



ASIA PACIFIC COLLEGE
School of Computing and Information Technologies

LitPath AI: Smart Pathfinder for Theses and Dissertations
Final Documentation Submitted to the Faculty of the
School of Computing and Information Technologies

In Partial Fulfillment of the Requirements for
Systems Analysis and Detailed Design
MSYADD1

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PM Docs Chapter 2

I. Charter

Purpose

LitPath AI was created to improve the quality, efficiency, and relevance of research experiences in academic libraries, particularly within OPAC (Online Public Access Catalog) systems. Students and researchers often face difficulties such as vague or irrelevant results, limited keyword matching, outdated user interfaces, and the lack of common research website features like in-text citation when searching for theses and dissertations. LitPath AI enhances the current system the DOST-STII has (OPAC) by having advanced filters and AI-powered query analysis to help users quickly find relevant theses and dissertations along with a citation tool. This improves research efficiency and maximizes access to DOST-STII Library's theses and dissertation collection.

High-level project description

LitPath AI is an AI-powered search engine designed to improve access to the DOST-STII Library's collection of theses and dissertations. It enhances the current OPAC system by offering:

- AI-powered query analysis for understanding user intent when searching
- Advanced filters for more precise search results
- In-text citation tool for easier reference
- Offers recommendations of related research based on the current research you are viewing

The system also includes an admin dashboard that allows library staff to track search trends and monitor usage for future updates.

The project will go through the following stages: planning, interface design, backend development, system integration, testing with users, and final deployment for presentation.

High-level milestone schedule

Milestone	Estimated Date	Status
Project Scoping	April 2025	Completed
Information Gathering for project requirements	April- May 2025	Completed

Completion of project deliverables, documentation, and final outputs	June 2025	Completed with little revision for final paper
Completion of interactive prototype design (for Figma prototype)	June 2025	For revision for MSYADD1 due to changes in project
Execution of the design thinking process (Stage 1 - Stage 5)	August 2025	Completed
Finalization of process diagrams and project management documentation	August 2025	Completed
Development Phase:		
Develop the core UI elements: System UI, Citation Generator, and Bookmark functionality	Sep - Oct 2025	In progress
Develop the Feedback mechanism and Filters .	Oct- Nov 2025	Not started
Develop more features: Generate overview and the AI Search Engine .	Dec 2025 - Jan 2026	Not started
Develop features that enhance the user's research process: Related Searches, Research History, and Follow-up Questions		Not started
Develop the final high-level features: Admin login and dashboard and Integration to OPAC .		Not started
Testing Phase:		
Internal Unit Testing, Integrated System Testing	Feb-March 2026	Not started
Usability testing		Not started
Performance optimization, Bug fixes	March - April 2026	Not started

Deployment	May- July 2026	Not started
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Rough cost estimate and budget

LitPath AI, as mentioned by our client from DOST-STII, does not require a formal budget. However, there are some minor operational costs related to development and testing:

Expected Costs:

- Cloud services that will be shouldered by DOST-STII.
- AI-related tools and services that will be used for the development of the system.

Stakeholders

- Student researchers (primary users)
- DOST-STII librarians and staff
- Project-Based Learning (PBL) instructor
- Library systems developers (future collaborators)
- LitPath AI development team (our team)

Project manager

Jenine Elaine Dulay, Group Leader

Project manager's responsibilities

- Ensure progress aligns with the milestone schedule
- Assign tasks and monitor team contributions
- Communicate with instructor and client when needed
- Oversee system integration, testing, and documentation
- Organize final outputs for defense and presentation

Project manager's authority

- Prioritize tasks and development features
- Reassign tasks when necessary
- Manage team budget and resource allocation
- Facilitate conflict resolution
- Make final decisions with group consensus

Formal declaration of sponsor's support

Sponsor Name: Khasian Eunice Romulo

Position: Client / Science Research Specialist II/ Unit Head of Digital Information and Processing Delivery Unit

Support

As the client, I support the LitPath AI project. This system addresses real problems experienced by students and researchers. It is a step forward toward modernizing our academic researching tools by using artificial intelligence. I encourage the team to stay committed to quality, collaboration, and creative problem-solving.

Statement:

II. Objectives

LitPath AI Case Study Objectives

In the pursuit of academic and professional research, theses and dissertations are crucial sources of original, comprehensive, and often localized studies. The Department of Science and Technology - Science and Technology Information Institute (DOST-STII) Library houses a valuable and growing collection of academic materials from DOST Scholars, which are classified and cataloged through its Online Public Access Catalog (OPAC).

Although the DOST-STII Library houses a valuable and growing collection of graduate theses and dissertations, the system presents difficulties in locating relevant theses and dissertations due to exact keyword matching, limited filtering options, slow search process, and lack of Artificial Intelligence. These difficulties created a major barrier for students, researchers, and other professionals. Users who are exploring a new research area or are unsure of precise terminology find it difficult to discover relevant materials, leading to research inefficiencies and the underutilization of the library's key academic resources.

The objective of the proposed project, LitPath AI: Smart Pathfinder for Theses and Dissertations, aims to address the limitations of the current DOST-STII OPAC system through the implementation of an AI-powered search engine designed to improve accessibility and help users discover relevant academic works.

Categorized Objectives

Objective	Category	Measure
Improve search efficiency and precision	Performance	Achieve a user satisfaction score of at least 3.5 out of 5 from testers on the relevance and ease of use of the new search features.
Help users discover more relevant studies	Performance	Top 10 search results reach a minimum of 70% accuracy based on user and expert validation
Create a better and faster user experience by reducing system response time	Performance	Reducing system response time to under one second for processing and displaying search results
Provide a built-in citation generator that supports APA, MLA, IEEE, and Chicago styles	Quality	Accuracy will be verified through expert review and user testing to ensure correct citation formatting

III. Scope

Scope Statement

Project goal and objectives

(What the project is supposed to achieve.)

The primary goal of this project is to develop and implement an AI-powered search engine to increase the discovery and use of the DOST-STII Library's collection of theses and dissertations.

The project will achieve this through the following specific objectives:

1. To improve search efficiency and precision, the system will be equipped with advanced filters allowing users to narrow down results by discipline, recency, and date range which directly solves the problem of the limited search mechanism. Success will be measured by achieving a user satisfaction score of at least 3.5 out of 5 from testers on the relevance and ease of use of the new search features.

2. To help users discover more relevant studies, the system will leverage AI-powered algorithms to provide semantically relevant search results. These algorithms will analyze user queries and content to ensure that the top 10 search results have a minimum relevance accuracy of 70%, based on user feedback and expert validation.
3. To create a better and faster user experience, the interface will be redesigned to be more intuitive and responsive, with a goal of reducing system response time to under one second for processing and displaying search results.
4. To make citing sources easier for researchers, a built-in automated citation generator that supports multiple citation styles, including APA 7th Edition, MLA 9th Edition, Chicago Manual of Style, and IEEE. Accuracy will be verified through expert review and user testing to ensure correct citation formatting.

Project Boundaries

Within scope: *What is included in the project.*

1. Data Source: The project will use the existing collection/database of graduate theses and dissertations from the DOST-STII Library.
2. System Integration: The system will integrate with the current OPAC of the DOST-STII Library without requiring a full redesign of the OPAC.
3. Primary Functionality: A search engine that delivers and ranks relevant literature based on user queries or research interests, improving search accuracy and relevance.
4. User Interface: A user-friendly interface designed for easy navigation, enabling users to search for and review academic materials with minimal effort.
5. Citation Feature: The system will offer an automatic citation generation feature, supporting multiple formats such as APA, MLA, Chicago, and IEEE.
6. Feedback Feature: A feedback mechanism will be incorporated, allowing users to provide comments and ratings after using the system to help improve the service.

Out of scope: *What is excluded from the project.*

1. Full-Text Access: The project will not provide full-text access to or scanning of physical theses/dissertations that have not yet been digitized. The system will focus on abstracts and metadata for these materials.
2. Creating or Managing Materials: The project will not involve the addition, deletion, or overall management of materials in the library's collection. It will focus on improving access to the existing resources, rather than altering the collection itself.

Project Deliverables

(The tangible items produced by the project.)

1. AI-powered search engine - A fully functional backend system that provides AI-powered semantic search and content-based recommendations. This engine will be delivered with an API for seamless integration into the existing DOST-STII Library OPAC.
2. User Interface - A responsive and intuitive web interface for searching the library's collection. This includes the main search page with advanced filtering options (by discipline, recency or date range) and a built-in automated citation generator supporting APA, MLA, Chicago, and IEEE styles.
3. User Feedback Tool - This feature captures user feedback through star ratings and comments. This tool will capture user ratings and comments to measure satisfaction and provide data for validating the relevance of search results.
4. Manual and Final Report - A complete package containing all necessary documentation for future use and maintenance. This includes a technical manual, a user guide for researchers and staff, and a final report verifying that all project objectives have been successfully met.

Success Criteria

(How you determine that the project and deliverables have been completed successfully.)

1. System achieves at least 70% relevance accuracy for its top 10 results. This will be measured through a combination of expert review and the user feedback system.
2. System achieves an average user satisfaction score of at least 3.5 out of 5 from the test group of students and DOST employees. Feedback must also confirm the system makes their research process feel faster and easier.
3. The new search system is fully integrated with the existing library OPAC and consistently processes search queries and displays results in under 1 second.
4. All key deliverables - the AI engine, the user interface including the citation tool, user feedback system, and all documentation, have been formally signed off on and accepted by the project stakeholders.

Project Assumptions

(Information that is not known at the time.)

1. The current library servers or the planned hosting environment has the capacity to support the new AI engine and meet the performance requirement of delivering search results in under one second.
2. The project team will have continuous and stable access to the DOST-STII database and any necessary technical systems throughout the project timeline.
3. The project scope will remain stable throughout the development phase.

4. The necessary people at DOST-STII will be available to help with the project when needed.

Project Constraints

(*Limitations such as time, budget, etc.*)

1. The project must be fully completed, tested, and deployed by the fixed deadline. All work and objectives stated in the paper must be accomplished as part of MCSProj.
2. The project is constrained to building a system that only reads information from the existing database; it will not have any capability to add or manage the library's collection.
3. Due to budget limitations, the project will exclusively rely on open-source software and technologies.

IV. Stakeholder analysis

Stakeholder Analysis

Name	Department / Company	Position	Advisers	Objectives, Requirements, Interests	Influence	Project Contribution	Resistance	Influence
Mr. Napoleon Juanillo, Jr. PhD	DOST-STII	Assistant Secretary for Technology Transfer, Communications and Commercialization and Officer-in-Charge, Office of the Director	Office of the Director	Research commercialization and partnership development	High	Provides projects to be worked on by the students	Concerned about budget allocations	High
Ms. Khasian Romulo	DOST-STII	Science Research Specialist II	Supervisor and Office of the Solicitor General	Efficient research discovery and modernize search capabilities	High	Requirements definition, supports work, and approves deliverables	Concerned about changing initial requirements mid-project	High
Mr. Jonathan Abalon	DOST-STII	Science Research Specialist II	Supervisor and Office of the Solicitor General	Improve user satisfaction and increase research utilization	High	System access and technical support	Concerned about the problems that might arise during system integration	High
Mr. Sean Sanchez	APC	Project Based Learning Coordinator	SOCIT Executive Director	Educational innovation and partnership development	High	Project sourcing	Concerned about partner organizations modifying project scope	High
Ms. Roselle Gardon	APC	CS Program Director	SOCIT Executive Director	Student academic success and skill development	High	Project guidance and approves deliverables	Concerned about timeline delays of the deliverables	High
Mr. Jose Quesada	APC	SOCIT Professor	SOCIT Executive Director	Student academic success and learning outcomes	High	Technical mentorship and academic evaluation	Concerned about insufficient time for mentorship due to multiple student commitments	Medium
End Users	N/A	General Public	N/A	Faster research discovery and friendly search interface	High	User feedback and system testing	Concerned about the interface change of the system	Medium
HecTech Team	APC	Project Developers	CS Program Director and SOCIT Professor	Academic achievement and successful project delivery	High	System development and client communication	Concerned about technical challenges and time constraints	High

OpenProject Activities

Budgets

OpenProject / APC_2025_2026_T1_M1231_G07 HectTech LitPath AI / Budgets

Budgets

# ↓	SUBJECT	PLANNED	SPENT	AVAILABLE	SPENT (RATIO)
56	Planning Phase Budget	PHP 147.000	PHP 12.600	PHP 134.400	<div style="width: 8.57%;"><div style="width: 100%;">9% Total progress</div></div>
55	Initiation Phase Budget	PHP 390.000	PHP 17.700	PHP 372.300	<div style="width: 4.5%;"><div style="width: 100%;">5% Total progress</div></div>
		PHP 537.000	PHP 30.300	PHP 506.700	

(1 - 2/2)
Also available in: CSV

Per page: 20 100

Roadmap

0.10 Alpha
Internal testing phase, focused on functionality and bug fixing.

25% Total progress

15 closed (23%) 49 open (77%)

RELATED WORK PACKAGES

- Phase #655: 3.0 Executing Phase
- Phase #856: 4.0 Monitoring and Controlling
- Task #661: 4.1 Tracking progress
- Task #866: 4.2 Comparing it to the plan
- Task #867: 4.3 Identifying any deviations or issues
- Task #868: 4.4 Measuring performance
- ~~Task #877: 3.2 Design Thinking Stage 4: Prototype Figma Final~~
- ~~Task #878: 3.3 Design Thinking Stage 5: Test~~
- Task #1860: 4.5 Performance Reporting
- Task #1861: 4.6 Risk and Issue Management
- Task #1862: 4.7 Quality Assurance and Control
- ~~Task #2770: 3.1.8.1.1 Task 01 Coding and testing~~
- ~~Task #2771: 3.1.8.1.1.2 Task 02 Initial deployment in GitHub~~
- ~~Task #2772: 3.1.8.1.1.3 Task 03 Update documentation in GitHub~~
- ~~Task #2773: 3.1.8.1.1.4 Task 04 Explore and implement RAG (Retrieval Augmented Generation)~~
- ~~Task #2774: 3.1.8.1.1.5 Task 05 Choosing and calling LLM~~
- ~~Task #2775: 3.1.8.1.1.6 Task 06 TDD~~
- ~~Task #3267: 3.14 Message Clients to set API/Database Asset Deadlines~~
- ~~Task #3268: 3.15 Schedule Sprint Review and Share Consultant Feedback~~
- ~~Task #3269: 3.16 Add Rule on References to Final Documentation~~
- ~~Task #3270: 3.17 Update Backlog Templates with Consultation Scheduled Checklist~~
- ~~Task #3271: 3.18 Breakdown Top-Priority Epic into Smallest User Stories~~
- ~~Task #3604: 3.1.2.1.2 metadata extraction~~
- ~~Sub-Task #3605: 3.1.2.1.2.1 File cleaning~~
- ~~Epic #1882: 3.1 Epics~~
- ~~Epic #1885: 3.1.1 Epic 01 Prompt research questions~~
- ~~Epic #1886: 3.1.2 Epic 02 View thesis details~~
- ~~Epic #1888: 3.1.3 Epic 03 Provide feedback~~
- ~~Epic #1889: 3.1.4 Epic 04 View search history~~
- ~~Epic #1890: 3.1.5 Epic 05 Log in to account~~
- ~~Epic #2748: 3.1.6 Epic 06 Manage usage analytics~~
- ~~Epic #2749: 3.1.7 Epic 07 Manage feedback~~
- ~~Epic #2750: 3.1.8 Epic 08 Generate AI analysis~~
- ~~Epic #2751: 3.1.9 Epic 09 Exposes data (read only)~~
- ~~Feature #1893: 3.1.1.1.1 Feature 01 System UI~~
- ~~Feature #1897: 3.1.2.1.1 Feature 01: Information Display~~
- ~~Feature #1901: 3.1.3.1.1 Feature 01: Feedback system~~
- ~~Feature #1904: 3.1.4.1.1 Feature 01: Research history~~
- ~~Feature #1907: 3.1.5.1.1 Feature 01: Log in~~
- ~~Feature #2743: 3.1.1.2.1 Feature 01 Search filters~~
- ~~Feature #2746: 3.1.2.2.1 Feature 01 Bookmark system~~
- ~~Feature #2747: 3.1.2.3.1 Feature 01 Citation generator~~
- ~~Feature #2756: 3.1.9.1.1 Feature 01 Database connection~~
- ~~Feature #2757: 3.1.8.1.1 Feature 01 AI-powered search engine~~
- ~~Feature #2758: 3.1.7.1.1 Feature 01 Feedback dashboard~~
- ~~Feature #2759: 3.1.6.1.1 Feature 01 Usage analytics dashboard~~

Work Packages

Work Packages by Tracie Tomon

OpenProject / APC_2025_2026_T1_MU231_G07 HecTech LitPath AI / Work packages / Default: Assigned to me			
+ Create Include projects Baseline Filter I E F G			
ID	SUBJECT	TYPE	STATUS
1901	3.1.3.1 Feature 01: Feedback system	FEATURE	New
3438	2.3.2.3 Test Cases	TASK	In progress
902	2.3.2.3.1 Test Case for Use Case 1.0	SUB TASK	In progress
2749	3.1.7 Epic 07 Manage feedback	EPIC	New
1888	3.1.3 Epic 03 Provide feedback	EPIC	In progress
1889	3.1.4 Epic 04 View search history	EPIC	In progress
3269	3.1.6 Add Rule on References to Final Documentation	TASK	In progress
2758	3.1.7.1 Feature 01 Feedback dashboard	FEATURE	New
2753	3.1.7.1 User Story 01 As a Library Staff I want to be able to view and analyze user feedback and ratings so that I can identify areas for improvement and track user satisfaction.	USER STORY	New
1906	3.1.5.1 User Story 01: As a Library Staff I want to be able securely manage my admin account with login so that I can safely access administrative functions.	USER STORY	New
1903	3.1.4.1 User Story 01: As a Student/Researcher I want to be able to view my research history and resume previous sessions so that I can track my research progress and continue from where I left off.	USER STORY	New
1900	3.1.3.1 User Story 01: As a Student/Researcher I want to be able to provide feedback by rating AI responses (1-5 stars) and submit comments so that I can help improve the service quality and share my experience.	USER STORY	New
1890	3.1.5 Epic 05 Log in to account	EPIC	New
1862	4.7 Quality Assurance and Control	TASK	New
861	4.1 Tracking progress	TASK	New
+ Create new work package			

Work Packages by Charijoy Cempron

OpenProject / APC_2025_2026_T1_MU231_G07 HecTech LitPath AI / Work packages / Default: Assigned to me			
+ Create Include projects Baseline Filter I E F G			
ID	SUBJECT	TYPE	STATUS
1859	3.13 Release & Finalization (System dry run and soft launch)	MILESTONE	New
1858	3.12 Pre-deployment	MILESTONE	New
1856	3.10 Usability testing	MILESTONE	New
855	3.0 Executing Phase	PHASE	To be scheduled
1882	3.1 Epics	EPIC	In progress
1892	3.1.1.1 User Story 01 As a Student/Researcher I want to be able to prompt research questions and receive AI-powered ranked results so that I can... USER STORY	USER STORY	Tested
1885	3.1.1 Epic 01 Prompt research questions	EPIC	Tested
901	2.3.2.3 Test Case for Use Case 2.0	SUB TASK	In progress
2756	3.1.9.1.1 Feature 01 Database connection	FEATURE	New
2755	3.1.9.1 As an External System I want to be able to provide database access (read-only) so that users can get up-to-date thesis/dissertation info...	USER STORY	New
2759	3.1.6.1.1 Feature 01 Usage analytics dashboard	FEATURE	New
2752	3.1.6.1 User Story 01 As a Library Staff I want to be able to view comprehensive usage analytics including most searched topics, user activity tr...	USER STORY	New
2751	3.1.9 Epic 09 Exposes data (read only)	EPIC	New
2748	3.1.6 Epic 06 Manage usage analytics	EPIC	New
1860	4.5 Performance Reporting	TASK	New
868	4.4 Measuring performance	TASK	New

Work Packages by Jenine Elaine Dulay

OpenProject / Work packages / Default: Assigned to me

Assigned to me

ID	SUBJECT	TYPE	STATUS	AUTHOR	UPDATED ON
871	2.5 Develop strategies for managing risks	TASK	In progress	JA Joe Gene Quesada APC	10/30/2025 3:19 PM
1886	3.1.2 Epic 02 View thesis details	EPIC	In testing	CC Charijoy Cempron	10/13/2025 6:56 PM
1896	3.1.2.1 User Story 01: As a Student/Researcher I want to be able to view comprehensive details of selected thesis/dissertation i...	USER STORY	In testing	CC Charijoy Cempron	10/13/2025 6:56 PM
2743	3.1.1.2.1 Feature 01 Search filters	FEATURE	In progress	CC Charijoy Cempron	10/13/2025 3:22 PM
1897	3.1.2.1.1 Feature 01: Information Display	FEATURE	In testing	CC Charijoy Cempron	10/09/2025 5:04 PM
2742	3.1.1.2 User Story 02 As a Student/Researcher I want to be able to filter search results by discipline and publication date so tha...	USER STORY	In progress	CC Charijoy Cempron	10/09/2025 3:42 PM
2745	3.1.2.3 User Story 03 As a Student/Researcher I want to be able to generate and copy citations in various formats (APA, MLA, i...	USER STORY	In progress	CC Charijoy Cempron	10/09/2025 1:39 PM
3271	3.1.8 Breakdown Top-Priority Epic into Smallest User Stories	TASK	In progress	MC Marielle Kloie Concepcion	10/08/2025 9:42 AM
3268	3.1.5 Schedule Sprint Review and Share Consultant Feedback	TASK	In progress	MC Marielle Kloie Concepcion	10/08/2025 9:41 AM
1907	3.1.5.1.1 Feature 01: Log in	FEATURE	New	CC Charijoy Cempron	09/27/2025 10:31 AM
2747	3.1.2.3.1 Feature 01 Citation generator	FEATURE	New	CC Charijoy Cempron	09/27/2025 10:30 AM
2746	3.1.2.2.1 Feature 01 Bookmark system	FEATURE	New	CC Charijoy Cempron	09/27/2025 10:29 AM
2744	3.1.2.2 User Story 02 As a Student/Researcher I want to be able to bookmark theses/dissertations for future reference so that i...	USER STORY	New	CC Charijoy Cempron	09/27/2025 10:28 AM
856	4.0 Monitoring and Controlling	PHASE	To be scheduled	JA Joe Gene Quesada APC	08/28/2025 6:45 PM
1861	4.6 Risk and Issue Management	TASK	New	CC Charijoy Cempron	08/28/2025 6:45 PM

Work Packages by Marielle Kloie Concepcion

Assigned to me | Work Packages

https://openproject2025.apc.edu.ph/projects/apc-2025-2026-t1-mi231-g07-hectech-litpath-ai/work_packages?query_props=%7B%22%3A%22%2C%22%3A%22%3Afalse%2C%22%3A%22updatedAt%3Adesc%22%3A%22desc%22%3A%22true%22%7D

Assigned to me

ID	SUBJECT	TYPE	STATUS	AUTHOR	UPDATED ON
3270	3.1.7 Update Backlog Templates with Consultation Scheduled Checklist	TASK	In progress	MC Marielle Kloie Concepcion	10/08/2025 9:42 AM
1904	3.1.4.1.1 Feature 01: Research history	FEATURE	New	CC Charijoy Cempron	09/27/2025 10:31 AM
867	4.3 Identifying any deviations or issues	TASK	New	JA Joe Gene Quesada APC	08/28/2025 6:44 PM
866	4.2 Comparing it to the plan	TASK	New	JA Joe Gene Quesada APC	08/28/2025 6:44 PM

+ Create new work package

(1 - 4/4)

Backlogs

			0
^	0.10 Alpha		
1882	Epic: 3.1 Epics	In progr...	
1907	Feature: 3.1.5.1.1 Feature 01: Log in	New	
1906	User story: 3.1.5.1 User Story 01: As a Library Staff I want to be able securely manage my admin account with login so that I can saf...	New	
1890	Epic: 3.1.5 Epic 05 Log in to account	New	
1904	Feature: 3.1.4.1.1 Feature 01: Research history	New	
1903	User story: 3.1.4.1 User Story 01: As a Student/Researcher I want to be able to view my research history and resume previous sessio...	New	
1889	Epic: 3.1.4 Epic 04 View search history	In progr...	
1901	Feature: 3.1.3.1.1 Feature 01: Feedback system	New	
1900	User story: 3.1.3.1 User Story 01: As a Student/Researcher I want to be able to provide feedback by rating AI responses (1-5 stars) a...	New	
1885	Epic: 3.1.1 Epic 01 Prompt research questions	Tested	
1888	Epic: 3.1.3 Epic 03 Provide feedback	In progr...	
1897	Feature: 3.1.2.1.1 Feature 01: Information Display	In testing	
1896	User story: 3.1.2.1 User Story 01: As a Student/Researcher I want to be able to view comprehensive details of selected thesis/disser...	In testing	
1886	Epic: 3.1.2 Epic 02 View thesis details	In testing	
1893	Feature: 3.1.1.1.1 Feature 01 System Ut	Closed	
1892	User story: 3.1.1.1 User Story 01 As a Student/Researcher I want to be able to prompt research questions and receive AI-powered r...	Tested	
2748	Epic: 3.1.6 Epic 06 Manage usage analytics	New	
2742	User story: 3.1.1.2 User Story 02 As a Student/Researcher I want to be able to filter search results by discipline and publication date...	In progr...	
2743	Feature: 3.1.1.2.1 Feature 01 Search filters	In progr...	
2744	User story: 3.1.2.2 User Story 02 As a Student/Researcher I want to be able to bookmark theses/dissertations for future reference s...	New	
2746	Feature: 3.1.2.2.1 Feature 01 Bookmark system	New	
2745	User story: 3.1.2.3 User Story 03 As a Student/Researcher I want to be able to generate and copy citations in various formats (APA, ...)	In progr...	
2747	Feature: 3.1.2.3.1 Feature 01 Citation generator	New	
2752	User story: 3.1.6.1 User Story 01 As a Library Staff I want to be able to view comprehensive usage analytics including most searched...	New	
2759	Feature: 3.1.6.1.1 Feature 01 Usage analytics dashboard	New	
2749	Epic: 3.1.7 Epic 07 Manage feedback	New	
2753	User story: 3.1.7.1 User Story 01 As a Library Staff I want to be able to view and analyze user feedback and ratings so that I can ide...	New	
2758	Feature: 3.1.7.1.1 Feature 01 Feedback dashboard	New	
2750	Epic: 3.1.8 Epic 08 Generate AI analysis	Closed	
2754	User story: 3.1.8.1 As an AI System I want to be able to help students find relevant research so that I can accelerate their learning p...	Closed	
2757	Feature: 3.1.8.1.1 Feature 01 AI-powered search engine	Closed	
2751	Epic: 3.1.9 Epic 09 Exposes data (read only)	New	
2755	User story: 3.1.9.1 As an External System I want to be able to provide database access (read-only) so that users can get up-to-date ...	New	
2756	Feature: 3.1.9.1.1 Feature 01 Database connection	New	

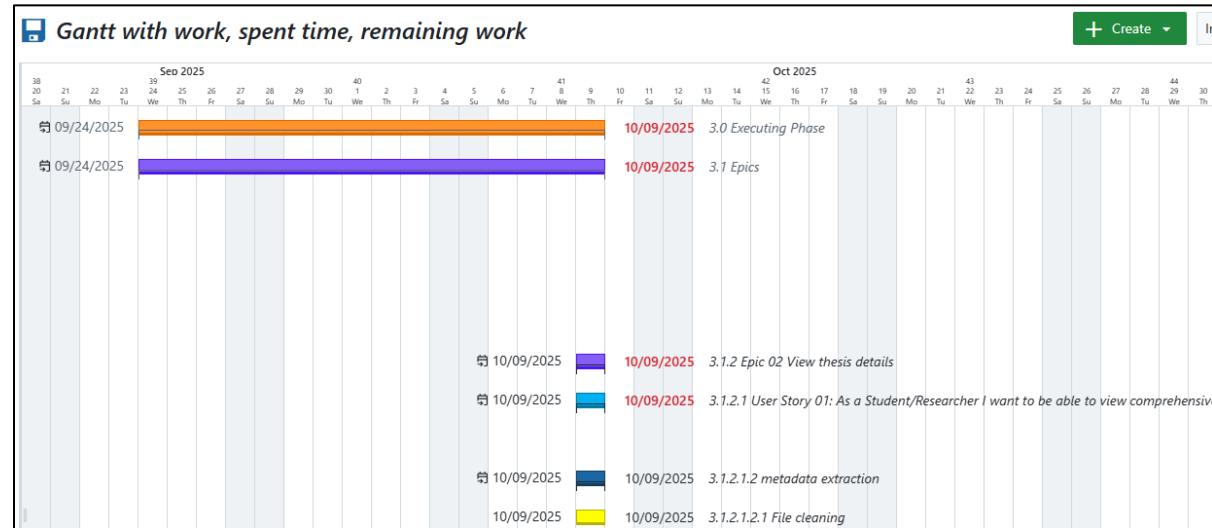
AY 2025-2026 T1 Sprint 01 Board

OpenProject / APC_2025_2026_T1_M1231_G07 HeTech LitPath AI / Boards / Public: AY 2025-2026 T1 Sprint 01

AY 2025-2026 T1 Sprint 01

Committed Backlog Items	Tasks Assigned (Not Started)	In Progress	For Review/Testing	Reviewed/Tested	Done
+ 1	+ 1	+ 1	+ 1	+ 1	+ 1
<div style="border: 1px solid #ccc; padding: 5px;"> Closed #1885 - APC_2025_2026_T1... EPIC 3.1.1 Epic 01 Prompt research questions </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1892 - APC_2025_2026_T1... USER STORY 3.1.1.1 User Story 01 As a Student/Researcher I want to be able to prompt research questions and receive AI-powered ranked results so that I can easily find appropriate research </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1893 - APC_2025_2026_T1... FEATURE 3.1.1.1.1 Feature 01 System UI </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1894 - APC_2025_2026_T1... FEATURE 3.1.1.1.1.1 Feature 01 AI-powered search engine </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1895 - APC_2025_2026_T1... USER STORY 3.1.1.1.1.1 As an AI System I want to be able to help students find comprehensive academic papers that can accelerate their learning process and improve the quality of their academic ... </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1896 - APC_2025_2026_T1... TASK 3.1.1.1.1.1 Task 01 Initial deployment in GitHub </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1897 - APC_2025_2026_T1... TASK 3.1.1.1.1.2 Task 02 Initial deployment in GitHub </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1898 - APC_2025_2026_T1... TASK 3.1.1.1.1.3 Task 03 Update documentation in GitHub </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1899 - APC_2025_2026_T1... TASK 3.1.1.1.1.4 Task 04 Explore and implement RAG (Retrieval Augmented Generation) </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1900 - APC_2025_2026_T1... TASK 3.1.1.1.1.5 Task 05 Choosing and calling LLM </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1901 - APC_2025_2026_T1... TASK 3.1.1.1.1.6 Task 06 Implementing RAG </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1902 - APC_2025_2026_T1... TASK 3.1.1.1.1.7 Task 07 Testing and validating RAG </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1903 - APC_2025_2026_T1... TASK 3.1.1.1.1.8 Task 08 Refining and improving RAG </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1904 - APC_2025_2026_T1... TASK 3.1.1.1.1.9 Task 09 Documenting and sharing findings </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1905 - APC_2025_2026_T1... TASK 3.1.1.1.1.10 Task 10 Finalizing and presenting findings </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1906 - APC_2025_2026_T1... TASK 3.1.1.1.1.11 Task 11 Evaluating and refining the system </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1907 - APC_2025_2026_T1... TASK 3.1.1.1.1.12 Task 12 Finalizing and presenting findings </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1908 - APC_2025_2026_T1... TASK 3.1.1.1.1.13 Task 13 Evaluating and refining the system </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1909 - APC_2025_2026_T1... TASK 3.1.1.1.1.14 Task 14 Finalizing and presenting findings </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1910 - APC_2025_2026_T1... TASK 3.1.1.1.1.15 Task 15 Evaluating and refining the system </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1911 - APC_2025_2026_T1... TASK 3.1.1.1.1.16 Task 16 Finalizing and presenting findings </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1912 - APC_2025_2026_T1... TASK 3.1.1.1.1.17 Task 17 Evaluating and refining the system </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1913 - APC_2025_2026_T1... TASK 3.1.1.1.1.18 Task 18 Finalizing and presenting findings </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1914 - APC_2025_2026_T1... 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TASK 3.1.1.1.1.24 Task 24 Finalizing and presenting findings </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1920 - APC_2025_2026_T1... TASK 3.1.1.1.1.25 Task 25 Evaluating and refining the system </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1921 - APC_2025_2026_T1... TASK 3.1.1.1.1.26 Task 26 Finalizing and presenting findings </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1922 - APC_2025_2026_T1... TASK 3.1.1.1.1.27 Task 27 Evaluating and refining the system </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1923 - APC_2025_2026_T1... TASK 3.1.1.1.1.28 Task 28 Finalizing and presenting findings </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1924 - APC_2025_2026_T1... TASK 3.1.1.1.1.29 Task 29 Evaluating and refining the system </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> Closed #1925 - APC_2025_2026_T1... TASK 3.1.1.1.1.30 Task 30 Finalizing and presenting findings </div>					

Gantt Chart



Design Thinking output (5 Stages)

Stage 1 – Empathize

Introduction

To build a solution that truly works, we had to start by understanding the people who will use it. The goal of this first stage was to learn about the main challenges and motivations of our client, their employees, and their customers. We made sure to set aside our own opinions to focus only on what we learned from them.



Figure 1. DOST-STII Library

Our main approach was talking to people directly. We started by visiting the DOST-STII office to interview our client and one employee in person. This helped us understand their work environment.

Next, we interviewed two customers online using Microsoft Teams to understand their point of view. Using both in-person and online interviews helped us get a complete picture from everyone involved.

After the interviews, we organized all the information we gathered. Our team worked together to create personas, which are simple profiles that represent our client, the employee, and the typical customer.

We also filled out empathy maps to show what users think & feel, hear, see, and say & do. This helped us clearly see what matters most to them, what their biggest

frustrations are, and what they need from the service. Everything we learned here will guide the rest of our project.

1.1 Client, Employee and Customer Interviews

1.1.1 Interview with the Client

We interviewed both clients at the same time. One met us in person at the DOST-STII Library, while Mr. Jonathan Abalon joined on Zoom.



Figure 2. Interview with Clients

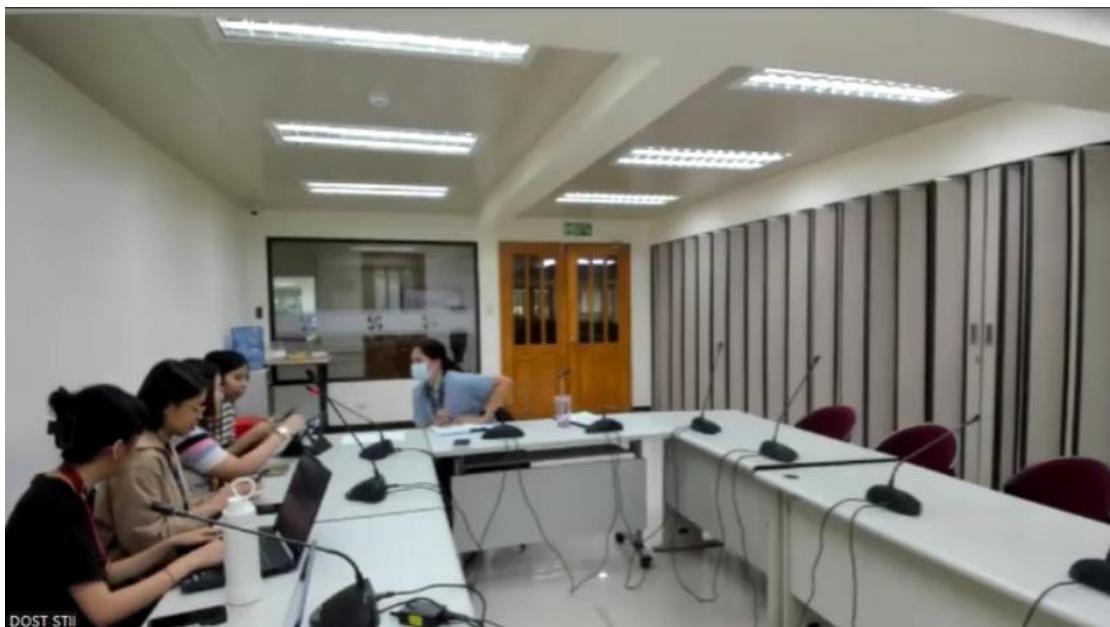


Figure 3. Interview with Clients (1)

Flow of the interview with Ms. Khasian Romulo (08/13/2025)

Question	Answer
Tell me about your current role and what a typical day looks like	<i>"Unit head of digital processing and information where we interview outstanding scientists and publish featured articles to encourage the youth in science and propose and develop projects like LithPath AI and sometimes we train people in committee works ganyan kumbaga we wear too many hats."</i>
How long have you been in this position and industry?	<i>"9 years"</i>
What are your goals in the next 6 months?	<i>"Finish LithPath AI project and deliverables and the list of thesis/dissertations to be used for the project."</i>
What's your biggest challenge or frustration at work?	<i>"Ang bagal ng government minsan mag di-digital kami pero at the end of the process may manual pa din so parang naduduplicate siya and the employees who are hesitant to change."</i>
Why do you think this problem is occurring right now in your situation?	<i>"Hindi kasi aligned ang government agencies and the generation gap of the employee but mostly talaga jan misalignment"</i>
Why do you believe these factors contribute to the problem?	<i>"Ang laki ng trust issues sa technology din minsan like what if mawala sya parang usually mas gusto nila evidence yung traditional even the budget is very limited."</i>
Why is research discovery important to you?	<i>"Kailangan may changes na sila parang pag stuck ka kasi sa ngayon lang, wala ka ng progress so you need research to advance in medicine, adapt to emerging</i>

	<i>technologies, and solve problems or to have opportunities.”</i>
Why do you think knowledge accessibility aren't being addressed in the current system?	<i>“Nakakasearch naman siya pero kulang lang siguro, kunwari nag eexpect ako ng maraming results, I think may kulang lang sa update ng system na yun and napabayaan din kasi talaga yun, ang tagal bago sya naupdate, super luma pa ng codes na ginamit.”</i>
Why would solving this problem transform your work and the students' experience?	<i>“Ang goal kasi namin is easier talaga para mabawasan yung burden ng clients looking for answers kapag even samin meron kaming mga points na stuck kami na parang nahirapan tayo so i-aasses namin kung san may pwedeng bawasan na process tapos i-propose namin so laging ganun continuous improvement, enhance experience and lesser time pero you can still get quality service for the students and even our stakeholders.”</i>
When you need to solve a problem, where do you go for information?	<i>“Depende sa affected problem, pag ka stakeholders, we hold a focused discussion, identify their problems, and assess if may resources kami to solve their problem and if none then we will request funding for project proposals.”</i>
What tools do you use daily for work?	<i>“Google sheet, google docs, scinet, facebook, canva, grammarly, viber and we have many tools pa.”</i>
How would you know if a solution was working?	<i>“Bumabalik yung tao actually we receive good feedback and they ask for more yun yung mahirap eh pag gusto nila they ask for more and parang na-unload kami ng isang malaking task yun yung feeling tas dadagdagan ilit kami ng task. Continuous problem solving.”</i>

1.1.2 Interview with Employee

We also conducted a face-to-face interview with one of the library's employees who uses the OPAC to help users with their library searches.



Figure 4. Face-to-Face Interview with Employee

Flow of the interview with Ms. Ronna Mae T. Pamilacan (08/13/2025)

Question	Answer
What's your name, age, and role?	<i>"My name is Ronna Mae T. Pamilakan. I'm 36 years old. Yung role ko sa library, mainly aside from front line, ako yung naghahandle ng social media page ng library."</i>
How long have you been working here?	<i>"Sa STII? Four years. Four pa lang. 2021. Four years. February."</i>
How did you start working here, and why did you choose this field?	<i>"So, nag-start ako dito. COS, contract of service. Nagsimula ako as user repair, science research assistant. Yung repairing mga books for archives, yun. Mainly DOST publications na for archives, COS."</i>

	<i>And then later, yung opening sa SRS-1, Science Research Specialist 1, nung 2023, June, July 23."</i>
What are your main tasks and responsibilities on a daily and long-term basis?	<i>"So, yung day-to-day operations ng library, nag-assist ako kapag may events like hybrid seminar, library orientation, and tour. So yun, yung sa front line, nag-ca-cater kami or pinaprovide namin yung may request na resources ng clients online and on-site and inventory. Ayan, yung mga pub mats na pinapost sa FB page ng library."</i>
What do you enjoy most about your work?	<i>"I enjoy po na hindi lang limited siya, or parang hindi naman siya naka-chain lang sa desk. Maraming variety, maraming klase ng mga ginagawa. So, na-enjoy ko mostly yung pub mats, yung paggawa ng pub mats sa Canva kasi malapit din sa undergrad ko course which is graphics technology."</i>
What parts of your work do you find easiest and most challenging?	<i>"Easiest, yung pub mats, patuloy ng pub mats sa Canva. And challenging, kasi kapag ano na, yung sabay-sabay na yung mga deadlines, kapag magsama na yung mga core functions and support functions."</i>
Can you describe how you currently assist researchers, students, or other users in finding academic resources?	<i>"So, pag may mga nag-request na clients online and on-site, nakikita namin yung request nila. Kapag on-site, matatanong kasi namin, mas madali, kasi nandun na rin yung clients. Kung halimbawa, may ganito lang yung available na resources, makapag-search pa kami ng ibang related articles or other online resources. Kapag lima yung nakita nila or napili nila yung book, makakapag-provide pa kami ng mas maraming alternative options. Sa online, may 8 working hours for us to provide yung materials. Kasi nga, hindi lang naman yun din sa material request yung kiniki-ter namin. So may parang manto-allowance sa time. Kung kailangan, kailangan i-provide yung</i>

	<i>resources. Well, sa on-site kasi, kailangan 5 minutes."</i>
How do you track or respond to inquiries from library users?	<p><i>"Yung pag-provide ng material requests. So, may monitoring sheet kami. Google Sheet pa lang yun eh. Pero, since may monitoring sheet kami, nilalagay namin yung logs—kung kailan ni-request ni client, and kailan namin i-provide, tapos ano yung topic.</i></p> <p><i>Actually, before pa ng monitoring sheet sa G-Drive Google Sheet, may form pa yung material request slip na pinapafill-up namin kay client, then pinapabalik sa naming para dun may hardcopy request nila sa kailangan yun, iniipon naming yun and then code naming yun sa monitoring sheet."</i></p>
How often do you interact directly with other library users online and offline?	<p><i>"Madalas, kapag open yung library. Kasi ngayon, ano yung inventory lang, comprehensive inventory. So ilang months lang ako sa library ngayon. Ah, nitong inventory period, online naman okay pa rin yung service namin.</i></p> <p><i>Kaya lang, nitong ito yung first, sem. Since ako yung nagha-handle ng pub mats, parang ako lang yung alternate. Kapag hindi kaya ng dalawang kong kasama, or wala sila, ako yung sumasagot sa online. On-site naman, bukas halimbawa yung library, dati last year, araw-araw yan.</i></p> <p><i>May times na wala masyadong clients. Pero may time din na halos puno talaga yung library, wala na silang maupuan. So, madalas."</i></p>
What common questions or problems do users usually bring to you?	<p><i>"Yung material requests lagi. "May material po or resources po ba?"</i></p> <p><i>May nagtanong na rin kung nagprovide kami na parang makapag-advise sa thesis nila, which hindi kami mandated sa ganun. Kasi syempre, kapag may thesis advisor sila or sa research nila. Kung mapaprovide namin resources or</i></p>

	<i>yung referral pag wala talaga yung hinahanap nila dito sa library namin."</i>
How do you assist users who are unfamiliar or are searching for the first time for academic materials?	<p><i>"The first-time client, tapos may nirequest siya. Ayun, nilalapitan ko. Minsan naman, sila rin yung nag-approach talaga. Minsan naa-lata ko na matagal sila dun sa may registration, halimbawa, tagal nilang nakatayo. Minsan doon nahihiya silang approach.</i></p> <p><i>So, kapag nagtanong naman sila, ina-explain ko kung paano gamitin yung OPAC, tapos kung ano yung mga klase ng materials na makikita dito sa STII Library, na focus siya sa Science and Technology and Innovation. May nagtanong dati tungkol sa wika sa Pilipino, so nire-refer ko siya sa ibang libraries na makakapag-provide resources."</i></p>
What is the most challenging part of your work when helping users find the information they need?	<p><i>"Siguro sabay-sabay din sila, tapos yung paggamit sa online public access catalog, hindi sila familiar kung paano i-search or i-key in yung research nila or yung topic na gusto nilang mahanan. Minsan nilalagay nila buo, kumpletong title, which is wala ka talagang masyadong makikitang results.</i></p> <p><i>Unlike kapag iniba mo yung keywords mo, makakapag-search ka na mas maraming results yung lalabas. Tsaka pag sabay-sabay talaga sila. And then, may material requested din kasi. So, pag hindi sila nakakasunod dun sa tamang format, maraming erasures."</i></p>
How do you handle requests for resources that are not available in your current database or library?	<p><i>"So, kapag wala dun sa library namin, nagha-hanap ako ng related online resources. And then pag wala talaga, or mas may mahanan silang resource sa ibang library, ni-rerefer ko sila. And then, sinasabi ko yung contact details. Sine-search ko na rin yung website ng library. Tapos sinasabi ko sa client."</i></p>

<p>Are there situations where you feel the current system slows down your work or the user's research process?</p>	<p><i>"Ayun, yung nakaka-disload sa akin, doon sa process ng paghanap, kapag may nakita si client sa OPAC na material na nandito sa library namin. However, yung physical material na yun, minsan naka-line up siya for digitization. So, nandito siya sa kabilang room, tapos yung pagkakalagay pa patong-patong na. Hindi siya katulad dun sa library na nakatayo. Minsan nakakatumba yung mga books or references.</i></p> <p><i>And also, kapag may mga hindi makitang resources, yung physical hindi makita. Pero yung sa system, nandun. Ito yung mahirap."</i></p>
<p>What challenges do you face in organizing and updating the library's digital and physical collections?</p>	<p><i>"Dati kase nakaopen shelves kami may ano kami araw-araw may nasheshelved kami na material sa designated area so symempre hindi lang yung ginawa naming kaya, ano, minsan, na hindi siya, tsaka pala si student or si clients, kapag humihiram, hindi niya magbabalik sa tama yung spot kung saan siya dapat. And also, kapag may nagtutour, library tour, hindi maiwasan kasi na siyempre magsi-stop over dun sa General Reference or sa Filipiniana. So, nakakahugot sila ng material ng libro. Tapos, syempre, sa gulat ng basa, hindi nila naalala kung saan talaga yung lalagay. Pinapamisan, pinapatagalagay na lang din namin sa itaas ng shelves tapos kami na lang magbabalik. So, may time talaga na kukuha siya ng 3 hours. One day, 3 hours lang para i-determine yung material sa tamang lugar."</i></p>
<p>How about sa digital database?</p>	<p><i>"Digital database, kapag may hinahanap nila, one naka lang siya. Hindi siya downloadable. Sa may nakita nga kanina, ano, yung alternative na resources online kaya hindi siya downloadable. May kailangang subscription."</i></p>

<p>What are your thoughts on using AI tools to help users search and interact with academic resources?</p>	<p><i>"It will be a lot helpful talaga. Lalo na sa yung pagse-search ni client. Mas makapadali talaga kung may AI. Saka, dapat mag-adapt na rin tayo."</i></p>
<p>How do you think an AI-powered platform could make your work easier?</p>	<p><i>"Makapag-search. Tsaka ano din, halimbawa, yung may binigay na title si client dun sa business status niya. Tapos, doon and there, medyo limitado lang kasi din. Minsan, nababox na rin talaga yung isip ni client—kahit ako rin eh—dun sa title. May limitado lang ako na pwedeng i-... Or yung pag na-reword mo yung topic niya. Kasi ayun, mas makapag-proof siya ng most likely na tamang keyword, tapos mas malapit or related na resources yung lalabas."</i></p>
<p>What specific features would you like to see in an AI-assisted research platform?</p>	<p><i>"Mabilis ma-search tsaka yung lalabas na results mas malapit dun sa ano talaga, topic na desire nito.</i> <i>Yung parang, siyempre, kailangan mo ma-provide agad yung materials ni client. So, parang hindi ka na rin gumugol ng marami pang oras mag-search, tapos pag binasa mo, ay hindi pa pala 'to."</i></p>
<p>If you could change one thing about the way the library system works right now, what would it be and why?</p>	<p><i>"I don't know if you will not watch this. Mas madali yung ma-search. Tapos, in ano rin, siguro dun sa part naman din ng design na mas ma-appreciate ni client. Parang halimbawa, how Spotify or Netflix works—ma-visual dun kasi, lalo na kapag sa mga students. Mas ma-appreciate nila. Tsaka siguro mas madali nilang mag-grasp or maintindihan kagad na, "Ah, ito yung resource mo." Hindi pa na pwede. Mas maganda pang ganyan—sounds, movies, movies.</i></p> <p><i>Siguro yung mapagsama-sama niya yung relative. Alam mo, kapag sa DOST, marami kasing agencies eh. Parang ganun, malalaman ng students kung ano kagad yung dapat nilang puntahan na office or i-contact na office. Nakakapag-</i></p>

	<p><i>example pala, yung sa mga testing, IPDI pala, DOSN pala. Although may nagtatanong naman sa amin, may nag-i-inquire. Ay, ano, compatible din yun kasi i-route namin. Ganito ang mga best things that were used."</i></p>
Do you think the new methodologies through technology can improve your current system and attract more researchers/library users? Can you share your thoughts?	<p><i>"Yung pag may new system na may na-indicate sa'yo with AI, hindi naman. Kasi mas mabilis. Tapos, in a way na mas ma-appreciate ni client. Painting din lang niya. Mas makaka-attract talaga din ang clients kasi ease of doing things din."</i></p>
How do you see the role of libraries and research assistance evolving in the next 5 years or at least the next few years? Like, what are your plans?	<p><i>"Dapat ano lang siya, hindi siya limited sa physical or sa books. Hindi, dapat sa digital na rin. Tsaka, dapat mas ano pa rin eh, mas si library dapat natutulungan niya pa rin yung mga clients na organize yung mga info. Actually, hindi natin problema yung information eh, kasi guarded na nga tayo ng info. The question is, ano yung dapat—yung right information at the right time. Providing right information at the right time when the client needs it.</i></p> <p><i>So, dapat, ayun. Kaya doon sa physical labor, kapag mag-aalisan na yung students, yung ma-sense sa lighting or sa aircon—kapag konti na lang yung tao, hindi na yung aircon. Dapat maging hub si library talaga na, aside from learning, dapat may collaboration. Mag-poster siya sa PALSA community."</i></p>
What is your hope for how AI could impact research accessibility in the Philippines?	<p><i>"Saan na yung union? Kailangan tayo na mga Pilipinas, tigay ito natin sa library para mas makapagbigay pa tayo ng mga assistance at resources na much faster and better."</i></p>

1.1.3 Interview with Customer #1

Since the DOST-STII Library was closed for its inventory, we were unable to interview users in person. Instead, we opted to interview students from nearby universities online via MS Teams, one of whom had even completed an immersion program there.

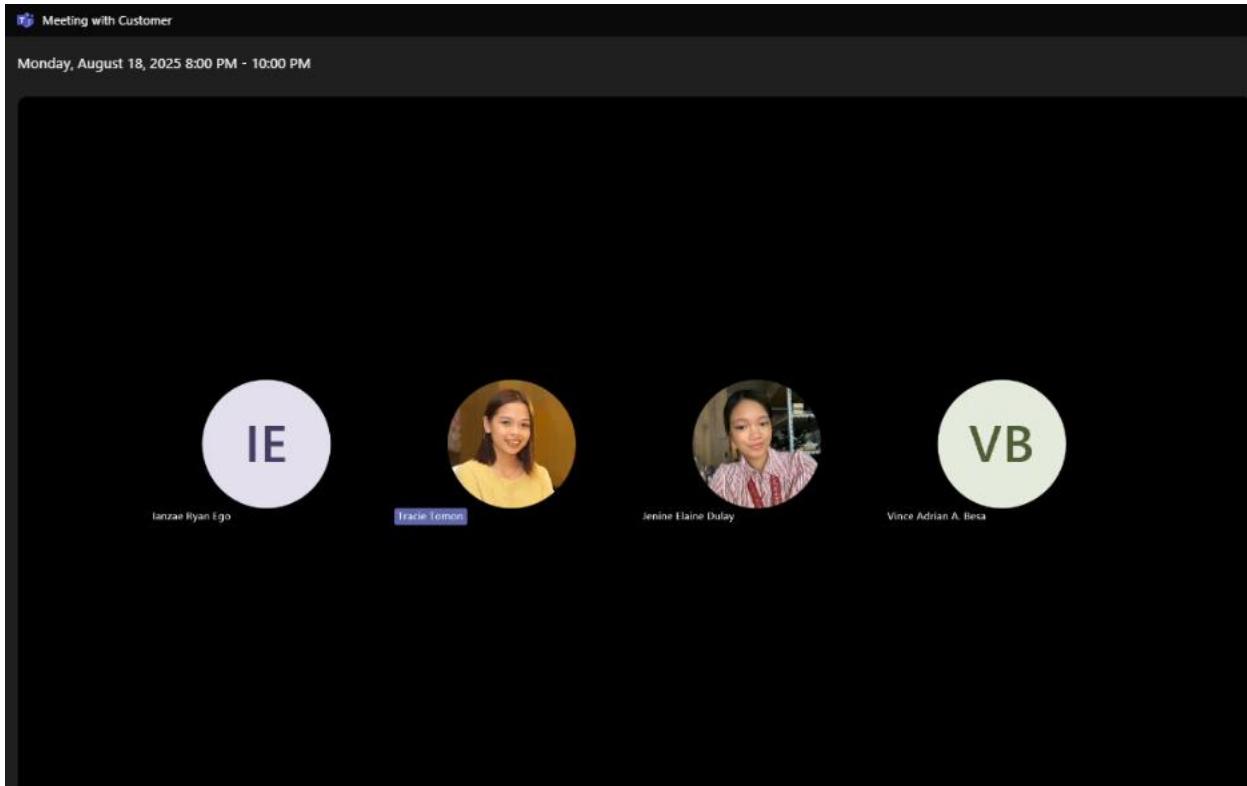


Figure 5. Interview with Customers

Flow of the interview with Mr. Lanzae Ryan Ego (08/18/2025)

Question	Answer
To start, could you tell me a bit about your professional or academic background? (Name, age, education).	<i>"Hi, good evening. My name is Lanzae Ryan Ego, 20, currently studying at the Technological University of the Philippines – Taguig Campus, taking up BSIT."</i>
Roughly how often do you find yourself using the DOST-STII OPAC? And what's your main goal when you do?	<i>"As much as I used the Google Scholar, I think pwedeng mabenefit rin sa paggamit nito. Usually sa amin rin kasi, sa department ng IT, meron rin kasing ginagawa na ganitong website which is taga archive ng mga different kinds of"</i>

	<p><i>research and theses na ginawa ng ano natin. So as for me, ito yung pwede kong makuhanan ng mga research material and sources especially mga results na pwede makapag-verify ng mga kailangang makuhang results sa amin, like maverify kung tamang results ba ung nakuha namin or ito ba yung tamang solution na gagawin namin.”</i></p>
<p>What types of materials from the OPAC are most essential for your work?</p>	<p><i>“Yung mga typical na pwede kong makitang materials na pwedeng magbenefit sa student, yung mga research material lalo na yung mga sources, for me, na nakalagay dito sa mga types dito sa website na pwedeng magbenefit sakin lalo na sa paggawa ng capstone, research and mga thesis na need naming gawin as a student.”</i></p>
<p>What are some of the exact words or phrases you've typed into the search bar recently?</p>	<p><i>“Nakabase ako kung ano yung mga given na searches, yung mga available like nong una sa material types, sa may theses and dissertations, ito yong mga una kong sinearch and other fields of research and location. Mostly, naoverwhelm ako sa mga other choices na mga availability ng mga choices sa OPAC. Usually kasi sa mga ganito may mga categories sila na naka-arrange. Nakaka-overwhelm sya, lalo na sa locations.”</i></p>
<p>How do you keep track of the materials you want to find in the library? Do you use a specific tool or method?</p>	<p><i>“Ginagawa ko yong pagdownload kung available. Dinownload ko sya then sinesave sa specific folder. Pero pag back up, minsan nilalagay ko sya sa hard drive para mas masecure yong gagamitin na materials. And binobookmark ko rin para mas madali kong makita.”</i></p>
<p>When you're looking at a page of search results, what information stands out to</p>	

you visually? What do you notice first?	<p><i>"Nakadeck lang sya, hindi kita yong text pero okay naman sakin yong nakikita na source, quick view and full catalog. Ang problema ko lang sa search results, yong color theme nya, mahirap makita yong mga text. Pwedeng idagdag yong light and dark mode."</i></p>
What other websites, apps, or documents do you typically have open on your screen while you are using the OPAC?	<p><i>"Nakaopen yung sites ng Google scholar, other libraries for research, Als like ChatGPT para mas maverify ko yong legitimacy, Grammarly for re-wording sa mga sentences and grammars, YouTube for music para di mapagod habang nagbabasa ng research."</i></p>
Where are you physically located when you usually access the OPAC? (ex. at a library computer, on your laptop at home, on your phone while commuting?)	<p><i>"Laptop at home"</i></p>
What do you see when you look at other universities or institutional library websites? What do their search pages look like?	<p><i>"Mostly pag nilagay mo na yong keyword or key topic ng research, makikita mo na yong mga related topic, researches na previously nang nagawa sa topic. Pwedeng i-categorize and i-archive yong mga topics."</i></p>
Have you seen any posters, announcements, or online posts from the library about its digital resources?	<p><i>"Wala naman masyadong nakikita na mga post. Pero sa university library namin, meron silang announcements regarding sa mga available or mga new na nakaarchive na research and previous theses."</i></p>
Let's try to visualize it. If your classmates knew about it, what would they usually say about the OPAC of DOST?	<p><i>"Magugulat sila na may ganito rin pala na inoffer ang DOST na website na research library."</i></p>
Have you overheard anyone talking about a different tool or website they prefer for	

research?	<p><i>"Kumukuha ng mga ideas sa AI, other websites like Google Scholar at university library, GitHub for coding."</i></p>
What do you hear in the news or online about the future of libraries and digital research?	<p><i>"As an IT student, mostly connected sya sa mga AI. Mostly connected sya sa pag use ng AI, lalo na sa pagguide at pagkuha ng mga available research materials na pwede mong makuha don sa mga libraries. Gumamit sila ng AI para matulungan nila yong user na hindi masyadong mahirapan lalo na sa pagsearch. Pwede ring gumawa yong AI ng specific prompt para mas maayos yong makuha mong results."</i></p>
What's going through your mind when a search returns many more results than you expected? What about when it returns zero results?	<p><i>"Tinatry kong kunin yong mas updated na date sa research if maraming results. If ever zero results, tinatry kong i-change yong topic or other topic na pwedeng connected sa topic ko para meron pa ring results. Last resort is gumamit ng AI para makahanap ng research materials."</i></p>
How confident do you feel that the search results are showing you the most relevant materials available?	<p><i>"Kung maraming search results na related sa makukuha kong topic kasi marami akong makukuhanan na materials at references."</i></p>
What are your expectations before you begin a search session on the OPAC?	<p><i>"Mabibigay nya yong recently updated research catalog, free yong material para manview and madaling ma-reference yong material. Madaling mabasa yong binibigay na output like letters, titles, and year of publication na connected sa research ko."</i></p>
What's the best part of the research process for you? When do you feel most successful?	<p><i>"Availability of categorized material type and don't have to go through manually searching like in Google Scholar."</i></p>

What are the most difficult parts of your current search workflow?	<i>“Searching for related topic for research, giving the undesired results and outdated materials, di makita yong pinakarecent na research, wala masyadong nagsolve kaya outdated yong binibigay na output.”</i>
Are there any tasks in your search process that you feel are boring or hard to navigate?	<i>“Slow loading time of materials or to provide search results”</i>
Can you describe a time when you felt like you were wasting time trying to find a piece of information? What was happening?	<i>“Nag-eerror yong code at di namin makita sa kahit anong research kung paano isosolve”</i>
What prevents you from finding what you need quickly and efficiently?	<i>“Slow network connection at compliance sa kagrupo, ikaw lang gumagawa sa documentation or sa research. Magkakaiba at magkakalayo yong ideas sa need ng research.”</i>
What would an ideal search experience look like for you?	<i>“When searching for the topic or title, it will provide the most updated research, articles na pwedeng makuha for free, no need to pay for further access.”</i>
What kind of tools or features would make your search process "easier and faster"?	<i>“Integration of AI with reliable answers for faster results, feature of proof reading and legitimacy of the resources, and availability.”</i>
What would make you feel happy and satisfied with a research tool website?	<i>“When searching for the topic or title, it will provide the most updated research, articles na pwedeng ma-access for free.”</i>

1.1.4 Interview with Customer #2

Mr. Besa, whom we interviewed online at the same time as Mr. Ego, had completed his immersion at the DOST-STII Library, making his experience with the OPAC particularly helpful.

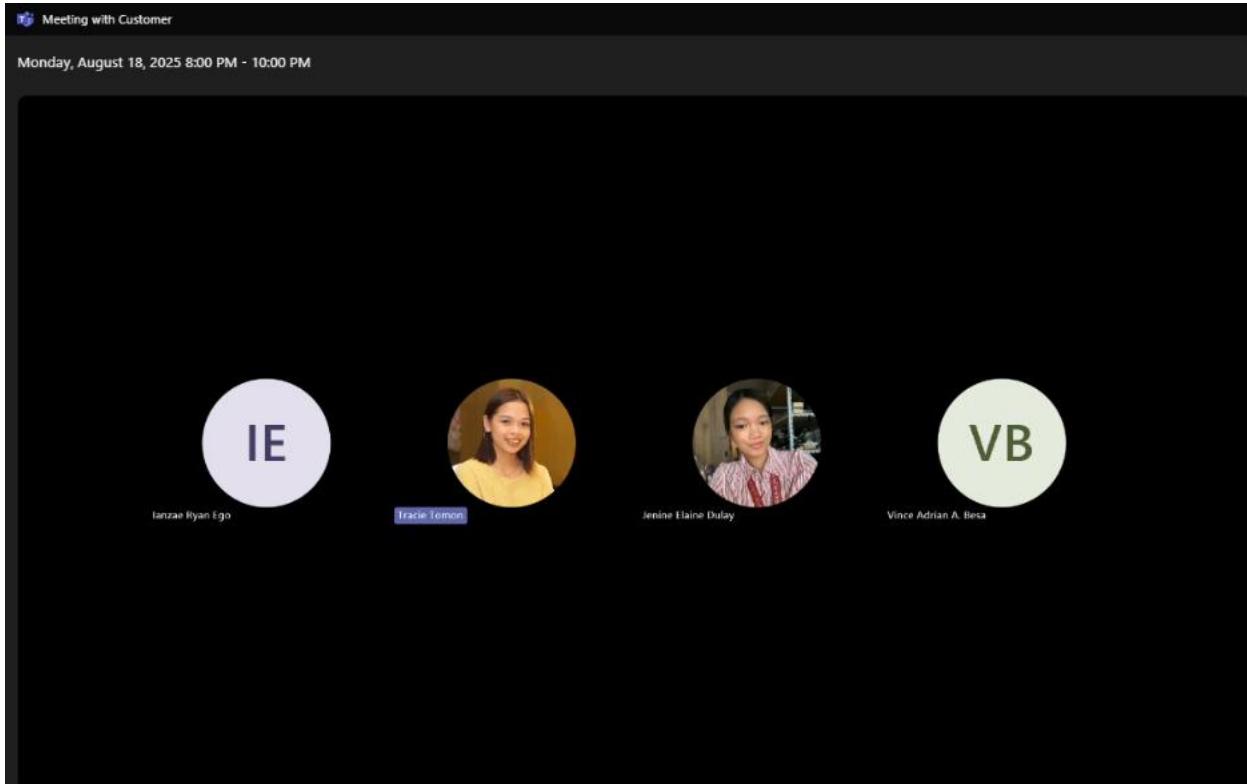


Figure 6. Interview with Customers (1)

Flow of the interview with Mr. Vince Adrian A. Besa (08/18/2025)

Question	Answer
To start, could you tell me a bit about your professional or academic background? (Name, age, education).	<i>"Good evening, everyone. I am Vince Adrian A. Besa, 20 years old. I am an incoming 3rd-year student at the Polytechnic University of the Philippines, Taguig, currently taking BSIT."</i>
Roughly how often do you find yourself using the DOST-STII OPAC? And what's your main goal when you do?	<i>"I think etong website has a lot of potential talaga sya na makatulong sa akin, especially sa atin mga students. Masasabi ko lang sa website, parang marami pa siyang kulang na pwede pang dapat gawin o i-improve. Kanina nung tinry kong mag-search dito ng mga researches or articles, nasa loading"</i>

	<i>animation pa lang ako. I think medyo kailangan pa ng improvement. Nagtry ulit ako ngayon mag-search ng mga archive researches, books, or articles, at nagtry ako sa desktop — may lumabas naman na results.”</i>
What types of materials from the OPAC are most essential for your work/course?	<i>“I think yung mga essential talaga rito sa OPAC is yung mga materials na academic-related, which is a great help for us, especially sa mga students, to help us in our researches or whether we are pursuing something academically related.”</i>
Walk me through the last time you used the DOST-STII OPAC, starting from how you opened the website. What were the first few things you did?	<i>“Dito marami na akong nakikitang mga problem o kailangan pang gawan ng improvement. So tulad lang din ni Mr. Ego na ginawa niya kanina, inexpolore ko lang tong website: yung FAQs, yung About tab, and then yung OPAC. Sa OPAC, tulad nga rin ng na-experience ni Mr. Ego kanina, na-stuck lang ako sa loading animation ng website. Nanotice ko rin na yung website is not secure. So, I think di pa siya fully nadeploy o developed. Dito sa kulay ng tab sa OPAC, ganon, siguro medyo dapat i-darken pa ng konti. Then dito sa search button sa OPAC, parang di siya uniform sa theme ng DOST.”</i>
What are some of the exact words or phrases you've typed into the search bar recently?	<i>“Napansin ko lang dito kanina sa OPAC, pag default mo lang yung mga subjects, etc., nagsstuck siya sa loading animation niya kanina. Then pag nagspecify ako, let's say, cinlick ko dito "theses and dissertations," and yung field, "all fields," then sa location, "all locations," may lumalabas naman na results. I think yung website, tulad kay Mr. Ego, na-overwhelm ako since andaming researches o articles na hindi ako familiar masyado. Kung first time ko gagamitin,</i>

	<i>parang mahihirapan akong i-navigate tong website na ito. Since hindi ba siya ganon ka-user-friendly, dito sa OPAC, pag lumabas yung search results, wala siyang back button para sa OPAC page o section ng website.”</i>
When you find a promising resource in the search results, what is your immediate next step?	<i>“Usually, when making a research and I find a promising resource, let's say Google Scholar, inoopener ko yung site na yon o research na yun, then cinocopy ko yung link niya, then issave ko sa notes ko. So, whenever gusto ko tignan o basahin yung article na yun, pwede ko siya makita agad.”</i>
How do you keep track of the materials you want to find in the library? Do you use a specific tool or method?	<i>“Usually yung mga nahahanap kong research sa internet, kung available, dinownload ko sila, then sinasave ko sa isang folder na madaling makita. Let's say, pangalanan natin yung folder ng “researches” or “studies,” then dun ko sila ilalagay lahat.”</i>
When you're looking at a page of search results, what information stands out to you visually? What do you notice first?	<i>“Yung mga una kong nanotice is yung types of material nila, then yung title ng study, then yung quick view, and then full catalog.”</i>
What other websites, apps, or documents do you typically have open on your screen while using the OPAC?	<i>“For me naman, yung mga naka-open na tab sa akin when making research or writing a research: syempre una-una is Facebook para makacommunicate sa mga classmates o groupmates. Naka-open din yung Google Scholar ko to find resources and more for references. Yung mga naka-open din na iba kong tab is yung AI, such as ChatGPT, Claude, and many more. Naka-open rin yung tab kong Google Docs para dun ko ilalagay yung mga words o phrases, or kung ano nakuha sa information sa study na ito.</i>

	<i>Gumagamit rin ako ng mga paraphrasing tools like QuillBot — malaking help talaga siya sa pag-fix ng grammar ko at paraphrase.</i>
Where are you physically located when you usually access the OPAC?	<i>"Laptop at home"</i>
What do you see when you look at other university or institutional library websites? What do their search pages look like?	<i>"Yung mga napansin ko sa ibang university sites tulad ng OPAC, yung search bar nila, pwede mong ilagay yung title ng research mo, then lalabas yung mga related studies sa ginagawa mong research."</i>
What do you see when you look at other university or institutional library websites? What do their search pages look like?	<i>"Yung mga napansin ko sa ibang university sites tulad ng OPAC, yung search bar nila, pwede mong ilagay yung title ng research mo, then lalabas yung mga related studies sa ginagawa mong research."</i>
Have you seen any posters, announcements, or online posts from the library about its digital resources?	<i>"Sa university namin, may makikita ka ring mga news o announcements na nakalagay kung ano yung mga latest studies na nakapost din sa website na pwede naming i-view. Pwede mo ring makita yung mga physical materials and studies na ginawa ng past seniors namin sa laboratory namin, which is mga nakahard bind na researches. Pwede mong tignan at basahin, at makakakuha ka ng ideas at references para sa gagawing capstone doon."</i>
What have you heard from your classmates or friends about their experience with the library's catalog?	<i>"Sa DOST-STII, familiar ako na may library sila. Dito kami nag-work immersion back when we were Grade 12, then dun ko lang nalaman tong DOST OPAC. Kung tatanungan ko yung mga classmates ko o</i>

	<i>mga kakilala ko kung familiar sila sa site, I think isasagot nila "no. ""</i>
Let's try to visualize it. If your classmates knew about it, what would they usually say about the OPAC of DOST?	<i>"They'd be surprised that this kind of site exists, kung saan makakahanap kami ng resources or references para sa mga researches namin."</i>
Have you overheard anyone talking about a different tool or website they prefer for research?	<i>"May mga nasabi rin yung classmates ko o past classmates ko tungkol sa mga sites na pwede kaming maghanap ng materials. Sa internet o social media, may mga napapanuod rin ako na may ganitong sites, like science-related or other things. Pero nakalimutan ko na yung sites na yon. Sa part ko naman, usually pag programming-related yung mga tanong o problems ko, gumagamit ako ng AI at Stack Overflow para maghanap ng ideas o solusyon sa problem na na-encounter ko."</i>
What do you hear in the news or online about the future of libraries and digital research?	<i>"As an IT student, siguro yung libraries, iba, siguro mas magiging less relevant na sila in the future since mostly, yung mga tao gumagamit na ng AI like ChatGPT, where makukuha natin yung mga sagot o information na gusto nating itanong sa kanila. Since na-train pa nga yung AI, nag-iimprove pa siya at naiimprove, siguro mas magiging accurate yung makukuha nating information in the near future. Magagamit na lang siguro yung ibang researches or studies for citations or references."</i>
What's going through your mind when a search returns many more results than you expected? What about when it returns zero results?	<i>"Pag naghahanap ako ng research, studies, or articles, let's say walang results na makita, nilalagay ko na sa search bar yung mga related topics sa topic namin. Kung wala pa rin makitang results, magaask na lang ako kay</i>

	<i>ChatGPT kung meron man na related sa research or study na ginagawa namin.</i>
How confident do you feel that the search results are showing you the most relevant materials available?	<i>"Hindi ako ganun ka-confident when finding a material in sites like Google Scholar. Pag naglalagay ako ng topic namin or pag sinesearch namin para makahanap ng related topics, usually yung mga lumalabas is irrelevant and mostly outdated yung mga swak talaga sa research na ginagawa ko."</i>
What are your expectations before you begin a search session on the OPAC?	<i>"Hindi ako gaano nage-expect dito sa OPAC, since nasabi nyo na ring kanina na etong website was created back in 2012 or 2010. Hindi naman ako gaanong nage-expect na makukuha yung relevant na information or studies dito since medyo outdated siya."</i>
What's the best part of the searching process for you? When do you feel most successful?	<i>"Pinaka fulfilling o pinaka natutuwa ako sa searching process is pag yung sinearch kong topic, yung lumalabas na search results is related sa topic ko, at yung date na ginawa sila is relevant pa, let's say 5 years ago lang sila ginawa o latest. Again, yung search results nya is relevant and related sa research na ginagawa ko."</i>
What are the most difficult parts of your current research workflow?	<i>"Pinaka difficult is paggawa ng title na papasa sa adviser o instruction namin, paghahanap ng RRL sa study namin, at pinaka mahirap talaga sa akin is yung pag-analyze at interpret ng data o information na na-gather namin sa respondents o participants para sa study namin."</i>
Can you describe a time when you felt like you were wasting time trying to find a piece of information? What was	<i>"Nasasayang ako sa oras pag sa group setting puro plano lang. I think the best solution is mag-take ng action at iplan nang maigi yung mga dapat gawin at i-</i>

happening?	<i>comply sa week na to at sa susunod na weeks. In that way, may guide kami at may process kami na sinusundan para maging organized.</i>
Are there any tasks in your research process that you feel are boring or hard to navigate?	<i>“Yung pinaka boring na tasks is maghanap ng research studies or articles. Let's say sa RRLs, yun talaga yung pinaka boring kasi mahirap talaga maghanap ng mga related studies na tutugma o related sa research na ginagawa namin.”</i>
What prevents you from finding what you need quickly and efficiently?	<i>“Yung nag-prevent sakin is kapag nag-open ako ng nagustuhan kong research, study, or article, yung nakikita ko lang o pwede ko lang basahin sa study na yun is yung abstract, o di ko siya ma-fully open o makita. So ayun talaga yung nag-prevent na makahanap pa ng further information na pwede i-cite o gawing reference sa ginagawa naming research.”</i>
What would an ideal research experience look like for you?	<i>“Pag nagssearch ako, lalabas na sa pinakatop yung most related na topic sa ginagawa naming research. Another thing is, hindi na natin matatanggi na kailangan nating gumamit ng AI para mas mapabilis yung research. Yun nga lang, pag gumagamit tayo ng AI, dapat nag-proofread tayo at vine-verify kung tama ba o accurate ba yung nakuha nating information at galing talaga siya sa isang research study o article.”</i>
What kind of tools or features would make your research process "easier and faster"?	<i>“For me, yun nga, para mas mapadali at mas mapabilis, gumagamit talaga ako ng AI para mas mapabilis at mapadali yung ginagawa kong tasks. May mga ginagamit rin akong features and extensions wherein, pag may nakikita akong link o website, may nakalagay dun na icon na</i>

	<i>nagsasabi na legit and verified tong website na to, at hindi siya threat o nagcocontain ng malware files na mag-affect sa device natin."</i>
What would make you feel happy and satisfied with a research tool website?	<i>"Siguro yung makakapagsaya sakin o satisfy is yung dapat yung mga studies o information na nakalagay doon is open-source and easy to access para madaling ma-access at madaling makakalat ng information sa ibang students para sa mga ginagawa nating research. Siguro yung magpapasaya rin sakin is yung user-friendly at, again, easy navigation."</i>

1.2 5 WHYs (Simplified)

Problem 1: Users feel the current OPAC is not meeting their needs, as they are disappointed by its slow performance, security warnings, and confusing layout.

- Why is the OPAC not meeting their needs?
 - Because users today expect technology to be fast, safe, and easy to use, but the OPAC falls short of providing this modern experience.
- Why does it fall short of providing a modern experience?
 - Because its underlying technology is outdated. This causes it to be slow, freeze often, and lack up-to-date security, which is why browsers show a "not secure" warning.
- Why is the technology outdated?
 - Because the system has not been given any meaningful updates or new features for a very long time.
- Why hasn't it been updated?
 - Because there has been no plan or budget set aside to keep the system modern and working properly.
- Why was there no plan or budget for it?
 - Because improving the OPAC was not treated as a priority, so no one was put in charge of making sure it was taken care of.

Root Cause: The main problem is that the OPAC was not considered an important priority. This lack of focus meant it never received the planning, funding, or attention needed to keep it up to date. As a result, it can no longer meet the basic needs and expectations of today's users.

Problem 2: The library staff knows the OPAC is old and needs to be fixed, but slow government rules and complicated procedures stop them from making real progress.

- Why do the rules stop them?
 - Because different government offices don't work together well. Their rules don't match, which turns a simple technology upgrade into a paperwork burden.
- Why don't the offices work together?
 - Because even if the library goes digital, they still have to print everything out for other offices. This doubles the work and makes employees feel like new technology is pointless.
- Why do employees feel new technology is pointless?
 - Because they already don't trust computers that much. They worry that digital files might get deleted and feel safer with real paper copies. When a "digital" process still requires paper, it just proves their fears are right.
- Why does this fear of computers persist?
 - Because there's not enough money to do a full, proper upgrade. They can only afford to fix small parts at a time, which never solves the whole problem and doesn't build anyone's confidence in new technology.
- Why isn't there enough money?
 - Because in the big government system, the library's search tool is easily forgotten or ignored. Bigger projects almost always get the money first, leaving the OPAC with very little.

Root Cause: The primary issue is that the library is currently hindered by complex governmental procedures and administrative requirements. Due to limited inter-agency coordination and ongoing budget constraints, it has been unable to carry out the major

upgrades needed for modernization. As a result, staff are forced to rely on outdated systems, which limits users' ability to conduct effective research.

This project addresses the issue by taking an alternative approach to existing government procedures. Instead of pursuing a full-scale replacement of the legacy system, a separate search tool has been developed for key research needs. This targeted solution is smaller in scope, more manageable, and allows us to deliver fast, meaningful results directly to users. By demonstrating success in this key area, we not only provide immediate value but also build trust in modern technology. This success story will help reduce resistance to change and create momentum for broader improvements in the future. We are delivering practical benefits today while laying the foundation for transformative upgrades tomorrow.

1.3 Personas

1.3.1 Client Persona



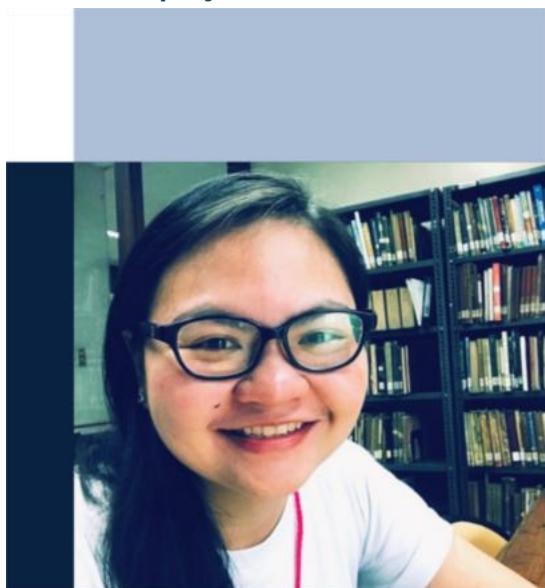
KHASIAN ROMULO

Age: 30
Residence: Pasig
Education: College Graduate
Occupation: Unit Head of Digital Processing and Service Registry
Marital Status: Single

<p>BIO</p> <p>Khasian is currently the Unit Head for Digital Processing and Service Registry in a government agency. She is a highly motivated and tech-savvy leader committed to driving progress and innovation within a traditionally slow-moving sector. She is a natural problem-solver who "wears many hats," from managing projects like LitPath AI to publishing scientific articles to encourage the youth.</p>	<p>VALUES</p> <ul style="list-style-type: none"> • Research as Progress Driver • Client-Centric Approach • Quality Service Delivery • Continuous Improvement 								
<p>COMFORT WITH TECHNOLOGY</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40%;">Comfort to technology</td> <td style="width: 10%; text-align: right;">10/10</td> </tr> <tr> <td>Internet</td> <td style="text-align: right;">10/10</td> </tr> <tr> <td>Software/apps</td> <td style="text-align: right;">10/10</td> </tr> <tr> <td>Social network</td> <td style="text-align: right;">10/10</td> </tr> </table>	Comfort to technology	10/10	Internet	10/10	Software/apps	10/10	Social network	10/10	<p>FEARS</p> <ul style="list-style-type: none"> • Stagnation • Inefficiency and Waste
Comfort to technology	10/10								
Internet	10/10								
Software/apps	10/10								
Social network	10/10								
<p>CRITERIA FOR SUCCESS</p> <ul style="list-style-type: none"> • Positive client feedback and return visits • Increased demand for services • Enhanced stakeholder experience • Reduced processing time while maintaining quality service 	<p>NEEDS</p> <ul style="list-style-type: none"> • Relevant Search Results • User-Friendly Interface • Reliable Performance • Integration Capability 								
	<p>WANTS</p> <ul style="list-style-type: none"> • Complete LithPath AI project and all deliverables • Finalize comprehensive list of thesis/dissertations for project use 								

Figure 7. Client Persona

1.3.2 Employee Persona



RONNA MAE PAMILACAN

Age: 36
Residence: Taguig City, NCR
Education: College Graduate
Occupation: Science Research Specialist I, DOST-STII (Library Services & Social Media Management)

BIO

VALUES

FEARS

NEEDS

WANTS

Ronna Mae T. Pamilacan is a Science Research Specialist I at DOST-STII. With a background in Library and Information Science and Graphics Technology, she specializes in library services and creating social media content to promote library initiatives. Her experience includes assisting with library tours, webinars, and special events, as well as moderating the Online Library Literacy Program.

COMFORT WITH TECHNOLOGY

Comfort to technology	10/10
Internet	10/10
Software/apps	10/10
Social network	10/10

CRITERIA FOR SUCCESS

- Providing accurate and timely resources to the clients
- Smooth and positive user experience in both physical and online library services
- Efficient organization of physical and digital collections
- Increased engagement of library users

VALUES

- Efficiency in providing accurate and timely resources
- Assisting clients in finding the right resources
- Creativity in promoting library services through design and content

FEARS

- Delays in service
- User disengagement from the library
- Work overload
- Limited access to resources

NEEDS

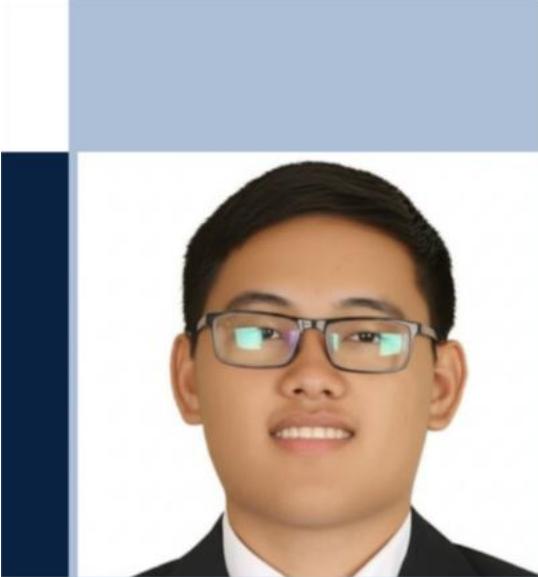
- Efficient search system
- Better material organization
- User-friendly digital interface

WANTS

- Intuitive visual design
- Faster resource delivery
- Wider digital accessibility

Figure 8. Employee Persona

1.3.3 Customer #1 Persona



**IANZAE RYAN
EGO**

Age: 20
 Residence: Taguig
 Education: College Undergraduate
 Occupation: Student
 Marital Status: Single

BIO

Ianzae is a diligent and resourceful 3rd year IT student preparing for his capstone project. He values efficiency and is energized by modern research platforms that are secure, fast, and intuitive. He is driven by the challenge of finding the most current, relevant information that will give his work a competitive edge in the fast-paced field of IT.

VALUES

A centralized place to search for materials, with resources that are free and legitimate.

FEARS

- Concerns about security
- Risk of IP detection
- Unstable connections
- Possibility of accessing links that may contain malware

NEEDS

- Updated materials and research resources
- Improved UI that isn't overwhelming

WANTS

- A better, more modern UI design
- More secure link access
- A more reliable and modern backend system

COMFORT WITH TECHNOLOGY

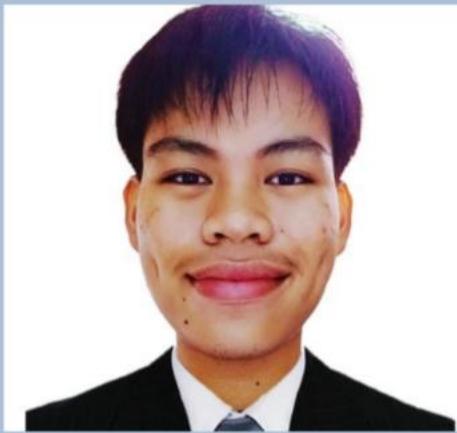
Comfort to technology	7/10
Internet	7.5/10
Software/apps	7.5/10
Social network	8/10

CRITERIA FOR SUCCESS

- Ease of Use
- User-Friendly Interface
- Up-to-Date Research Materials

Figure 9. Customer #1 Persona

1.3.4 Customer #2 Persona



**VINCE ADRIAN
A. BESA**

Age: 20
Residence: Taguig
Education: College Undergraduate
Occupation: Student
Marital Status: Single

BIO

Vince is a practical and observant IT student with a keen eye for what makes a digital tool truly effective. He sees the immense potential in online research platforms and is driven to find tools that are reliable, well-designed, and rich with current information to support his coursework. He embraces technology, understanding how to leverage AI to accelerate his research process while maintaining a high standard for accuracy.

COMFORT WITH TECHNOLOGY

Comfort to technology	8/10
Internet	8/10
Software/apps	7/10
Social network	9-10/10

CRITERIA FOR SUCCESS

- Accessible to the public
- Easy to navigate
- Foolproof design with prompts for user errors.

VALUES

- Good UI design
- Security
- Being open-source and free

FEARS

- Site security
- User and data privacy issues that could affect users.

NEEDS

- Further improvements and adjustments to the online library website
- Updated materials

WANTS

- A better UI, with unnecessary links removed.
- A user-friendly and foolproof design.
- A website theme that is consistent with DOST color theme (dark blue colors and a dark blue search button)

Figure 10. Customer #2 Persona

1.4 Empathy Map

1.4.1 Client Empathy Map



Figure 11. Client Empathy Map

PAIN	GAIN
Budget constraints	Comprehensive search results
Limited search results	Successful Projects
Coordination and workforce alignment challenges	Quality Service Delivery
Outdated system	Efficient Processes

1.4.2 Employee Empathy Map

Empathy Map



Figure 12. Employee Empathy Map

PAIN	GAIN
<p>Overlapping deadlines and workload</p> <p>OPAC search difficulties</p> <p>Limited access to digital databases</p> <p>Time-consuming search and re-shelving process in inventory</p>	<p>Efficient client service</p> <p>Opportunities for digital transformation and system improvements</p> <p>Ability to provide alternative resources</p> <p>Libraries as digital hubs</p>

1.4.3 Customer #1 Empathy Map

Empathy Map



Figure 13. Customer #1 Empathy Map

PAIN	GAIN
Irrelevant/outdated results	Updated and relevant content
Slow loading times	Free and easy to access
Unsolvable problems	AI-powered search
Poor connectivity	Efficient processes
Difficulty collaborating on group searches	High resource availability

1.4.4 Customer #2 Empathy Map

Empathy Map

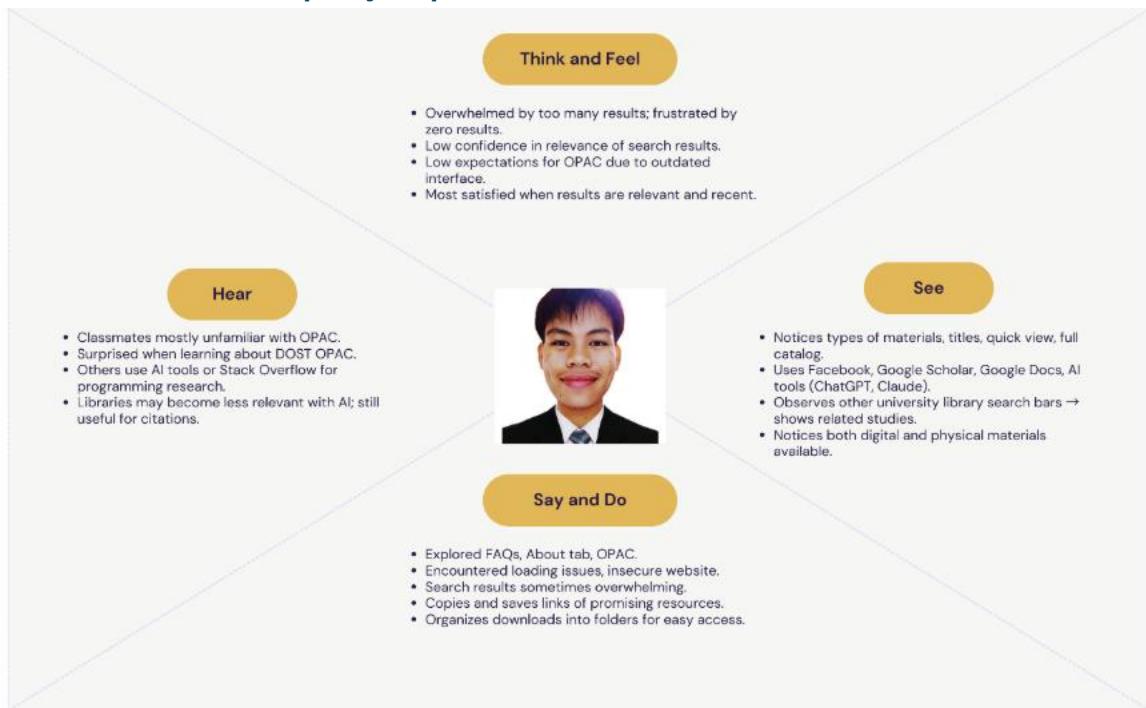


Figure 14. Customer #2 Empathy Map

PAIN	GAIN
Hard to find and access RRLs (only abstracts available)	Open-access studies and reliable references
Website is not secure	AI-assisted search for faster results
Hard to navigate	Tools for better organization
Slow, outdated, and sometimes unreliable system	Extensions/features to verify credibility
	User-friendly and simple interface

1.5 Pain-Gain Analysis Summary

PAIN	GAIN	ANALYSIS
<ul style="list-style-type: none"> • Hard to find the relevant results because of limited search options • Slow, outdated system with security warnings that reduces trust • System sometimes down and searching take too long • Confusing design and filters make the site difficult to use • Library resources are not fully used because of system issues 	<ul style="list-style-type: none"> • Wants reliable, up-to-date research materials • Hopes for a faster and easier search experience • Looks for modern features clean design • Needs free, accessible, and easy-to-cite resources 	<ul style="list-style-type: none"> ✓ Build a fast, secure, and reliable platform that users and staff can trust ✓ Create a smarter search that delivers accurate, recent, and relevant results ✓ Enhance efficiency with features that save time and reduce manual work for everyone ✓ Design a modern, easy-to-use interface that is credible and familiar

Stage 2 – Define

In the Define stage, the second step in our design thinking process, our focus was to analyze and narrow down our research findings to frame a central problem statement. Building on the interviews from the Empathize stage, we first listed all the challenges and pain points mentioned by our clients, employees, and customers.

Our team used Trello to manage this information, creating lists of all identified issues. By grouping these points into specific categories, we were able to better organize and understand the data. This process of synthesizing our observations was essential for pinpointing the exact problem our team would aim to solve.

2.1 Clustered Problems

After identifying the initial problems, our team analyzed them to find common concept. This process led us to establish three distinct categories to group the issues: Usability and Performance, Search Results, and Competition from Modern Tools. Using our Trello board, we then organized each problem into its corresponding category to create a structured overview of the core challenges.

Usability and Performance

- The user interface is outdated and difficult to use
- The platform's search filters don't offer enough useful options
- Slow loading times lead to user frustration
- Security warnings on the website cause users to lose trust
- System slowdowns make it hard for staff to help users
- Frequent downtime makes the system unstable

Search Results

- Search results don't always match what users need
- Too many results make it hard to find what's relevant
- Users doubt the timeliness of the information
- Users must check the search results one-by-one to pick out the few that are useful for their research
- Students struggle to find recent and easy-to-cite sources

DOST OPAC vs. Modern Research Tools

- The current system does not meet modern user expectations

- Users prefer AI-powered tools over the current platform
- Other library websites have better design and are easier to use
- Limited filters make it hard to narrow down search results
- Missing built-in tools, such as an automatic citation generator

Clustered Problem in Trello Board

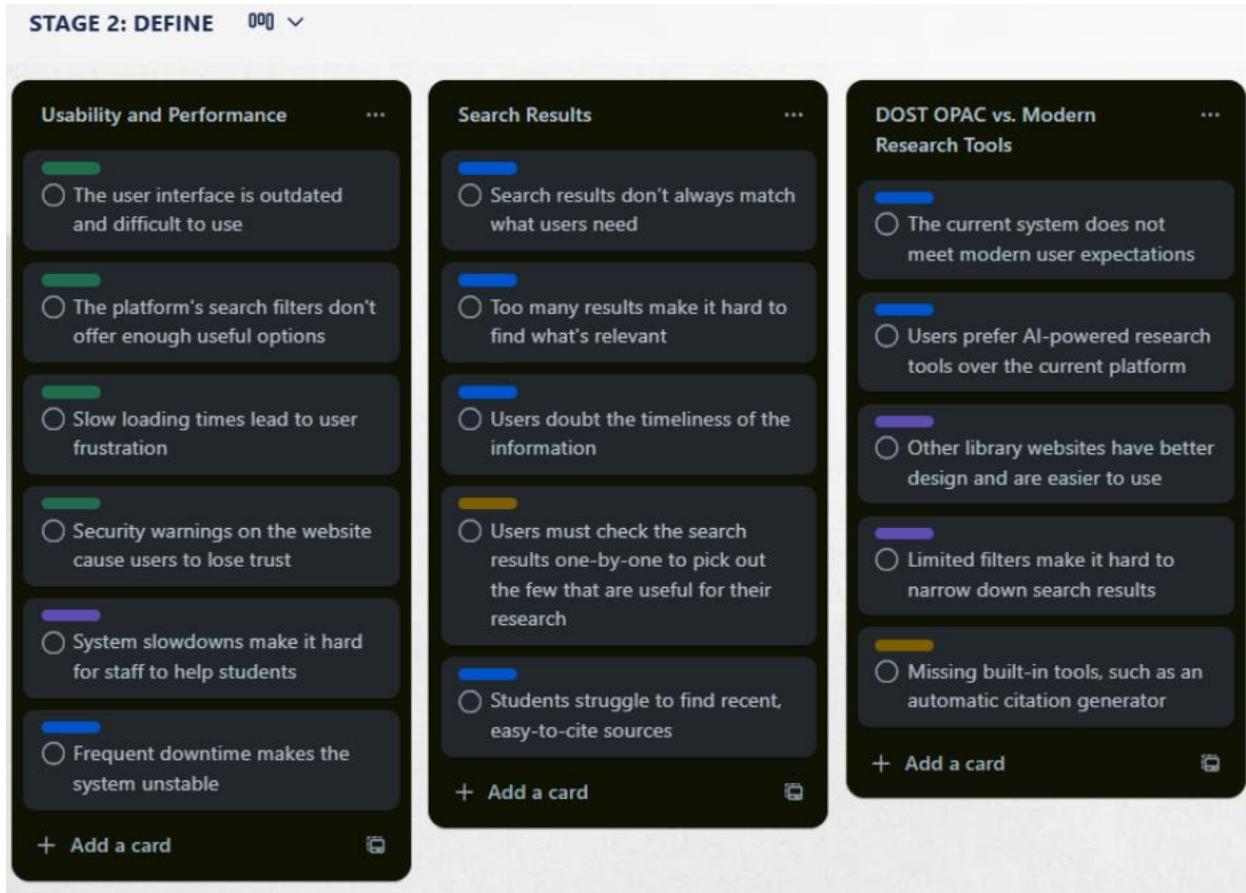


Figure 15. Clustered Problems in Trello board

2.2 Problem Statement

After reviewing each cluster of problems, our team combined the main issues into the following clear problem statements:

1. The system is slow, with searches taking over a minute, which frustrates users and wastes time.
2. Technical issues, such as downtime or security warnings, reduce trust and make it harder for staff to assist users.

3. The search function often gives too many or less relevant results, making it hard for users to find accurate and updated sources.
4. The platform's design is confusing and hard to use, unlike modern user-friendly websites.
5. The system is missing important features like advanced filters, AI-powered suggestions, and automatic citation tools.

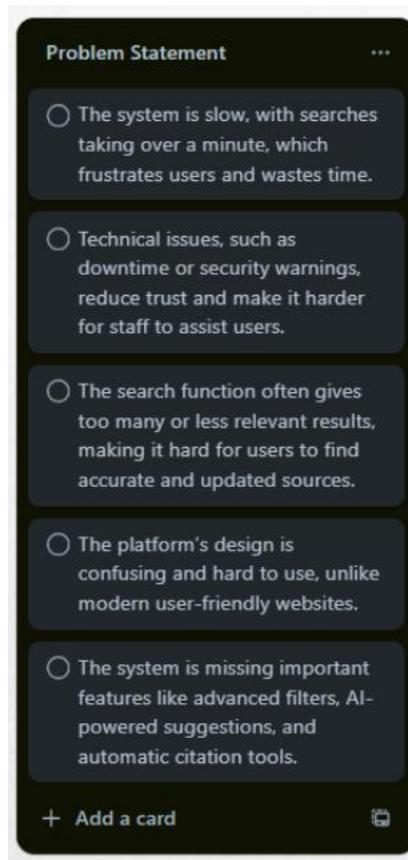


Figure 16. Problem Statements in Trello board

2.3 How-Might-We

After finalizing our problem statements, we created “How Might We” (HMW) questions to turn those challenges into opportunities. These open-ended questions are designed to spark a wide range of ideas during our brainstorming sessions. This method keeps our focus on the user needs while encouraging creative and practical solutions.

Here are the How Might We questions our team developed:

1. How might we redesign the platform to be simpler, modern, and better fit users' needs?
2. How might we rethink the search process so users can easily find relevant and reliable information?
3. How might we reimagine the system's foundation to make it faster, more stable, and secure?
4. How might we redesign the platform to work well with AI tools for smarter research?
5. How might we rethink ways to reduce employees' workload?
6. How might we rethink the user experience to improve usability and satisfaction?

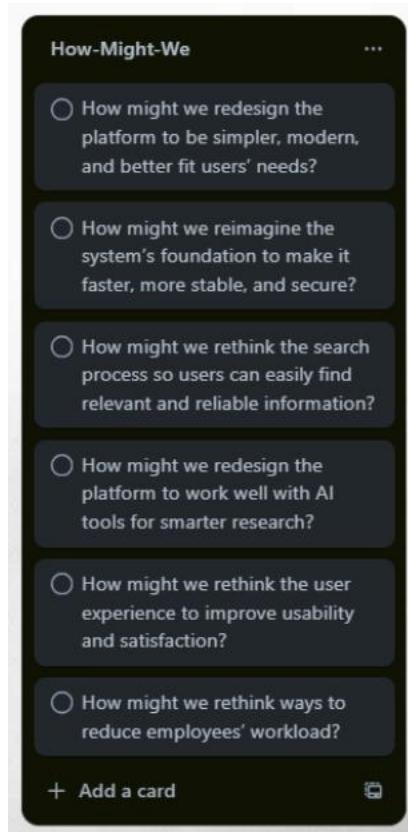


Figure 17. How-Might-We in Trello board

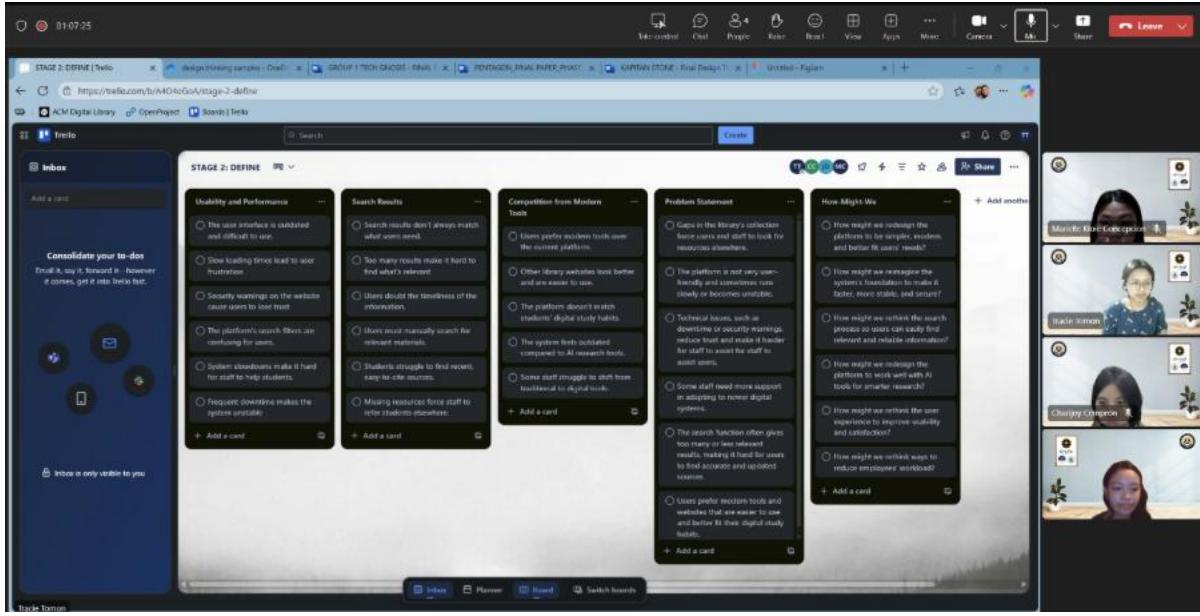


Figure 18. Collaborative "Define" Stage of Design Thinking using a Trello Board

Conclusion

The Define stage was a key step that helped us turn our research into a clear goal. We analyzed all the feedback from our interviews and grouped the issues into three main categories: Usability and Performance, Search Results, and Competition from Modern Tools. This process allowed us to write focused problem statements, which we then converted into “How Might We” questions. With a clear problem defined, our team is now prepared to begin brainstorming solutions in the Ideation stage.

Stage 3 – Ideate

The third phase of our process is Ideate, where our team shifted from defining problems to exploring potential solutions. Using the "How Might We" questions from the Define stage as our guide, the primary goal was to come up with as many ideas as possible, rather than finding the perfect one right away. We focused on creating an open, non-judgmental environment where every idea was encouraged. In our brainstorming sessions, we aimed to think creatively to find innovative solutions that would improve the thesis and dissertation search experience for researchers and students.

3.1 Brainstorming Session

Our team held a brainstorming session with one main goal: to come up with as many different ideas as possible. To make sure everyone felt comfortable sharing, we created an open and relaxed environment and even looked at how a past team did their brainstorming for inspiration. We utilized Teams as our tool for this session.

Using our problem statements as a guide, each person added their own ideas to our Trello board. The main rule was to focus on quantity over quality and to encourage creative, "out-of-the-box" thinking. After generating a long list of potential solutions, we discussed all the ideas as a group to identify the most promising ones to develop further.

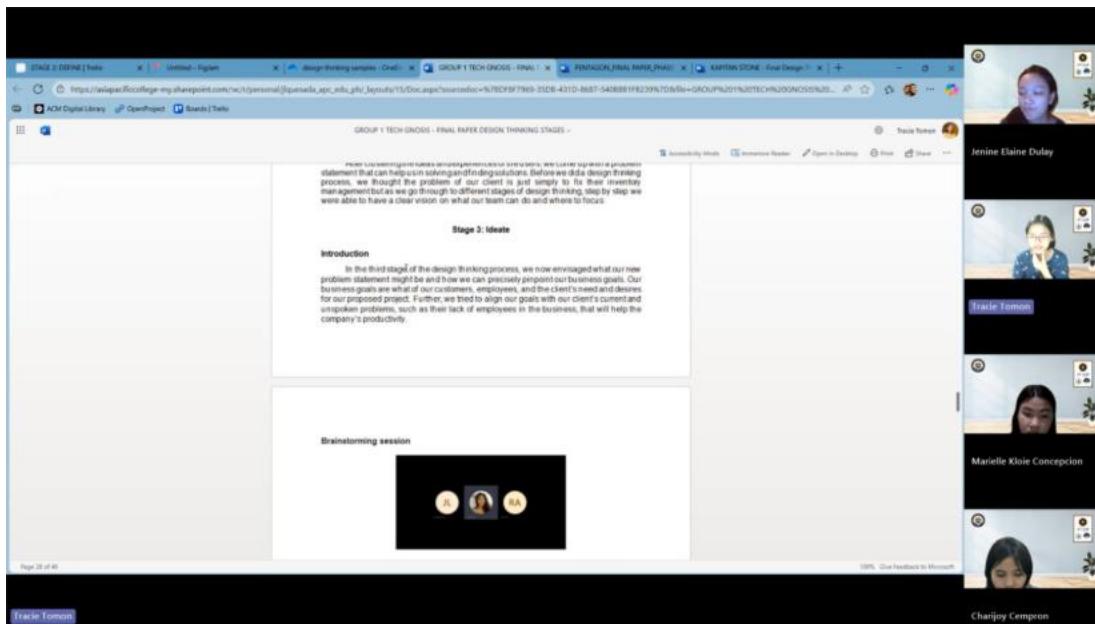


Figure 19. Stage 3: Ideate brainstorming

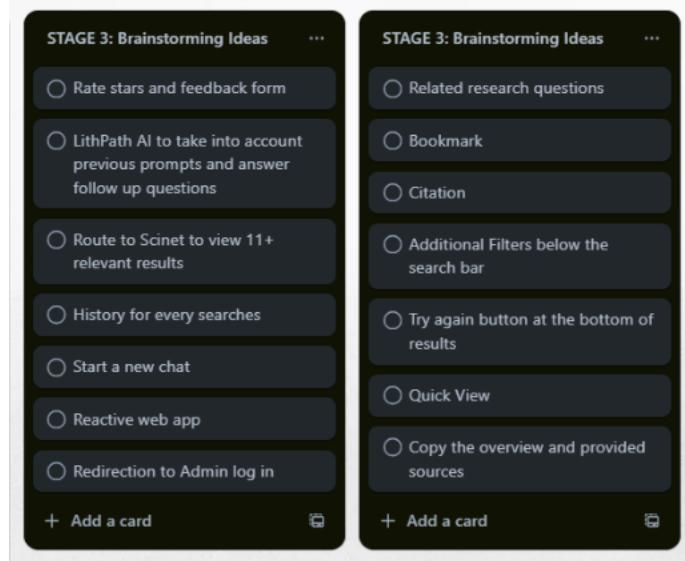


Figure 20. Trello brainstorming

3.2 Crazy 8s

To quickly come up with many visual ideas, our team did a Crazy 8's exercise. While on a live Microsoft Teams call, each of us used pen and paper to sketch eight different ideas in eight minutes. We used the timer in Figma to keep track of the time, as we planned to use it again for our voting session right after.

The one-minute limit for each sketch pushed us to think fast and not overthink our drawings. After the eight minutes, we shared photos of our sketches in the Teams chat. We then took turns explaining our ideas, which allowed everyone to understand the concepts and share creative feedback. This quick exercise helped us move beyond the obvious solutions and gave us many new visual ideas to consider.

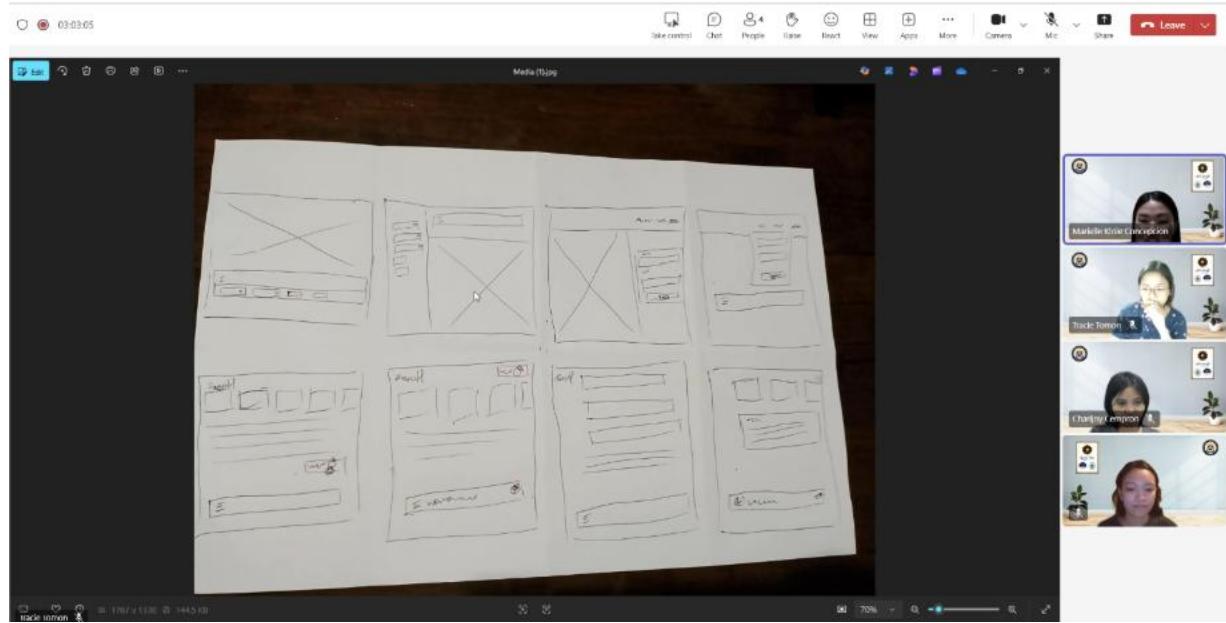


Figure 21. Explaining "Crazy 8s" Wireframes

Charijoy Cempron

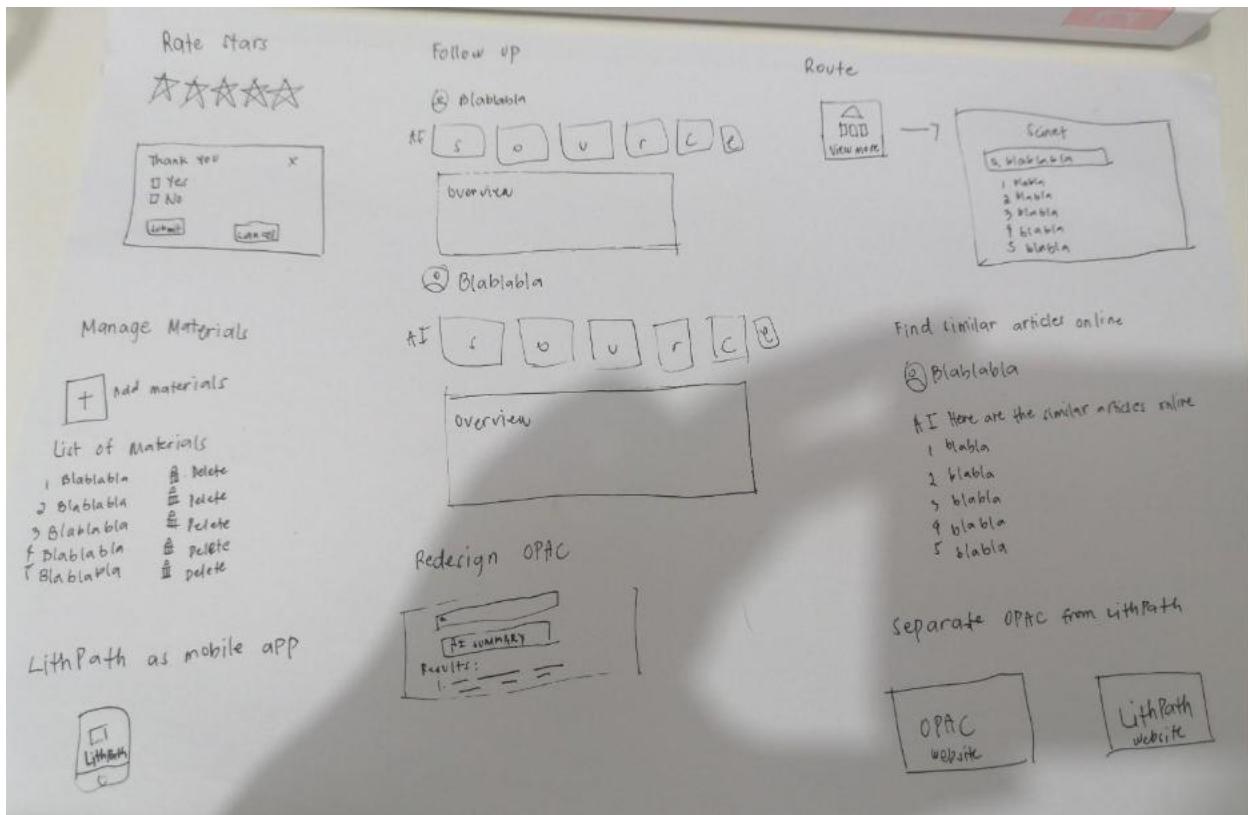


Figure 22. Charijoy's Crazy 8s Illustrations

Marielle Kloie Concepcion

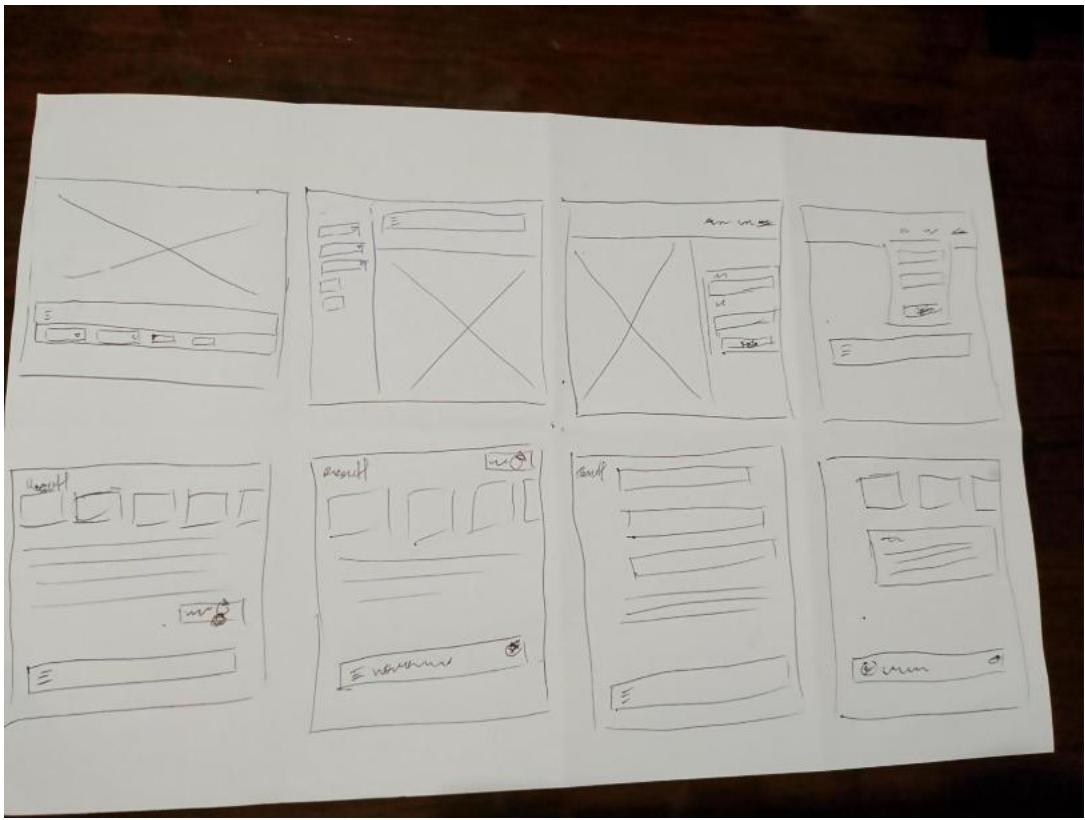


Figure 23. Kloie's Crazy 8s Illustrations

Jenine Elaine Dulay

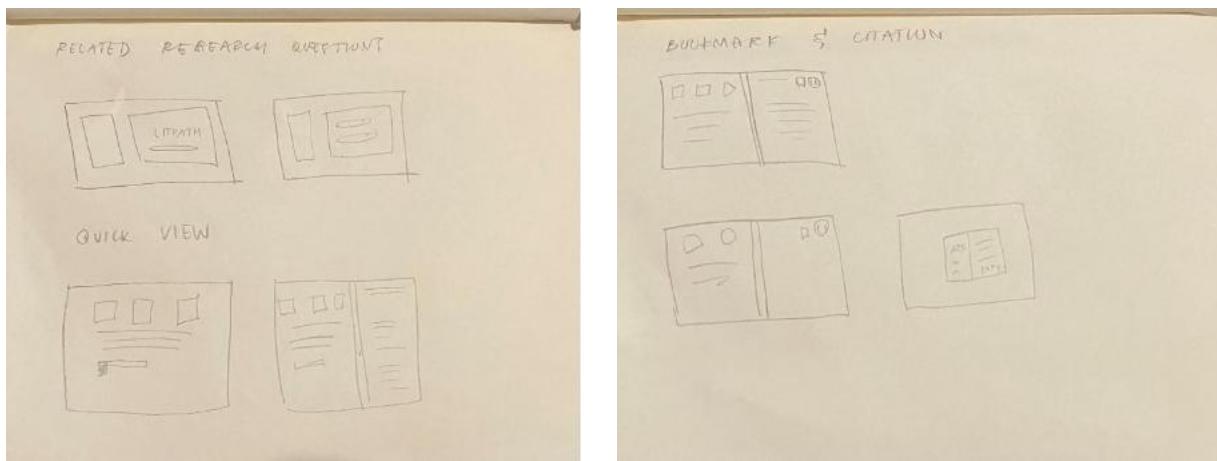


Figure 24. Jenine's Crazy 8s Illustrations

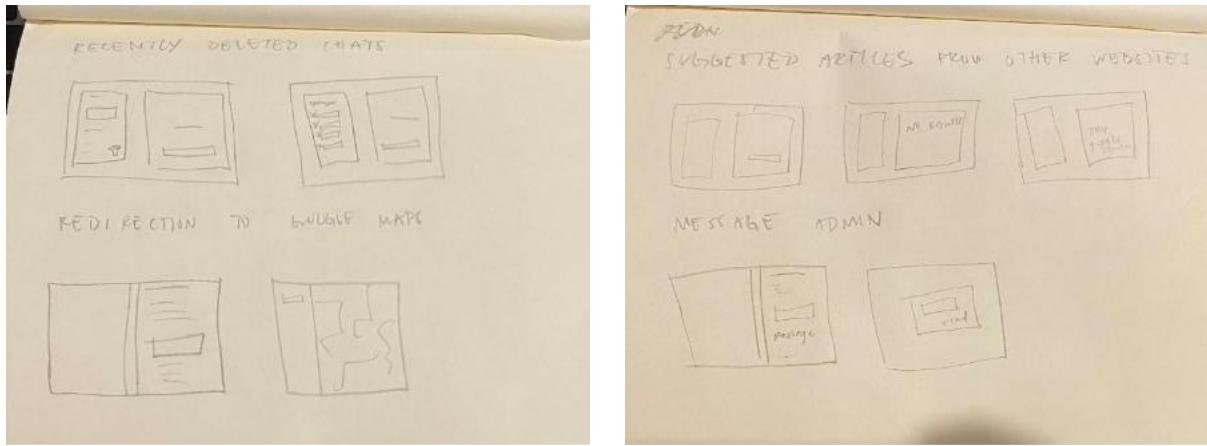


Figure 25. Jenine's Crazy 8s Illustrations (1)

Tracie Tomon

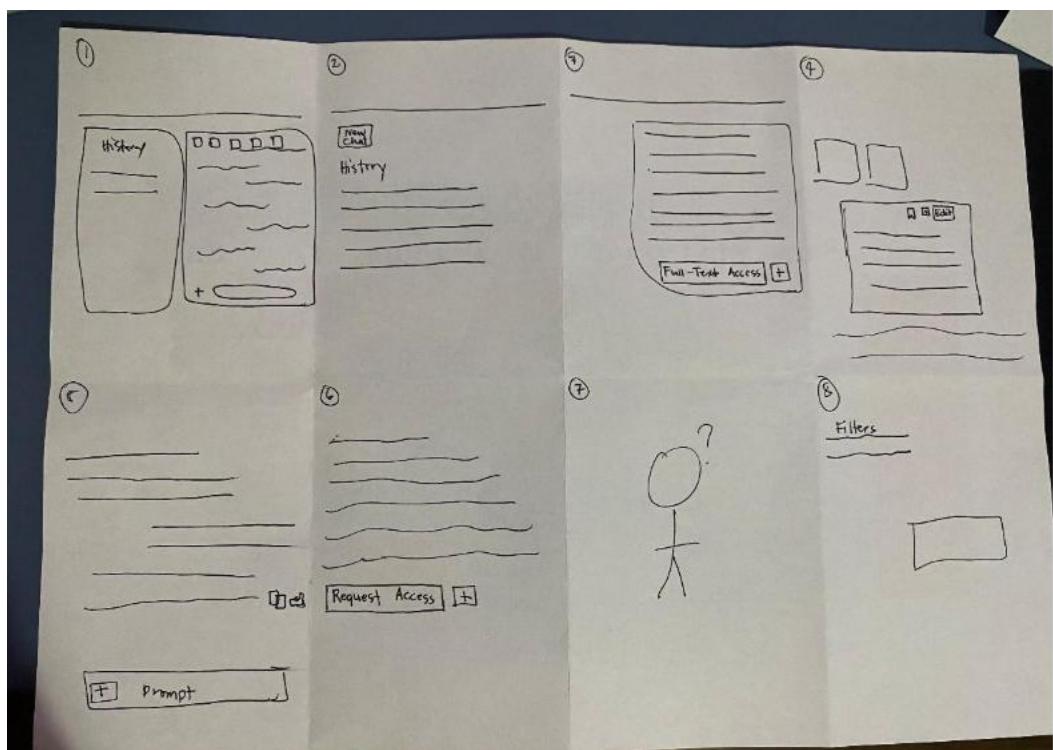


Figure 26. Tracie's Crazy 8s Illustrations

3.3 Post-It Voting

After generating a wide range of ideas, our team's next step was to prioritize them using a Post-it Voting session. We compiled our concepts from the previous activities onto a FigJam board.

Each of our four team members then cast their votes by placing stamps on the ideas they believed had the most potential. This was a fast and visual way to see where we all agreed. The top ideas received four votes, meaning everyone on the team supported them. These chosen features will now be the focus of our work in the Prototyping stage.

Here are the ideas that got the most votes:

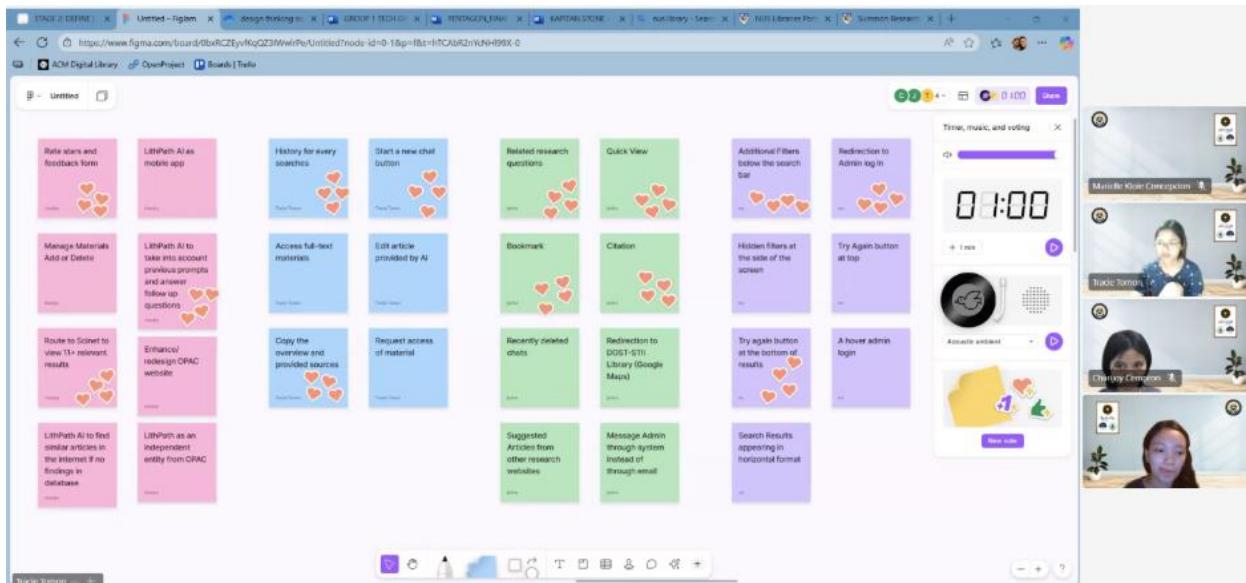


Figure 27. Post-It Voting

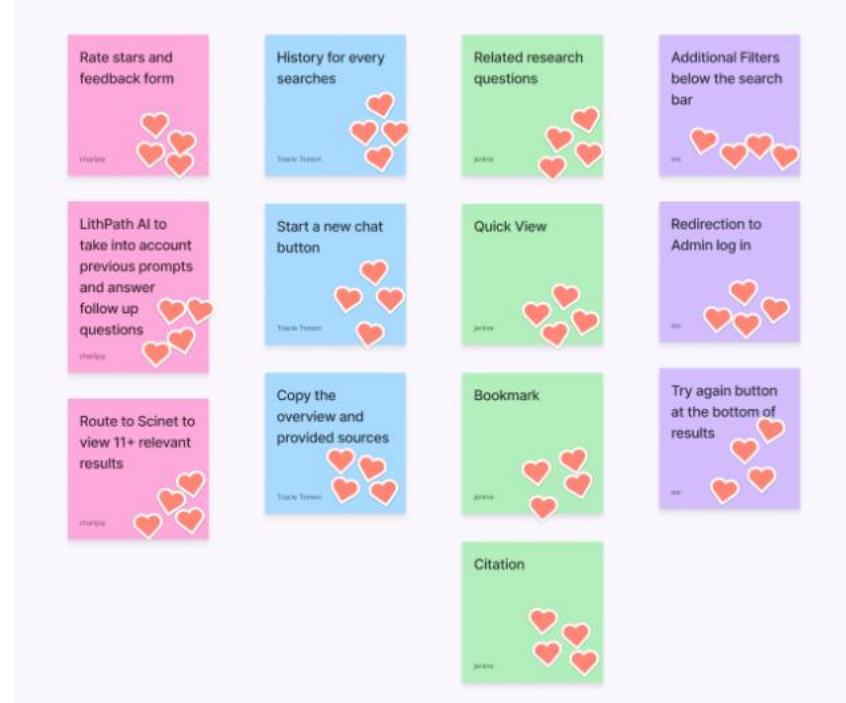


Figure 28. Final Post-It Votes

3.4 Desirability, Viability, Feasibility

After choosing our top ideas from the vote, our final step in the Ideate stage was to check if they were strong in three key areas. To do this, we used the Desirability, Viability, and Feasibility framework.

This method helped us ask three simple questions for each idea:

- Desirability: Do users actually want or need this feature?
- Viability: Does this idea help us meet our project's main goals? Does it contribute to long-term growth?
- Feasibility: Can we realistically build this with our current skills and resources?

By checking our top-voted ideas against these three points, we were guided on which ideas to focus on and how to use our time wisely, increasing our chances of building a solution that truly helps our client.



Figure 29. Desirable features

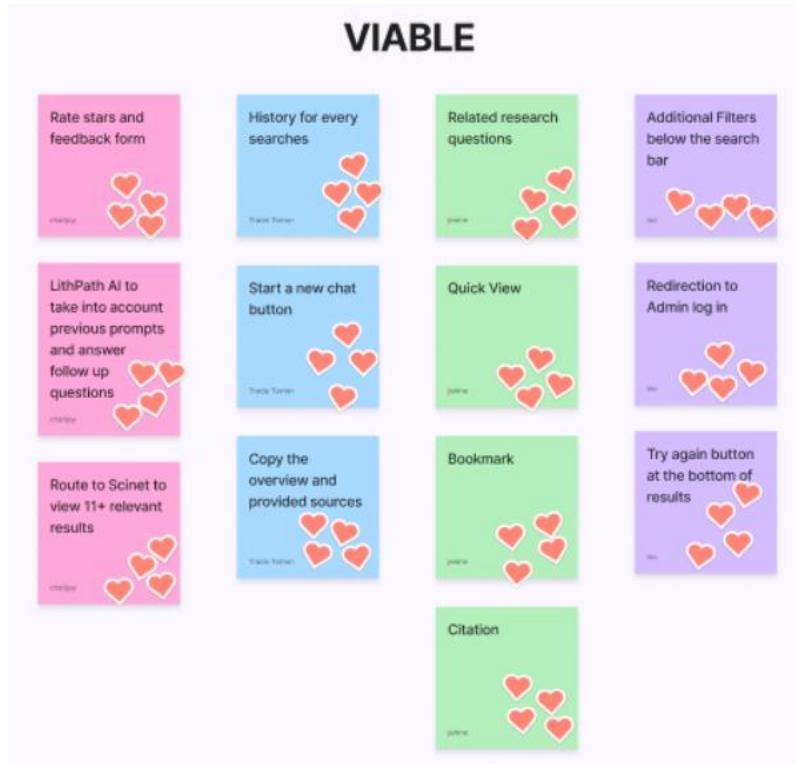


Figure 30. Viable features

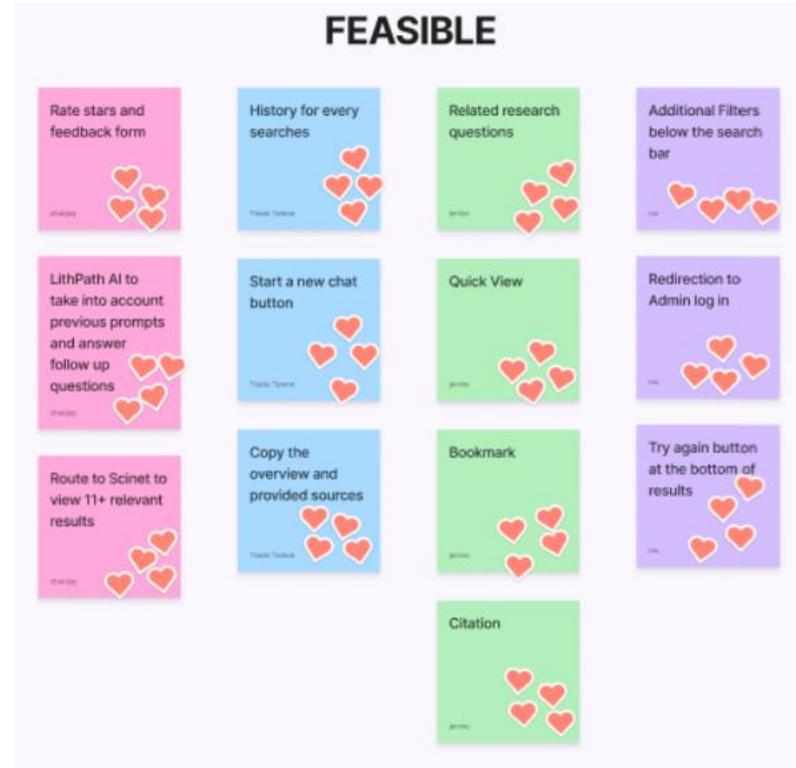


Figure 31. Feasible features

Stage 4 – Prototype

The fourth phase of our process is Prototype, where our team started turning ideas into visuals. We used storyboards to document the flow of each feature and created mock-up designs for the complete system workflow. We developed these prototypes using Canva for storyboards and Figma for interface designs. We then prepared this prototype for user testing to gather valuable feedback.

4.1 Storyboards

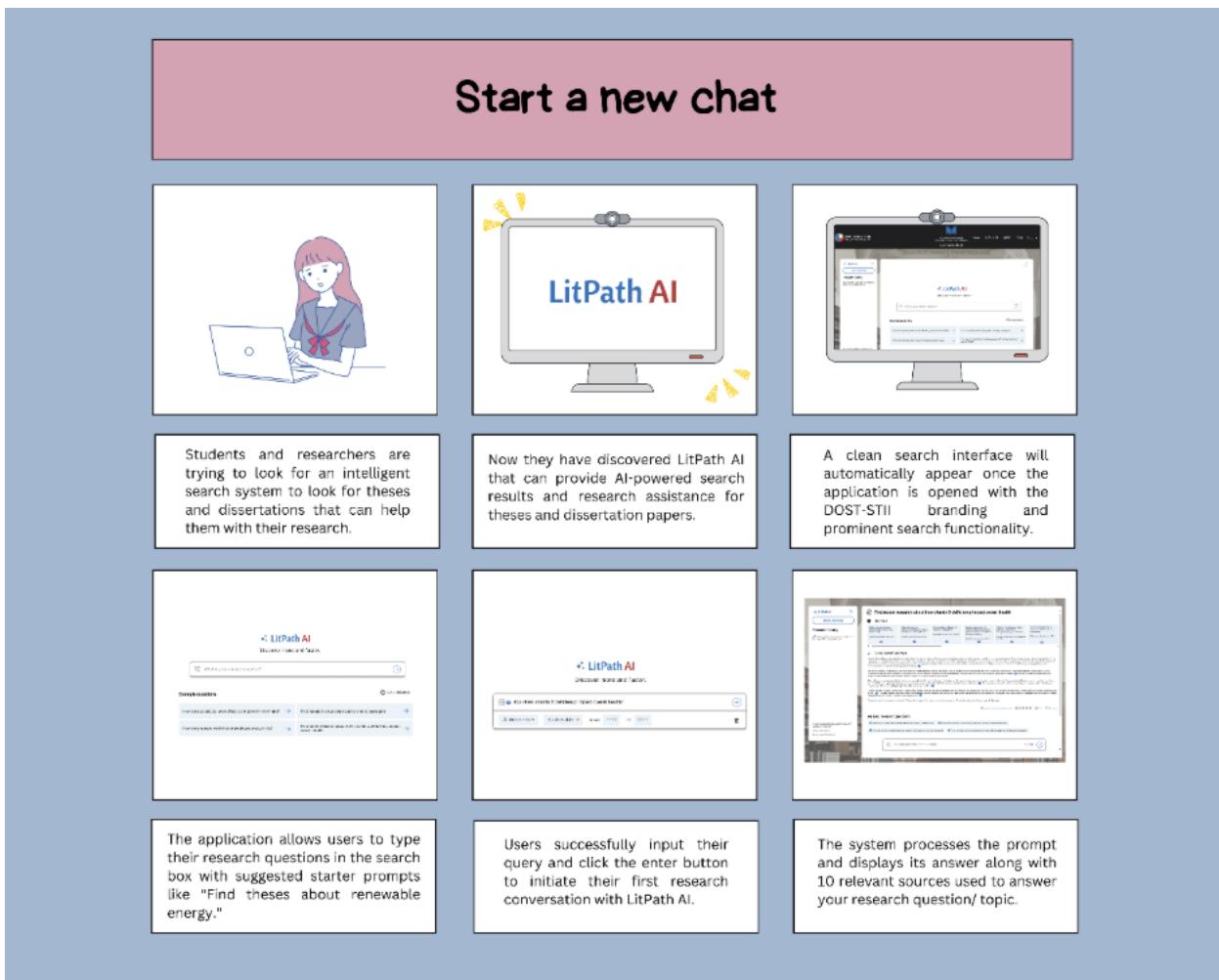


Figure 32. User Storyboard: Start a New Chat

Filter

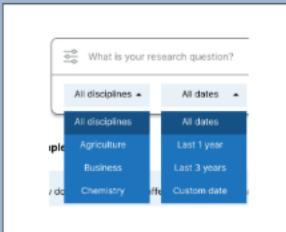
The storyboard illustrates the user journey for filtering search results. It begins with a researcher (represented by a cartoon character) using a laptop. The researcher then interacts with a system interface, which displays a search bar and a filter panel. The filter panel includes dropdown menus for 'All disciplines' and 'All dates', along with specific discipline and date range options like 'Agriculture', 'Business', 'Chemistry', 'Last 1 year', 'Last 3 years', and 'Custom date'. Below this, a second filter panel shows 'All disciplines' and 'Custom date' with 'From' and 'To' fields. A visual icon of three sliders with a '2' indicates the number of filters applied. Finally, the storyboard shows the results page with filtered search results and active filter tags.



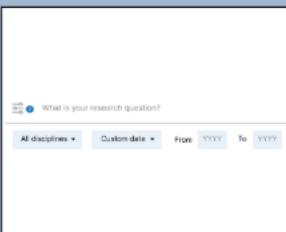
Researchers need to narrow down search results by specific disciplines and publication years to find the most relevant materials efficiently.



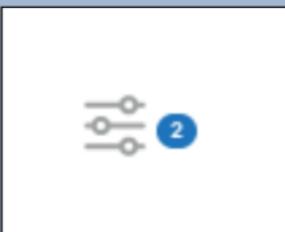
Now they have access to comprehensive filtering options including academic disciplines and flexible date range selections.



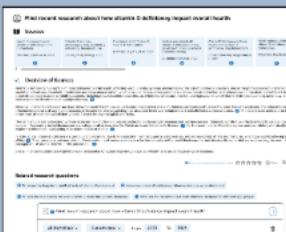
Advanced filter panels will automatically appear with discipline categories (Agriculture, Business, Chemistry) and date options (Last 1 Year, Last 3 Years, Custom Date).



The System allows users to select one or all disciplines and choose from preset or custom date ranges.



Users successfully apply their selected filters and see real-time updates showing the number of filters applied.



The system displays filtered results with active filter tags that can be easily removed, improving the research results.

Figure 33. User Storyboard: Filter

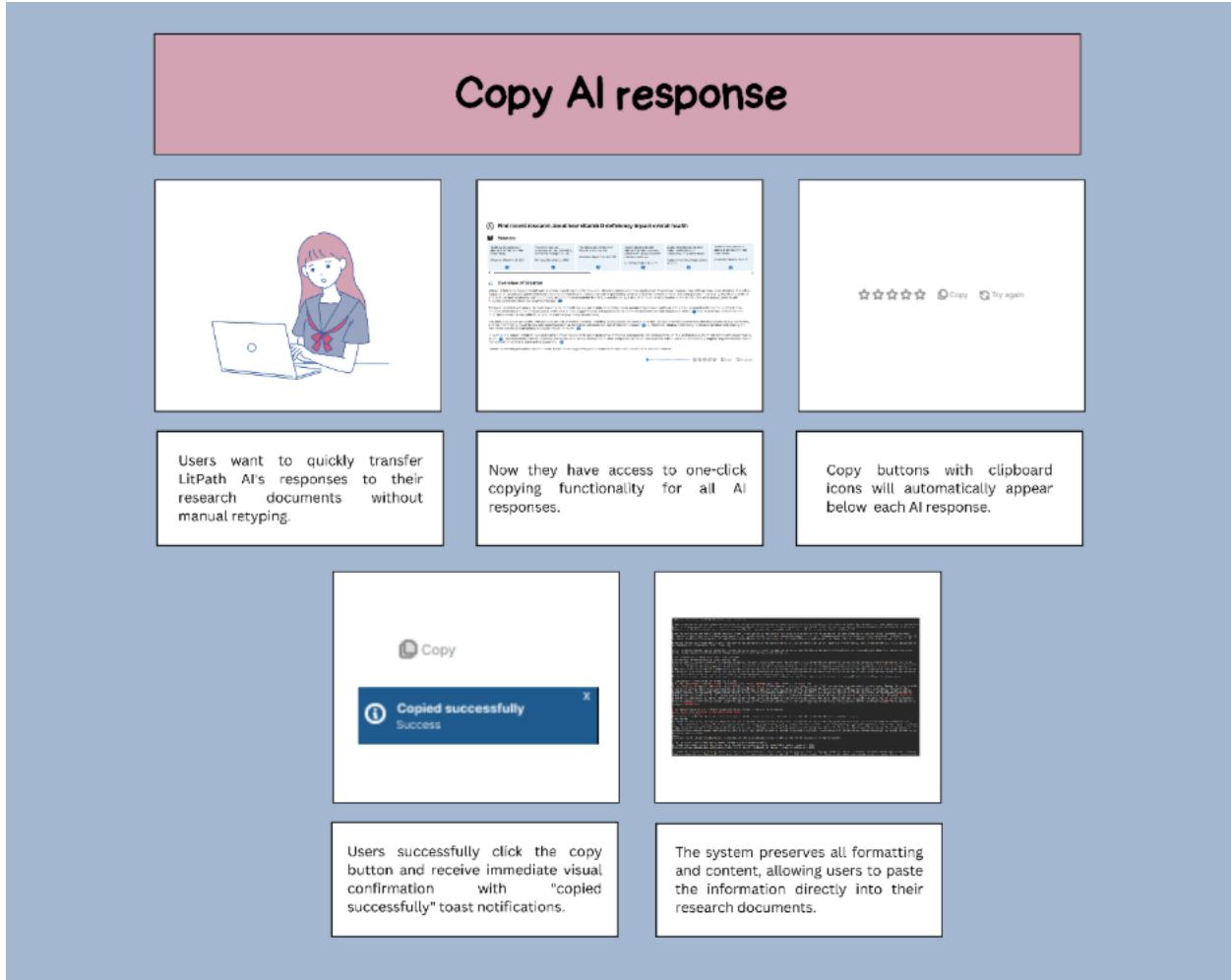


Figure 34. User Storyboard: Copy AI response

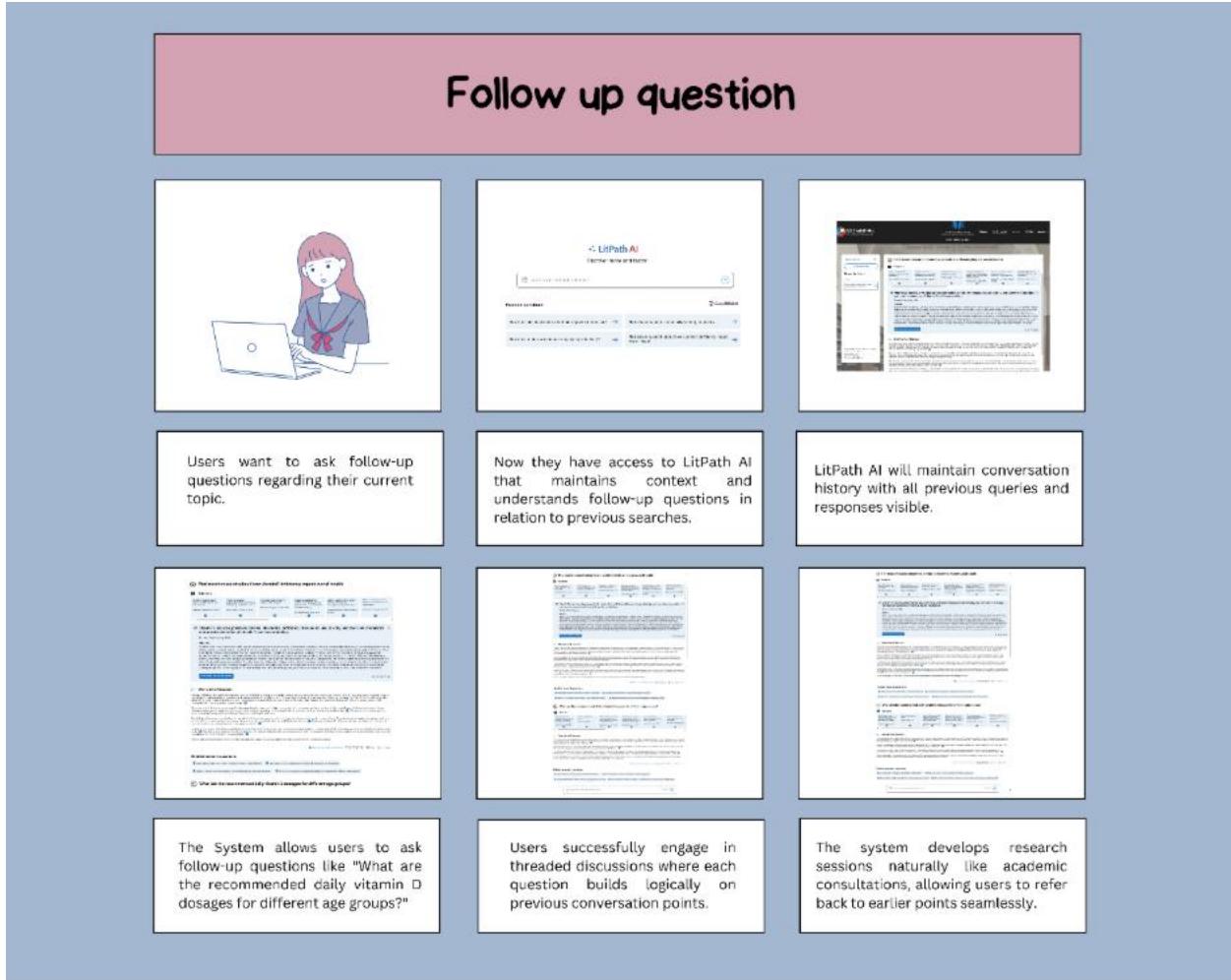


Figure 35. User Storyboard: Follow-up question

Related research question

The storyboard illustrates the user flow for generating related research questions:

- Panel 1:** Researchers often need guidance on related topics to expand their literature review comprehensively.
- Panel 2:** Researchers have access to LitPath AI's intelligent suggestion system that analyzes search context and generates relevant research questions.
- Panel 3:** "Related Questions" sections will automatically appear below main responses with 4 clickable suggested questions.
- Panel 4:** The System allows users to view contextual suggestions.
- Panel 5:** Users successfully click on suggested questions to automatically initiate new searches while maintaining context from previous results.
- Panel 6:** The system generates answers for the chosen research question.

Figure 36. User Storyboard: Related research question

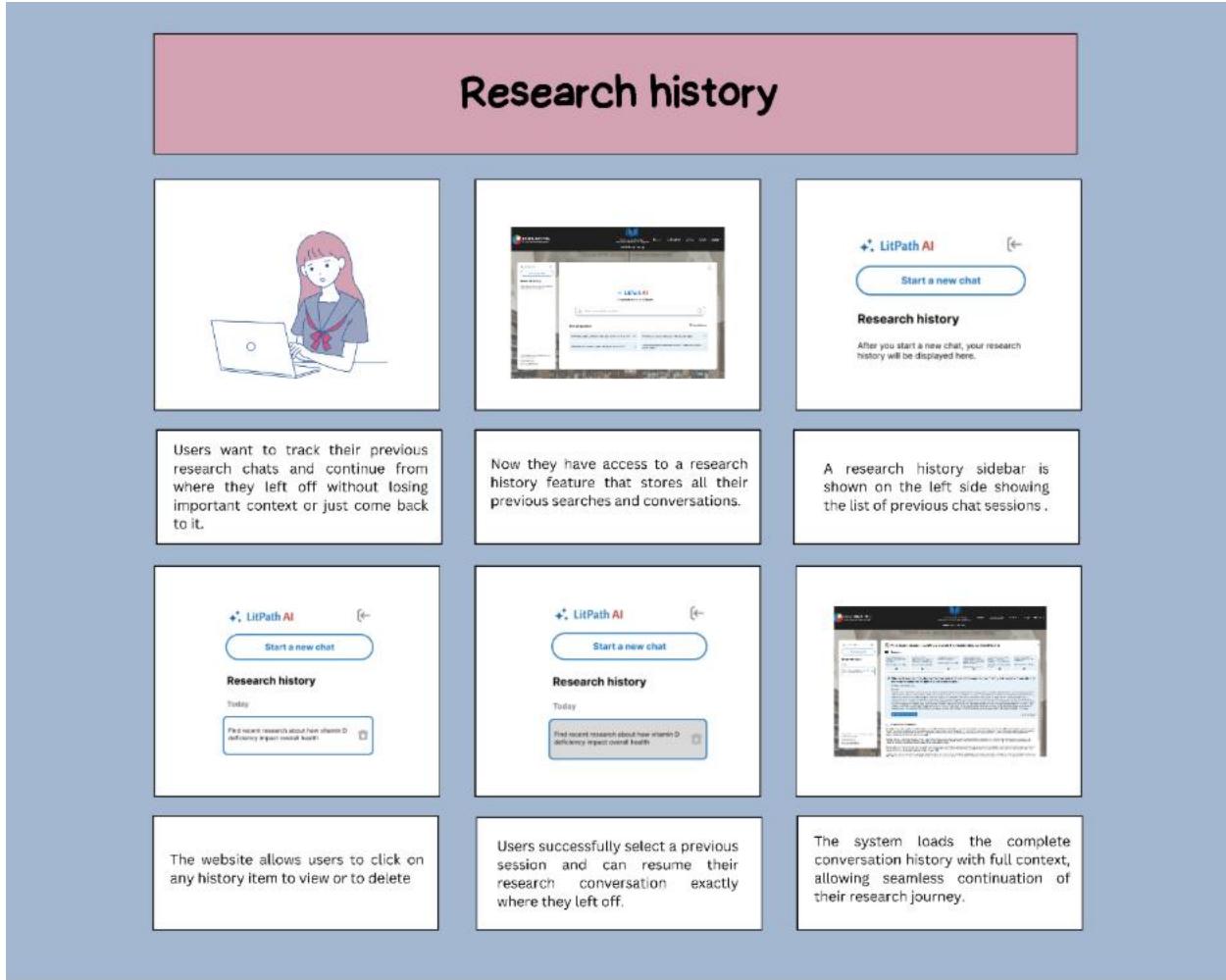


Figure 37. User Storyboard: Research history

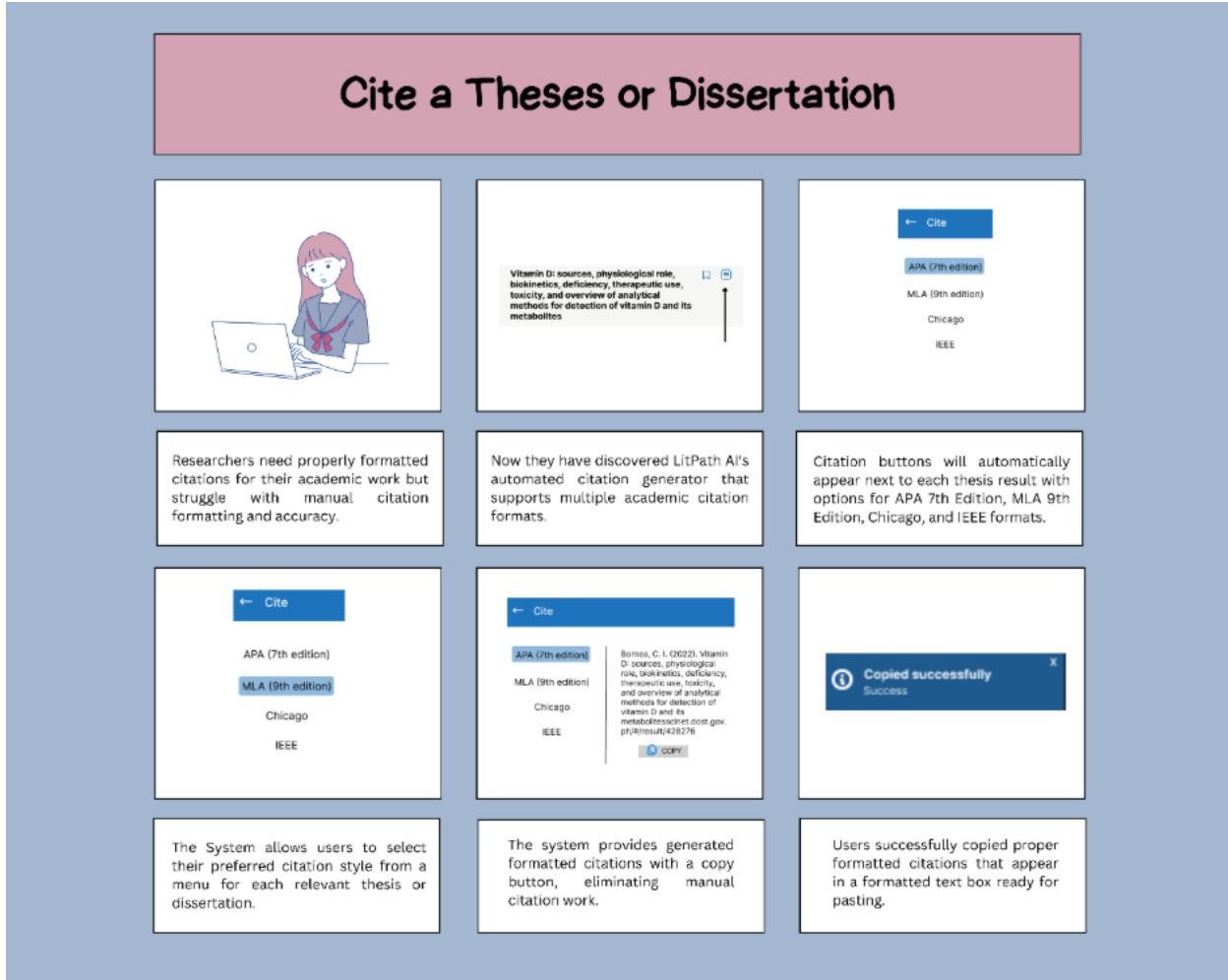


Figure 38. User Storyboard: Cite a theses or dissertation



Figure 39. User Storyboard: Try again

Quick view of Theses or Dissertation

The storyboard consists of nine panels arranged in a grid. The first panel shows a user icon (a person with a laptop) and the title 'Quick view of Theses or Dissertation'. The second panel is a screenshot of a library search interface with a modal window titled 'More details and request options'. Subsequent panels show the progression of the user's interaction with the system, including the modal being closed, the user clicking 'More details and request options', and finally viewing detailed thesis metadata and request options.

Panel 1: A user is shown sitting at a desk with a laptop, looking at the screen. The title 'Quick view of Theses or Dissertation' is displayed above the user icon.

Panel 2: A screenshot of a library search interface. A modal window titled 'More details and request options' is overlaid on the search results. The modal contains fields for 'Title', 'Author', 'Degree', 'Publication year', and 'Abstract'.

Panel 3: A screenshot of the library search interface after the modal has been closed. The thesis details are now displayed directly on the source card.

Panel 4: A screenshot of the library search interface with the 'More details and request options' button highlighted.

Panel 5: A screenshot of the library search interface showing the thesis details in an organized format. The details include the title 'Health consequences of vitamin D deficiency in...', author 'Gibowski, Paweł; Nowicka, Katarzyna; Środek, Karolina; Postopyt, Małgorzata', and abstract text about Vitamin D's role in health.

Panel 6: A screenshot of the library search interface showing the thesis details in an organized format. The details include the title 'Health consequences of vitamin D deficiency in...', author 'Gibowski, Paweł; Nowicka, Katarzyna; Środek, Karolina; Postopyt, Małgorzata', and abstract text about Vitamin D's role in health.

Panel 7: A screenshot of the library search interface showing the thesis details in an organized format. The details include the title 'Health consequences of vitamin D deficiency in...', author 'Gibowski, Paweł; Nowicka, Katarzyna; Środek, Karolina; Postopyt, Małgorzata', and abstract text about Vitamin D's role in health.

Panel 8: A screenshot of the library search interface showing the thesis details in an organized format. The details include the title 'Health consequences of vitamin D deficiency in...', author 'Gibowski, Paweł; Nowicka, Katarzyna; Środek, Karolina; Postopyt, Małgorzata', and abstract text about Vitamin D's role in health.

Panel 9: A screenshot of the library search interface showing the thesis details in an organized format. The details include the title 'Health consequences of vitamin D deficiency in...', author 'Gibowski, Paweł; Nowicka, Katarzyna; Środek, Karolina; Postopyt, Małgorzata', and abstract text about Vitamin D's role in health.

Figure 40. User Storyboard: Quick view of Theses or Dissertation

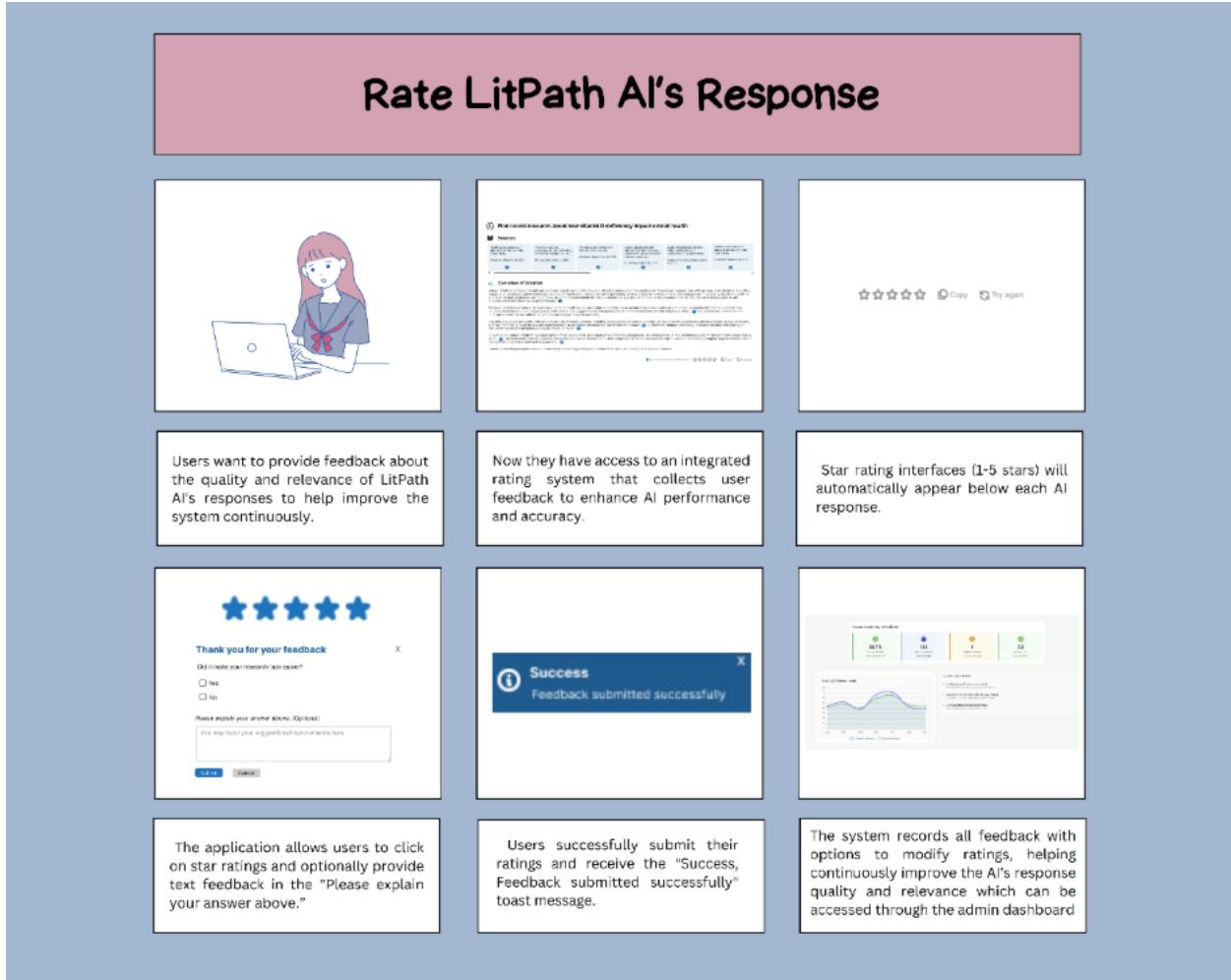


Figure 41. User Storyboard: Rate LitPath AI's response

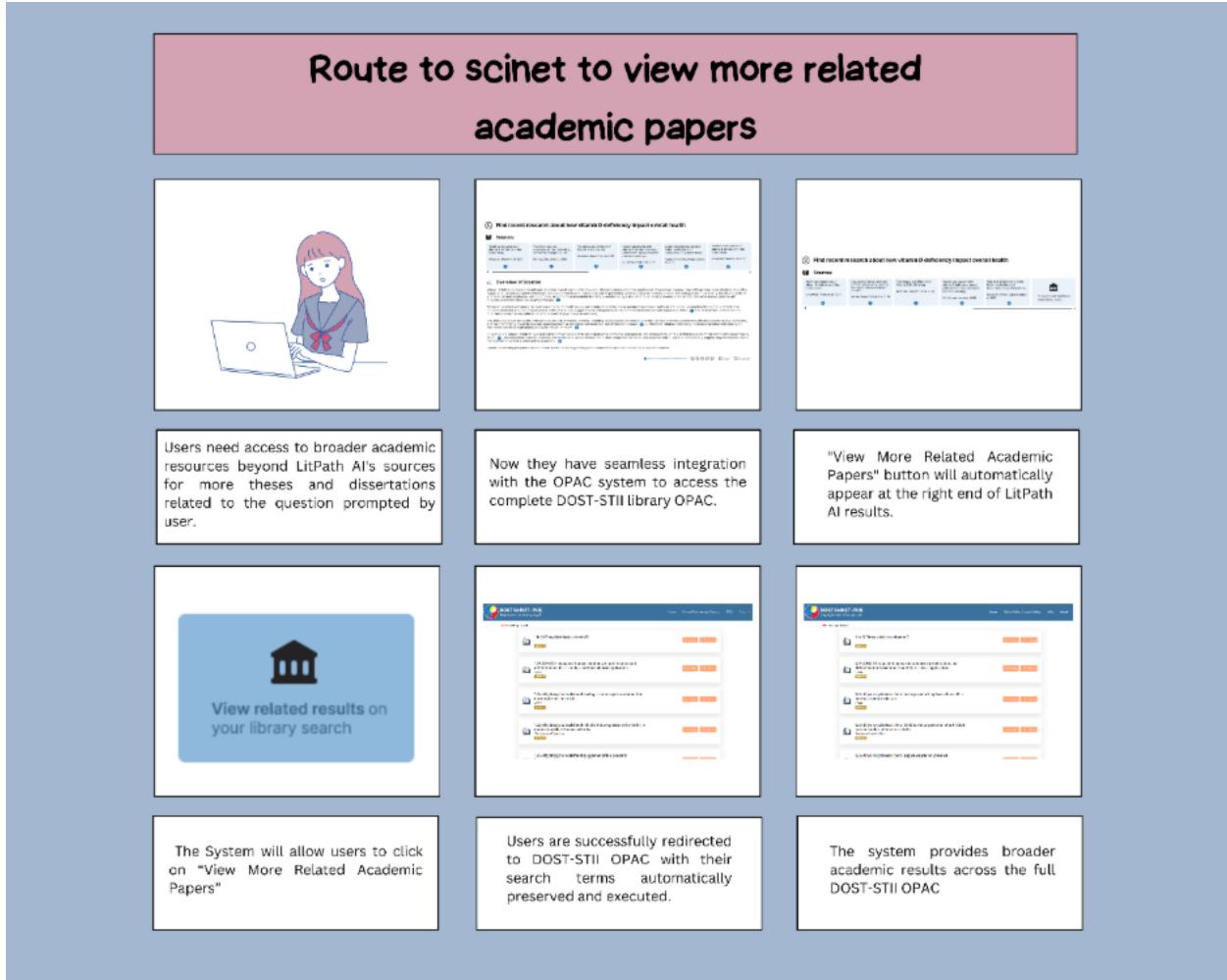


Figure 42. User Storyboard: Route to SCINET to view more related academic papers

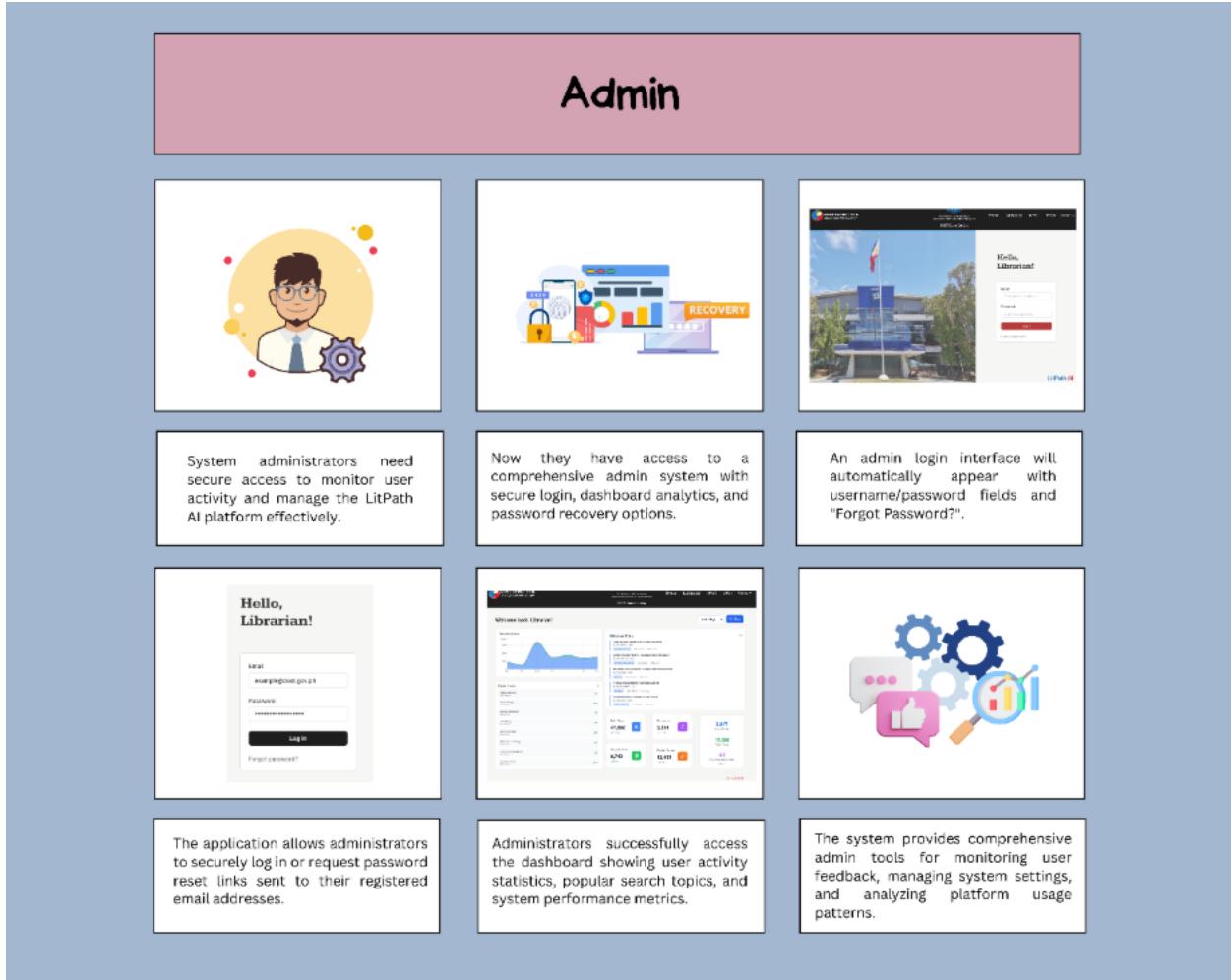


Figure 43. User Storyboard: Admin Access

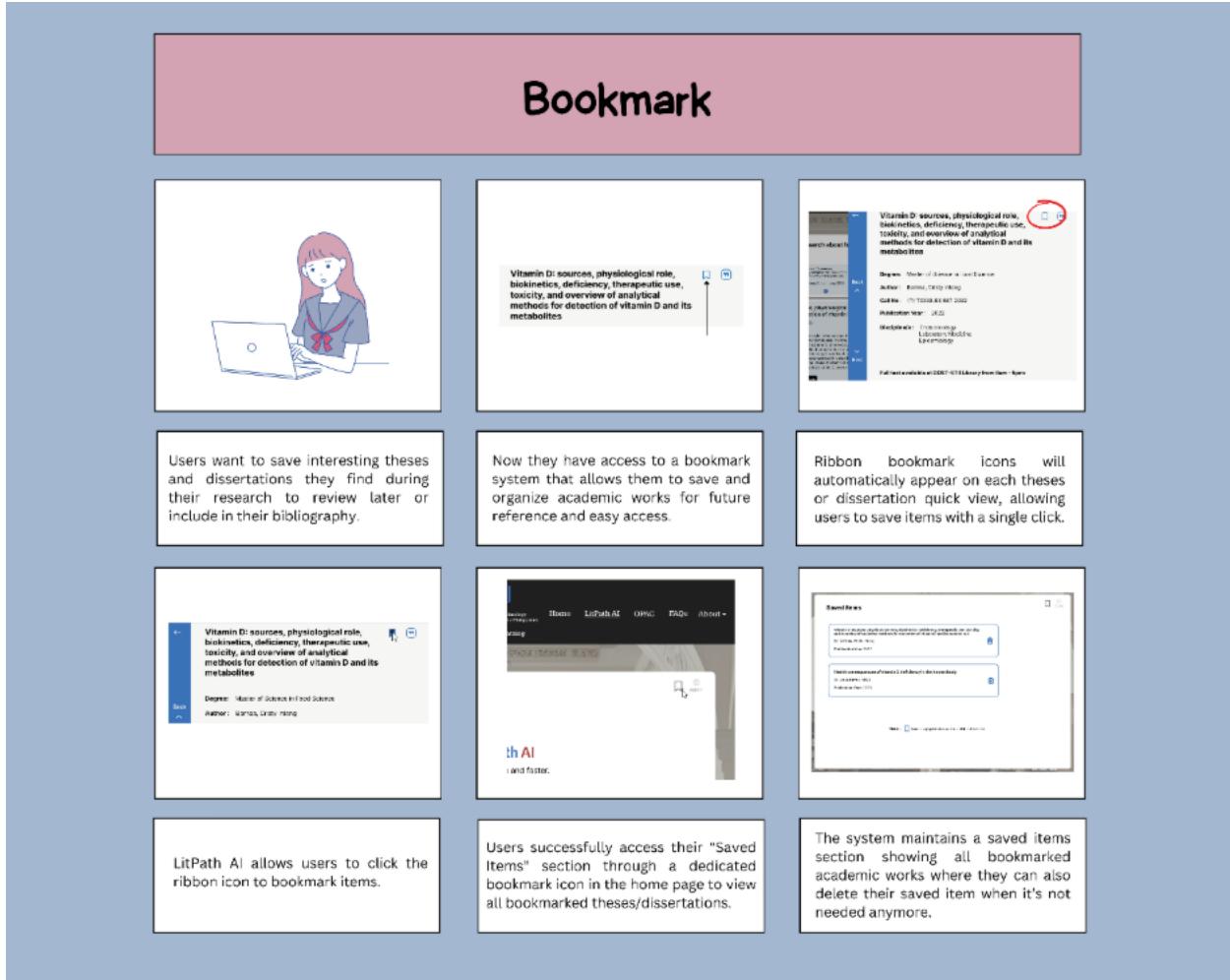


Figure 44. User Storyboard: Bookmarking

4.2 Mock-up Design

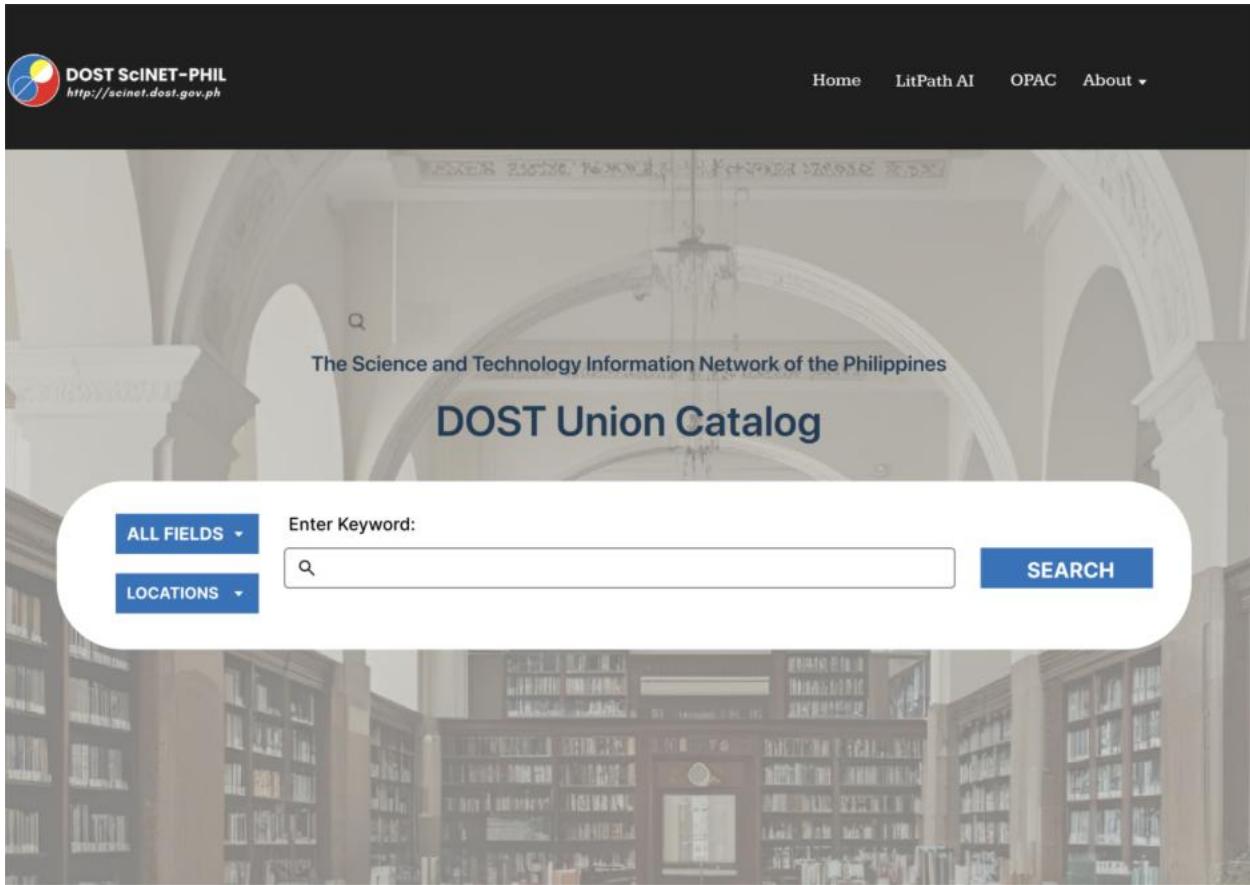


Figure 45. OPAC Homepage

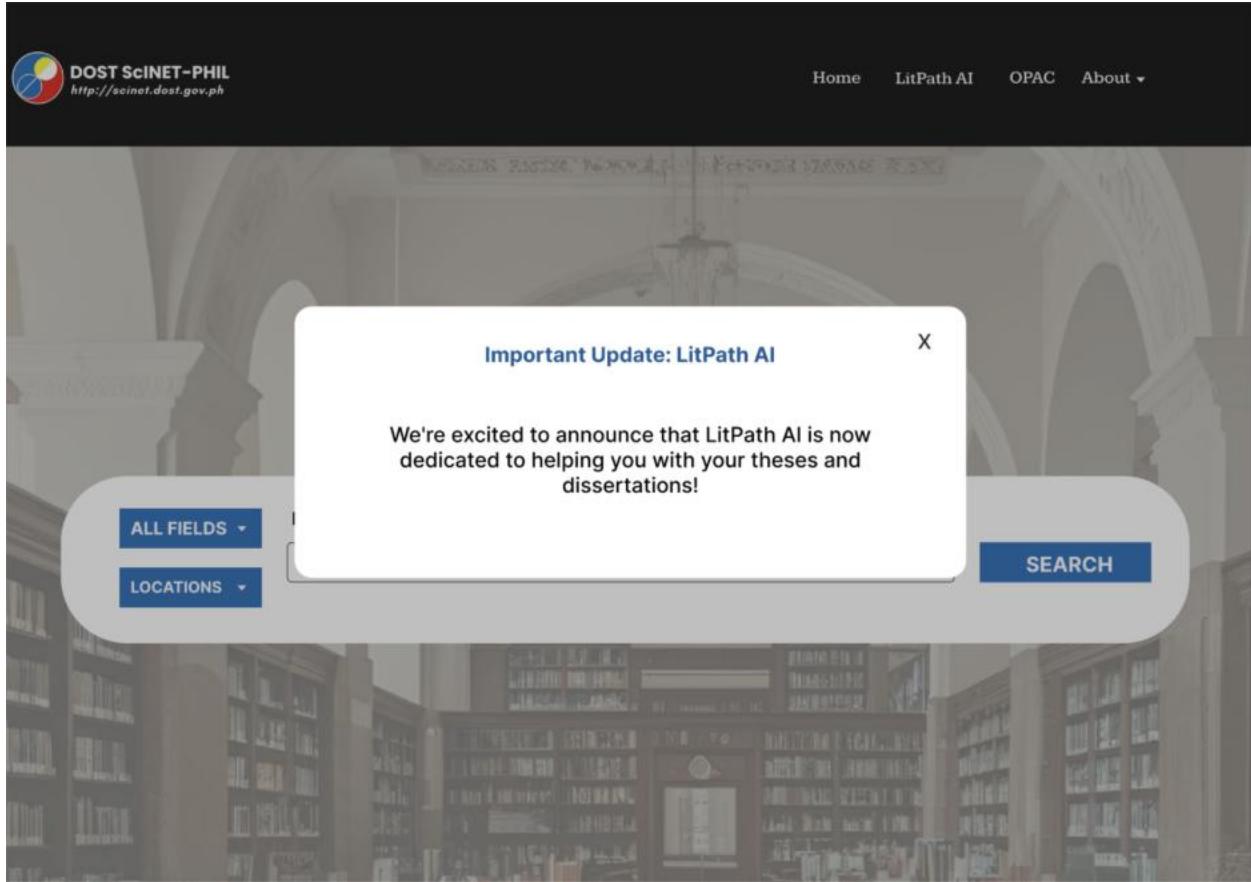


Figure 46. LitPath AI memo

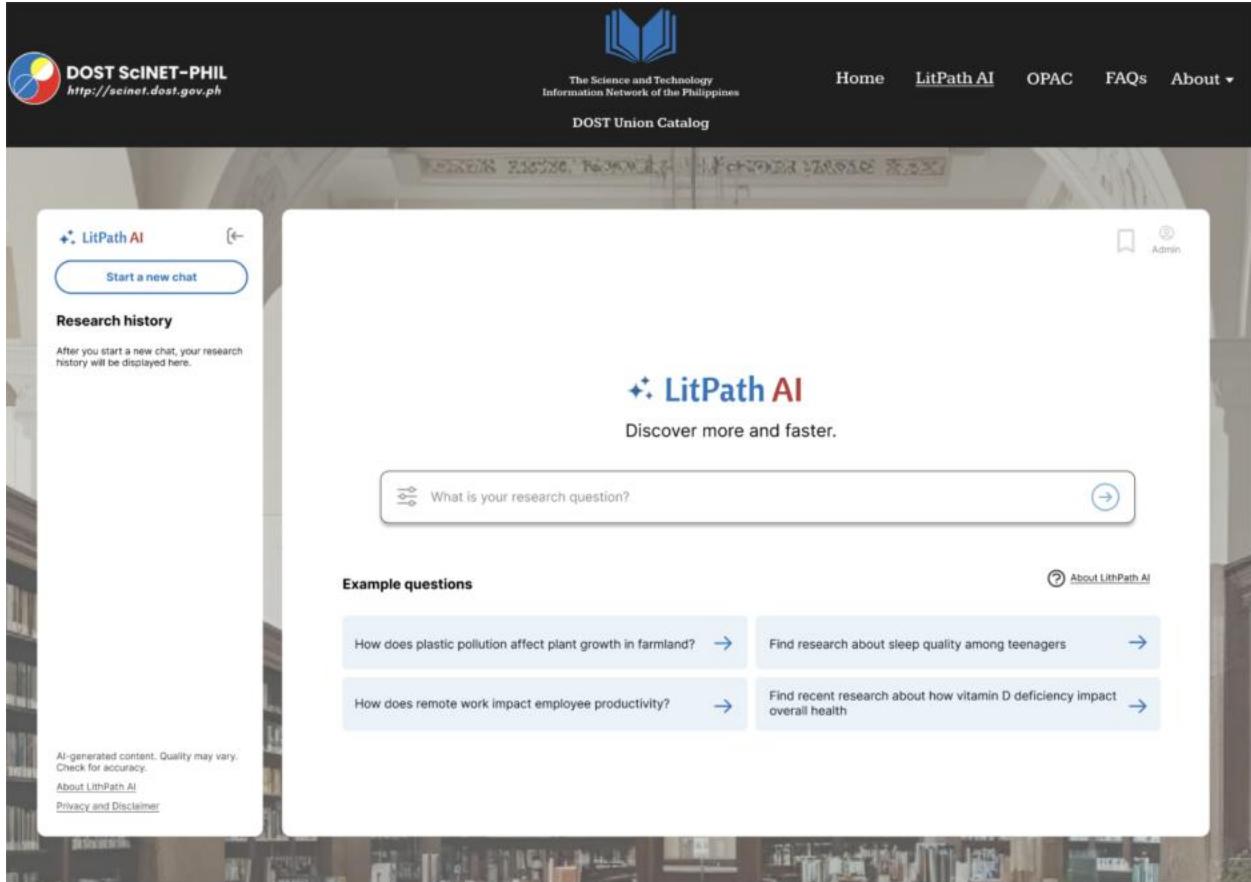


Figure 47. LitPath AI Homepage

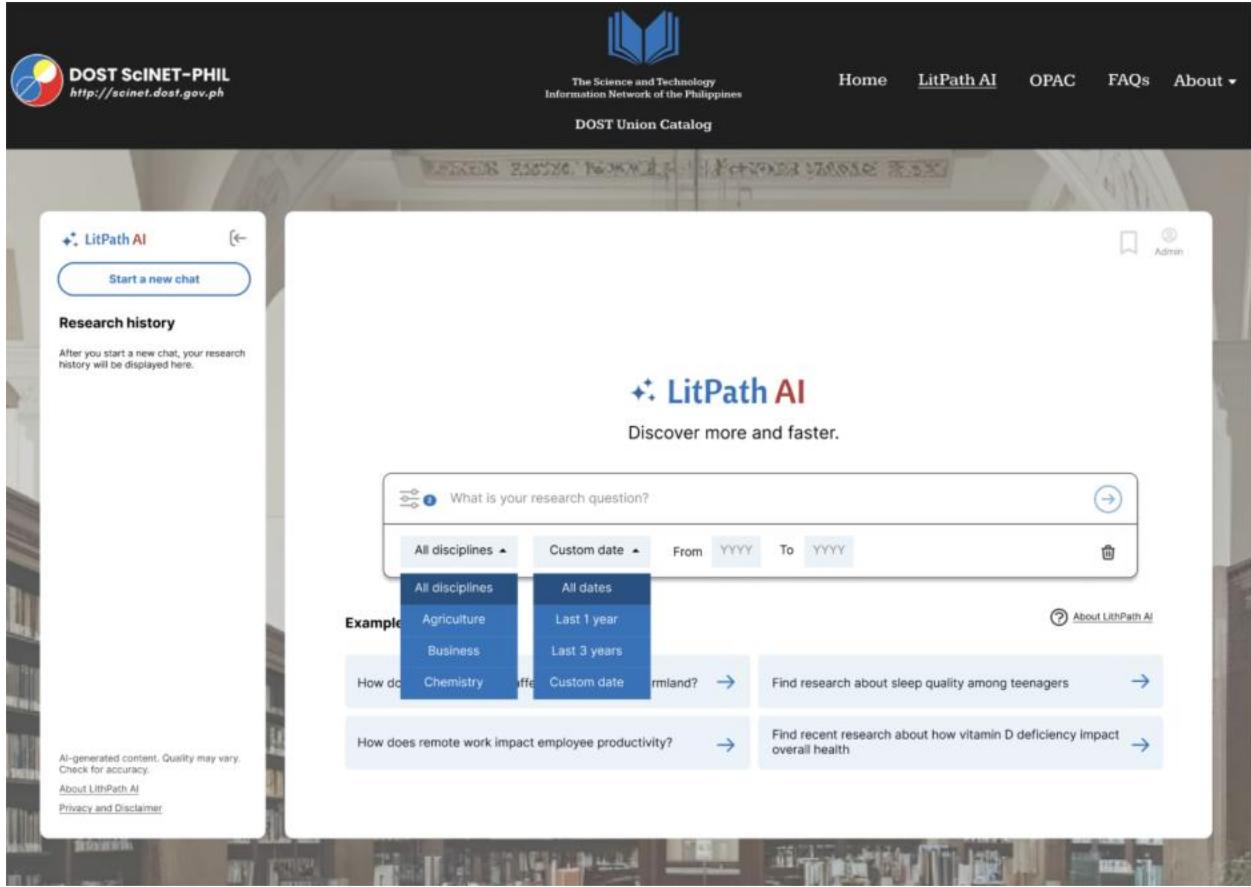


Figure 48. LitPath AI: Filters

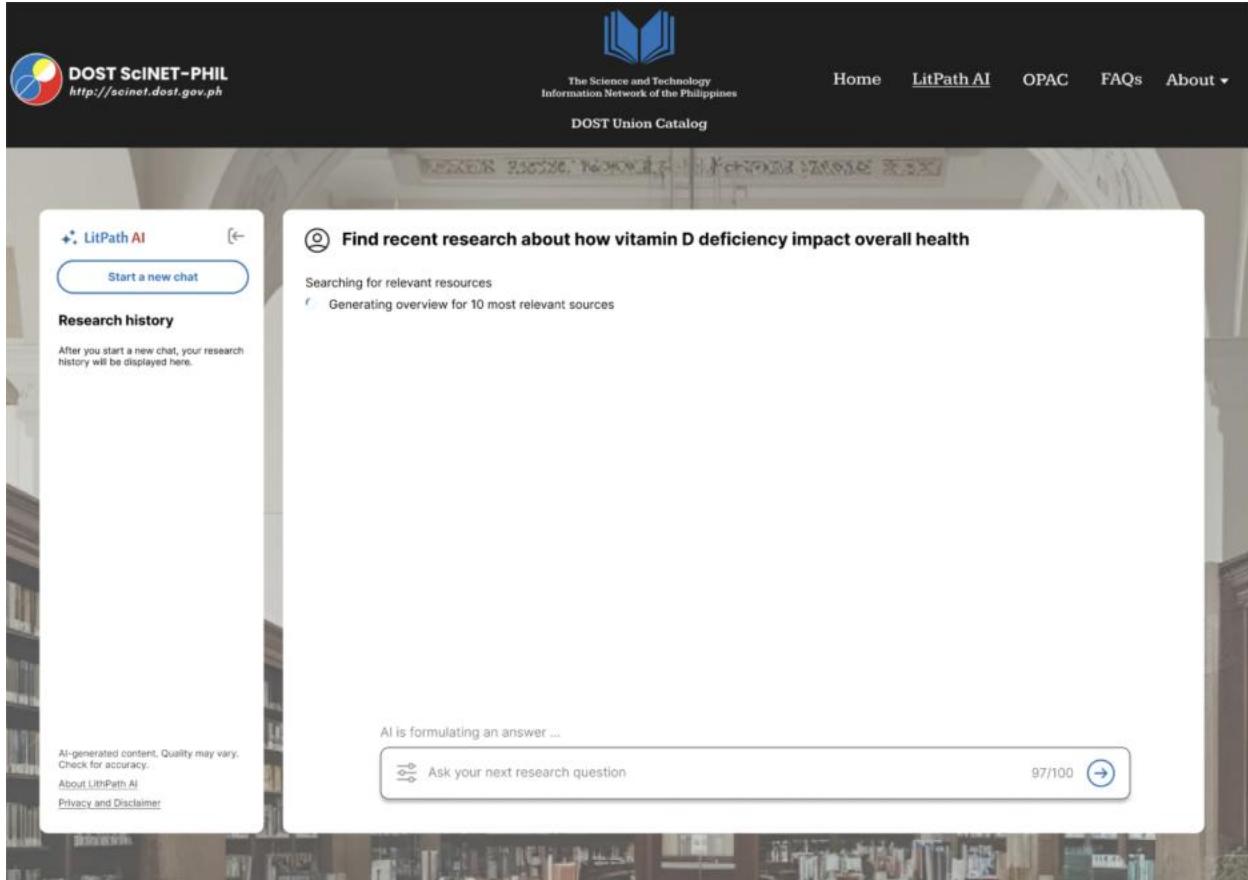


Figure 49. LitPath AI: Loading screen

The screenshot shows the DOST Union Catalog interface. At the top, there is a header with the DOST SCINET-PHIL logo, the URL <http://scinet.dost.gov.ph>, and the Science and Technology Information Network of the Philippines logo. To the right of the header are links for Home, LitPath AI, OPAC, FAQs, and About.

The main content area displays a search result for "vitamin D deficiency impact overall health". The results are categorized under "Sources".

Sources

- Health consequences of vitamin D deficiency in the human body - Gilbowksi, Paweł et al. 2021
- Vitamin D sources, physiological role, biokinetics, deficiency, therapeutic use... - Borras, Cristy Intong. 2022
- The Impact and Efficacy of Vitamin D Fortification - Alnafisah, Ruyuf Y. et al. 2024
- Factors associated with vitamin D deficiency among patients with musculoskeletal disorders seeking... - Ali, Mohammad et al. 2022
- Vitamin D Deficiency in Older Patients—Problems of Sarcopenia, Drug Interactions... - Kupisz-Urbanska, Małgorzata et al. 2021
- Health consequences of vitamin D deficiency in the human body - Gilbowksi, Paweł et al. 2021

Overview of Sources

Vitamin D deficiency has significant implications for overall health, affecting various bodily systems and increasing the risk of numerous diseases. One of the primary roles of vitamin D is in the regulation of calcium-phosphate metabolism and bone mineralization, which is crucial for preventing conditions such as rickets in children and osteoporosis in the elderly. Insufficient levels of vitamin D can lead to adverse health outcomes, including musculoskeletal disorders, as evidenced by a study that found a high prevalence of vitamin D deficiency among patients with musculoskeletal disorders seeking physiotherapy. Moreover, vitamin D deficiency has been linked to mental health issues, particularly its potential role in modulating serotonin synthesis in the brain. Research indicates that vitamin D may influence emotional and cognitive processes, with some studies suggesting that adequate levels can enhance mood and alleviate depressive states. This relationship underscores the importance of maintaining sufficient vitamin D levels for psychological well-being. The deficiency is also associated with an increased risk of chronic diseases, including cardiovascular diseases and certain cancers. Vitamin D's protective effects extend to various conditions, such as inflammatory bowel disease and neurodegenerative disorders like Parkinson's and Alzheimer's disease. Furthermore, vitamin D deficiency has been correlated with obesity and respiratory infections, highlighting its broader impact on health.

In older adults, vitamin D deficiency is particularly concerning due to its association with sarcopenia, osteoporosis, and increased risk of falls and fractures, which can significantly impair quality of life. The interactions between vitamin D metabolism and various medications further complicate the health landscape for individuals with comorbidities, emphasizing the need for careful management of vitamin D levels in this population.

Overall, maintaining adequate vitamin D levels is essential for supporting various aspects of health and preventing a range of diseases.

AI-generated content. Quality may vary. Check for accuracy.

[About LitPath AI](#) [Privacy and Disclaimer](#)

[How to cite generated AI generated content](#)  [Copy](#) [Try again](#)

Related research questions

- What are the long-term health effects of vitamin D deficiency? How does vitamin D deficiency influence immune system function?
- What is the relationship between vitamin D levels and chronic diseases? What are the recommended daily vitamin D dosages for different age groups?

97/100 

Figure 50. LitPath AI: Response

The screenshot shows the DOST ScINET-PHIL website interface. At the top, there is a navigation bar with links for Home, LitPath AI, OPAC, FAQs, and About. Below the navigation is a banner for the DOST Union Catalog. On the left, there is a sidebar for 'LitPath AI' with a 'Start a new chat' button and a 'Research history' section. The main content area displays a search result titled 'Find recent research about how vitamin D deficiency impact overall health'. It includes a section for 'Sources' with several articles listed, followed by a detailed abstract for one article. The abstract discusses the health consequences of vitamin D deficiency in the human body, mentioning its role in calcium-phosphate metabolism and bone mineralization, and its impact on various diseases like rickets, osteoporosis, and COVID-19. It also highlights its protective effects against depression and its association with chronic diseases like cardiovascular diseases and certain cancers. The abstract ends with a note about older adults and their increased risk of falls and fractures due to vitamin D deficiency.

Figure 51. LitPath AI: Quick view of sources

Vitamin D: sources, physiological role, biokinetics, deficiency, therapeutic use, toxicity, and overview of analytical methods for detection of vitamin D and its metabolites

Degree: Master of Science in Food Science

Author: Bornea, Cristy Intong

Call No.: (T) TX558.B3 B67 2022

Publication Year: 2022

Discipline/s: Endocrinology
Laboratory Medicine
Epidemiology

Full text available at DOST-STII Library from 8am - 5pm:

STII Bldg., Gen. Santos Ave., Upper Bicutan,
Taguig City, Metro Manila, 1631, Philippines
library@stii.dost.gov.ph

ABSTRACT

Vitamin D has a well-known role in the calcium homeostasis associated with the maintenance of healthy bones. It increases the efficiency of the intestinal absorption of dietary calcium, reduces calcium losses in urine, and mobilizes calcium stored in the skeleton. However, vitamin D receptors are present ubiquitously in the human body and indeed, vitamin D has a plethora of non-calciemic functions. In contrast to most vitamins, sufficient vitamin D can be synthesized in human skin. However, its production can be markedly decreased due to factors such as clothing, sunscreens, intentional avoidance of the direct sunlight, or the high latitude of the residence. Indeed, more than one billion people worldwide are vitamin D deficient, and the deficiency is frequently undiagnosed. The chronic deficiency is not only associated with rickets/osteomalacia/osteoporosis but it is also linked to a higher risk of hypertension, type 1 diabetes, multiple sclerosis, or cancer. Supplementation of vitamin D may be hence beneficial, but the intake of vitamin D should be under the supervision of health professionals because overdosing leads to intoxication with severe health consequences. For monitoring vitamin D, several analytical methods are employed, and their advantages and disadvantages are discussed in detail in this review.

Figure 52. LitPath AI: Source details overlay

The screenshot shows a web interface for DOST ScINET-PHIL. At the top left is the logo and URL: DOST ScINET-PHIL (<http://scinet.dost.gov.ph>). On the right, a blue bar indicates "Copied Successfully".

The main content area displays a research article citation:

Vitamin D: sources, physiological role, biokinetics, deficiency, therapeutic use, toxicity, and overview of analytical methods for detection of vitamin D and its metabolites

Degree: Master of Science in Food Science
Author: Bornea, Cristy Intong
Call No.: (T) TX558.B3 B67 2022
Publication Year: 2022
Discipline/s: Endocrinology, Laboratory Medicine, Epidemiology

The citation details are as follows:

Bornea, C. I. (2022). Vitamin D: sources, physiological role, biokinetics, deficiency, therapeutic use, toxicity, and overview of analytical methods for detection of vitamin D and its metabolites. *Scinet.dost.gov.ph*, TX558.B3 B67 2022.

Citation formats available:

- APA (7th edition)
- MLA (9th edition)
- Chicago
- IEEE

A "COPY" button is present. To the right, there is a sidebar with the text "DOST-STII Library from 8am - 5pm:" and the address "Gen. Santos Ave., Upper Bicutan, Taguig, Metro Manila, 1631, Philippines" along with the email "library@stii.dost.gov.ph".

The bottom section contains a summary of Vitamin D's role in calcium homeostasis and its various health impacts, followed by related research questions and a "Ask your next research question" input field.

Figure 53. LitPath AI: Citation

The screenshot shows the DOST Union Catalog website. At the top, there is a header with the DOST ScINET-PHIL logo, the URL <http://scinet.dost.gov.ph>, and the text "The Science and Technology Information Network of the Philippines". To the right of the header are links for "Home", "LitPath AI", "OPAC", "FAQs", and "About". Below the header, the text "DOST Union Catalog" is displayed.

The main content area features a search bar with the query "Find recent research about how vitamin D deficiency impact overall health". Below the search bar, there is a section titled "Sources" which lists several research papers:

- Health consequences of vitamin D deficiency in the human body - Gilbowski, Paweł et al. 2021
- Vitamin D sources, physiological role, biokinetics, deficiency, therapeutic use... - Bornea, Cristy Intong. 2022
- The Impact and Efficacy of Vitamin D Fortification - Alnafash, Ruyuf Y. et al. 2024
- Factors associated with vitamin D deficiency among patients with musculoskeletal disorders seeking... - Ali, Mohammad et al. 2022
- Vitamin D Deficiency in Older Patients—Problems of Sarcopenia, Drug Interactions... - Kupisz-Urbalska, Małgorzata et al. 2021
- Health consequences of vitamin D deficiency in the human body - Gilbowski, Paweł et al. 2021

One specific article is expanded, titled "Vitamin D: sources, physiological role, biokinetics, deficiency, therapeutic use, toxicity, and overview of analytical methods for detection of vitamin D and its metabolites" by Bornea, Cristy Intong. 2022. The abstract discusses the well-known role of Vitamin D in calcium homeostasis and its various physiological functions. It notes that Vitamin D can be synthesized in the skin but may be deficient due to factors like clothing and sun exposure. The article highlights the link between Vitamin D deficiency and conditions like rickets, osteomalacia, and osteoporosis, as well as its association with hypertension, type 1 diabetes, multiple sclerosis, and cancer. It also mentions the importance of monitoring Vitamin D levels through analytical methods and the potential risks of overdosing.

Below the abstract, there is a section titled "Overview of Sources" which provides a summary of the broader implications of Vitamin D deficiency across different systems and diseases. It mentions its role in mental health, cognitive processes, and chronic diseases like cardiovascular disease and cancer. For older adults, it discusses the risk of falls and fractures due to Vitamin D deficiency.

At the bottom of the page, there is a "Related research questions" section with three items:

- What are the long-term health effects of vitamin D deficiency?
- How does vitamin D deficiency influence immune system function?
- What is the relationship between vitamin D levels and chronic diseases?
- What are the recommended daily vitamin D dosages for different age groups?

At the very bottom of the interface, there is a footer with a "Find recent research about how vitamin D deficiency impact overall health" button, a "97/100" score, and a "Try again" button.

Figure 54. LitPath AI: Try Again

The screenshot shows the DOST Union Catalog interface. At the top right, a blue bar indicates "Copied Successfully". The main content area displays a research summary about Vitamin D deficiency. The summary includes a title, abstract, and several sections of text. Below the summary, there's a "Related research questions" section with four items. At the bottom, a search bar contains the query "Find recent research about how vitamin D deficiency impact overall health".

LitPath AI

Find recent research about how vitamin D deficiency impact overall health

Sources

Vitamin D: sources, physiological role, biokinetics, deficiency, therapeutic use, toxicity, and overview of analytical methods for detection of vitamin D and its metabolites

Overview of Sources

Related research questions

Find recent research about how vitamin D deficiency impact overall health

Figure 55. LitPath AI: Successfully copied AI response

DOST SCINET-PHIL
<http://scinet.dost.gov.ph>

The Science and Technology Information Network of the Philippines

Home | [LitPath AI](#) | OPAC | FAQs | About ▾

DOST Union Catalog

LitPath AI

Start a new chat

Research history

After you start a new chat, your research history will be displayed here.

Sources

- Health consequences of vitamin D deficiency in the human body
Gibowicz, Paweł et al. 2021
- Vitamin D sources, physiologic, pharmacologic, and therapeutic use...
Borres, Cristy Intong. 2022
- The Impact and Efficacy of Vitamin D Fortification
Amanatian, Ruyuf Y. et al. 2024
- Factors associated with vitamin D deficiency among patients with musculoskeletal disorders seeking...
Ali, Mohammad et al. 2022
- Vitamin D Deficiency in Older Patients—Problems of Sarcopenia, Drug Interactions...
Kupris-Uberinkie, Małgorzata et al. 2021
- Health consequences of vitamin D deficiency in the human body
Gibowicz, Paweł et al. 2021

Thank you for your feedback

Is this relevant to your question?

Yes

No

Success
Feedback submitted successfully

Please explain your answer

You may input your suggestions/improvements here

Submit Cancel

More info
Influence
Importance of maintaining sufficient vitamin D levels for psychological well-being.

The deficiency is also associated with an increased risk of chronic diseases, including cardiovascular diseases and certain cancers. Vitamin D's protective effects extend to various conditions, such as inflammatory bowel disease and neurodegenerative disorders like Parkinson's and Alzheimer's disease. Furthermore, vitamin D deficiency has been correlated with obesity and respiratory infections, highlighting its broader impact on health.

In older adults, vitamin D deficiency is particularly concerning due to its association with sarcopenia, osteoporosis, and increased risk of falls and fractures, which can significantly impair quality of life. The interactions between vitamin D metabolism and various medications further complicate the health landscape for individuals with comorbidities, emphasizing the need for careful management of vitamin D levels in this population.

Overall, maintaining adequate vitamin D levels is essential for supporting various aspects of health and preventing a range of diseases.

How to cite AI-generated AI-generated content | **5** ★★★★☆ | Copy | Try again

Related research questions

1 What are the long-term health effects of vitamin D deficiency? **1** How does vitamin D deficiency influence immune system function?

1 What is the relationship between vitamin D levels and chronic diseases? **1** What are the recommended daily vitamin D dosages for different age groups?

Find recent research about how vitamin D deficiency impact overall health

97/100

Figure 56. LitPath AI: User Feedback

The screenshot shows the Purdue University Libraries & Schools of Information Studies website. At the top, the Purdue logo and name are displayed. Below the logo, there are links for 'Hours', 'Databases', 'Ask a Librarian', and 'My Account'. The main navigation bar includes 'Purdue Libraries', 'Research Guides', 'Subject Guides', 'Artificial Intelligence (AI)', and 'How to Cite AI-Generated Content'. A search bar at the top right contains the placeholder 'Search this Guide' and a 'Search' button.

The page title is 'Artificial Intelligence (AI)'. A sub-header states: 'This LibGuide provides an overview of AI knowledge, the applications of AI tools in teaching and learning, and content for the AI research areas.' On the left, a sidebar menu lists categories: Home, AI Tools, AI in Research, How to Cite AI Generated Content (which is highlighted in dark grey), Resources for Educators, AI in K12, Purdue AI Resources, Prompt Design, AI and Ethics, Copyright, Publisher Policies, and Selected Journals in AI.

The main content area is titled 'How to Cite AI-Generated Content' and is further divided into sections: 'APA', 'Examples', and 'Reference'. The 'APA' section contains guidelines from the APA blog, detailing the APA format for citing AI-generated content. It includes examples such as 'OpenAI. (2023). ChatGPT (Feb 13 version) [Large language model]. https://chat.openai.com/chat' and 'OpenAI. (2023). ChatGPT (Mar 14 version) [Large language model]. https://chat.openai.com/chat'. The 'Examples' and 'Reference' sections provide additional context and examples.

Figure 57. LitPath AI: How to cite AI content redirection site

The screenshot shows the DOST SciNET-PHIL homepage with a search bar at the top. Below it, a large banner displays research results for "vitamin D deficiency". The banner has sections for "Sources" and "Overview of Sources". It includes several thumbnail cards with titles like "Vitamin D sources, physiological role, biokinetics, deficiency, therapeutic use, toxicity, and overview of analytical methods for detection of vitamin D and its metabolites" and "Vitamin D prophylaxis in infancy". At the bottom of the banner, there's a "Related research questions" section and a "Ask your next research question" input field.

Figure 58. LitPath AI: Follow-up question

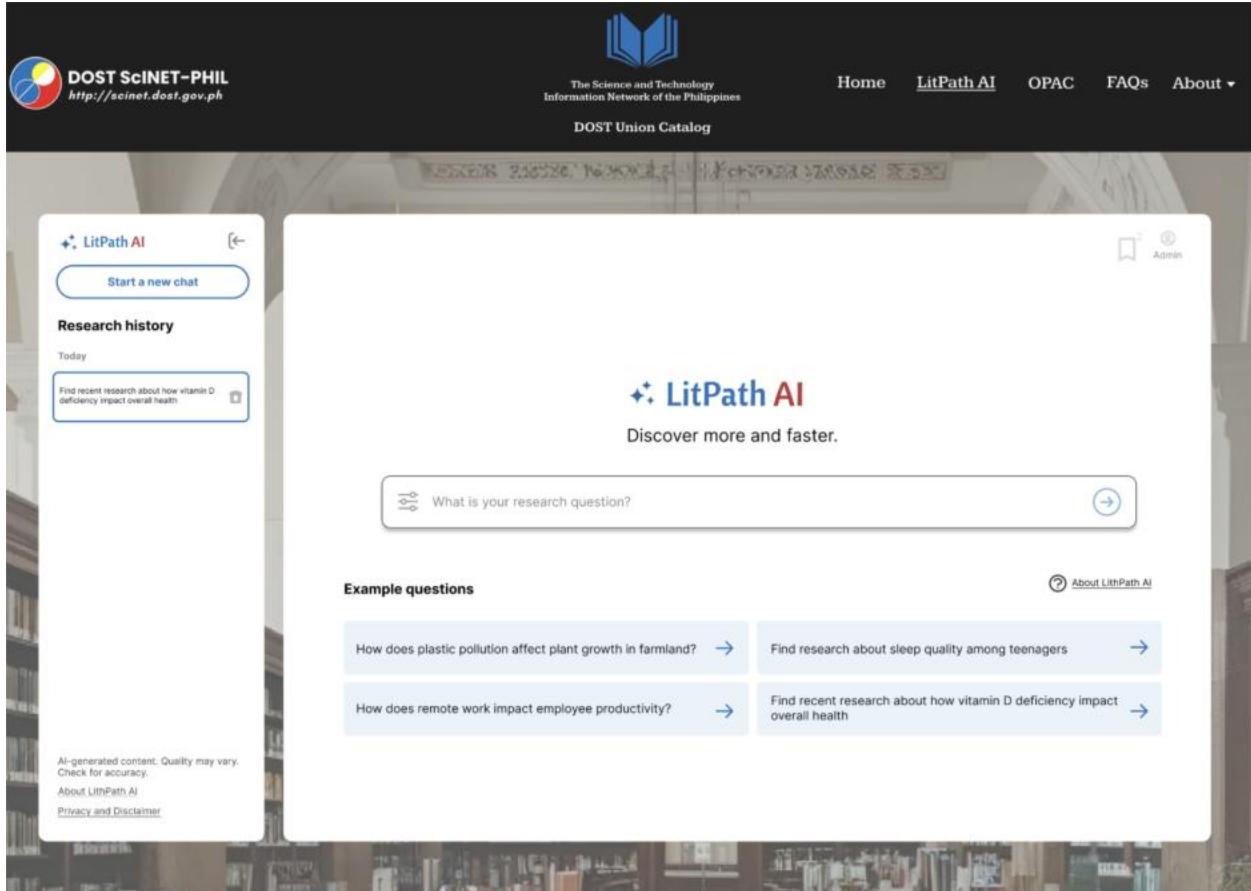


Figure 59. LitPath AI: Search History

The screenshot shows the DOST ScINET-PHIL website with a dark header. The header includes the DOST ScINET-PHIL logo, the URL <http://scinet.dost.gov.ph>, a blue book icon, the text "The Science and Technology Information Network of the Philippines", and navigation links for Home, LitPath AI, OPAC, FAQs, and About.

The main content area has a light gray background with a photograph of a library in the background. On the left, there's a sidebar with a "LitPath AI" button, a "Start a new chat" button, and a "Research history" section showing a recent search for "Find recent research about how vitamin D deficiency impact overall health".

The main content area contains several sections:

- How to use the LitPath AI**: A detailed explanation of how the tool works, mentioning it uses Generative Artificial Intelligence (LLM) to explore academic content by asking questions in natural language. It extracts relevant information from document descriptions/abstracts to generate answers, including inline citations.
- How are responses generated?**: An explanation that the question is converted into a query understood by a Large Language Model, which then ranks sources and generates an answer. It notes that answers can vary due to the nature of LLMs.
- How to formulate a good question**: Advice on asking clear and detailed questions about academic topics.
- Share your thoughts**: A section encouraging users to provide feedback on the AI-generated content.

At the bottom of the content area, there's a note: "AI-generated content. Quality may vary. Check for accuracy." and links for "About LitPath AI" and "Privacy and Disclaimer".

Figure 60. About LitPath AI

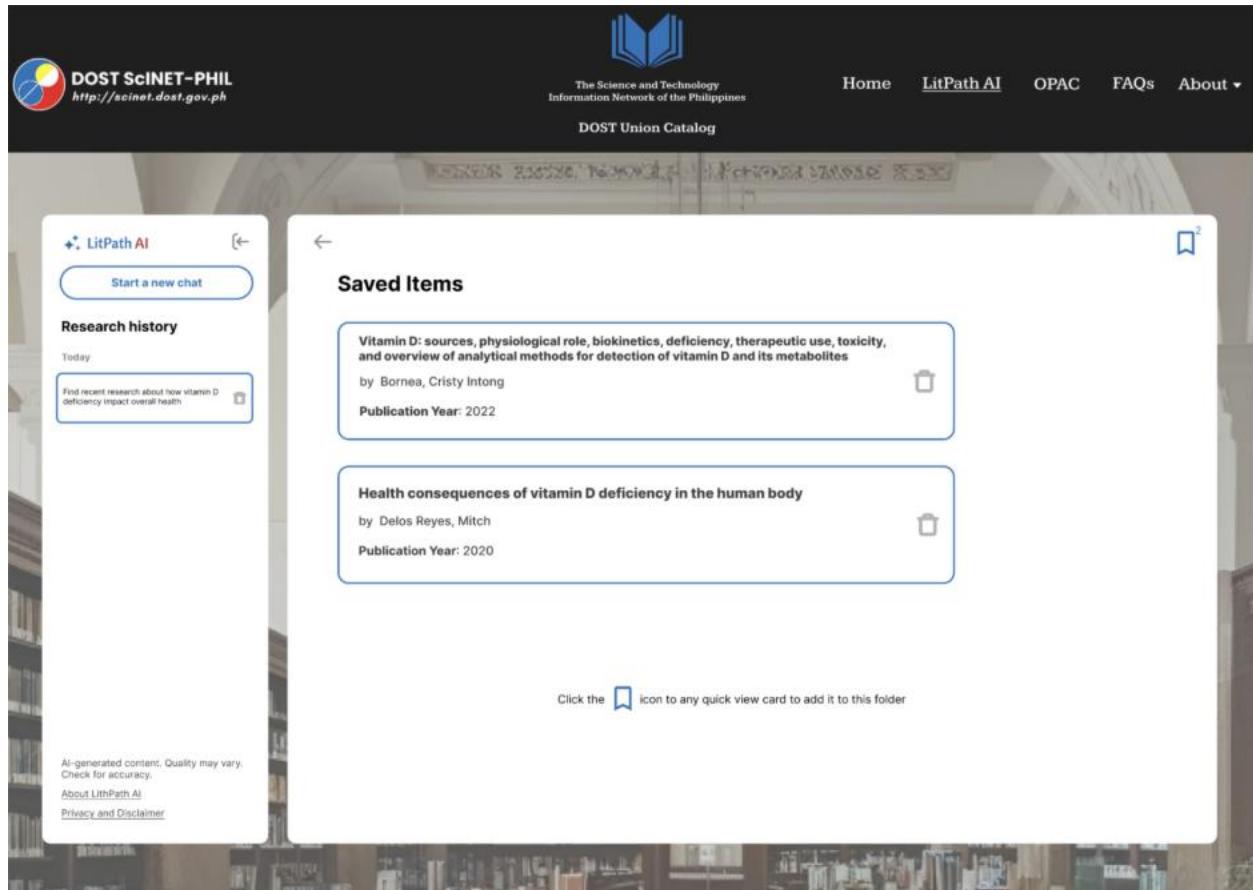


Figure 61. LitPath AI: Saved Items

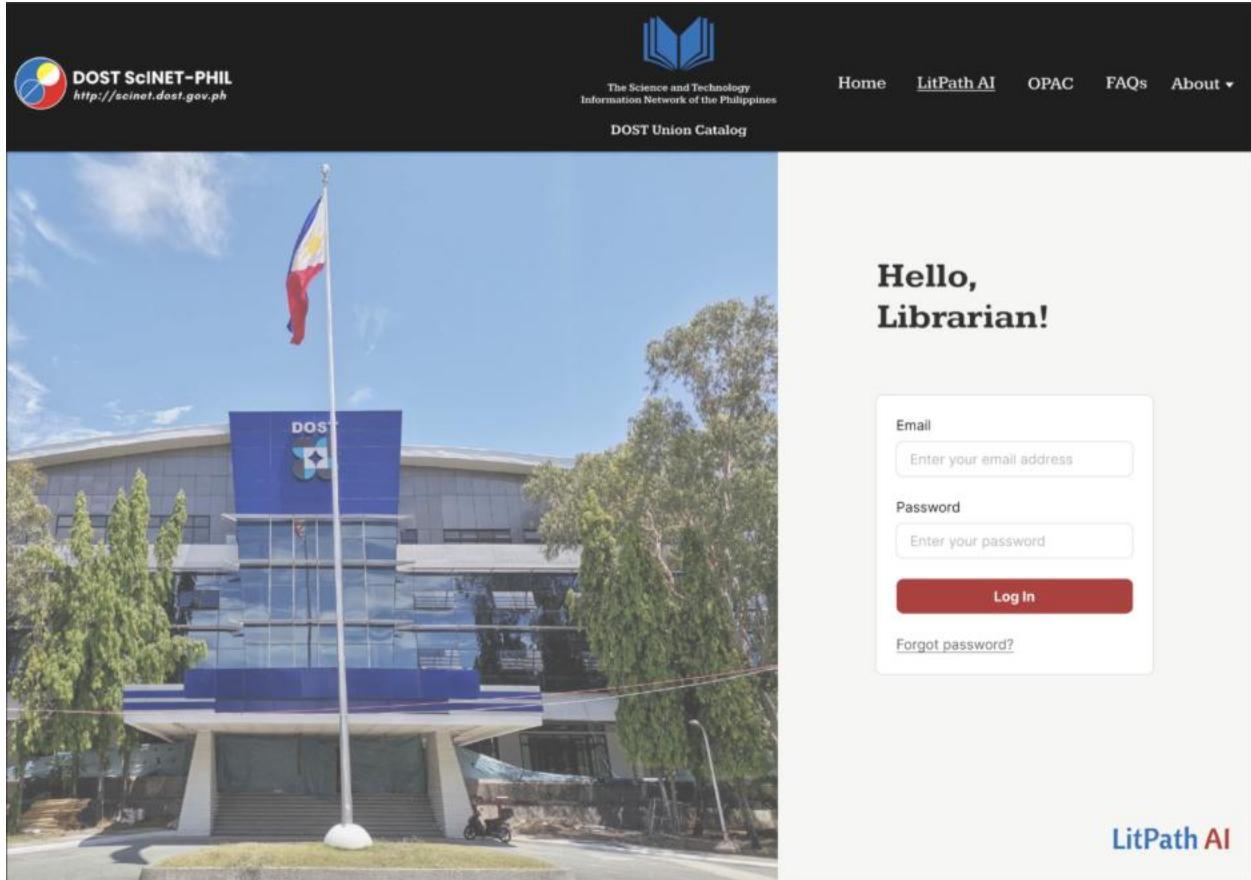


Figure 62. LitPath AI: Admin Log In

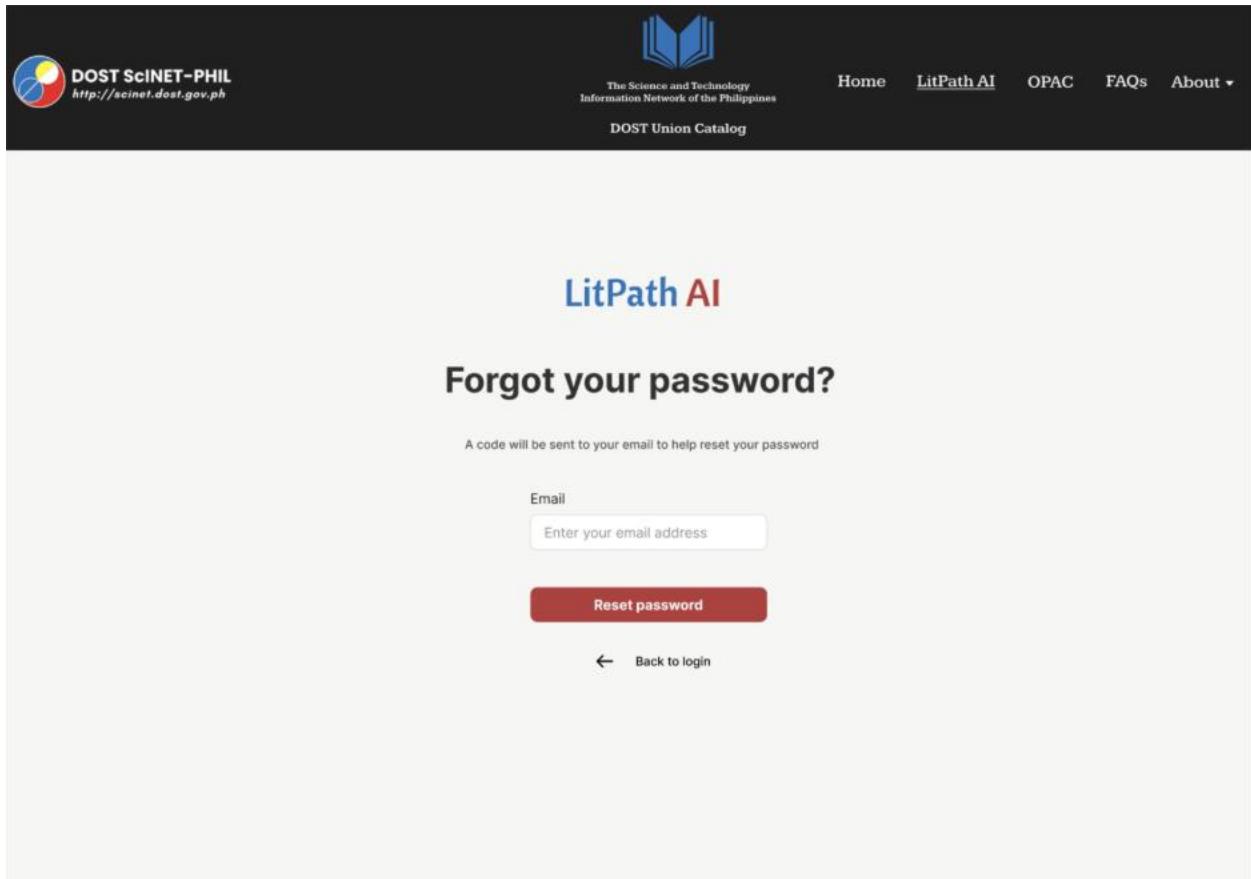


Figure 63. Forgot password: Enter email

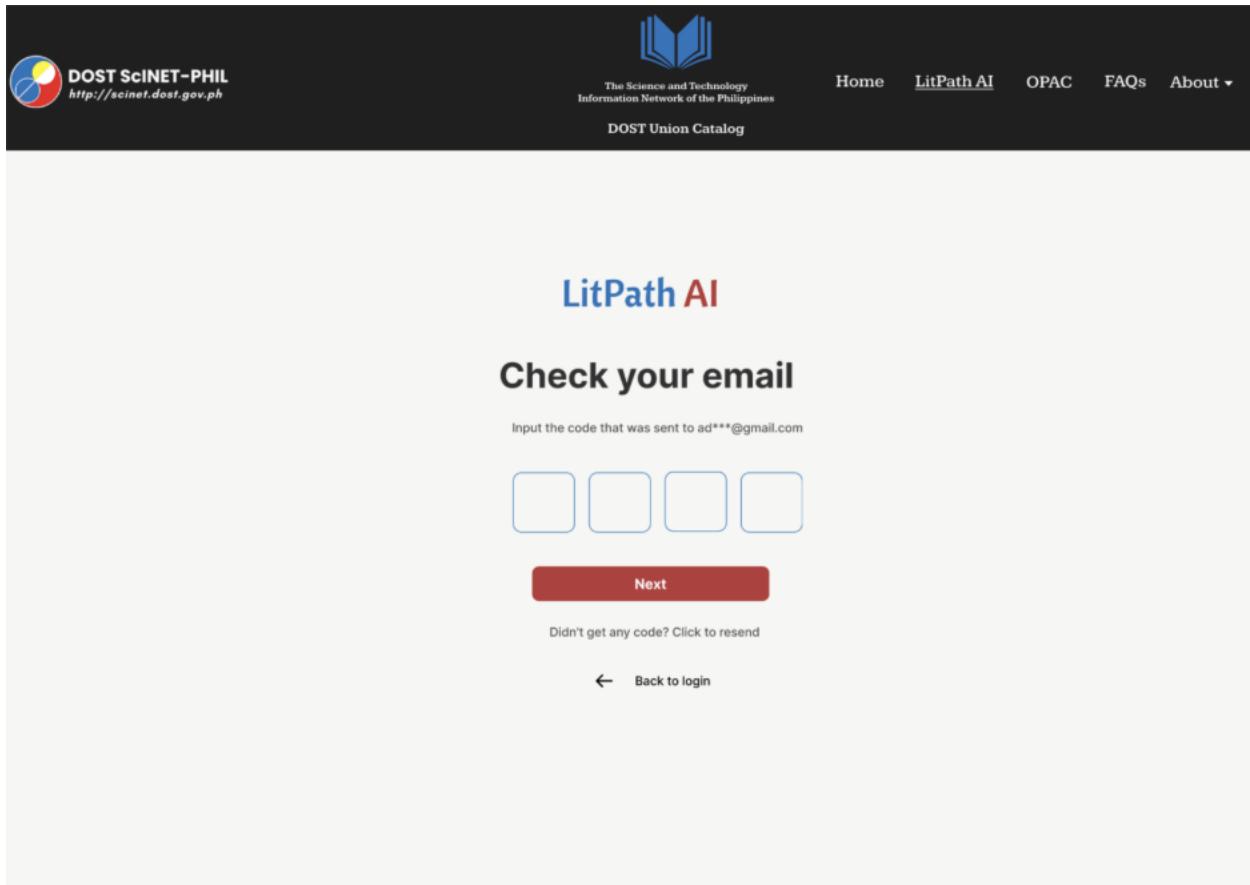


Figure 64. Forgot password: Email code entry

The screenshot shows the DOST ScINET-PHIL website interface. At the top left is the logo for DOST ScINET-PHIL with the URL <http://scinet.dost.gov.ph>. To its right is a blue book icon representing the Information Network of the Philippines. Below the logo is the text "The Science and Technology Information Network of the Philippines". On the far right of the header are links for "Home", "LitPath AI" (which is underlined), "OPAC", "FAQs", and "About ▾". Underneath the header, the text "DOST Union Catalog" is visible. The main content area has a light gray background. In the center, the text "LitPath AI" is displayed in blue. Below it is a large, bold, black heading "Set a new password". A note below the heading states: "Your new password must be different from previously used passwords". There are two input fields: one labeled "New Password" containing "*****" and another labeled "Confirm Password" also containing "*****". Below these fields are two radio buttons with the following options: "Must be at least 8 characters" and "Must contain one special character". A red rectangular button labeled "Reset password" is positioned below the validation text. At the bottom left, there is a back arrow icon followed by the text "Back to login".

Figure 65. Setting a new password

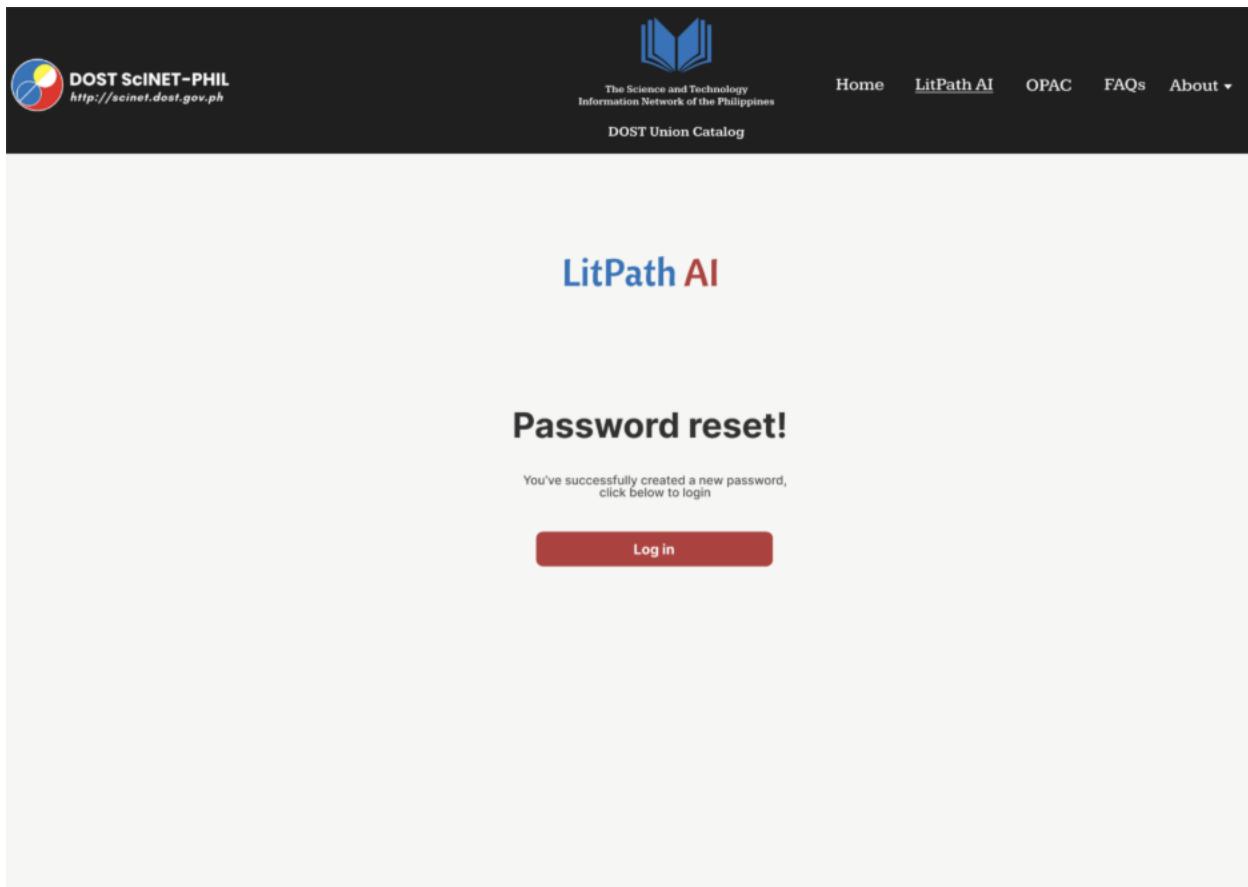


Figure 66. Successfully resetting of password

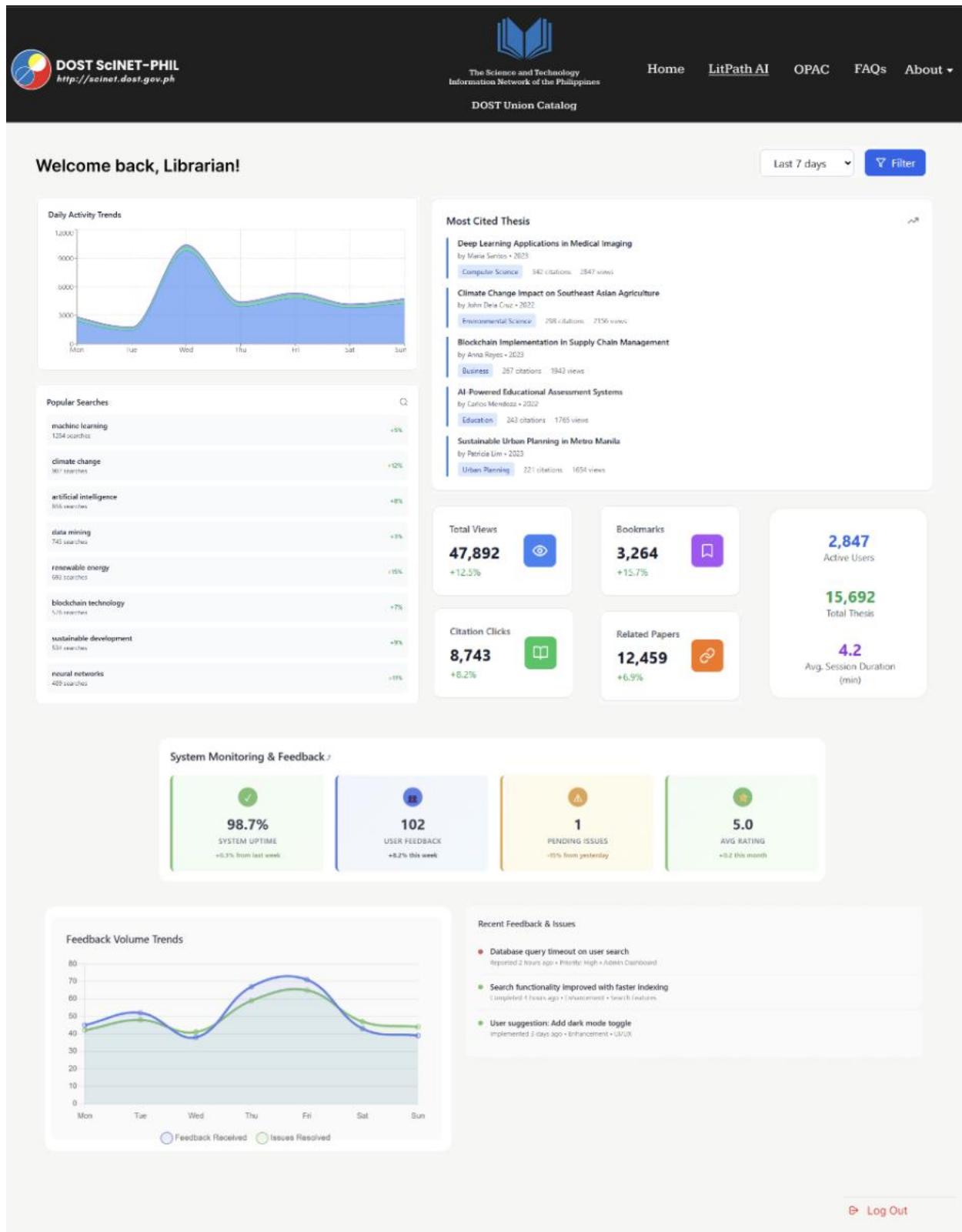
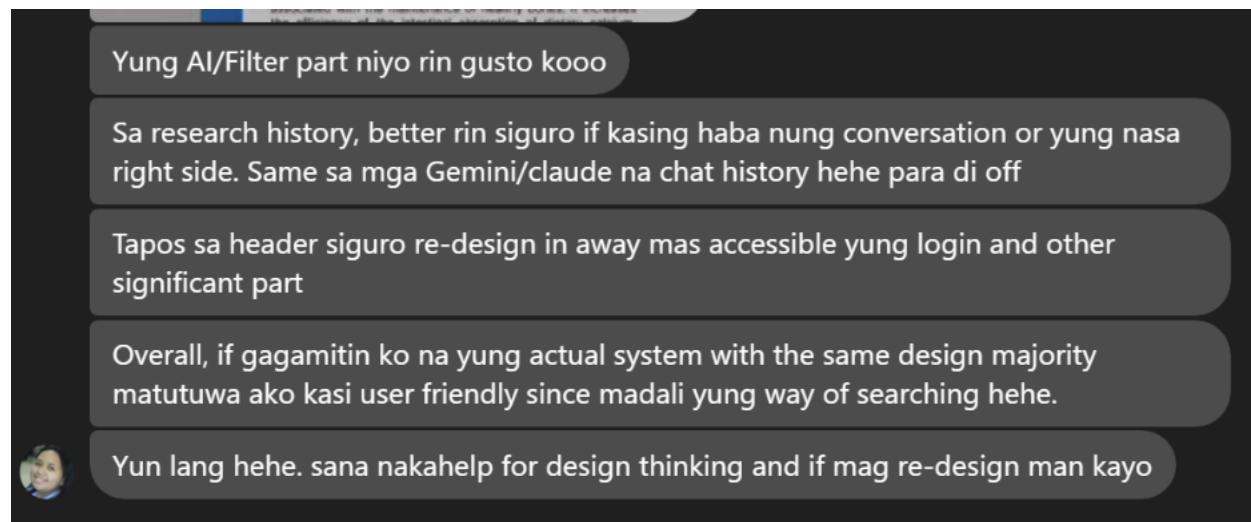


Figure 67. Admin Dashboard

Stage 5 – Test

Lastly, the fifth phase of our process is Test, where our team handed over this prototype to real users. We observed how clients and customers interacted with our designs, and we collected their feedback to understand their experience with the prototype. These insights and identified areas for improvement will be used for future development processes.

CUSTOMER FEEDBACK



*Figure 68. Customer Feedback
NOTE: Customer 1 is contacted through Facebook Messenger due to busy schedules.*

General Feedback:

- Design and color palette is okay, and I suggest making the detail page of the thesis in full screen.
- I'm happy that there is a citation generator and it would be even great to also have in-text citations.
- I also like the search interface features.
- The research history conversation should have been longer.
- Include in the header the login and bookmark so it can be easily accessible.
- Overall, it's user friendly and the searching process is easy to navigate.

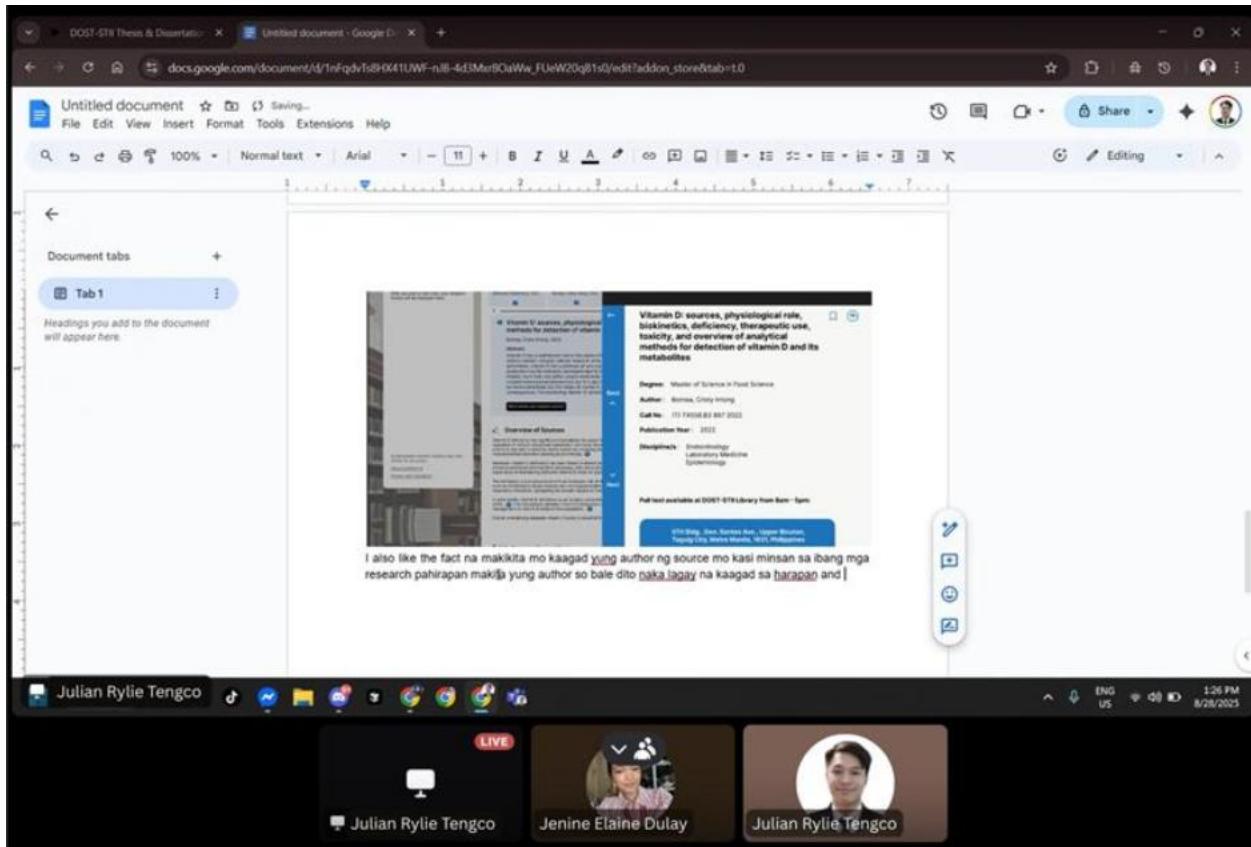


Figure 69. A screenshot of a customer feedback session conducted via video call
NOTE: Customer 2 is contacted through Discord due to busy schedules.

General Feedback:

- The design and color scheme is okay and simple.
- The features are easy to navigate because all that you need is shown there like the example questions.
- I like that the sources are shown on top because it's the first thing you see and that you can also view the details where you can view the author and year instantly.
- It's also nice that the chat history can be saved.
- Overall, it's easy to use.

CLIENT FEEDBACK



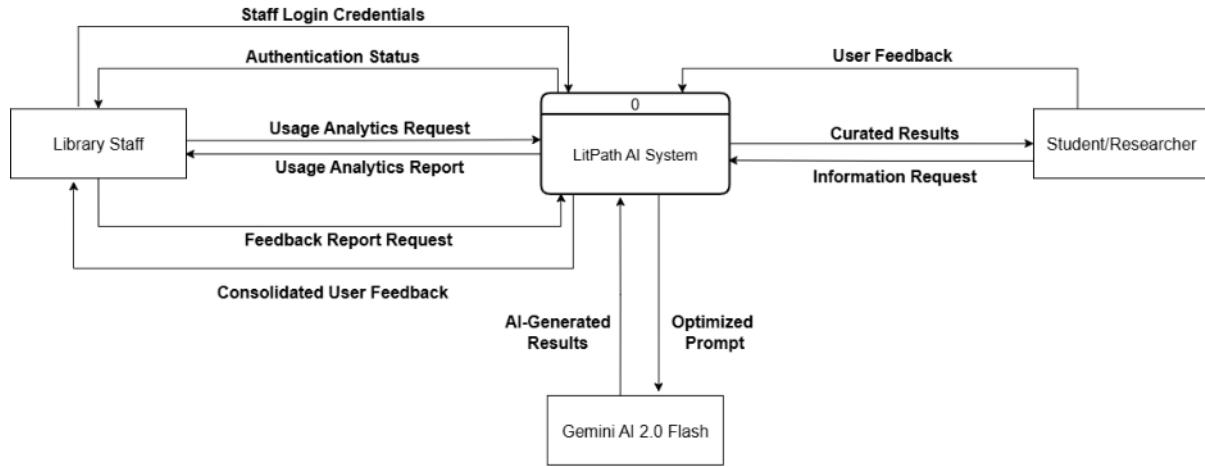
*Figure 70. Client Feedback
NOTE: Client is contacted through Viber due to busy schedules.*

General Feedback:

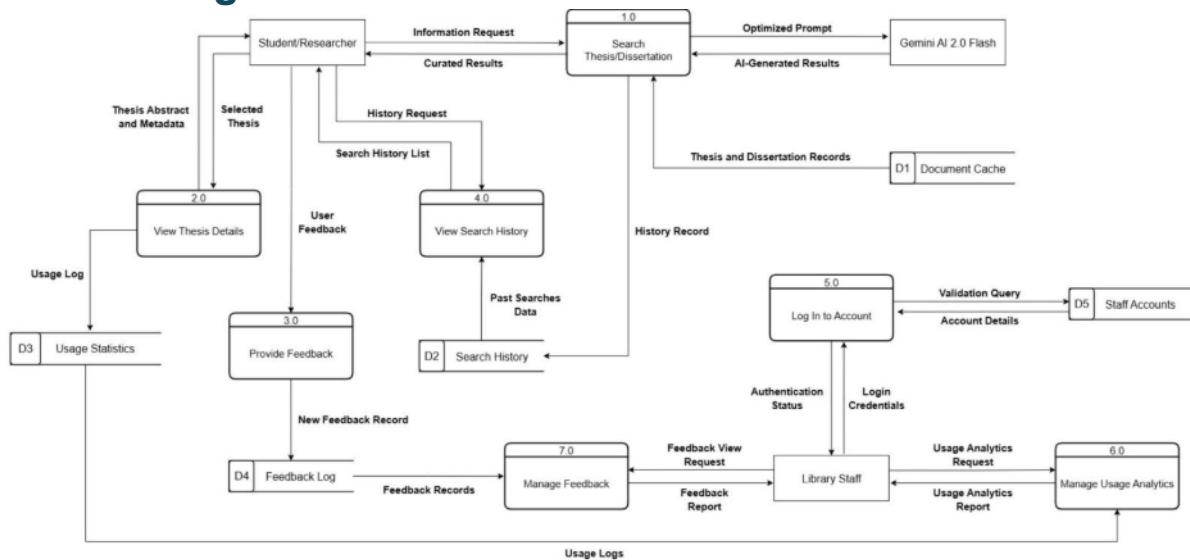
- **Design:** 8/10. The design is clean and not overwhelming but there are some parts which are text heavy.
- **Elements:** 9/10. Elements needed is complete, but some placement of the elements need to switch
- **Overall feels:** 9/10. Requirements and design were achieved with minor revisions
- **Suggestions:** Enhance readability and create clearer section dividers for the Search results.

Dataflow Diagrams

Level 0 (Context Diagram)

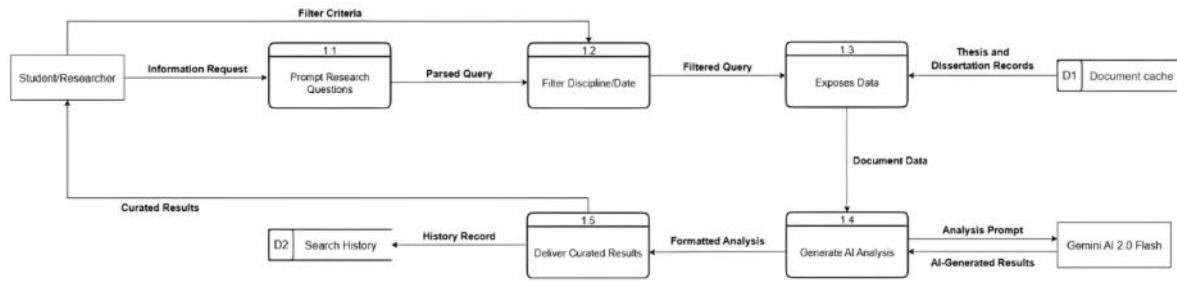


Level 1 diagram

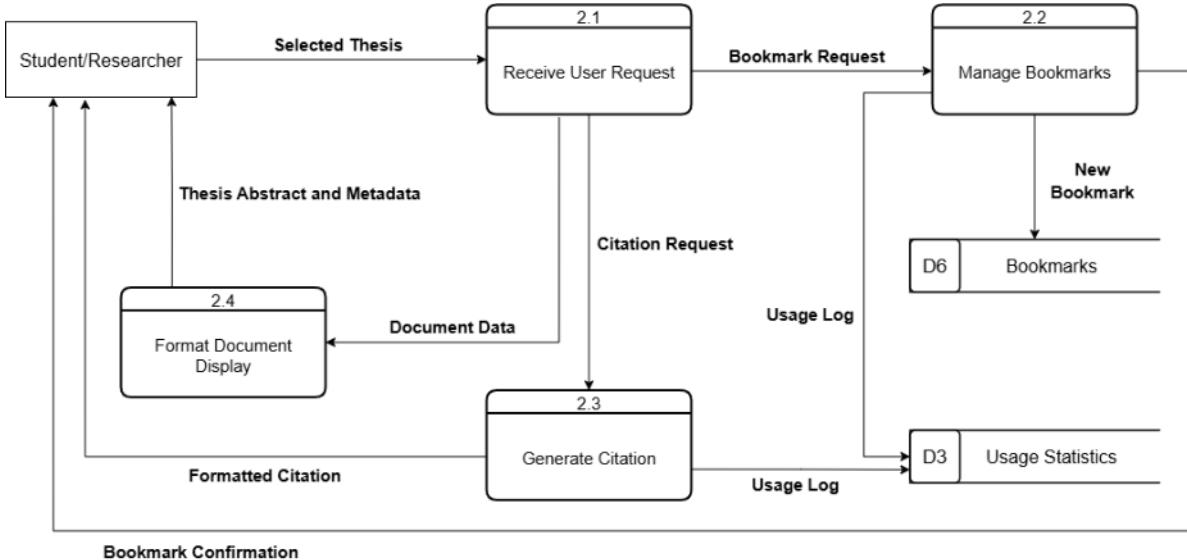


Level 2 diagrams

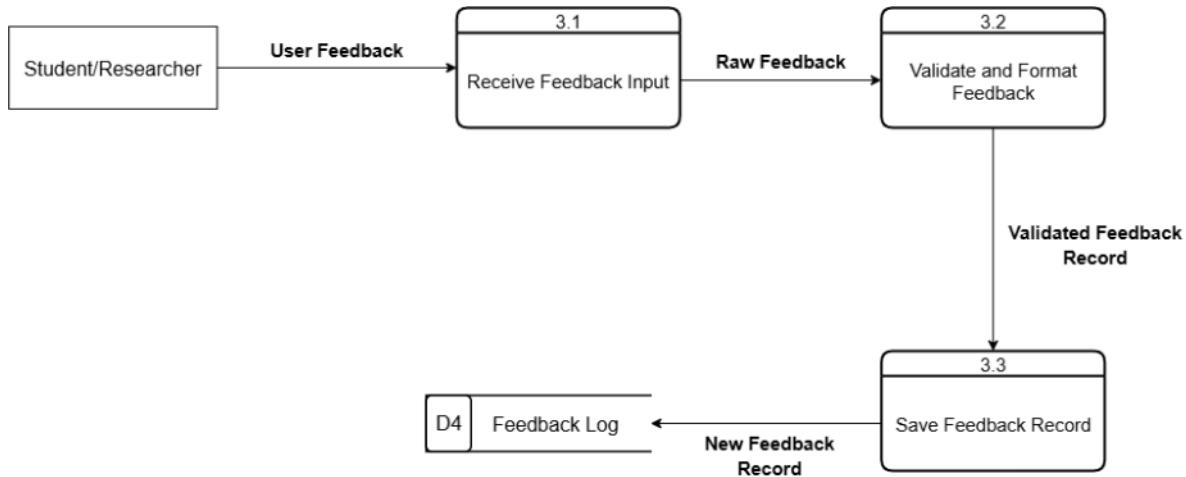
1.0 Search Thesis/Dissertation



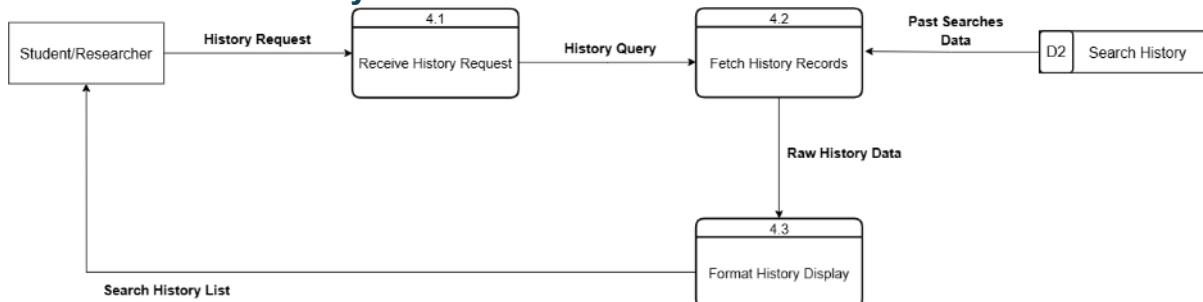
2.0 View Thesis Details



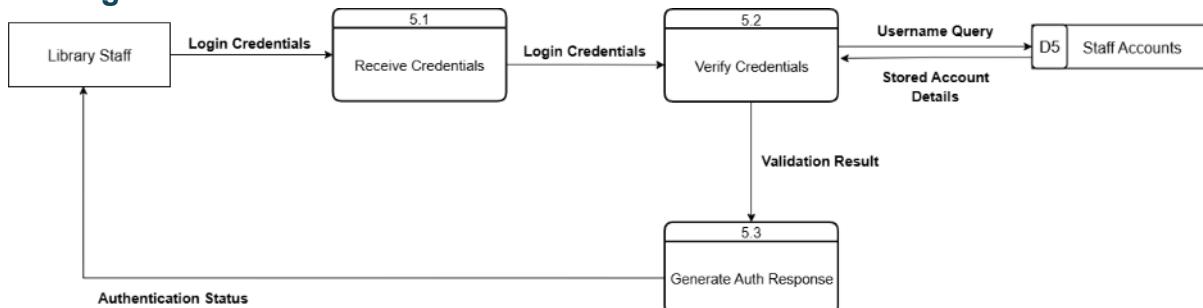
3.0 Provide Feedback



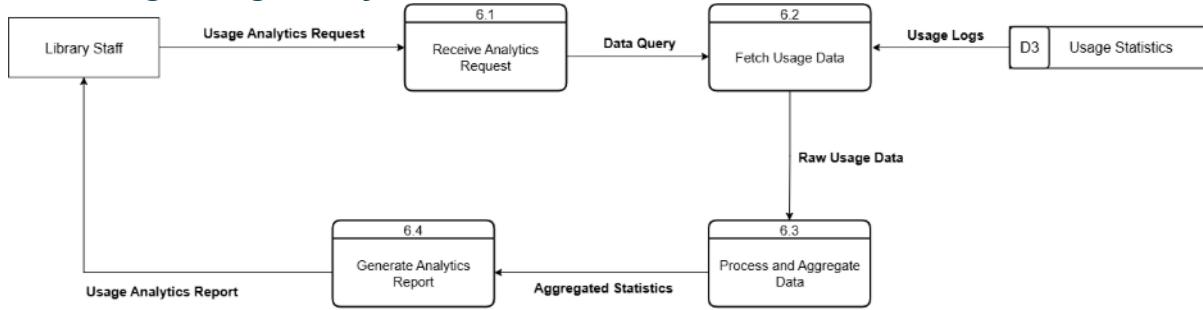
4.0 View Search History



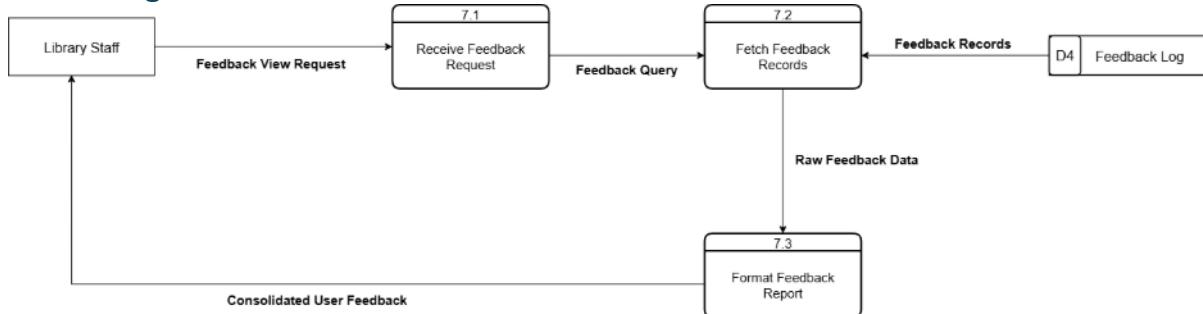
5.0 Log In to Account



6.0 Manage Usage Analytics

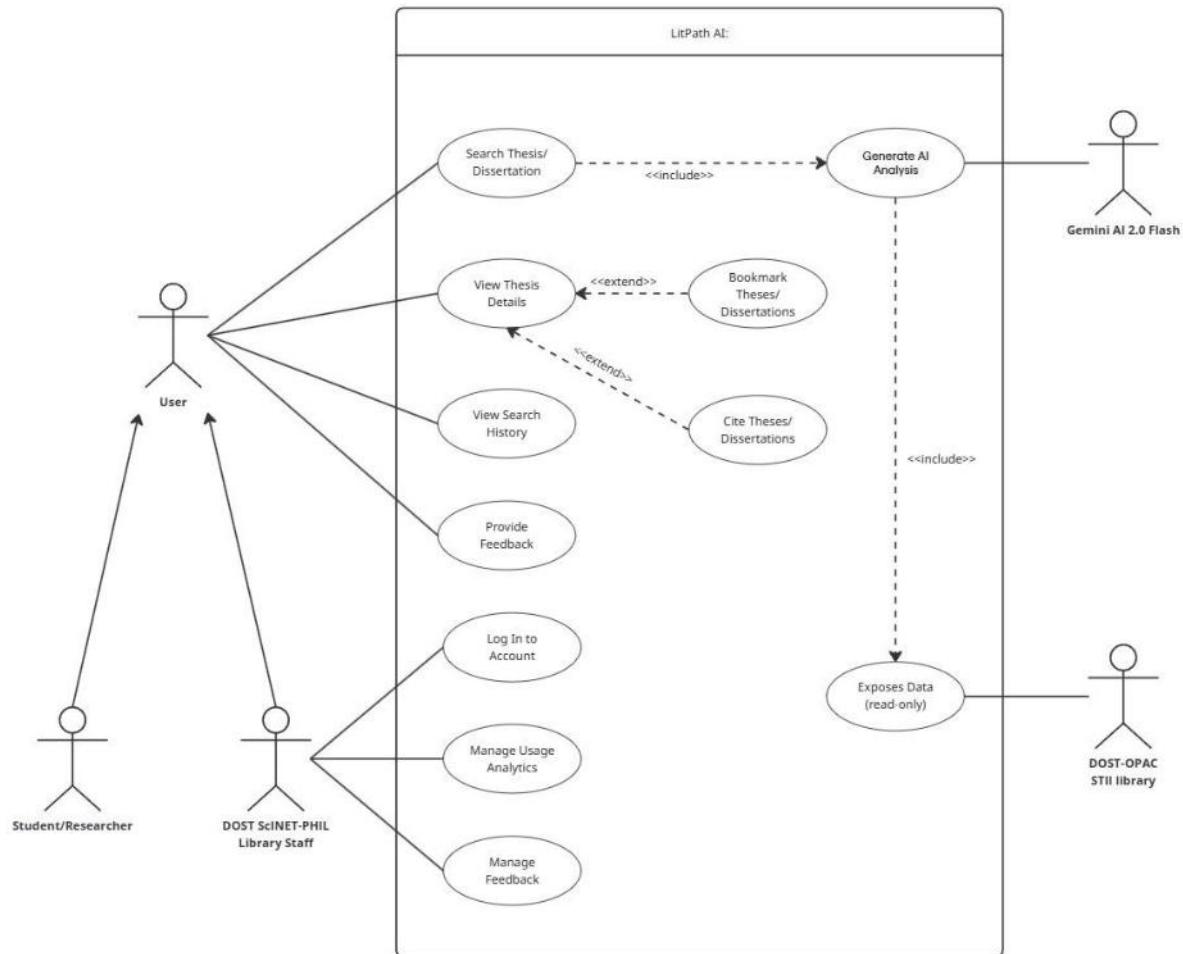


7.0 Manage Feedback



Use Case Documentation

Use Case Diagram



Fully Dressed Use Cases

Table 2. Use Case Name: Search Thesis/Dissertation

Use Case ID	UC-01
Author/s	Jenine Elaine Dulay, Charijoy Cempron
Purpose	To allow a user to enter a research question and receive a curated list of relevant theses and dissertations analyzed by an AI.
Requirement Traceability	BR-01, BR-02

Priority	High
Preconditions	<ul style="list-style-type: none"> The system is online and accessible. User can access LitPath AI platform.
Postconditions	<ul style="list-style-type: none"> On success, the user is presented with a ranked list of relevant documents and an AI-generated overview. On failure, the user is notified of the issue (e.g., no results, system error).
Actors	Student/Researcher
Flow of Actions	<p>Basic Flow</p> <ol style="list-style-type: none"> User accesses the “LitPath AI” search page. User clicks search bar or "Start a new chat" and enters a research question into the search bar. User clicks the search button to submit the query. System retrieves relevant document data from the DOST-OPAC STII Library. System sends the document data and the user's query to the Gemini AI for analysis. System receives a ranked list of documents and a generated overview from the AI. System displays the ranked search results and the AI-generated overview to the user. <p>Alternative Flow</p> <p>A1: User Applies Filters</p> <p>This can occur before or after step 3 of the Basic Flow.</p> <ol style="list-style-type: none"> User applies filters (ex. by discipline or publication date). System constrains the data retrieval in step 4 based on the applied filters. Use case continues from step 5 of the Basic Flow with the filtered dataset. <p>A2: AI Provides Clarifying Suggestions for Vague Query</p> <p>This occurs if the system detects a vague or broad query at step 5 of the Basic Flow.</p> <ol style="list-style-type: none"> The AI engine identifies the query as ambiguous. Instead of a ranked list, the system presents the user with clarifying questions or suggested, more specific research topics.

	<p>3. The user selects one of the suggestions or manually refines their original query.</p> <p>4. The use case restarts from step 3 of the Basic Flow with the new, refined query.</p>
Exception Flows	
	<p>E1: No Results Found</p> <p>This occurs if the system, after step 4 of the Basic Flow, finds no matching documents in the library.</p> <ol style="list-style-type: none"> 1. System displays a message to the user indicating that no relevant documents were found. 2. System may provide tips on how to broaden the search query. 3. Use case ends.
<p>E2: System Timeout or AI Service Error</p> <p>This can occur at step 5 or 6 of the Basic Flow if the connection to the Gemini AI fails or times out.</p> <ol style="list-style-type: none"> 1. System detects the error. 2. System displays an error message to the user, such as "We're sorry, the AI service is currently unavailable. Please try again later." 3. Use case ends. 	

Table 3. Use Case Name: View Thesis Details

Use Case ID	UC-02
Author/s	Jenine Elaine Dulay
Purpose	To allow users to view comprehensive details of a selected thesis or dissertation.
Requirement Traceability	BR-03
Priority	High
Preconditions	<ul style="list-style-type: none"> • User is on the search results page. • System is online
Postconditions	<ul style="list-style-type: none"> • On success, the user is shown detailed information for the selected document. • User's viewing activity is logged for analytics.

Actors	Student/Researcher
Flow of Actions	<p>Basic Flow</p> <ol style="list-style-type: none"> 1. From the search results list, the user clicks on the title of a thesis or dissertation they wish to view. 2. System retrieves the detailed record for the selected document. 3. System displays the document's details, including the title, author, publication year, abstract, disciplines, and library location. 4. System logs the viewing of this document to the usage statistics. <p>Alternative Flows (Extensions)</p> <p>A1: User bookmarks the document</p> <ul style="list-style-type: none"> • Condition: At any point after step 3 of the Basic Flow, the user clicks the "Bookmark" button. • Action: The flow of the UC-03: Bookmark Theses/Dissertations use case is executed. <p>A2: User generates a citation</p> <ul style="list-style-type: none"> • Condition: At any point after step 3 of the Basic Flow, the user clicks the "Cite" button. • Action: The flow of the UC-04: Cite Theses/Dissertations use case is executed. <p>Exception Flows</p> <p>E1: Document details are unavailable</p> <p>This occurs if the system at step 2 of the Basic Flow cannot retrieve the selected record.</p> <ol style="list-style-type: none"> 1. System displays an error message, such as "Sorry, the details for this document could not be retrieved at this time." 2. Use case ends.

Table 4. Use Case Name: Bookmark Theses/Dissertations

Use Case ID	UC-03
Author/s	Jenine Elaine Dulay
Purpose	To allow users to save a specific thesis or dissertation for future reference.

Requirement Traceability	BR-04
Priority	High
Preconditions	<ul style="list-style-type: none"> User is viewing the detailed information of a specific document (UC-02: View Thesis Details is active). System is online
Postconditions	<ul style="list-style-type: none"> On success, the selected document is added to the user's bookmark list, and the user is notified. The bookmarking action is logged for analytics.
Actors	Student/Researcher
Flow of Actions	<p>Basic Flow</p> <ol style="list-style-type: none"> While viewing the details of a document, the user clicks the "Bookmark" icon. System saves item to bookmarks and appears in "Saved Items" section. System displays a confirmation message to the user, such as "Bookmark added." System logs the bookmarking action for analytics. <p>Alternative Flow</p> <p>A1: User removes an existing bookmark</p> <p>Condition: The user clicks the "Bookmark" icon for a document that is already bookmarked.</p> <ol style="list-style-type: none"> System removes the document's reference from the user's bookmark list. System displays a confirmation message, such as "Bookmark removed." Use case ends. <p>Exception Flows</p> <p>E1: System fails to save the bookmark</p> <p>Condition: This occurs at step 2 of the Basic Flow if the system cannot write to the bookmarks data store.</p> <ol style="list-style-type: none"> System detects the save error.

	<ol style="list-style-type: none"> 2. System displays an error message to the user, such as "Sorry, the bookmark could not be saved at this time." 3. Use case ends.
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Table 5. Use Case Name: Cite Theses/Dissertations

Use Case ID	UC-04
Author/s	Jenine Elaine Dulay
Purpose	To allow users to generate a formatted citation for a specific document.
Requirement Traceability	BR-05
Priority	High
Preconditions	<ul style="list-style-type: none"> • User is viewing the detailed information of a specific document (UC-02: View Thesis Details is active). • System is online
Postconditions	<ul style="list-style-type: none"> • On success, a formatted citation is displayed to the user. • Citation action is logged for analytics.
Actors	Student/Researcher
Flow of Actions	<p>Basic Flow</p> <ol style="list-style-type: none"> 1. While viewing the details of a document, the user clicks the "Cite" icon. 2. System displays a list of available citation formats (APA, MLA, Chicago, IEEE) 3. Choose citation format. 4. System generates and displays the citation in the default format. 5. System provides an option for the user to copy the citation to their clipboard. 6. System logs citation action for analytics. <p>Alternative Flow</p> <p>A1: User changes citation format</p> <p>Condition: At step 3 of the Basic Flow, the user selects a different citation format from the list.</p> <ol style="list-style-type: none"> 1. System regenerates and displays the citation in the newly selected format.

	<p>2. Use case resumes at step 5 of the Basic Flow.</p> <p>Exception Flows</p> <p>E1: System fails to generate the citation</p> <p>Condition: This occurs at step 3 of the Basic Flow if the document's metadata is incomplete or corrupted.</p> <ol style="list-style-type: none"> 1. System detects the error. 2. System displays an error message to the user, such as "Sorry, a citation could not be generated for this document due to missing information." 3. Use case ends.
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Table 6. Use Case Name: Provide Feedback

Use Case ID	UC-05
Author/s	Tracie Tomon
Purpose	To allow users to rate the quality of the AI-generated results and provide optional text feedback.
Requirement Traceability	BR-06
Priority	High
Preconditions	<ul style="list-style-type: none"> • User is viewing a set of search results generated by the AI (UC-01 has been completed). • System is online
Postconditions	<ul style="list-style-type: none"> • On success, the user's feedback is saved to the feedback log. • User receives a confirmation that their feedback was submitted.
Actors	Student/Researcher
Flow of Actions	<p>Basic Flow</p> <ol style="list-style-type: none"> 1. After viewing the AI-generated search results, the user decides to provide feedback. 2. Rating interface appears. 3. User clicks on a star rating (1-5). 4. User enters text comments into the feedback field. 5. User clicks the "Submit Feedback" button.

	<p>6. System displays a confirmation message to the user, such as "Thank you for your feedback!"</p> <p>7. System saves the rating and text comments to the D4: Feedback Log data store for admin review.</p>
Alternative Flows	
A1: User provides a rating but no text feedback	
<p>Condition: At step 3 of the Basic Flow, the user gives a rating but leaves the text field empty.</p> <ol style="list-style-type: none"> 1. User clicks the "Submit Feedback" button. 2. Use case continues from step 6 of the Basic Flow. 3. System saves just the rating to the D4: Feedback Log data store for admin review. 	
Exception Flows	
E1: System fails to save feedback	
<p>Condition: This occurs at step 5 of the Basic Flow if the system cannot write to the feedback data store.</p> <ol style="list-style-type: none"> 1. System detects the save error. 2. System displays an error message to the user, such as "Sorry, your feedback could not be submitted at this time." 3. Use case ends. 	

Table 7. Use Case Name: View Search History

Use Case ID	UC-06
Author/s	Tracie Tomon
Purpose	To allow users to access and resume their previous search sessions.
Requirement Traceability	BR-07
Priority	High
Preconditions	<ul style="list-style-type: none"> • User has previously conducted at least one search. • System is online

Postconditions	<ul style="list-style-type: none"> On success, the user is shown the details of a selected previous search session.
Actors	Student/Researcher
Flow of Actions	<p>Basic Flow</p> <ol style="list-style-type: none"> User clicks on the "Research History" link or button. System retrieves and displays a list of the user's previous search sessions. User selects a specific session from the list to view. System retrieves the full context for the selected session, including the original query and the AI-generated results. System displays the selected search session, allowing the user to continue the interaction. <p>Alternative Flow</p> <p>A1: User deletes a single search history item</p> <p>Condition: At step 2 of the Basic Flow, the user decides to delete one of their previous searches.</p> <ol style="list-style-type: none"> User clicks the "Delete" icon next to a specific search session. System prompts the user to confirm the deletion. User confirms. System removes the selected session from the search history. System refreshes the list of previous search sessions. Use case resumes. <p>A2: User clears the entire search history</p> <p>Condition: At step 2 of the Basic Flow, the user decides to delete all previous searches.</p> <ol style="list-style-type: none"> User clicks the "Clear History" button. System prompts the user to confirm they want to delete all history. User confirms. System removes all sessions from the user's search history. System displays a message indicating the history has been cleared. Use case ends. <p>Exception Flow</p>

	<p>E1: System fails to load the selected session</p> <p>Condition: This occurs at step 4 of the Basic Flow if the system cannot retrieve the details of the selected search history.</p> <ol style="list-style-type: none"> 1. System detects the error. 2. System displays an error message to the user, such as "Sorry, this session could not be loaded." 3. Use case ends.
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Table 8. Use Case Name: Log In to Account

Use Case ID	UC-07
Author/s	Jenine Elaine Dulay
Purpose	To allow authorized library staff to securely access the administrative dashboard using their existing DOST OPAC credentials.
Requirement Traceability	BR-09
Priority	High
Preconditions	<ul style="list-style-type: none"> • User is a library staff with a valid, active DOST OPAC account. • System is online
Postconditions	<ul style="list-style-type: none"> • On success, the library staff is authenticated and granted access to the admin dashboard. • On failure, the library staff is denied access and shown an error message.
Actors	DOST SciNET-PHIL Library Staff
Flow of Actions	<p>Basic Flow</p> <ol style="list-style-type: none"> 1. Library staff navigates to the admin login page. 2. Staff enters their DOST OPAC username and password into the login form. 3. Staff clicks the "Log In" button. 4. System verifies the provided credentials. 5. Upon successful validation, the system grants access and displays the administrative dashboard. <p>Exception Flow</p> <p>E1: Invalid Credentials</p>

	<p>Condition: This occurs at step 4 of the Basic Flow if the username does not exist or the password does not match the stored record.</p> <ol style="list-style-type: none"> 1. System rejects the authentication attempt. 2. System displays an error message, such as "Invalid username or password." 3. Use case ends, and the user remains on the login page. <p>E2: System Fails to Connect to Account Data Store</p> <p>Condition: This occurs at step 4 of the Basic Flow if the system cannot access the account data.</p> <ol style="list-style-type: none"> 1. System detects the connection error. 2. System displays a system error message, such as "Please try again later." 3. Use case ends.
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Table 9. Use Case Name: Manage Usage Analytics

Use Case ID	UC-08
Author/s	Charijoy Cempron
Purpose	To allow authorized library staff to view and analyze platform usage statistics.
Requirement Traceability	BR-10
Priority	High
Preconditions	<ul style="list-style-type: none"> • Library staff is successfully logged into the admin dashboard (UC-07 is complete). • There is data in D3: Usage Statistics data store to be displayed. • System is online.
Postconditions	<ul style="list-style-type: none"> • On success, the library staff is presented with the usage analytics dashboard.
Actors	DOST SciNET-PHIL Library Staff
Flow of Actions	<p>Basic Flow</p> <ol style="list-style-type: none"> 1. From the admin dashboard, the library staff clicks on the "Usage Analytics" section. 2. System retrieves the usage logs and analyzes data patterns and trends. 3. System generates reports or export data if needed.

	<p>4. System displays the analytics dashboard, showing charts and metrics for most searched topics, user activity trends, and most frequently cited/bookmarked documents.</p> <p>Alternative Flow</p> <p>A1: Staff applies filters to the dashboard</p> <p>Condition: At any point after step 4 of the Basic Flow, the staff member decides to filter the data.</p> <ol style="list-style-type: none"> 1. Library staff selects a date range or other filter criteria (ex. by discipline). 2. System re-quires the usage statistics based on the applied filters. 3. System refreshes the dashboard to display the filtered charts and metrics. 4. Use case ends. <p>Exception Flow</p> <p>E1: Analytics data is unavailable</p> <p>Condition: This occurs at step 2 of the Basic Flow if the system cannot retrieve data from the usage statistics log.</p> <ol style="list-style-type: none"> 1. System detects the error. 2. System displays an error message, such as "Usage analytics data could not be loaded at this time." 3. Use case ends.
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Table 10. Use Case Name: Manage Feedback

Use Case ID	UC-09
Author/s	Tracie Tomon
Purpose	To allow authorized library staff to view, analyze, and manage user-submitted feedback.
Requirement Traceability	BR-11
Priority	High

Preconditions	<ul style="list-style-type: none"> • Library staff is successfully logged into the admin dashboard (UC-07 is complete). • There is data in the D4: Feedback Log to be displayed. • System is online
Postconditions	<ul style="list-style-type: none"> • On success, the library staff is presented with a list of user feedback.
Actors	DOST SciNET-PHIL Library Staff
Flow of Actions	<p>Basic Flow</p> <ol style="list-style-type: none"> 1. From the admin dashboard, the library staff clicks on the "Manage Feedback" section. 2. System retrieves all records from the feedback log. 3. System displays a list or dashboard of all user feedback, showing ratings and text comments. <p>Alternative Flow</p> <p>A1: Library staff filters feedback</p> <p>Condition: At any point after step 3 of the Basic Flow, the staff member decides to filter the feedback.</p> <ol style="list-style-type: none"> 1. Library staff selects a filter criterion (ex. by date range, by star rating). 2. System re-queries the feedback log based on the applied filters. 3. System refreshes the feedback list to display only the filtered results. 4. Use case resumes. <p>A2: Library staff marks feedback as resolved</p> <p>Condition: At any point after step 3 of the Basic Flow, the staff member decides to update the status of a feedback item.</p> <ol style="list-style-type: none"> 1. Library staff selects a feedback item. 2. Library staff clicks a button to mark the item as "Resolved" or "Addressed." 3. System updates the status of the feedback item in the log. 4. System provides a confirmation of the status change on the screen. 5. Use case resumes. <p>Exception Flow</p> <p>E1: Feedback data is unavailable</p>

	<p>Condition: This occurs at step 2 of the Basic Flow if the system cannot retrieve data from the feedback log.</p> <ol style="list-style-type: none"> 1. System detects the error. 2. System displays an error message, such as "User feedback data could not be loaded at this time." 3. Use case ends.
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Table 11. Use Case Name: Generate AI Analysis

Use Case ID	UC-10
Author/s	Charijoy Cempron
Purpose	To have the AI engine process a set of documents against a user's query, then rank them and generate a summary overview.
Requirement Traceability	BR-02
Priority	High
Preconditions	<ul style="list-style-type: none"> • A primary use case (UC-01) has provided a user query and a set of relevant documents. • The connection to the Gemini AI service is active. • Data retrieved.
Postconditions	<ul style="list-style-type: none"> • On success, a ranked list of documents and a summary overview are returned to the calling use case. • On failure, an error is returned.
Actors	Gemini AI 2.0 Flash, LitPath AI System
Flow of Actions	<p>Basic Flow</p> <ol style="list-style-type: none"> 1. Use case is triggered by the system, receiving a user's research query and a collection of document data. 2. System sends the query and document data as a prompt to the Gemini AI engine. 3. AI engine analyzes the content of the documents in relation to the query. 4. AI engine scores and ranks the top 10 most relevant documents. 5. AI engine generates a concise summary overview based on the top 5 results. 6. System receives the ranked list and the summary overview from the AI engine. 7. Use case returns the formatted analysis to the primary use case (UC-01) for display to the user.

	<p>Exception Flow</p> <p>E1: AI fails to process the data</p> <p>Condition: This occurs at step 3 if the AI engine cannot parse the provided data or times out.</p> <ol style="list-style-type: none"> 1. AI engine returns an error status. 2. Use case returns an error to the primary use case, which then displays a system error message to the user. 3. Use case ends. <p>E2: AI returns no meaningful analysis</p> <p>Condition: This occurs at step 6 if the AI engine processes the data but returns an empty or invalid result.</p> <ol style="list-style-type: none"> 1. System detects the empty result. 2. Use case returns an error to the primary use case, which then displays a "No results found" message to the user. 3. Use case ends.
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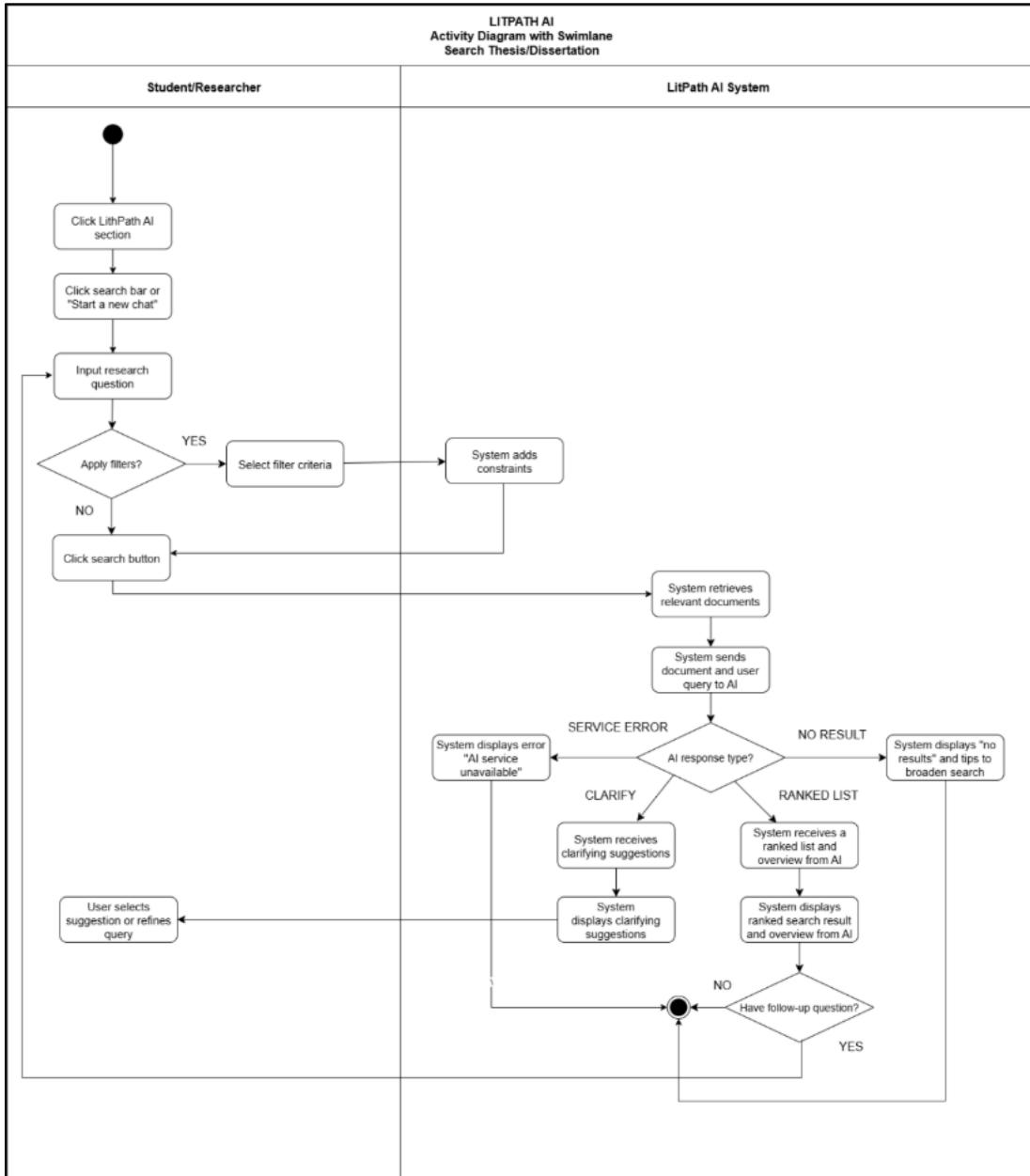
Table 12. Use Case Name: Exposes Data (read-only)

Use Case ID	UC-11
Author/s	Charijoy Cempron
Purpose	To retrieve thesis and dissertation records from the DOST-OPAC STII Library data store based on a specific query.
Requirement Traceability	BR-08
Priority	High
Preconditions	<ul style="list-style-type: none"> A primary use case (UC-01) has provided a query for specific documents. DOST OPAC database accessible. Read-only credentials configured.
Postconditions	<ul style="list-style-type: none"> On success, a set of relevant document records is returned to the calling use case. On failure, an error or an empty set is returned.
Actors	LitPath AI System, DOST-OPAC STII Library

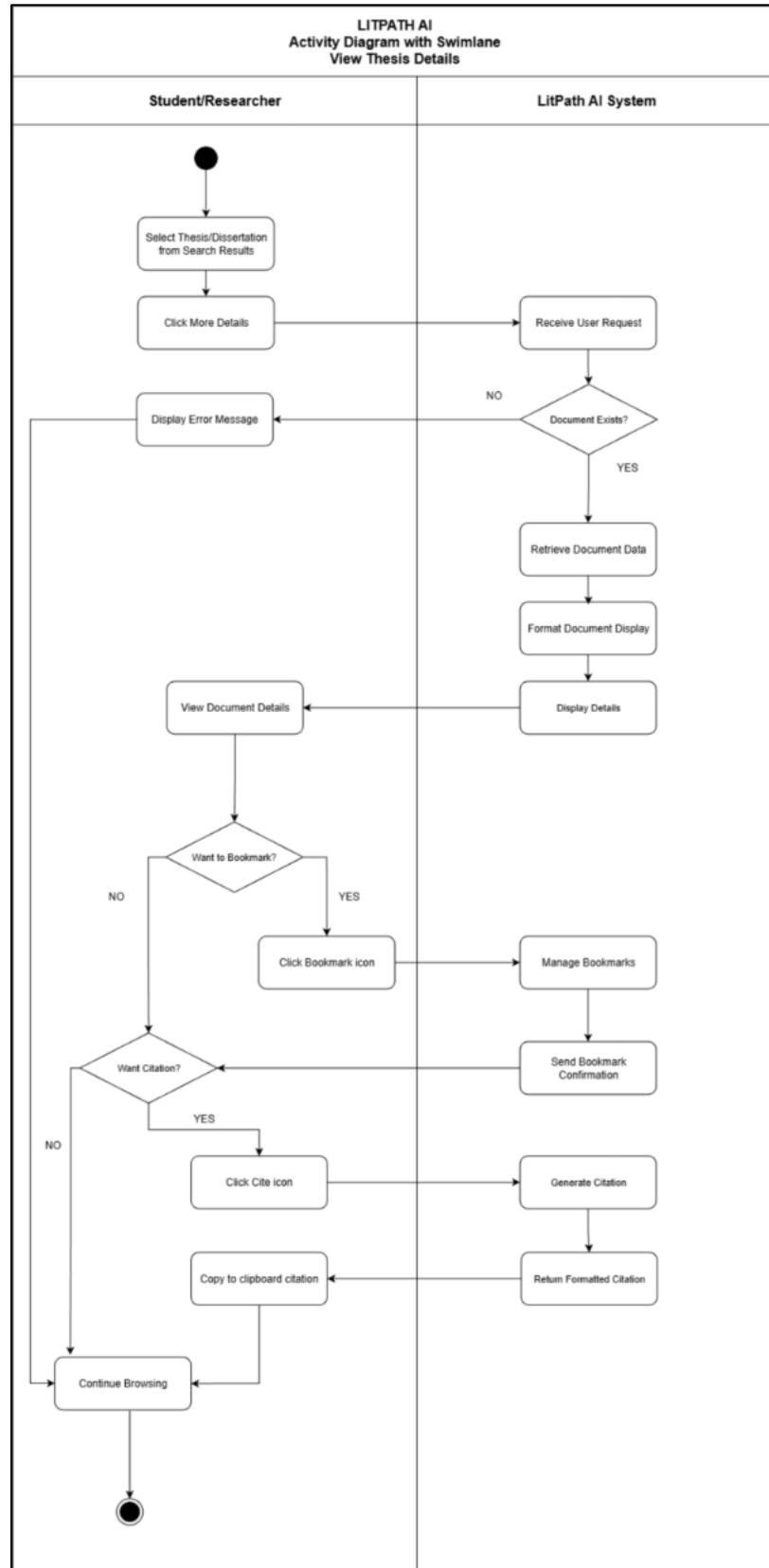
Flow of Actions	<p>Basic Flow</p> <ol style="list-style-type: none"> 1. Use case is triggered by the system, receiving a validated and filtered query for document data. 2. System establishes a secure, read-only connection to the DOST-OPAC STII Library database. 3. System executes a search against the database using the provided query. 4. LitPath AI receives a set of matching thesis and dissertation records. 5. Use case returns the retrieved document data to the primary use case for processing. <p>Exception Flow</p> <p>E1: Connection to database fails</p> <p>Condition: This occurs at step 2 of the Basic Flow if the system cannot connect to the library database.</p> <ol style="list-style-type: none"> 1. System detects the connection error. 2. Use case returns an error to the primary use case, which then displays a system error message to the user. 3. Use case ends. <p>E2: No records found</p> <p>Condition: This occurs at step 4 of the Basic Flow if the query returns no matching records.</p> <ol style="list-style-type: none"> 1. System receives an empty result set. 2. Use case returns a "no results" status to the primary use case. 3. Use case ends.
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Activity diagrams with Swim-lanes

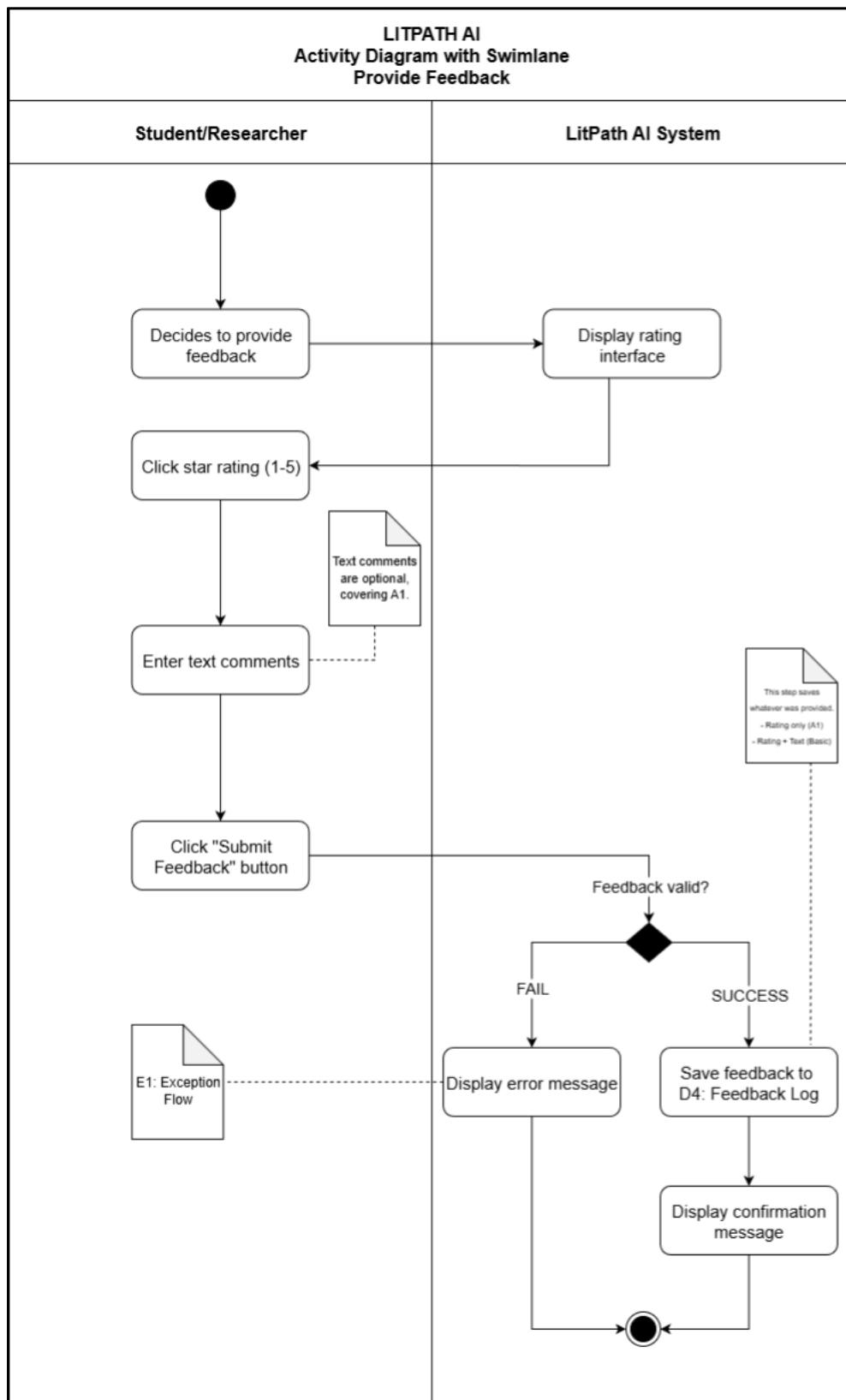
1.0 Search Thesis/Dissertation



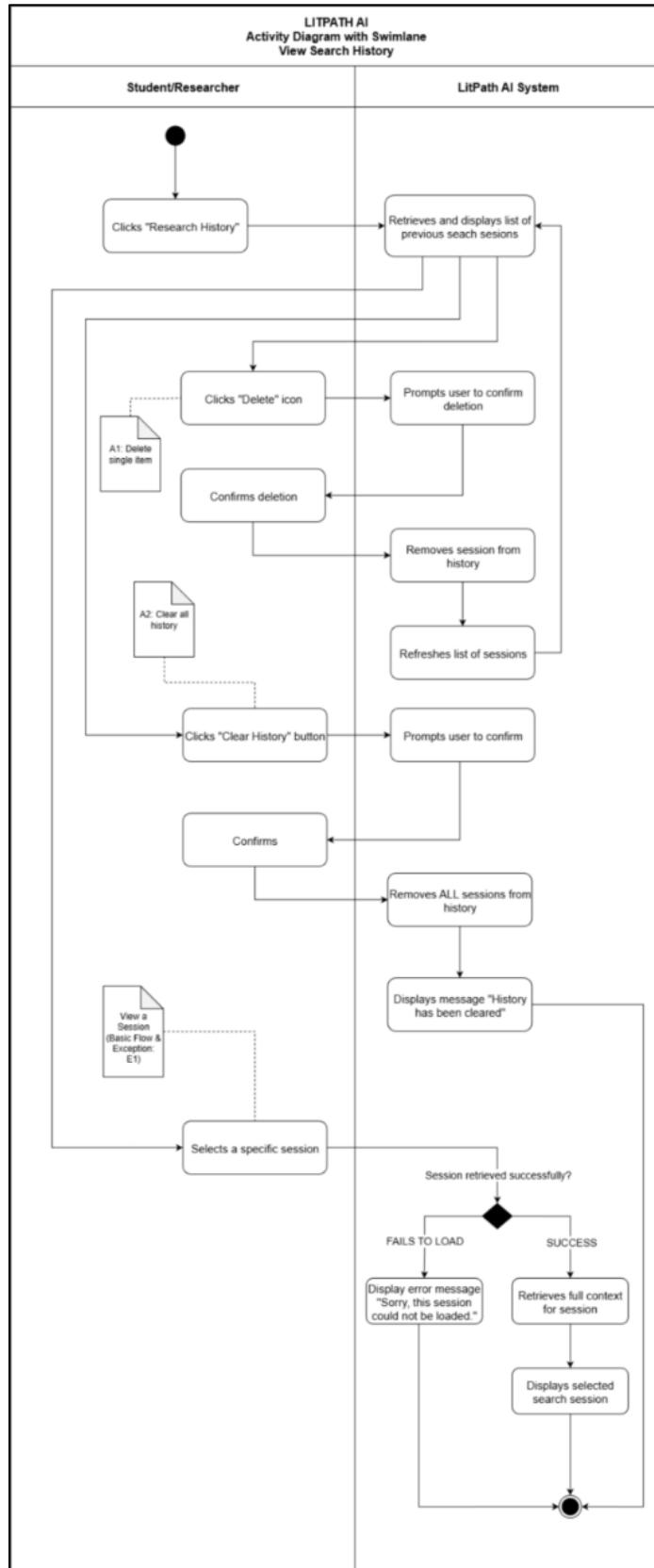
2.0 View Thesis Details



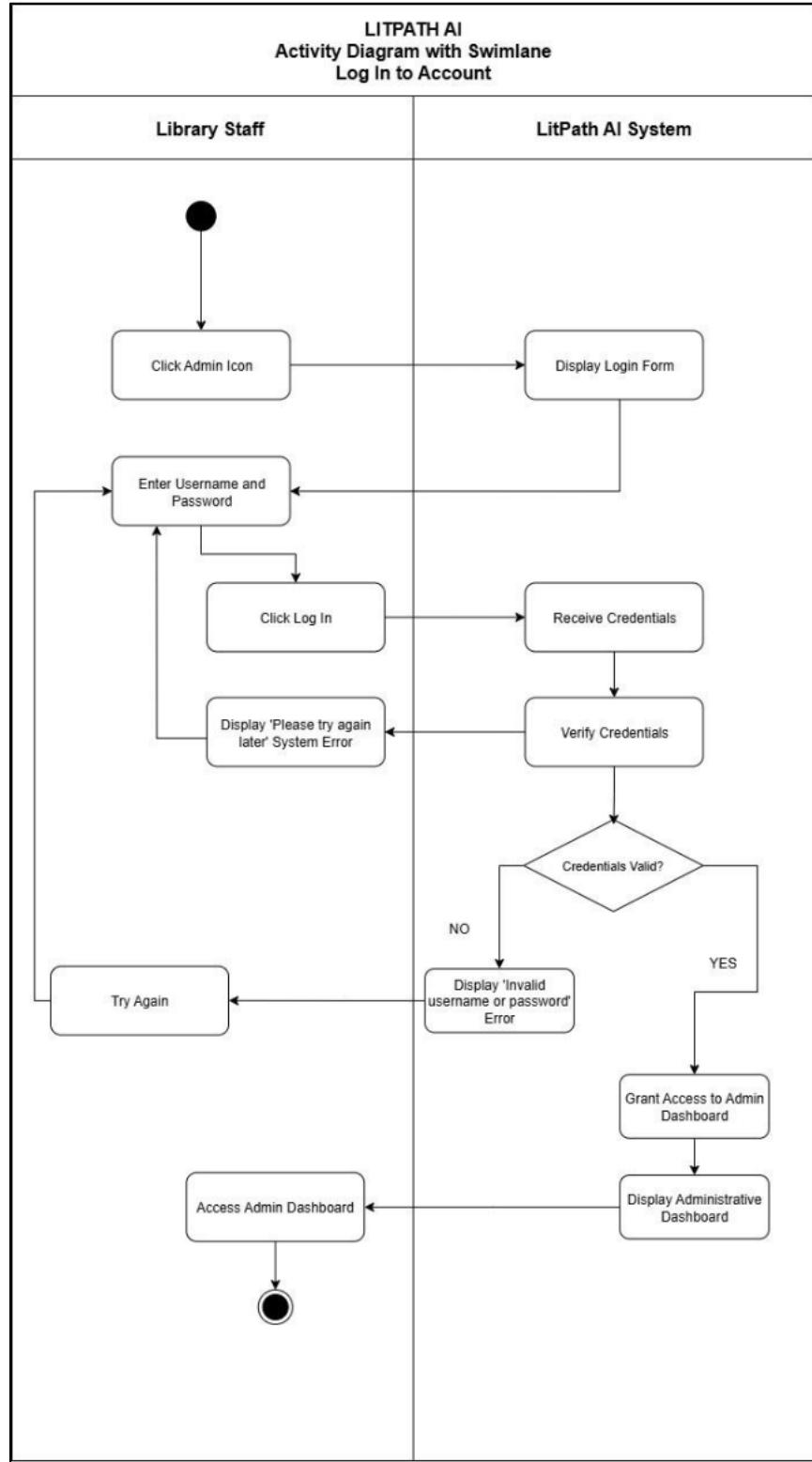
3.0 Provide Feedback



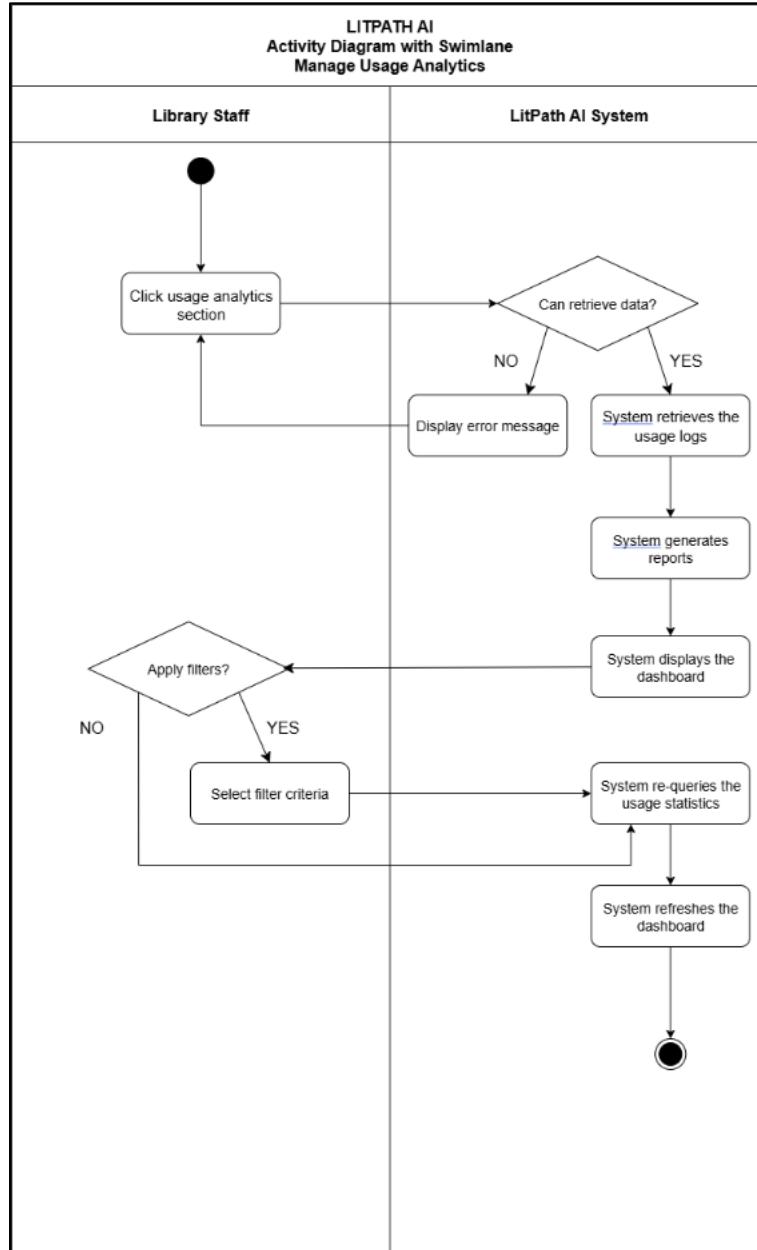
4.0 View Search History



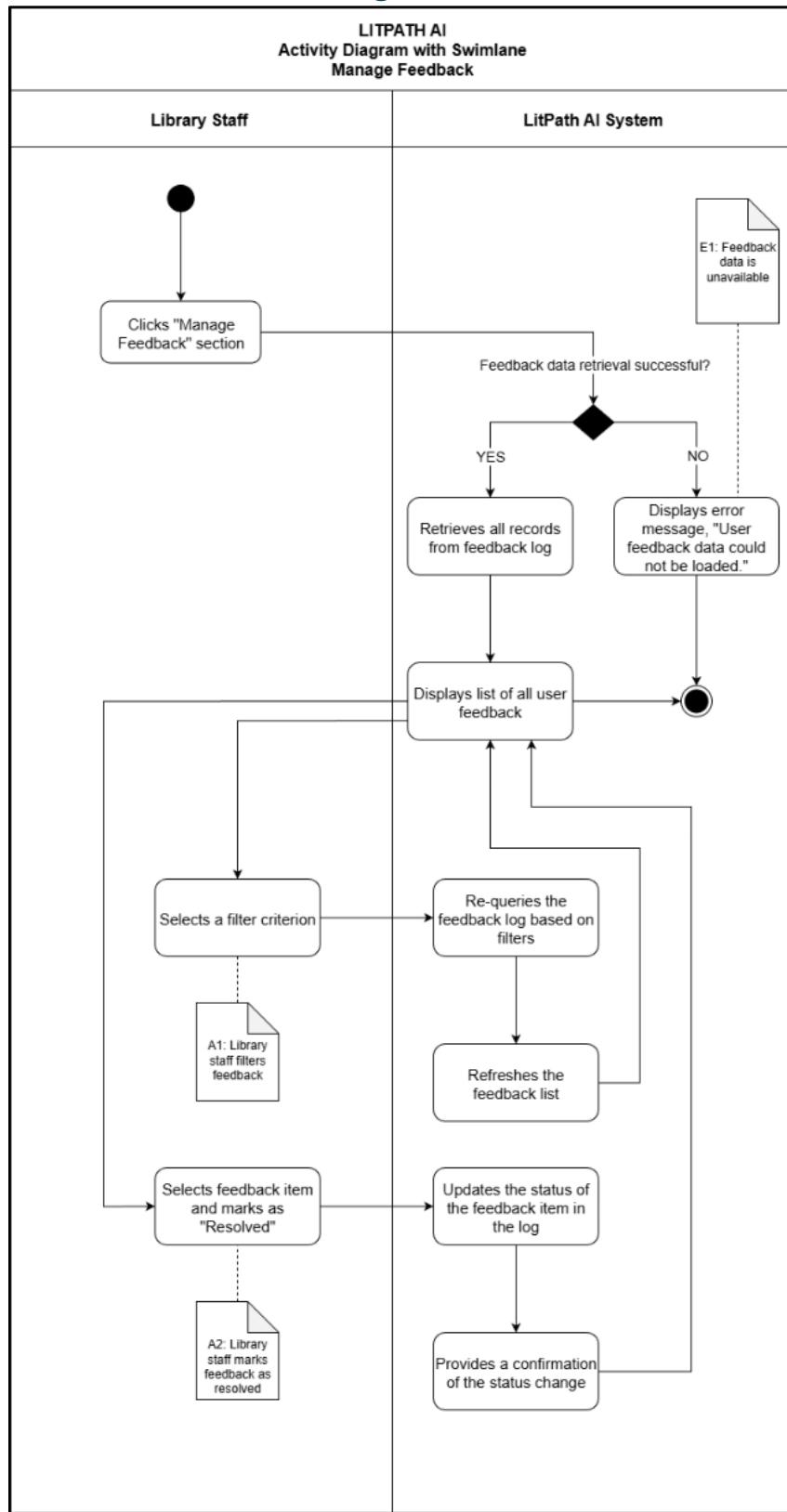
5.0 Log In to Account



6.0 Manage Usage Analytics



7.0 Manage Feedback



Test Cases

UC-01 TC01

Project Name	LitPath AI
Description	A user enters a query, and the AI returns the top 10 ranked results from the library with a generated overview.
Test Objective	To verify the system accepts queries and returns 10 relevant results and an accurate AI overview in a timely manner.
Created By	Tracie Tomon
Reviewed By	Jenine Elaine Dulay
Test Case Version	v1.0
Test Execution Date	09-Oct-25

Test Case ID	Use Case ID	Test Case Name	Test Description	Test Steps	Test Data	Expected Results	Actual Results	Execution Status
STD-TC01	UC-01	Verify a valid query returns ranked results and an AI overview	Verify the system successfully processes a valid research question and displays the ranked results and AI overview.	1. Access the "LitPath AI" search page. 2. Enter the research question into the search bar. 3. Click the search button. 4. Wait for the search results page to load.	Query: "What are the health risks of rice?"	1. System displays a ranked list of relevant documents. 2. System displays an AI-generated overview/summary based on the query.	Same as expected	Passed
STD-TC02	UC-01	Verify results are displayed when a document has incomplete metadata	Verify the system handles and displays a document even if a returned document has incomplete data (which could cause later failure in UC-04, Cite Theses/Dissertations).	1. Access the "LitPath AI" search page. 2. Enter the research question into the search bar. 3. Click the search button. 4. Wait for the search results page to load.	Query: "Characterization of Roseleaf Raspberry (Rubus rosifolius Sm.) In Its Native Habitat and Its Acclimation Under Low Elevation" Data Constraints: One of the thesis/dissertation has missing metadata (e.g., missing Author or Abstract).	1. System successfully displays the ranked list of 10 documents and the AI overview. 2. The incomplete document is visible in the list.	Same as expected	Passed
STD-TC03	UC-01	Verify an error message is displayed when no results are found	Verify the system displays a user-friendly message when the search returns zero matching theses/dissertations from the library (E1), and provides helpful alternative results.	1. Access the "LitPath AI" search page. 2. Enter a research question that is known to have zero matching theses/dissertation in the DOST-OPAC STII Library. 3. Click the search button.	Query: "What are the effects of fast fashion?"	1. System displays a message indicating no relevant theses/dissertations were found in the DOST-OPAC library. 2. System provides suggested, similar topics with sources from the AI analysis.	Same as expected	Passed
STD-TC04	UC-01	Verify system handles an error from the Gemini AI service	Verify the system displays an appropriate error message when the Gemini AI 2.0 Flash service fails or times out (E2).	1. Access the "LitPath AI" search page. 2. Enter a valid research question into the search bar. 3. Click the search button. 4. The connection to Gemini AI fails at step 5 or 6 of the Basic Flow.	Query: "What is vaccine immunization?"	1. System detects the error. 2. System displays an error message, such as "[Gemini error:pdf]". 3. Use case ends.	Same as expected	Passed

UC-02 TC02

Project Name	LitPath AI
Description	A user selects a search result to view its detailed metadata and abstract.
Test Objective	To confirm that selecting a result displays its full metadata and abstract, and that the full-text is inaccessible.
Created By	Tracie Tomon
Reviewed By	Jenine Elaine Dulay
Test Case Version	v1.0
Test Execution Date	09-Oct-25

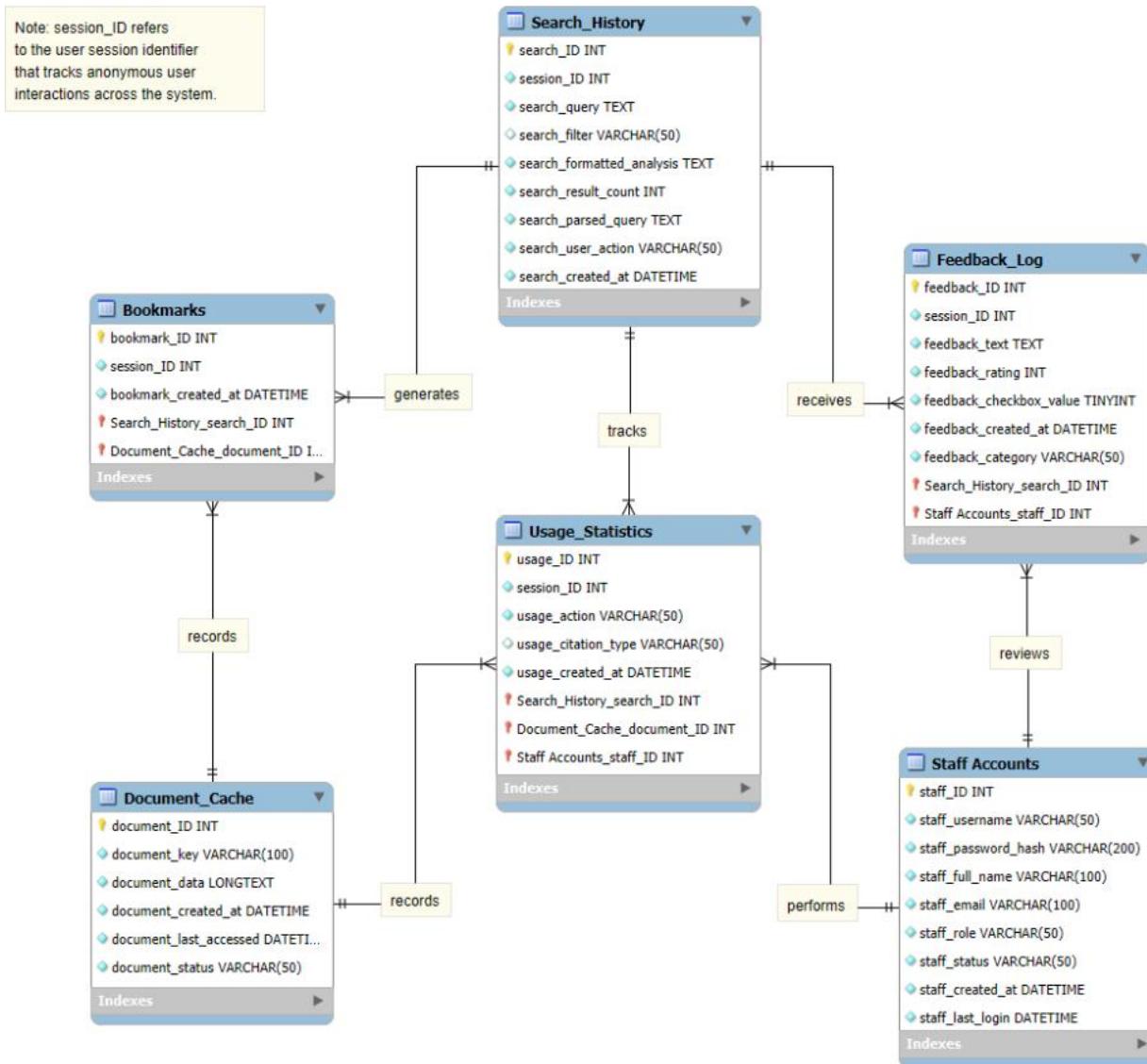
Test Case ID	Use Case ID	Test Case Name	Test Description	Test Steps	Test Data	Expected Results	Actual Results	Execution Status
VTD-TC01	UC-02	Verify a user can view a thesis/dissertation's full abstract and metadata	Verify the system fulfills BR-03 by displaying the full detailed information for a selected thesis/dissertation.	1. Complete UC-01 to generate search results. 2. Click on the "More details and request options". 3. Wait for the details page to load.	Selected thesis/dissertation: "Setting Localized Conservation Priorities of the Useful Plant Species of the Alangan Mangyan of Mt. Ilong, Halcon Range, Mindoro Island, Philippines"	1. System displays the document's details, including title, degree, author, publication year, subject/s, abstract, and library location. 2. Viewing activity is logged for analytics.	Same as expected	Passed
VTD-TC02	UC-02	Verify "Abstract not available." is shown when a document's details are unavailable	Verify the system displays "Abstract not available." if it fails to retrieve the detailed record for the selected document (E1).	1. Complete UC-01 to generate search results. 2. Click on the title of a thesis/dissertation. 3. The system fails to retrieve the detailed record at step 2 of the Basic Flow.	Selected thesis/dissertation: "Characterization of Roseleaf Raspberry (Rubus rosifolius Sm.) In Its Native Habitat and Its Acclimation Under Low Elevation"	1. System displays an error message, such as "Abstract not available.". 2. Use case ends.	Same as expected	Passed

UC-10 TC10

Project Name	LitPath AI
Description	The core AI process of interpreting a query, ranking results, and generating a summary.
Test Objective	To verify the AI-generated summary is relevant, coherent, and accurately reflects the top-ranked documents.
Created By	Tracie Tomon
Reviewed By	CharliJoy Cempron
Test Case Version	v1.0
Test Execution Date	09-Oct-25

Test Case ID	Use Case ID	Test Case Name	Test Description	Test Steps	Test Data	Expected Results	Actual Results	Execution Status
AI-TC01	UC-10	Verify successful ranking and summary generation (Basic Flow)	Verify the AI engine successfully processes the document data and user query, returning a ranked list and summary to UC-01.	1. (Precondition) UC-01 sends a valid query and a collection of relevant document data (e.g., 20+ records) to UC-10. 2. System waits for the AI analysis process to complete.	Query: "what are nice related health risks?" Document Data: 22 relevant document records (metadata and abstracts).	1. The system receives a ranked list of the top 10 documents. 2. The system receives a concise summary overview based on the top 5 results. 3. UC-10 returns the analysis to UC-01.	Same as expected	Passed
AI-TC02	UC-10	Ensure summary is based only on the top documents	Verify that the AI-generated summary reflects the content of only the top-ranked documents (e.g., top 5) and does not include irrelevant information.	1. (Precondition) UC-01 sends a query and document data to UC-10. 2. System reviews the generated summary.	Query: "Mt. Makiling" Document Data: 4 highly relevant documents and 113 irrelevant documents.	1. The generated summary only synthesizes findings from the highly relevant documents (top 4). 2. The summary does not mention concepts or keywords found only in the irrelevant documents.	Same as expected	Passed
AI-TC03	UC-10	Verify system handles AI returning an empty/invalid result (E2)	Verify the system detects when the AI engine processes data but returns an empty or otherwise invalid result.	1. (Precondition) UC-01 sends a valid query and document data to UC-10. 2. (Simulate) AI engine processes the data but returns an empty list and null summary at step 6.	Query: "who is jenine dulay" Data Constraint: AI processes data but returns a no result.	1. System detects the empty result. 2. UC-10 returns an error to UC-01, which displays a "No results found" message to the user	Same as expected	Passed
AI-TC04	UC-10	Boundary Test: Valid query with minimal documents	Verify the AI engine can still generate a coherent analysis when the input document set is minimal (e.g., less than 5).	1. (Precondition) UC-01 sends a valid query and a minimal set of document data to UC-10. 2. System waits for the AI analysis process to complete.	Query: "Starbooks" Document Data: Only 3 highly relevant document records	1. The system receives a ranked list of the 3 documents. 2. The system receives a coherent summary overview based only on the 3 available documents. 3. UC-10 returns the analysis to UC-01.	Same as expected	Passed

Entity Relationship Diagram



Technology Stack

- Frontend Framework

React.js has already been implemented in the project to build a dynamic and responsive user interface. Its component-based structure allows for efficient development through reusable elements and consistent design. The use of React's virtual DOM enhances performance by ensuring fast and smooth rendering of updates. With React already in place, the frontend is well-optimized for integration with backend services and real-time data handling.

- **Backend Framework**

Django will be implemented as the project's backend framework to manage server-side logic, data processing, and database operations. Its built-in features such as authentication, admin interface, and ORM will allow for faster and more organized development. The framework's strong emphasis on security will help protect the application from common vulnerabilities. Django's scalability and reliability will ensure stable backend performance as the project grows.

- **Frontend/ Backend communication**

The project will employ a REST API to establish communication between the React frontend and the Django backend. Through HTTP requests, the API will manage data exchange, enabling efficient retrieval and submission of information. This approach will maintain a clear separation between the user interface and backend logic. It will also provide flexibility for future updates or system integrations without major architectural changes.

GitHub APC-SoCIT Project Repository URL Link |[Link](#)

OpenProject Team Site URL Link |[Link](#)

Cloud hosted site URL Link |[Link](#)

Note: We used an HTTP server to connect our frontend with our python backend, so we currently don't have a backend framework. This is why we can't use Vercel to cloud host it, hence, why we are currently using Codespace instead.