Enhancing Theses Recording and Monitoring Using a Customized Database Management System (DBMS)

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ABSTRACT

A Theses Management and Monitoring System (TMMS) was designed and implemented to enhance the recording and monitoring of undergraduate theses at the Research and Development-Management Information Systems Office of the Nueva Vizcaya State University, Bayombong, Nueva Vizcaya, Philippines. The TMMS is a customized Database Management System (DBMS) using Microsoft Access.

The TMMS was able to solve the basic problems encountered with manual and keyed-in recording since it allowed users to easily access and generate the needed information by just a few clicks and key in on a computer.

INTRODUCTION

It is commonly assumed that Information Technologies have the potential to transform organizations through their capacity to gather, store huge amounts of data, manipulate, and transmit information efficiently with amazing speed. Information technology has touched every part of people's lives; the way they work, learn, live, and play.

The advent of technology revolutionized changes in information management and monitoring. Database systems provide an accurate means of record keeping, monitoring and data processing. Scot Morton (1991) argued that transforming organizations through a customized database system is an important objective because traditional structures are often ineffective in attaining the desired productivity. In the future, all organizations need to be transformed with computer-based technologies to be effective.

Database Management System (DBMS) is a software system that enables users to define, create, and maintain the database and provide controlled access to these databases. Post and Anderson (1997) stated that DBMSs provide abstractions by which the logical model of the data can be separated from the way it is physically stored. DBMSs are designed to help users examine data from a variety of perspectives. Instead of simply printing one type of report, they enable users to ask questions and create their own report.

Two important strengths of DBMSs are the ease of sharing data and the ability to search for data by any criteria. In terms of creativity, a database can make a person more efficient by providing easier and faster data processing and retrieval (Post and Anderson, 1997).

Thus, DBMS is one of the most important tools in Management Information Systems

(MIS). They have changed the way that computer applications are developed and are changing the way that organizations are managed.

Record keeping becomes increasingly difficult to handle in any organization because they continuously generate information. However, in a study conducted by Tolentino (2007), she claimed that through computers and vast databases available today, keeping the large amount of information seems to be a natural phenomenon to an organization requiring a proper place to store all essential information. Through this, spoilage or misplacing records can be avoided and information can be acquired instantly.

For the past years, the RD-MIS office used two methods which were manual file system and file-oriented system. The manual file system used a log book to store data then those data were keyed in using Microsoft Word or Excel. In the old system, problems were redundancy, inconsistency, difficulty to maintain, and data retrieval and processing was a big trouble.

Obviously, having manual access of record is a big problem. It needs a lot of effort, time and patience to produce the information needed. Files recorded in the manual system are difficult to access and manipulate. Likewise, necessary records may be lost when they are placed in a wrong storage. Since manual documents are usually done with pen and paper, keeping bulky documents becomes a major drawback.

The keyed in system using Microsoft Word or Excel can improve the record keeping process. However, it lacks features that DBMS applications can offer. Thus, development of a DBMS is a great help and solution to these problems. Hence, the Research and Development Management Information Services (RD-MIS) team of the Nueva Vizaya State University came up with a system aiming to change and improve the existing manual system. The use of a
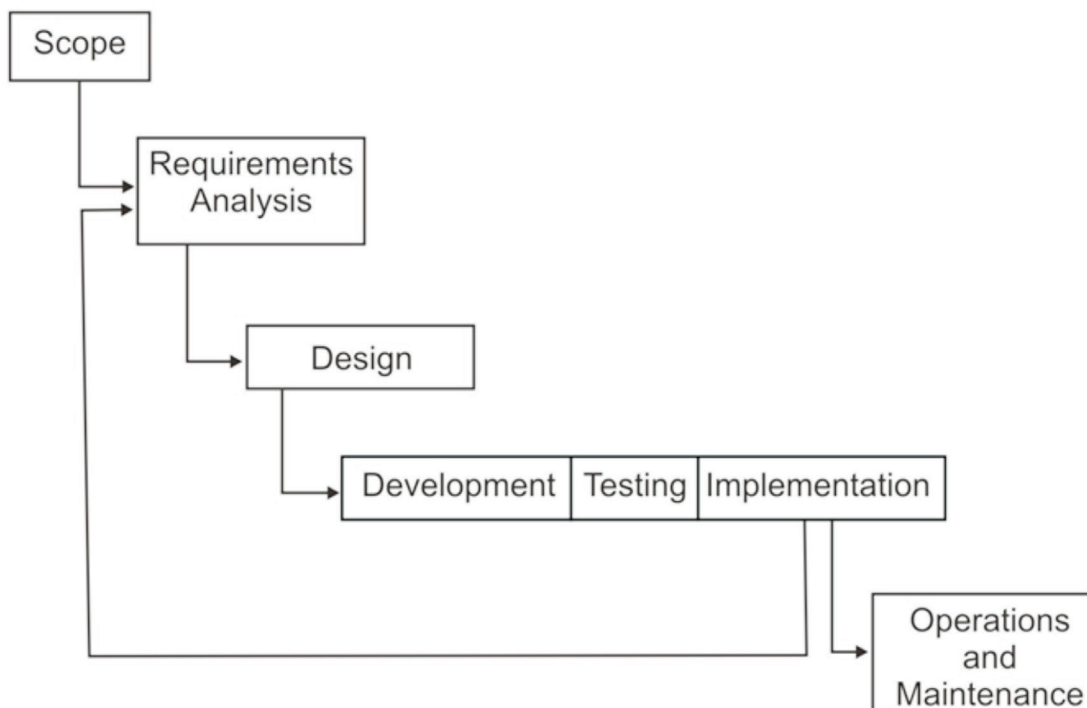
Figure 1. Conceptual framework

customized DBMS is the best solution that would answer the existing problem in terms of theses recording, monitoring, data retrieval and report generation:

The Thesis Management and Monitoring System (TMMS) can change the traditional system of recording/monitoring and report generation processes. It can solve the basic problems encountered in manual recording. Information will be intact in a proper, organized and secured way. Through TMMS, data will be stored digitally thereby information can be acquired instantly.

Generally, the project aimed to enhance the recording and monitoring system of undergraduate theses using a customized Database Management System (DBMS).

Specifically, it aimed to design a system that enables easier and faster way of record keeping, data processing and retrieval and implement this system to facilitate change in recording, monitoring, and data generation.

METHODOLOGY

Methodologies involved in this project are data collection and Theses Management and Monitoring System (TMMS) development using Microsoft Access.

Data Collection

The team gathered and compiled the necessary information needed for the development of a TMMS such as thesis title, thesis student, thesis adviser, major, commodity, etc. Sources of data were thesis manuscripts and previous thesis reports.

System Design and Development

The team followed the database design methodology cited by Aripin (2006). Figure 2 shows the seven steps of design flowchart.

Microsoft Access for TMMS Design and Development

Aripin (2006) described MS Access as a set of tools for end-user database management. It has a table creator, form designer, query manager and report writer. Access is also an environment for developing applications. The author further discussed that by using macros and modules to automate tasks, user-oriented applications as powerful as those created with programming languages can be created complete with buttons, menus and dialog
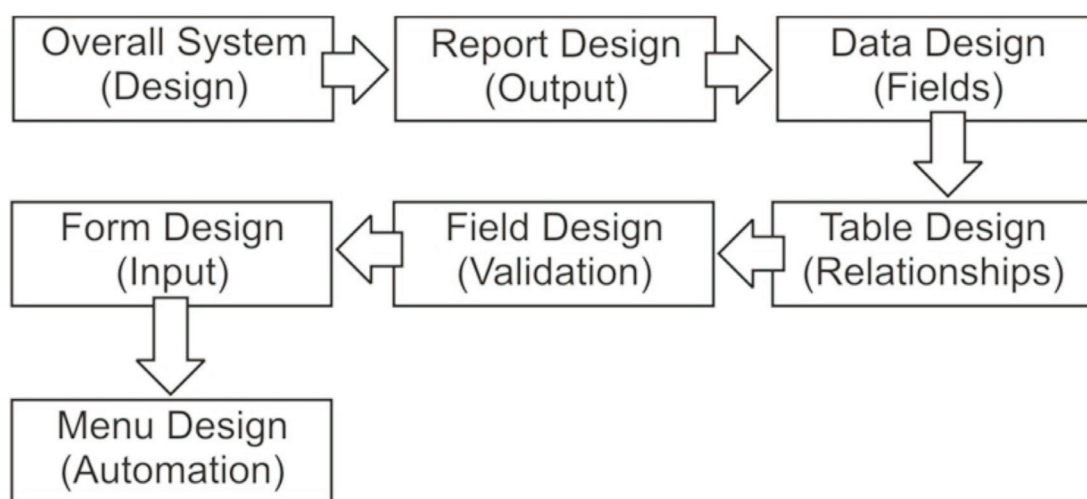

Figure 2. The seven steps of design flowchart (Aripin, 2006)

boxes.

The TMMS was developed using Microsoft Access 2002 application software. Guided by the capabilities of this application, the team believe that through TMMS development, the drawbacks of using the old system would be eliminated.

RESULTS AND DISCUSSION

Figure 3 presents the design and parts of the interface of TMMS.

Menus and Functions

Find Report. To find thesis by name, course, commodity, major field of specialization, etc.

Preview Report. To preview report per parameter value. This menu of TMMS was designed to preview filtered information based on various criteria set on the run query function such as: list by adviser; list by major; list by commodity, etc.

Run Query. To run query per parameter value. The query is designed as a means of accessing and displaying data from a single or multiple record (Post and Anderson, 1997). In TMMS' query, specific fields can be selected, sorting orders can be defined, calculated expressions can be created, and criteria to select desired records can be entered.

There are several queries developed in the system. Through these queries, information can be accessed using the following criteria: Outline, Manuscript, Adviser Name, Classification, Major, Course, and Commodity. Using these criteria to filter information in TMMS, the system has the capability to generate various reports and format. Queries can be created and edited easily.

Figure 5 shows a query designed specifically to generate list of thesis by classification and by major.

Print Report. To print a report in various list and formats. This menu was designed to print filtered information based from various criteria set on the run query function. Reports can be formatted easily in various styles using the report design function of Access to fit the needed format of a particular report.

There are several report formats designed in TMMS. Those reports are formatted based on the various report formats and they are just waiting to be clicked and printed.

Previous/Next Record. To navigate the record within the TMMS.

Add Record. To add record.

Export to File. This menu is used to export reports. Data or information stored in TMMS can be exported to Microsoft Word, Excel, Text and PDF formats using filters set on the query function.

This function of TMMS is very useful since it enables the RD-MIS team to send a particular report via e-mail. Figure 4 shows a list of thesis titles conducted by students exported in PDF format.

Entry Guide/Help. This contains instructions, guidelines, and entry codes used for filling up TMMS. This feature is very important to ensure uniformity of data entry.

Name Preview. To give a view of thesis student's name. This facilitates faster identification and searching.

Close Form. To close the form.

Data Fields. To hold the necessary data in the database.

Data Fields and their Functions

RandD Contribution No. To serve as a primary key. It is used to relate a table to foreign keys in other tables. Post and Anderson (1997) discussed that a primary key does not allow null values and must always have a unique value.

Date. To serve as a reference when the thesis was indexed in the TMMS.

Classification. To classify the titles to thesis manuscript and outline. This data field can be used to filter and generate a list of theses by classification.

Course. To record the academic course of the thesis student. This data field can be used

Parts of the Theses Management and Monitoring System

1. Find Record	5. Add Record	9. Close Form
2. Preview Report	6. Print Report	10. Name Preview
3. Run Query	7. Export to File	11. Data Fields
4. Previous/Next Record	8. Entry Guide/Help	

Figure 3. The input interface of the TMMS

Figure 4. A query designed specifically to generate list of thesis by classification and by major

to filter and generate a list of theses by course.

Major. To record the major field of the thesis student. This data field can be used to filter and generate a list of theses by major.

Study title. To record the title of the thesis.

Name of Student. To record the name of the thesis student.

Commodity. To record the commodity being studied. This data field can be used to filter and generate a list of theses by commodity.

Sector. To record the sector of the thesis. This data field can be used to filter the report and generate a list of theses by sector.

Discipline. To record the discipline of the thesis/research. This data field can be used to filter and generate a list of theses by discipline.

Adviser. To record the name of the adviser of the thesis student. This data field can be used to filter and generate a list of theses by adviser.

Adviser data field was placed on a separate table and linked through relationships. The team linked the RandD Contribution No. to Adviser ID to link information on Theses and the Thesis Adviser.

Filtering information can be a combination of two, three or more data fields. For example, list of theses by classification by course and by major (Figure 5).

Other Features of the TMMS

The TMMS use of Access' data-validation rules prevent inaccurate data regardless of how data is entered. Every field in a record has format and default definitions for more productive data entry.

Multiple record in the TMMS are linked by defining relationships between each record. This relationship can be used to create queries, forms, and reports to display information from several record at once (Figure 6 and 7).

As cited by Apirin (2006), a relationship

List of Theses manuscripts conducted by Agriculture Studentes (Major :Soil Science)

m/dd/yyy)	Classificatio	Course	Major	Study Title	LastName	GiventN	M.
3/26/2007	M	BS in Agriculture	SS	Influence of a-napthaleneacetic acid (ANAA) on rooting performance of	Bahatan	Alfonso	P.
3/26/2007	M	BS in Agriculture	SS	Rooting Ability of Jatropha (J. curcas L.) stem sections dipped in a-	Bilwan	Carlos	M
4/1/2007	M	BS in Agriculture	SS	Growth and yield of peanut (A. hypogea Linn) as affected by rhizobium	Serona	Teddy	L.
3/30/2010	M	BS in Agriculture	SS	Assessment of Erosion-Vulnerable Areas in Belance, Dupax Del Norte,	Pini	Marnell	L.
3/25/2011	M	BS in Agriculture	SS	Growth and Yield of Hybrid Tomato (L. lycopersicum Karsten) Applied with	Cumiha	Erlinda	H.
6/24/2013	M	BS in Agriculture	SS	Growth and Yield Response of Basmati 370 (O. sativa L.,) To Bio-N Under	Celeste	Wilfred	M

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Figure 5. List of theses filtered by classification by course and by major

works by matching data in key fields - usually a field with the same name in multiple records. In most cases, these matching fields are the primary key from one record, which provides a unique identifier for each record, and a foreign key in the other record. This is illustrated in figure 6 which shows that Adviser ID 9 (Sana, Elbert A.) is linked to RandDContribNo (RandD Contribution Nos.) 07-CS-003-0, 07-CS-004-0, 08-CS006-M, 12-CS036-M and 13-CS040-M.

Figure 6 implies that if a report is to be generated by Adviser ID List, the system will automatically list the titles corresponding to the RandD Contribution Nos. (Figure 6A).

System Implementation

After thorough testing and system improvements, the developers decided to fully implement the TMMS. Upon implementation, encoding of thesis manuscripts was done.

The TMMS was designed to manage and monitor the theses conducted by the students of Nueva Vizcaya State University. Before,

Figure 6. Table showing the Adviser ID keys linked to the RandDContribNo keys.

Figure 6A. Sample report generated using AdvierID keys linked to the RandDContribNo keys

Figure 7. Table showing the RandDContribNo keys linked to Adviser ID keys

Doctor of Veterinary Medicine, 42, 12%

BS in Home Technology, 26, 8%

BS in Information Technology, 27, 8%

BS in Environmental Science, 33, 9%

BS in Agriculture, 92, 26%

BS in Agribusiness, 38, 11%

BS in Computer Science, 40, 11%

BS in Agricultural Engineering, 36, 10%
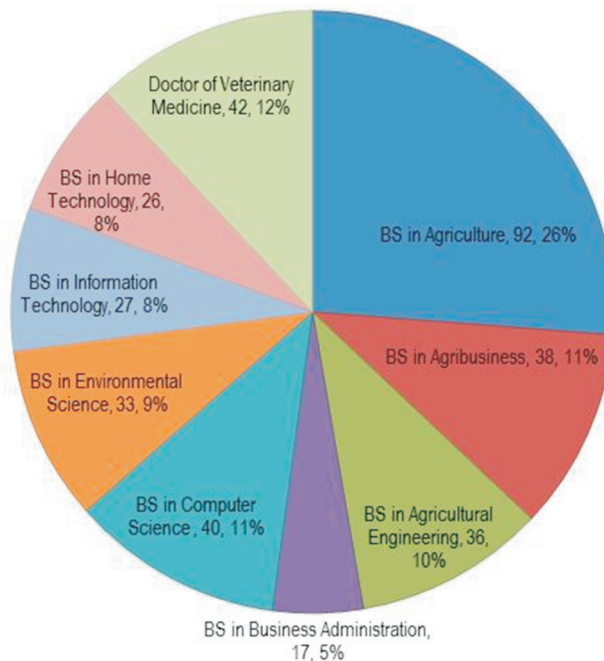
BS in Business Administration, 17, 5%

Figure 8. Distribution of theses manuscripts collected per academic course of students from 2007 to 2013

the RD-MIS team repeatedly encodes (or used to copy and paste) needed information on Word and Excel to prepare a particular theses report such as: list of undergraduate thesis per commodity per year; list of undergraduate thesis students per college per adviser; and title of thesis conducted per commodity per year per field of specialization. With the implementation of the TMMS, theses records are now more compact, systematic and can be accessed easily. Theses related information are stored digitally in TMMS, and report generation and processing are just a few clicks away.

The system is now running in a standalone computer. Updating of data is done every time that a new thesis title is submitted to the RD-MIS office. At present the TMMS holds 351 manuscripts (see figure 8 for details) titles and 112 outline titles.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The Thesis Management and Monitoring System (TMMS) enhanced the recording and monitoring of undergraduate theses. The system allows its users to easily have access with the records in a faster and more convenient way. Instead of searching particular information in folders or logbooks, which is time consuming, users can readily access and generate the needed information by just a few clicks and simple key in on the computer.

With the TMMS, basic problems encountered in the traditional system of recording and monitoring, and report generation processes were solved.

Recommendations
1. The RD-MIS team should collaborate with the IT department to come up with a more comprehensive database.
2. Inclusion of thesis abstract to the system to make it more accessible.

3. All thesis students should be advised to have their thesis outlines indexed at the RD-MIS office.

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