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Research and Extension Completed and On-going Registered Programs Database System (RECORDS)

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Abstract--The study designed and developed RECORDS (Research and Extension Completed and On-going Registered programs Database System which will serve as the central storage of data of SLSU Research and Extension offices. The development of the system used VB.Net as a programming language and MySQL as a database of the system application to function properly. This research followed the process of developmental research. It was conducted during the school year 2019-2020 at SLSU Campus Lucena. The developed software and database system were evaluated by IT experts, selected members of the Research and Extension Council, and researchers and extensionists of SLSU. The parameters used in evaluating the developed system were functionality, reliability, usability, efficiency, maintainability, portability, and security. The evaluation result showed that the 30 respondents highly accepted the system. Overall rating of the RECORDS evaluation got the average weighted mean of 3.79 with the equivalent interpretation of highly acceptable. This implied that the developed RECORDS (Research and Extension Completed and On-going Registered programs Database System) can be utilized by the SLSU Research and Extension Offices.

Keywords--database system, extension, registered programs, research, software.

Introduction

The advancement of technology creates and develops an easy task. Over the last

few decades, the advancement in computer and software technologies has reached an impressive level. These fields require different sets of resources like computing hardware, internet, software and hardware tools, mobility technologies, storage, system management, and security technology.

Based on the study of [Sharma \(2016\)](#), utilization of computers in our life is essential. Computer and modern gadgets are tools to get in with social media as a way of communication just to be updated in almost everything about the world. One of the systems modernized by different organizations, industries, and institution is transferring their traditional files of records into an electronic record for convenient use and easy retrieving of data. Its significance runs into the reality that almost all institutions enhanced global competency to respond to global demands in the line of education, medicine, research, community linkages, businesses, agriculture, climate change, etc.

A database is an organized collection of data, stored and accessed electronically, generally stored in the database management system. It is a computer-software application that interacts with end-users, other applications, and the database itself to capture and analyze data where general-purpose allows the definition, creation, querying, update, and administration of databases ([Barbour, 2001](#); [Kitchenham et al., 2009](#); [Chow & Cao, 2008](#)).

21st-century education is characterized by e-learning. It's significantly made as a framework of research and practice of productive services ([Singh 2017](#)). It can inevitably transform all forms of education with pedagogies into effective processes and practices to attain outcomes-based education. The presence of modern technology is the basis of changes in the system of almost all organizations and industries and even the lifestyle of people.

Upholding the highest standard of learning, SLSU provides a wide range of learning experiences and disseminates knowledge-based research ([Bougrain & Haudeville, 2002](#); [McDougall et al., 1994](#)). Likewise, it holds active participation to share it's worth supporting a different organization through strong community linkages.

The RECORDS (Research and Extension Completed and On-going Registered programs Database System) can contribute the significance of how database system can increase the efficiency of storing records and information along with the name of researchers, the title of particular research undertaken at such specific time, the status, funding source, presented, published and likewise the extension project conducted ([Frischknecht & Rebitzer, 2005](#); [El-Mehalawi & Miller, 2003](#)). This study can showcase how SLSU through the services made by the Research and Extension Offices continuously embraces the updates on the system brought by technology advancement likewise it can realize that through RECORDS SLSU faculty and students can work conveniently guided by the stored records and information. The development of RECORDS can be a way to urgently respond to the call of report submission particularly by those affiliated offices like CHED, DBM, DOST, etc. This can be also the source of aspiration that, SLSU family as a known institution in the province of Quezon can make a difference in

the line of innovation which demands by global changes as modern technology speaks for its worth in our life (Home et al., 2009; Dykoski et al., 2005).

The main objective of this research was to design and develop RECORDS (Research and Extension Completed and On-going Registered programs Database System which can be utilized effectively by SLSU Research and Extension offices (Jahanshahloo et al., 2006; Fanger & Toftum, 2002). Specifically, it aimed to answer the following objectives:

- To identify the requirements that will serve as a tool for the design and development of RECORDS (Research and Extension Completed and On-going Registered programs Database System
- To design a prototype system using Unified Modelling Language and the identified requirements needed by the end-user.
- To develop a Window Based application using Visual Basic.Net as the programming language and MySQL as its back-end database for the data warehouse.
- To evaluate the level of acceptability of the system using ISO/IEC:25010, 2011 in terms of:
 - Functionality
 - Reliability
 - Usability
 - Efficiency
 - Maintainability
 - Portability
 - Security

Research Method

This institutional study was conducted at SLSU Lucena since the project leader was the former Campus Director and the proponent members were the campus faculty till present. SLSU Lucena is presently attaining to be the research-driven campus through the reference of the researches conducted, presented, and published by both student and faculty researchers along with pedagogical and developmental study. The SLSU Lucena Campus is presently located in its spacious location at Barangay Ibabang Dupay Lucena City.

The research utilized the developmental research design. Developmental Research is defined as the systematic study of designing, developing, and evaluating instructional programs, processes, and products that must meet criteria of internal consistency and effectiveness.

The respondents of this study were composed of (30) persons who were chosen purposively and contributed their expertise by evaluating the system and sharing their ideas in this research. It was composed of twelve (5) IT experts and (25) Research and Extension Council, researchers and extensionists of Southern Luzon State University who will likewise benefit as end-user of this study. The survey questionnaire was used as the main tool in gathering the data. This survey questionnaire was lifted from the ISO 25010 Software Quality.

Evaluation criteria

Table 1
Four-Point Likert scale

Range of WM	Descriptive interpretation
3.26- 4.0	Highly Acceptable
2.51 - 3.25	Acceptable
1.76 - 2.50	Unacceptable
1.0 - 1.75	Highly Unacceptable

Table 1 shows the Four Point Likert Scale used as evaluation criteria where 4 is the highest and 1 is the lowest. The researchers used the Average Weighted Mean formula as statistical treatment in analyzing and interpreting the gathered data.

Formula:

$$AWM = \frac{\sum WM}{N}$$

Where:

AWM= Average Weighted Mean

Σ = Summation

WM= Weighted Mean

N= Number of Items of Weighted Mean



Figure 1. Project development of RECORDS

Figure 1 shows the stages of development of the system. It started with the project planning. This stage consists of a review of the areas associated with the system. It produced a broad definition of the system requirements in the terms of the functions that the system can support. Then, created a plan for the corresponding design of the information system and built it. After planning and conceptualizing the design, the system was programmed. The proponents consulted IT experts in designing the information system. Their suggestions improved the functionalities of the system. The proponents modified the errors in the program and syntax was checked. A test was conducted to find out whether the system was performing well based on the design. Adjustments and some corrections were taken before

finalizing and setting the system. After all the adjustments to the system were made, it was finalized. The system was evaluated to determine its acceptability.

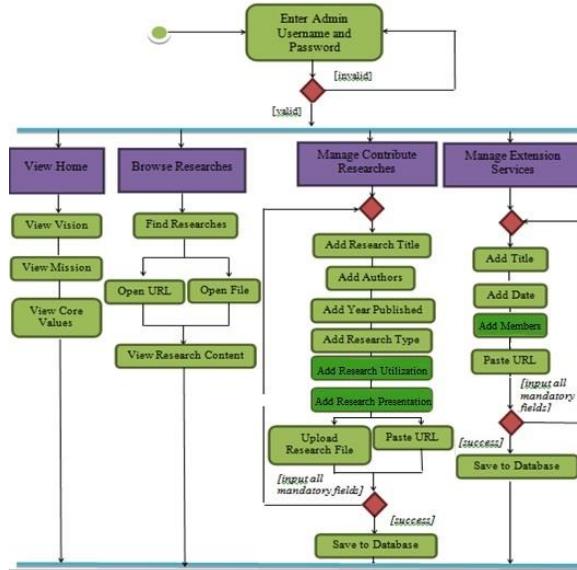


Figure 2. RECORDS Activity Diagram for Administrator

Figure 2 displays the first activity diagram of the RECORDS (Research and Extension Completed and On-going Registered programs Database System). The activity starts when the login form appears, a password dialog box will prompt to authenticate the username and password of the administrator. When username and password are correctly entered, the administrator can now view and manage the system of researches and extension projects.

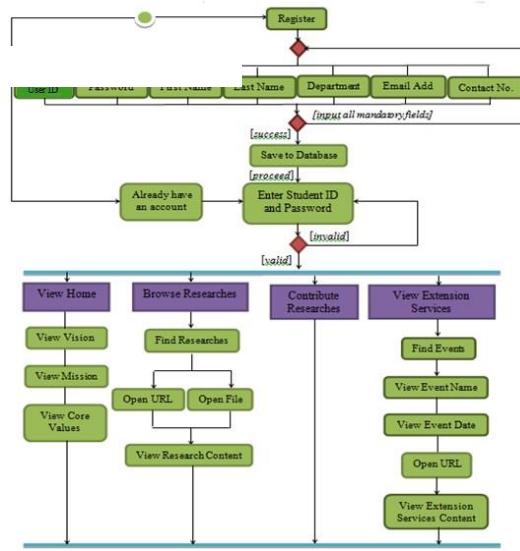


Figure 3. Activity diagram for user

Figure 3 illustrates the activity diagram for the user. The activity starts with the account registration of the user. Users must input all the mandatory fields to proceed. If the user already has an account, there's no need to register. Once the user accesses the system, the user will log in as a guest and the user can now view the system and its content.

Project technical description

This RECORDS (Research and Extension Completed and On-going Registered programs Database System). For the development of the software application, Microsoft Visual Studio 2010 platform was used and Visual Basic. Net as a programming language. MySQL, and a free open-source database management system was used as its back-end database for the system. To store the data of researches and extension projects inside the system, MySQL was used as the database. Adobe Acrobat application was installed to view the researches and extension services inside the system in a Portable Document Format (PDF) file.

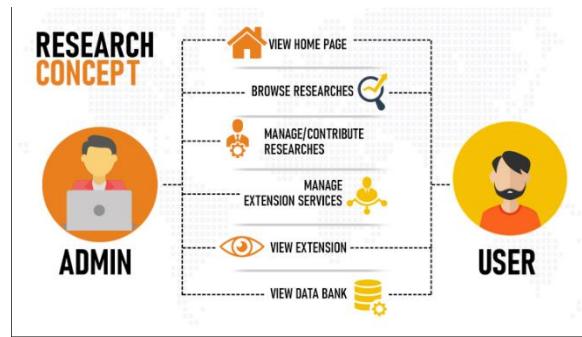


Figure 4. RECORDS use-case diagram

Figure 4 illustrates the use-case diagram access of the administrator and user to the system including the processes of managing and viewing the compilation of researches and extension projects. The administrator can manage the system while the user was limited only for viewing. The end-user can access the system using the username and password generated by the system administrator.

Result and Discussion

Table 2
Summary of results

Parameters	Weighted Mean	Interpretation
Functionality	3.95	Highly Acceptable (HA)
Reliability	3.79	Highly Acceptable (HA)
Usability	3.75	Highly Acceptable (HA)
Efficiency	3.79	Highly Acceptable (HA)
Maintainability	3.61	Highly Acceptable (HA)
Portability	3.95	Highly Acceptable (HA)
Security	3.75	Highly Acceptable (HA)
Average Weighted Mean	3.79	Highly Acceptable (HA)

*Legend: 3.26 – 4.00 – Highly Acceptable (HA) 2.51 – 3.25 – Acceptable (A)
 1.76 – 2.50 – Unacceptable 1.00 – 1.75 – Highly Unacceptable (HU)*

Table 2 shows the summary of the results of the respondent's evaluation of the developed RECORDS. It showed that functionality and portability got the same highest weighted mean of 3.95, followed by reliability and efficiency with the same WM of 3.79, usability and security with the same weighted mean of 3.75, and maintainability with 3.61 weighted mean. The overall rating for the RECORDS evaluation got the average weighted mean of 3.79 with an equivalent interpretation of highly acceptable. This implied that the developed RECORDS (Research and Extension Completed and On-going Registered programs Database System) can be utilized effectively by the SLSU Research and Extension Offices ([Spector et al., 2018](#); [Awa et al., 2010](#); [Biletska et al., 2021](#); [Guliyev, 2021](#)).

This study aimed to design and develop RECORDS (Research and Extension Completed and On-going Registered programs Database System) for utilizing by the SLSU Research and Extension Offices. This was conducted at SLSU Lucena Campus with 30 respondents who were chosen purposively. This study followed the developmental research design and utilized a survey questionnaire in gathering the data lifted from ISO 25010 Software Quality. The gathered data were tabulated, analyzed, and interpreted using the Average Weighted Mean statistical treatment.

Conclusion

Based on the findings, the researchers concluded that the major software requirements for the design and development of RECORDS (Research and Extension Completed and On-going Registered programs Database System) were Microsoft Visual Studio as programming software and MySQL as its Database Management System. The overall rating for the RECORDS evaluation got the average weighted mean of 3.79 with the equivalent interpretation of highly acceptable. This implied that the developed RECORDS (Research and Extension Completed and On-going Registered programs Database System) can be utilized effectively by the SLSU Research and Extension Offices.

Recommendations

The researchers have successfully achieved the objectives after conducting a series of testing and analysis following the developmental research method. Based on the result of the study, the following are hereby recommended:

- Enhancement of the developed software from a standalone application to a web-based application exclusively for SLSU is strongly encouraged.
- Additional functionalities might widen its scope and improve the overall performance through data analytics.
- Improve security features of the system.
- Enhancement of this study can be put into Geographic Information System (GIS) Mapping.
- This software and database development is strongly recommended for a patent in the name of SLSU.

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