

AUTOMATED LIBRARY USER'S MANAGEMENT SYSTEM

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ABSTRACT: *The problem was realized to help the library users and the librarian including the library personnel generate accurate and reliable statistical reports in the library by creating an application software entitled automated library users management system (ALUMS). Especially, the system was intended for St. Therese MTC-Colleges in Magdalo Street, LaPaz, Iloilo City. The success of the system was based on the researcher's efforts in determining first the accuracy and reliability of the manual system used in the library and was found that the work process was done by tallying. This was the gap, and the researcher designed an automated system that generated an accurate and reliable database in replacement of the previous tallying process. The accuracy and reliability of the automated library system were determined, and the accuracy and reliability between the manual and the automated system was compared. It was found that the newly developed automated library system generally improved the process, and all the reports were accurately done spending less time and effort, and was marked by accuracy and reliability.*

Keywords: File Management, Report Generation, Document Archiving, online transactions

1. INTRODUCTION

The interest in conducting the system study to develop an automated library user's management system of St. Therese MTC-Colleges, Jalandoni, Inc., Iloilo City will help the school library personnel manage all their library users that enter the library with the integration of barcode technology to assist the system most especially the students. It is one of the CHED requirements during inspections to determine the average, percentage, and total students that enter the library. In the same way, the school library is required to submit the monitoring reports monthly, and semestral reports to the administration to determine the daily average and percentage in all courses, and year level student that enters the library. Before, the school library required the students and other researchers to log in to the logbook when entering the library their name, course, and the time they entered the library which sometimes made the students feel uncomfortable especially when there were many students. They stayed for quite a long time at the information desk. Due to this hindrance, the school librarian decided to change their system into tallying manual monitoring system. The library assigned personnel to log in at the logbook every time the student entered the library and classified according to course, and year level, and at the end of the day, they had to compute the number of library users. This manual system showed a slow consolidation of reports and sometimes showed inaccurate results because sometimes they missed to log-in some students when they were busy. In view of this observation, the researcher chooses this system to be the focus of the study to develop an automated library users management system that can give a very comfortable way both to library personnel and library users. This system provided a very systematic way when monitoring the library users offering the fastest way and generating accurate results in a short period without delay. The system has to be incorporated with the latest technology to help enhance the system called Webcam. This technology is used to capture the picture of the student during the registration of their information so that they will not be bothered to bring their picture. The library users' picture will appear on the monitor screen when scanning their library ID

during log-in and log-out. Upon issuing the library ID, each is given a barcode which is printed in front of their library ID. This is used for log-in/log-out in the library by scanning their ID with the barcode to the barcode scanner. This library user's registration should be done only once and this should be validated during the enrollment period only. The researcher aims to offer a solution to the problems concerning library monitoring of library users and provide a user-friendly system for their ease and comfort. The system basically responds to the needs of the library personnel that makes their work easier and more convenient. It also gives exact/accurate records of the library users for documentation purposes needed for the school administration and for the inspection and accreditations.

THEORETICAL FRAMEWORK

This study is anchored on the User Acceptance of the Information Technology theory postulated[17]. This theory provides an understanding of the factors that influenced user acceptance of information technology to give more interest both to researchers in a variety of fields as well as procurers of technology for large organizations. This theory demonstrated the nature of technological acceptance is mediated by distinct factor groups related to the psychology of the users, the design process of information technology, and the quality of the technology in user terms. It is concluded that current research offers insights that can support the derivation of reliable predictions of user acceptance. However, potentially overlapping theories seem to exist independently of each other and there exists scope for a unifying framework to extend innovation diffusion concepts and systems design models (particularly user-centered design) into a formal theory of user acceptance of information technology.

In relation to the study, this theory is anchored in designing the database, especially in applications of the entity-relationship of every table in the database applied on object-oriented languages like the programming language Visual Basic version 6.0.

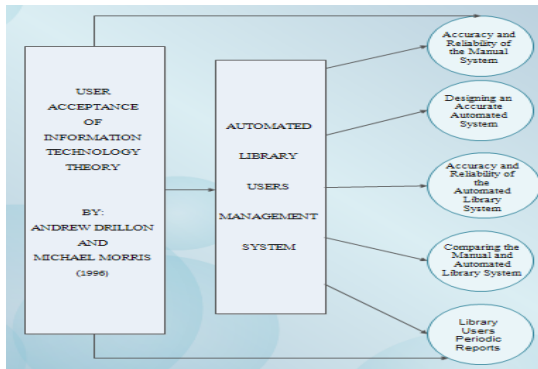


Figure 1. The Theoretical Conceptual Framework in Schematic Diagram

OBJECTIVES

The study aimed to create an application software entitled automated library users management system that can generate accurate and reliable library users' statistical reports in the library of St. Therese MTC-Colleges, Jalandoni, Inc. Specifically, the following specific objectives are raised to answer the main problem:

1. Determine the accuracy and reliability of the manual system
2. Design an accurate automated system that generates an accurate and reliable database.
3. Determined the library users' periodic reports
4. Determining the accuracy and reliability of the automated library system.
5. Compare the accuracy and reliability between the manual and automated library system

REVIEW OF RELATED LITERATURE

The Automated Library User's Management System highlights the importance of bridging the gap between academic institutions and the communities they serve. It emphasizes the need for high-quality extension programs and projects to reach underserved and underprivileged community stakeholders. The COVID-19 pandemic has accelerated the shift towards online operations, leading to the development of an online management system. This system aims to streamline transactions, reduce exposure to the virus, and provide convenient access to vital extension-related documents. Key design elements include user-friendliness, accessibility, and the ability to generate downloadable and printable documents for seamless submission to external agencies and stakeholders[16]. Understanding the key concept Srinivasa [1], stated that one reason that automation is important for libraries—it is the way to effectively modernize their function and services, which is turn makes them more efficient at responding to the needs of their users. Library automation is viewed as the total composite of technologies needed to bring to the library using the necessary access and services to answer real-world information needs. Automation makes the library system, resources, and services more attractive and interactive, helping libraries to meet their user's expectations.

The computerization of the library usage monitoring system helps a lot of library personnel in monitoring the students doing their research in the library. Because of the computerized enrollment system, the information about the student is automatically connected to the library once they are enrolled. When the students enter the library the library personnel enter the student ID to the system for log-in or for log-out when going out. The system generates output based on courses according to year and level [5].

System IDs in schools [2], a lot of data entry is required to track the students' information. It is a very tedious task that *requires* documenting different steps and transmitting information when required. In any department of the educational institution, barcode equipment or technology eliminates paperwork, cuts down data entry errors, and allows instant wireless transmission. Manual data entry requires double the effort and has a large number of errors.

Ibrahim [3] stated that this project develops a barcode recognition system by using image processing. The system is able to read barcodes through images and it will be captured by webcam. This project is a MATLAB software program to develop the system and it will integrate with a webcam or digital camera. The system analyzes the image and then displays on the Graphical User Interface (GUI) the barcode type, data, and size of the image. System designation is to recognize different types of barcodes and display the data once the barcode image is captured.

2. METHODOLOGY OF THE STUDY

This study was developmental research intended for software development. A prototype model in software development was used in developing the system.

DEVELOPMENT PHASE

Planning phase. At this stage, the first task is to identify the algorithm that would be implemented in edge detection on the design of the system. The task is to find an algorithm to approximate the edge that discontinuity of the design in the system.

Analysis phase. This phase required the knowledge of the planning phase to be structured and discussed upon developing the system. This study performed detailed research on all the problems that arise during the manual monitoring of library users which is considered important to understand.

Design phase. The primary objective of the design phase was to create a design that satisfies the agreed application requirements. In this phase, the application chosen from the analysis phase was constructed including the database design and codified.

System Logical Design. The following diagrams and tables showed how the proposed system went through its development and its mapping from logical design to its equivalent physical design.

Screen Design. The following screen design and figures show how the proposed system went through its development and its mapping from logical design to its equivalent physical design of the system.



Figure 2. The Logical Design of System Process Flow in Opening screen (Splash screen)

System Loading. In loading the system (ALUMS), from the desktop point the mouse pointer to the ALUMS icon and double click after few seconds the splash screen was first loaded, and the same time opening the database (MS Access2010) of the program. The main screen was displayed in the monitor for monitoring the login/logout of the library users that entered the library.



Figure 3. The Logical Design of System Process Flow in the Main Screen Interface.



Figure 4. the logical Design of the Library Users Registration This registration form will accept input information of the Library users and is also composed of several commands which follow Add, Edit, Cancel, Delete, Save, Close, Take Picture, and Browse.



Figure 5. The Logical design of the Capture Image Form

Take Picture command. This command was used in taking the picture of the library user after entering their information by using of Webcam, Digital camera, etc., and saved it to the database for the future use. Click captured image button to capture the picture from the camera and click close button to exit this form.

Browse Command. This command was an alternative from the take picture command. This command loaded the existing picture of the library user from the computer and saved to the database.

This student list form displayed all active registered library users. The form had the following commands options: Edit Command, Active Command, Refresh Command, Search Command, Print and Close.



Figure 6. The Logical Design of Library User List Query

This form displayed all logged-in library users inside the library. The form has the following facility query by name, by user classification, and user type. This form is capable to display the date and time logged in of the specific library user.

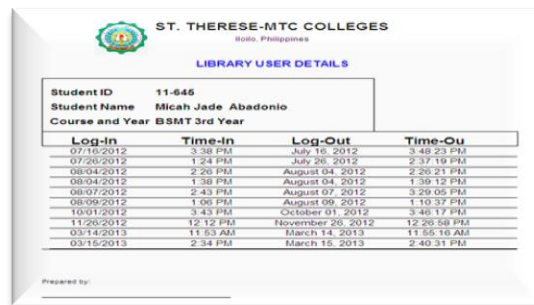


Figure 7. The Logical Design of Library Users Logged Details

Table 1. Print Library Users Monthly Summary Reports

Course	Registered Students	Total Membership	Percent	Average Day
BSMT	1,830	531	1.81	29.50%
BSMAR-E	1,785	412	1.28	22.80%
BS Criminology	172	143	5	7.94%
ASBS	407	35	.48	1.94%
HIGH SCHOOL	37	42	6.31	2.33%
FACULTY	62	12	1.08	.67%
STAFF	49	3	6.12	.34%
ALUMNI	2			%
OUTSIDER RESEARCHERS	2	5	13.89	.28%
TOTAL	4,438	1,191	1.40%	66.17

User Details form

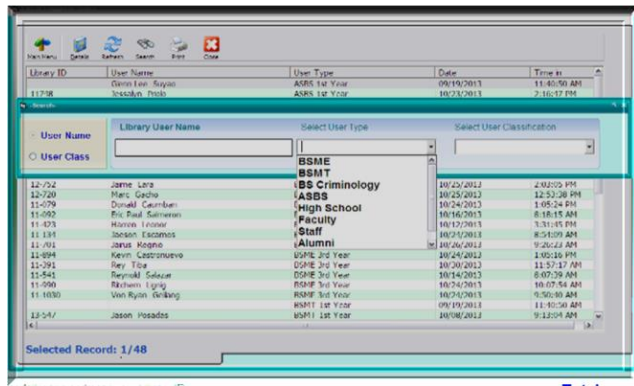


Figure 8. The Logical Design of Individual User Details report.

Library user details reports

This reports library user details and generates the summary of individual library user log-in and log-out in the library. This report generates monthly summary reports based on the number of school days per month. The first column is composed of user type followed by the total number of users registered in the particular semester, the third column is the total monitoring on the specified month and the total school days, and the fourth column is the equivalent percent based on the monitoring and the last column is the average/per day. This Entity Relationship Diagram (ERD) shows the relational connectivity of every table and the database normalization.

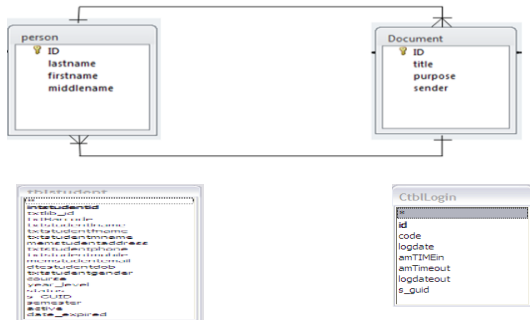


Figure 9. The Logical ERD of Users' Log-in

This query displayed all log-in users monitoring from the database upon typing the name of the student or by course and year level.

Coding. The program needed a function to generate the algorithm that was applied to the design target of the system. This coding was necessary to build the program to run successfully. This was the harder stage in developing the system that must be implemented

Implementation Phase

This phase described how the designs were translated into code. This phase included the information which was the algorithm coded and tested. The implementation phase also needed a programming tool (Visual Basic 6.0) to create and support the graphical user interface for the prototype of the application to generate the output of the algorithm.

RESULTS AND DISCUSSIONS

This comprised the analysis, statistical presentation and interpretation of the findings resulting in the statistical reports process from the monitoring of all the library users and generated the monthly summary and semestral reports. These statistical reports showed the average per day of every library user classification and the daily percentage.

INTERPRETATION OF DATA

This output is generated from the input data from the monitoring of log-in and log-out of the library users composed of semestral reports and monthly reports.

Semestral Statistical Reports

In the semestral reports, for the first semester, it covered from June, July, August, September, and October

These reports generated the summary monitoring according to every library user's classification based on by

Table 2. BSMar-E 1st Semester Reports

Bachelor of Science in Criminology						
Semester :1st Semester School Year : 2013-2014						
Year Level	June	July	Aug	Sept	Oct	Total
1st Year	24	18	33	21	25	121
2nd Year	92	75	105	64	46	382
3rd Year	10	33	45	29	18	135
4th Year	17	28	18	13	9	85
TOTAL :	143	154	201	127	98	723
AVG/Day	7.94	5.70	7.44	5.08	3.63	5.83
Percent :	4.62	3.32	4.33	2.95	2.11	3.39

semester and school year. This sum-up in all year level by month in the whole semester is given from the input monitoring.

Below sums up the total monthly monitoring in all year levels which determined the average per day by computing the total monthly monitoring in every year level and dividing by the total number of school days. In monitoring the daily percentage the result from the average per day is divided to the total number of enrollees and the answer multiply by 100.

Table 3. BSMT 1st Semester Reports

Bachelor of Science in Marine Engineering						
Semester :1st Semester School Year : 2013-2014						
Year Level	June	July	Aug	Sept	Oct	Total
1st Year	114	160	391	355	297	1317
2nd Year	269	587	605	276	246	1983
3rd Year	29	253	1109	331	270	1992
4th Year	0	0	0	0	0	0
TOTAL :	412	1000	2105	962	813	5292
AVG/Day	22.89	37.04	77.96	38.48	30.11	42.68
Percent :	1.28	2.07	4.37	2.16	1.69	2.39

Monthly Summary Statistical Reports

This output sum-ups the total monthly monitoring, the monthly report generated based on the query by month, and the total school days for the month. The reports were composed of all library users in the library, total registered users by classifications, total monitoring for the month, the percentage, and the average per day based on the monthly report.

SUMMARY OF FINDINGS

The study created an application software entitled "Automated Library User's Management System" that gives a more systematic means that can generate accurate, and reliable library users statistical reports in a short period of time.

Specifically, the coverage of this study determined the library users monitoring by monthly, and semestral reports in terms of Course and year level for the students, and for the faculty, this will determine if how many professional instructors in maritime, criminology, and high instructors entered the library. The system computed the average per day and the daily percentage of the library users who entered the library based on the reports generated.

Also, this will determine the accuracy and reliability of the current manual system and design the accurate automated system that generates an accurate and reliable database.

Moreover, this determined the accuracy and reliability of the automated library system and compare the accuracy and reliability between manual and automated library systems.

This provided detailed monitoring for the library users starting from the date, time log-in, and logout, and it shows if how many times he/she enter the library in the whole semester.

Additionally, the system provides an easy method of login/logout without delay for the library user by the time they entered the library. The registered library users scanned their library ID to the barcode scanner for login and logout of the system.

As a whole, the findings of it take time in preparing the reports.

CONCLUSION

Based on the data gathering, it shows that slow processing of monitoring, and inaccurate generation of the library users' records arise in the library.

Therefore, the researcher concludes, that the implementation of the proposed system can give benefits the library specifically the library users and library personnel that make their job easy for making monitoring the easiest way, especially in accounting for the number of library users that visit the library for research purposes and the same time generating of accurate and reliable daily, monthly and semestral reports in a short period of time.

RECOMMENDATIONS

The following are recommended by the researcher:

1. Based on the findings of the study, the researcher strongly recommends the implementation of the proposed system entitled "Automated Library Users Management".

2. Before implementation of the system, the possible users of the proposed system have to undertake a training seminar from the researcher in order for them to understand the process and operation of the proposed system as well as its functions.
3. Other schools may adopt the system provided permission is served from St. Therese MTC-Colleges.

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