R2S: A REPOSITORY PLATFORM FOR RESEARCH OFFICES IN THE HIGHER EDUCATION INSTITUTION (HEI's) IN THE PHILIPPINES

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Abstract

The purpose of the study was to create a research repository system as a databank for thesis documents of the undergraduate and graduate students that provide a secure, efficient, and reliable repository; develop a user-friendly design, and prove that the developed design complies with the system requirements and specifications. The researchers used a model to help the development be successful so that the user would appreciate the project. It followed the Agile-model procedure under the Software Development Life Cycle (SDLC) in verifying and validating the application. The researcher used a survey questionnaire to determine the platform's effectiveness as the students and research coordinators rated at some universities in Negros Occidental, Philippines. Upon completing the study, the researchers found out that the respondents wanted the system to be implemented for better and well-managed data archiving of research digital content.

Keywords: Research Repository, Data Archiving, Software Development, Higher Education Institution.

Introduction

A repository is a central file storage site in software development. It was a program to keep track of multiple files. It can be set up on a single user's machine, and it is usually stored on a server that numerous users can access. It served as a central databank that everyone connected to use when required information. Many companies utilize information repositories to manage their data, and they may collaborate with other organizations to share information as needed. It is a collection of formally organized and managed digital content created by teachers, staff, and students at a university. It is the institution's collective intellectual output, captured in a format that can be maintained and used [1].

Many universities in the Philippines keep their theses records from undergraduate and graduate levels. Some of the files are kept in a file cabinet or a folder. Others keep their digital data in a systematic platform called a data arching system, which stores and keeps all the theses' records. Universities usually find problems when they start to retrieve the file from previous years to check for duplicates. In general, there are no policies or rules for dealing with digital data, or there are conflicting regulations set by academic organizations [2]. With this concern, the model aids in electronically organizing the theses files of students and eliminates duplication of thesis titles. The system also facilitates ease in file search, retrieval, and storage.

Methodology

The researchers followed the agile-model procedure in verifying and validating the platform.

In the verification phases, the researchers defined the solution in detail on what to build and how to build it. During these phases, the researchers worked on the architecture and design, developed the functional specification, and prepared the work plan during the design process. The system's requirements were gathered by assessing the demands of the users. This phase is all for figuring out what the ideal system should do. However, it does not influence how the software is created or developed. Users are usually interviewed. The user requirements document explains how to create software objects that follow analytical models and satisfy all other system needs. In the validation phase, each process was checked to eliminate errors at the code level. The minor process must also be checked if there are codes that must be fixed.

Figure 1 is a schematic diagram of the conceptual framework of the study. As seen from the diagram, the inter-relationships of the different definitions made by experts on transaction processing strongly underpin the present study.

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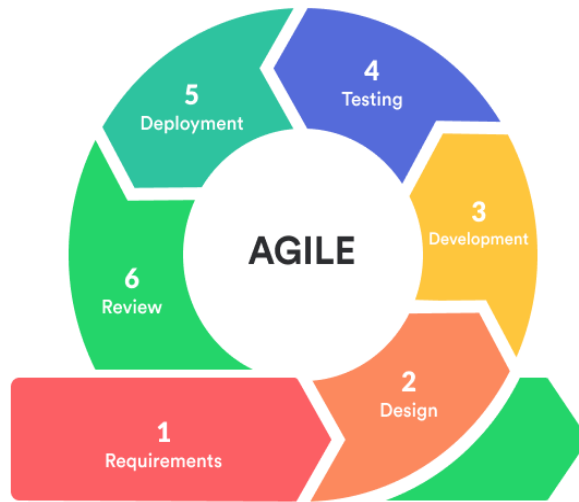
Figure 1: System Development Life Cycle (Agile Model)

Requirements

Table 1 shows the software requirements in the development of the system. It specified the minimum version of the software used in the development.

Table 1: Software Requirements (Minimum)

Software	Version
Sublime Text Editor	v3.2.2 Build 3211
XAMPP DBMS Server	v3.2.4
Google Chrome or Any Browser	Latest version
Composer	V4.1

Table 2 presents the hardware requirements for developing and utilizing the system.

Table 2: Hardware Requirements (Recommended)

Device	Specifications
Central Processing Unit (CPU)	Processor: Intel Core i7-4510U
Monitor	17'' 1024x768 resolution
Keyboard	Standard Keyboard
Mouse	Standard Mouse
Hard Disk Drive (HDD)	1 TB
Random Access Memory (RAM)	4 GB
Switch	5 Port 10/100Mbps Mini Switch
Network Cable	UTP Cable Straight Through type

Design

Figure 2 shows the design process from inputs provided by users to be processed depending on what the users require as an output.

INPUT
- Author(s)
- Title
- Abstract
- Course
- Year

PROCESS
- Search/Advanced Search
- View
- Storing
- Filtering
- Document checking for duplication

OUTPUT
- List of thesis books stored in the repository
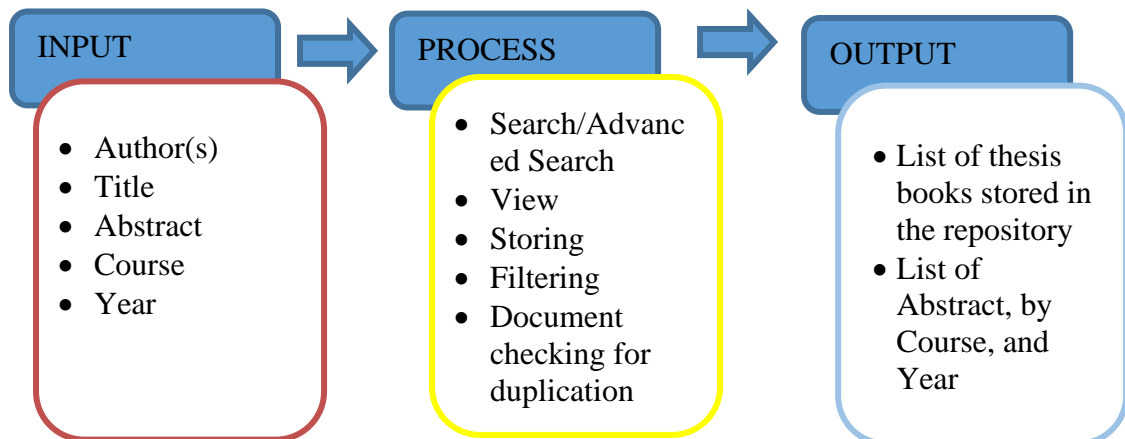- List of Abstract, by Course, and Year

Figure 2: IPO of The R2S Platform

The process flow illustrated the network connectivity of the system from the University.
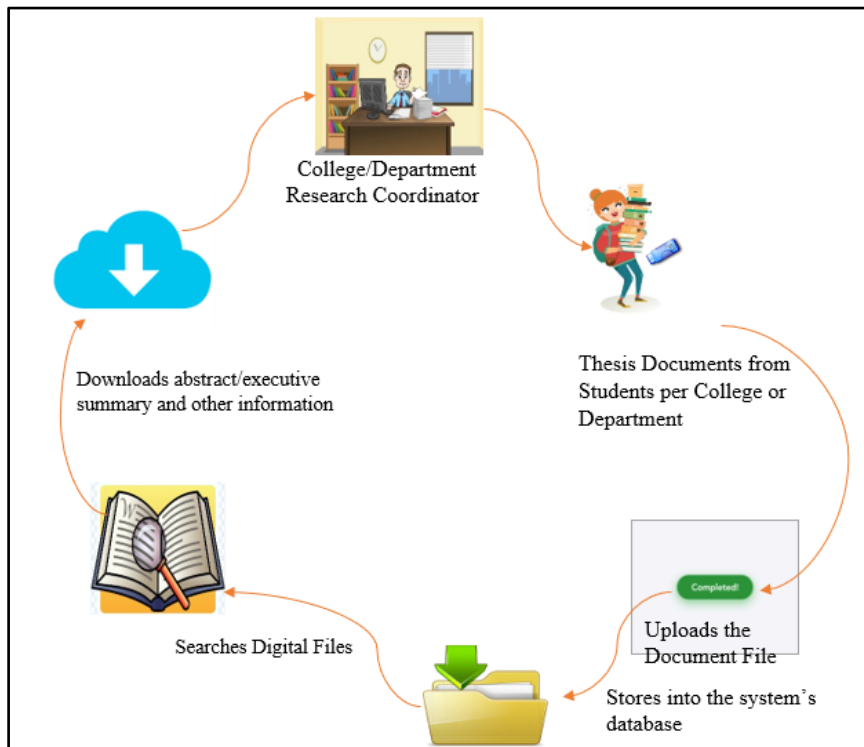

Figure 3: Process Flow of The System

The research coordinator's job is to eliminate duplication of thesis titles. File search, retrieval, and storage would be efficient and reliable through the system. The study's respondents are undergraduate and graduate school students, which ease in searching for possible duplication of these titles they might be of interest to.

Development

MySQL for database, Laravel framework for the back-end functionalities, and bootstrap for the front-end/UI view. The R2S platform was developed using the XAMPP 7 as a local server environment. The researchers have made sure that it is compatible with any browser. Additionally, the design was tested in different browsers for compatibility testing and at the same time on mobile phones.

Results and Discussion

Table 3: Distribution of Respondents

Respondents	Frequency	Percentage
Students	40	80.00
Research Coordinators	10	20.00
Total	50	100.00

The questionnaire was designed using the framework of PIECES modification and distributed to 50 respondents taken from identified schools in the province of Negros Occidental with a sample random sampling method. This framework evaluates information systems' user satisfaction and the importance of information systems [3].

Table 4: PIECES Evaluation Framework

Performance	**Unorganized Filing** Files are unorganized that require more time to locate
Information	**Lack of Information** Some pages of the book are missing
Economy	**Expensive** Book reproduction requires monetary allocation
Control/ Security	**Lack of Control** Anybody can have access to information and get a copy by ripping the pages or taking photos
Efficiency	**Delay in Processing** Manual processes delay the work

Service	**Time Consuming** Unorganized filing means more time and effort in searching and retrieving files	

On the user satisfaction of the system, the following standard scores from the Likert scale were used.

Table 5: Likert Scale in Evaluating the System and The User's Level of Satisfaction

RATING	WEIGHTED MEAN	SYSTEM CAPABILITY DESCRIPTIVE RATING	LEVEL OF SATISFACTION DESCRIPTIVE RATING
5	4.21-5.00	Excellent	Very Satisfied
4	3.41-4.20	Very Good	Satisfied
3	2.61-3.40	Good	Neither satisfied nor Dissatisfied
2	1.81-2.60	Poor	Dissatisfied
1	1.00-1.80	Needs Improvement	Very Dissatisfied

The table below presents the evaluation conducted on the respondents as to the system's functionality. The result reveals that the system captures the intended behavior or performance expected by the users and has met the software requirements. The development is supported by [4] that in the user level rating, it should satisfy the users' needs and conditions to use and utilize the platform.

Table 6: Evaluation of System Functionality

FUNCTIONALITY	MEAN	DESCRIPTIVE RATING
Inputting information is fast and convenient	4.40	Excellent
Easy to operate and user-friendly	4.47	Excellent
Searching for data is efficient and displays the results in a second	4.27	Excellent
Generates report in real-time	4.47	Excellent
It functions as expected	4.40	Excellent
TOTAL MEAN	**4.40**	**Excellent**

Design refers to the user interface of any software or application or the look of things to facilitate usability and improve the user experience or make it more engaging. Table 7 displays the result of the evaluation conducted on the respondents as to how they interact with the system. In terms of the design, the platform got a total mean of 4.36 with a descriptive rating. The result indicates that the system gives a one-of-a-kind user experience where manipulating it would not burden the end-users.

According to [5], an exemplary user interface combines visual and interaction design, and complete information, making it easier for the target audience to see what the system intends to perform and draw users' attention.

Table 7: Evaluation of System Design

DESIGN	MEAN	DESCRIPTIVE RATING
It is pleasant to the eyes	4.20	Very Good
Contents are well organized	4.13	Very Good
The interface is user-friendly and very engaging	4.40	Excellent
It is easy to manipulate	4.60	Excellent
The text is clear and easy to read	4.67	Excellent
TOTAL MEAN	**4.36**	**Excellent**

As presented in the table below, system security got an overall excellent rating or a total mean of

4.35. The result indicates that the system has very good security features that prevent the data within the application from being stolen or compromised.

Table 8: Result of The Evaluation on System Security

SECURITY	MEAN	DESCRIPTIVE RATING
Only one user is allowed per account	4.40	Excellent
Users should log in with /her password	4.47	Excellent
It ensures the confidentiality of user's information and stored data	4.40	Excellent
One account can be logged in at a time Only the system administrator can delete	4.27	Excellent
the data	4.20	Very Good
TOTAL MEAN	**4.35**	**Excellent**

Accuracy is the degree to which information is delivered with legitimacy, precision, and authenticity. System Accuracy got a total mean of 4.31, with an excellent descriptive rating. The result implies that the users can rely on the functionalities and features of the system since data accuracy and accessibility are integrated into the system. Because information on individuals and organizations is so widely disseminated through information systems, extra caution must be exercised to avoid inaccuracies and fix known problems. When erroneous data is transferred between computer systems, difficult questions remain [6].

Table 8: Evaluation of System Accuracy

ACCURACY	MEAN	DESCRIPTIVE RATING
Function buttons perform as intended	4.53	Excellent
The system is compatible with laptop and desktop computers	3.93	Very Good
Information is reliable and stored in a secured database	4.40	Excellent
It is intended for individual use	4.27	Excellent
Downloading is fast	4.40	Excellent
TOTAL MEAN	**4.31**	**Excellent**

Maintaining adequate user satisfaction during software development requires effective management tactics and user representation. Table 9 displays the users' satisfaction with the system as they utilize it from the first time they log in, access the various procedures, then log out. For the User's Level of Satisfaction, it gained a total mean of 4.41, described as Very Satisfied. This shows that they liked the overall package of the system. The result is supported by the [7] study.

Table 9: Evaluation of User's Level of Satisfaction

LEVEL OF SATISFACTION	MEAN	DESCRIPTIVE RATING
The system performs its intended functionalities	4.47	Very Satisfied
It is easy to operate and familiarize	4.53	Very Satisfied
It provides fast and accurate results	4.53	Very Satisfied
Information is stored securely	4.47	Very Satisfied
I recommend this system be implemented	4.07	Satisfied
TOTAL MEAN	**4.54**	**Very Satisfied**

Conclusion

The R2S platform met the requirement set by the users. This said system benefits the research section of any university when it comes to data banking of research works for the undergraduate and graduate students. Moreover, the system is easy to manipulate, fast, reliable and has security features. They will also find it very useful and

safe. It also preserves and makes the documents digitally available for the users, thereby lessening the time spent searching and retrieving documents.

Recommendations

It is highly recommended that other techniques may be used to improve the system. It would upgrade the current features of the developed system, as it found out that the institution must have a suitable server upon utilization. HEIs may use the system for other academic activities regarding research manuscript retrievals. Lastly, University may formulate a policy on the usage of the system and how it is being utilized in any school unit.

Conflict of Interest

There is no conflict of interest between the authors in this manuscript.

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