority updates are made during off-hour, low-traffic times in the database. In this study, the DSS is designed to help administrators, faculty, staff and students with data and information for:

- ❖ Program evaluation reports
- ❖ Campus and University planning projects
- ❖ Grants applications.
- ❖ Faculty and classified position applications.
- ❖ Arrangement of classes and proposals to either expand current class.

The Old System that existed in the University

The university has various Information systems such as Library management system, Human Resource Management System, Financial Management System, Inventory Stock Management System and the various management system from the three satellite campuses, thus Kumasi campus, MampongCampus, Winneba Campus. Figure 3 shows University of Education's Enterprise systems schema.
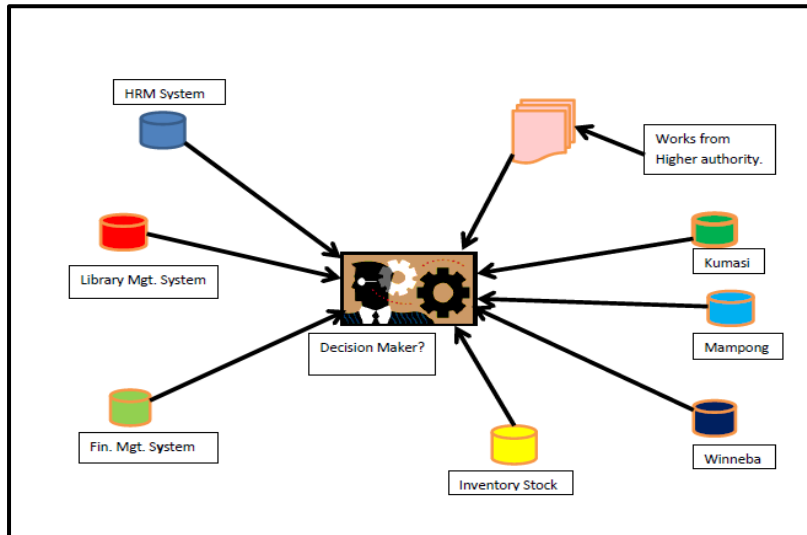
Figure 3 University of Education Enterprise System's Schema

4.0 PROPOSED DSS SOLUTION

In order to solve this complexity and help the decision-maker, integrated systems are offered as a solution. Figure 4 shows the proposed integrated system with a DSS.

The main reason behind this problem is a simple fact namely "relational databases are good at retrieving small number of records quickly, but they do not retrieve a large number of records and summarize them on the fly" (Friend, 1995).
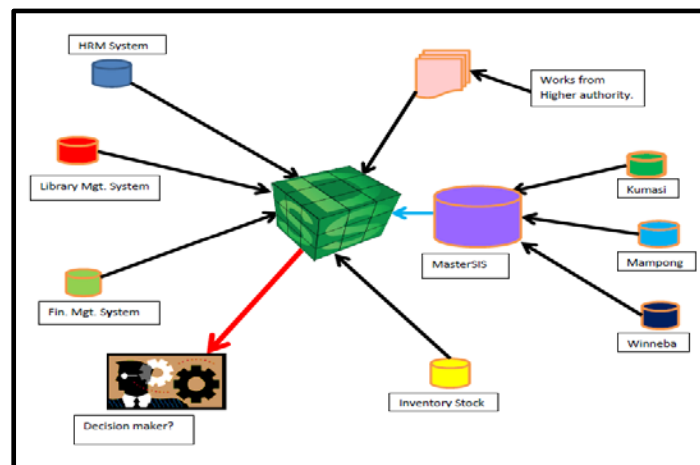

Figure 4 Proposed Integrated Systems for the University with a DSS at the center by (Author)

With this proposed system, there is an integrated system which will enable users and students to access their records at any satellite campus. The decision maker is also not at center of the system but he/she can access the DSS with ease.

Integrated systems collect and combine information coming from different sources, provide integrated view to the user, a uniform user interface and supports data sharing among different systems (Aidong 2007)

RELEVANCE OF THE PROPOSED DSS TO THE UNIVERSITY

❖ The most significant consideration is the DSS's ease of use by the decision makers in the University - its ability to allow less-technical know howpeople to interact with it directly.

❖ The ability to access information or data at any satellite campus.

❖ Current Students or Graduates from the University can access their records at any satellite campus.

❖ Assessment of the total number of academic staff in all programs taking the whole university into consideration is not a headache now to decision makers such as vice chancellor.

❖ Analysis of success ratios of students in any satellite campus according to their departments can be done with just a mouse clicks.

❖ Calculation of the number of academic personnel according to their titles in a definite year and program within the whole university community can be done without any manual means like making a telephone call.

CONCLUSION

In conclusion the researcher summarizes the work accomplished so far. The main objective of this paper was to propose a DSS for a university with satellite campuses using University of Education Master Program as my case study in order to help decision makers. If the system is to be accepted and implemented by the university, they will now have a better source of information on which to base decision-making Retrieving the historical data is quick so users will save time, users can have access to data that are not included in their Information Systems in their satellite campus.

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