



Enhancing Graduate School Thesis Accessibility Through Digitalization: A Case Study of Wup Library Systems

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Abstract: This research, entitled "ENHANCING GRADUATE SCHOOL THESIS ACCESSIBILITY THROUGH DIGITALIZATION: A CASE STUDY OF WUP LIBRARY SYSTEMS," aimed to develop a system that could help graduate school students to access the graduate school theses easily and in a user-friendly manner. The System Development Life Cycle (SDLC) Model (Royce, 1970) was employed in this study. The System Development Life Cycle (SDLC) is an organized method for designing, developing, testing, and implementing information systems. The researchers adopt the following five stages of the SDLC model: First, planning; second, analysis; third, design; fourth, development; and fifth, testing. The study found that beginning with a clear objective to enhance academic research access, the planning and analysis phases ensured that the system would meet user needs while integrating seamlessly with existing platforms. The design phase established a structured framework for content organization, secure access, and ongoing maintenance. Utilizing a no-code approach with Google Sites and Google Drive, the development phase produced a fully functional and easily manageable digital repository. Finally, testing results confirmed the system's stability, efficiency, and usability, affirming its effectiveness in supporting academic research and digital access for graduate students.

Keywords: Case Study, Digitalization, Graduate School Theses, SDLC Model, WUP Library System.

I. INTRODUCTION

Graduate school theses digitization is a major imperative of the academy nowadays if they are to enhance the availability of scholarly publications, particularly among diverse and far-flung communities (Sinclair, Mann, Reymond & Sansome, 2023). Digitizing graduate theses in Wesleyan University—Philippines (WUP) is intended to contribute to the solutions of different concerns facing the learners and researchers. In making such study papers available on the internet, WUP makes it easy to access research materials by online class students and foreign learners without necessarily visiting the university.

Digitization significantly improves the availability of scholarly materials, ensuring that students abroad or residing overseas have access to research with ease (Pierce & Reuille, 2018). It also preserves quality scholarly work by safeguarding theses against physical destruction, loss, or becoming obsolete, and hence offering a seamless string of scholarly thought to future generations. The electronic form also enhances the movement of information in a way that researchers at various points can share and access information at high speed.

In addition to these benefits, implementing a digital library system makes it easier to manage physical space in the library by avoiding piles of outdated theses and creating space to include newer studies without erasing valuable historical documents. International students can access vast databases quickly and more methodically via digital libraries, maximizing their experiences and encouraging global academic collaboration (Fallah & Bernstein, 2019). Lastly, electronic records traverse borders, facilitate more sharing of resources, and organize the academic structure better and more efficiently (Kubricka, 2020).

Moreover, transitioning to a digital library system guarantees the management of physical space without compromising access to previous research. The benefits altogether ensure an improved, organized, accessible, and collaborative learning environment supporting quicker and more effective research processes for international students and scholars (Australasian Journal of Educational Technology, 2023; CRL: College & Research Libraries, 2020).



II. METHODOLOGY

The System Development Life Cycle (SDLC) Model (Royce, 1970) was employed in this study. The System Development Life Cycle (SDLC) is an organized method for designing, developing, testing, and implementing information systems, claims Royce. It gives teams a framework to follow when creating new systems, from conception to upkeep.

SDLC models, such as Waterfall or Agile, aid in process management and guarantee a safe, affordable, and high-quality system. The researchers adopt the following five stages of the SDLC model: First, planning; second, analysis; third, design; fourth, development; and fifth, testing. Fifteen (15) IT and engineering experts with extensive backgrounds in software development and five (5) education experts with a wealth of research and thesis experience evaluated the system.

III. RESULTS AND DISCUSSION

Here are the steps involved, as enumerated in the five phases of the SDLC model:

1. PLANNING

This initial phase involves identifying the need for a new system, defining objectives, and outlining the project scope.

Objective

The objective of this project is to digitize graduate school theses, enabling easy and efficient access for students. This initiative aims to streamline the retrieval and utilization of academic research materials by providing a digital platform specifically designed for the graduate school community of Wesleyan University Philippines.

Project Scope

- The system will serve as a digital library for graduate school theses.
- Access will be provided to students of Wesleyan University Philippines, with a particular focus on graduate school students.
- The library system will be both local (accessible within the university network) and internet-based (accessible remotely via the web).
- Core functionalities will include searching, viewing, and downloading graduate theses.
- The system will ensure secure access and protect the intellectual property rights of the authors.
- Administrative features will allow authorized personnel to upload, manage, and update thesis records.
- The project will be implemented within the infrastructure and policies of Wesleyan University Philippines.

2. ANALYSIS

This phase focuses on gathering and analyzing the system's demands. It means understanding what users need, defining how the system works, and figuring out how it will work with other systems.

1. Understanding the user needs

- Accessibility: Students, especially those who are studying from a distance or from another country, want to be able to access their theses at any time and from any place.
- Easy to Use: The interface needs to be easy to understand so that users can quickly search for, browse through, and download theses.
- Searchability: Users should be able to search by more than one thing, such as author, title, subject, or date.
- Security: Students and teachers need to know that digital data are safe and that only the right individuals may access them.

2. Functions of the Systems

- Thesis Repository: A place to save digital theses in PDF or other forms that are accepted.
- Search and Retrieval Tools: Users can search by keywords, authors, program levels, and years of submission.
- Download and see Options: Users can either see documents online or download them, depending on their authorization levels.
- Administrative Panel: Some staff members can add, alter, delete, and organize thesis documents.
- User Authentication: Login information controls who can see and use data and keeps it safe from people who shouldn't be able to.

3. Interaction with other systems

- Google Sites and Google Drive: The digital library employs Google Sites as the front-end interface and Google Drive as the backend storage solution.
- Getting on the University Network and the Internet: You can utilize the system on campus and off campus over the web.



- Permissions and Security: Use institutional user credentials, such as email logins, to decide who may see what and make sure that copyright regulations are respected.

3. DESIGN

Stage	Description
1. Planning & Content Organization	- The primary categories, subcategories, and essential components of each thesis have to be specified in a sitemap that you ought to build. - The use of wireframes is recommended to develop the functionality and layout of the website from the ground up.
2. Website Development	- It is essential that you ensure that the Google Sites template you choose is suitable for the objectives and structure of the website. - Ensuring that it is compatible with mobile devices is essential in order to guarantee that it can be accessed from any platform.
3. File Integration	- Establishing a link between the website and Google Drive in order to simplify the hosting and storage of data. - Make sure that the files are organized into folders that correspond to the year, department, or program that they are associated with.
4. User Access & Permissions	- Provide administrative personnel, staff members, and students with permission to view and download files on their computers. To protect intellectual property, access should be restricted as necessary.
5. Maintenance & Updates	- Establishing a periodic program to evaluate and improve your material is the fifth step in the maintenance and updates process. - To uncover broken links, obsolete files, or design errors, it is important to monitor the statistics of the website.

4. DEVELOPMENT

During the development process, we utilized a no-code approach that combined Google Sites, a drag-and-drop website builder, with Google Drive for file storage. This approach was chosen for its ability to enable the creation of a digital repository that is easily accessible to students, irrespective of their technical or programming skills. The subsequent steps provide a concise summary of the development process:

A. Drag-and-Drop Interface.

The website was created without any conventional coding techniques. The team successfully constructed a fully operational digital library exclusively utilizing the visual tools provided by Google Sites, recognized for its user-friendly drag-and-drop interface.

This approach accelerated deployment and diminished the necessity for software engineering expertise.

Rationale for using Google Sites

- Google Sites was selected for its speed, user-friendliness, and compatibility with Google Drive.
- It facilitated the research team in swiftly establishing a centralized thesis repository accessible to students.
- The platform is sufficiently straightforward for academic or library personnel to manage future content changes and site maintenance alone, without requiring technological assistance.

B. Material Planning and Organization:

- A structured sitemap was developed that classifies material by program and thesis title for enhanced accessibility.
- The configuration of each component was crafted to mirror the thesis structure employed in the university library.

C. Website Development and Layout:

- We customized existing templates to align with the brand identity of Wesleyan University Philippines.
- Wireframes facilitated our decision-making on page layout and provided a visual representation before construction.
- The site was optimized for mobile and tablet accessibility, allowing users to view it from any device.

**D. Integration of File Storage:**

- Google Drive was used for secure file storage.
- Files were uploaded in a standardized PDF format and included in the appropriate web pages.
- Adhering to a uniform name system facilitated indexing and maintenance.

E. User Access and Permissions:

- In Google Drive's built-in accessibility sharing settings, we set limited access and rights for every role.
- User end like patrons are limited to read-only access.
- Back-end users, like admins, can modify, upload, and change other settings in the system.

F. Intellectual Property and Safety:

- Viewing and downloading were restricted as necessary to protect the rights of authors.
- The content of the repository was only accessible to verified email users, which prevented individuals from sharing it without authorization.

G. Maintenance and updates:

- Biweekly update for newly received theses/dissertations to scan and upload to the system
- Real-time modification simplifies the process of site management by updating without downtime of the server.

H. Analytics and Monitoring:

- Google Sites provides built-in analytics and external monitoring tools that we can use for reports.
- This serves as a foundation for future content expansion and design modifications.

5. TESTING

The testing phase involves rigorous testing of the system to identify and fix any bugs, defects, or errors in the system. The system was evaluated by 20 experts in the field of Information Technology, Research, and Education. The results of the evaluation are reflected in Tables 1 and 2.

Table 1. Function Stability, Performance Efficiency, and Usability of the System

Function Stability (n=20)	Mean	Verbal Description
1. Functional completeness: The Degree to which the set of functions covers all the specified tasks and user objectives.	4.55	Strongly Agree/Very Stable
2. Functional correctness: The Degree to which a product or system provides the correct results with the needed degree of precision.	4.50	Strongly Agree/Very Stable
3. Functional appropriateness: The Degree to which the functions facilitate the accomplishment of specified tasks and objectives.	4.50	Strongly Agree/Very Stable
Overall weighted mean (Very Stable)	4.52	Strongly Agree
Performance Efficiency	Mean	Verbal Description
1. Time behavior: Degree to which the response and processing times and throughput rates of a product or system, when performing its functions, meets requirements.	4.60	Strongly Agree/Very Efficient
2. Resource utilization: The Degree to which the amounts and types of resources used by the system, when performing its functions, meet requirements.	4.45	Strongly Agree/Very Efficient
3. Capacity: Degree to which the maximum limits of the system parameter meet requirements.	4.50	Strongly Agree/Very Efficient
Overall weighted mean (Very Efficient)	4.52	Strongly Agree



Usability	Mean	Verbal Description
1. Appropriateness Recognizability Degree to which users can recognize whether a system is appropriate for their needs.	4.60	Strongly Agree/Very Usable
2. Learnability: The Degree to which specified users can use a system to achieve specified goals of learning to use the system with effectiveness, efficiency, freedom from risk, and satisfaction in a specified context of use.	4.55	Strongly Agree/Very Usable
3. Operability: The Degree to which a system has attributes that make it easy to operate and control.	4.55	Strongly Agree/Very Usable
4. User error protection: The Degree to which a system protects users against making errors.	4.45	Strongly Agree/Very Usable
5. User interface aesthetics The degree to which a user interface enables pleasing and satisfying interaction for the user.	4.45	Strongly Agree/Very Usable
6. Accessibility The degree to which a system can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use.	4.65	Strongly Agree/Very Usable
Overall weighted mean (Very Usable)	4.54	Strongly Agree

Table 1 shows the results of the testing of the system as evaluated by 20 experts. It can be observed on the table that it was very functional, very efficient, and very usable. The findings show that the system performs very well in terms of stability, efficiency, and usability. Evaluators agree that it works correctly, covers all needed tasks, and helps them achieve their goals. It meets performance expectations with fast response times and proper use of resources (Fitrios, Nur & Zakya, 2022). The system is also easy to learn, operate, and access, while offering a pleasant user experience and helping prevent errors (Saleem, 2023). Overall, the system is reliable, efficient, and user-friendly, making it a strong choice for use.

Table 2. Reliability, Security, and Maintainability of the System

Reliability (n=20)	Mean	Verbal Description
1. Maturity Degree to which a system or component meets needs for reliability under normal operation	4.60	Strongly Agree/Very Reliable
2. Availability Degree to which a system or component is operational and accessible when required for use.	4.60	Strongly Agree/Very Reliable
3. Fault tolerance: The Degree to which a system or component operates as intended despite the presence of hardware or software faults.	4.30	Strongly Agree/Very Reliable
4. Recoverability Degree to which, in the event of an interruption or a failure the system can recover the data directly affected and reestablish the desired state of the system	4.40	Strongly Agree/Very Reliable
Overall Weighted Mean (Very Reliable)	4.48	Strongly Agree
Security	Mean	Verbal Description
1. Confidentiality: The Degree to which a system ensures that data are accessible only to those authorized to have access.	4.50	Strongly Agree/Totally Secured
2. Integrity Degree to which a system component prevents unauthorized access to, or modification of, computer programs or data.	4.45	Strongly Agree/Totally Secured



3. Non-repudiation: The Degree to which actions or events can be proven to have taken place so that the events or actions cannot be repudiated later.	4.55	Strongly Agree/Totally Secured
4. Accountability: The Degree to which the actions of an entity can be traced uniquely to the entity.	4.60	Strongly Agree/Totally Secured
5. Authenticity: The Degree to which the identity of a subject or resource can be proved to be the one claimed.	4.45	Strongly Agree/Totally Secured
Overall Weighted Mean (Totally Secured)	4.51	Strongly Agree
Maintainability	Mean	Verbal Description
1. Modularity Degree to which a system or computer program is composed of discrete components such that a change to one component has a minimal impact on other components	4.60	Strongly Agree/Well Maintained
2. Reusability Degree to which an asset can be used in more than one system, or in building other assets.	4.50	Strongly Agree/Well Maintained
3. Analyzability Degree of effectiveness and efficiency with which it is possible to assess the impact on a product or system of an intended change to one or more of its parts, or to diagnose a product for deficiencies or causes of failures, or to identify parts to be modified.	4.60	Strongly Agree/Well Maintained
4. Modifiability: The Degree to which a product or system can be effectively and efficiently modified without introducing defects or degrading existing product quality.	4.60	Strongly Agree/Well Maintained
5. Testability Degree of effectiveness and efficiency with which test criteria can be established for a system, product, or component, and tests can be performed to determine whether those criteria have been met.	4.60	Strongly Agree/Well Maintained
Overall Weighted Mean (Well Maintained)	4.58	Strongly Agree

Table 2 presents the results of the testing of the system as evaluated by 20 experts. It can be observed on the table that the system was very reliable, totally efficient, and well-maintained. The results show that the system is highly reliable, secure, and easy to maintain. It performs well under normal conditions, stays available when needed, can handle faults, and recovers quickly from failures (Thomson, Murphy & Lukeman, 2018). The evaluators also feel confident that their data is well protected, with strong features ensuring privacy, accuracy, and traceability. In terms of maintenance, the system is easy to update, test, and modify without causing issues. Overall, these findings suggest that the system is dependable, safe, and built to last.

IV. CONCLUSION

The following conclusions are derived based on the findings of this study:

1. In the planning stage, the project aims to develop a secure and accessible digital thesis library customized to the needs of graduate students at Wesleyan University Philippines, enhancing academic research through efficient and streamlined digital access.
2. The analysis phase ensures that the digital thesis library system is user-centered, functional, and securely integrated with existing platforms to meet the academic and accessibility needs of graduate students at Wesleyan University Philippines.
3. The design phase outlines a structured approach to building a user-friendly, organized, and secure digital thesis library by planning content, integrating storage, setting user permissions, and ensuring ongoing maintenance.
4. The development phase successfully utilized a no-code approach with Google Sites and Google Drive to create a secure, user-friendly, and easily maintainable digital thesis repository catered to the needs of Wesleyan University Philippines' graduate students.
5. The testing phase confirmed that the system is highly stable, efficient, and user-friendly, as validated by expert evaluations demonstrating strong agreement on its functionality, performance, and usability.

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