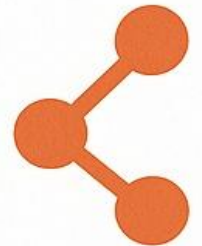




VASIREDDY VENKATADRI
INSTITUTE OF TECHNOLOGY



DESIGN THINKING AND INNOVATION



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CERTIFICATE

This is to certify that the project titled “**BOOK EXPLORER**” is a Bonafide record of work done by **A. Bhavya Sree, A. Sai Balaji Nayak, B. Mohith Kumar, D. Krishna Lokesh** under the guidance of Mr. P. R. Krishna Prasad, Associate Professor in partial fulfilment of the requirement for the award of credits to Design Thinking & Innovation - course of Bachelor of Technology in Computer Science & Engineering, JNTUK during the academic year 2024-25.

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1. PROBLEM STATEMENT

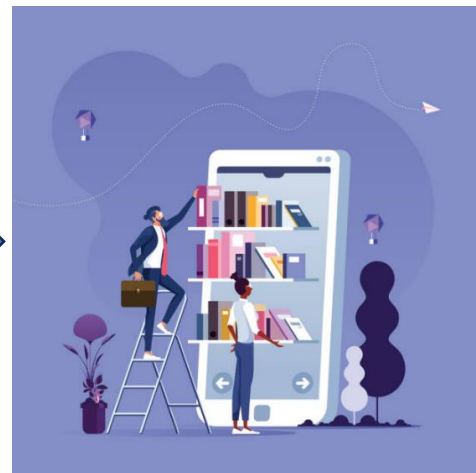
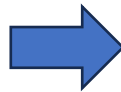
Reading books is one of the best habit. It offers numerous benefits, including enhancing vocabulary, expanding knowledge, and boosting imagination. It can also improve emotional intelligence, empathy, and reduces stress.

Book reading is decreasing due to a combination of factors including the rise of digital entertainment, shorter attention spans. One of the reasons for decreasing interest is –

- ❖ Some people are uninterested to read, if they feel difficulty in understanding the book
- ❖ Some people feel boring to read if they adopted to read a high level grammar book and the selected book doesn't match their style.

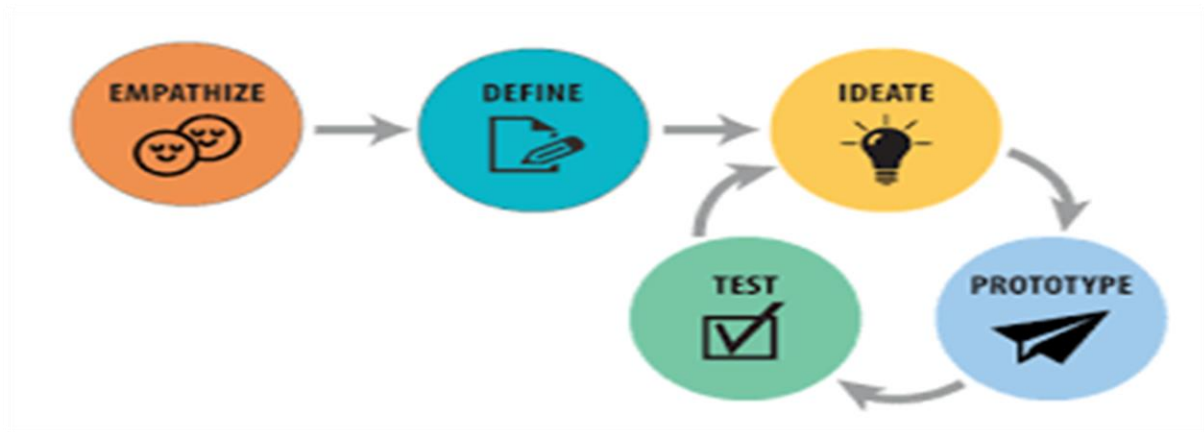
So it is necessary to select a book according to their style of reading in order to preserve their reading habit.

To address these issues, our solution is -- a web-based platform called “**BOOK EXPLORER**” that allows people to select a book which suits their style of reading.



2. Phases of Design Thinking

Design Thinking is a user-centric approach to problem-solving that emphasizes empathy, ideation, and iterative testing. It helps in developing practical and innovative solutions by deeply understanding users' needs. Our project on Book Exploring follows the five key phases of Design Thinking:



2.1. Empathy:

Empathy is the first step in design thinking because it is a skill that allows us to understand and share the same feelings that others feel. Through empathy, we are able to put ourselves in other people's shoes and connect with how they might be feeling about their problem, circumstance, or situation.

2.1.1 Brainstorming (Explore & Exploit):

- **Explore:** We listed all the possible reasons of decreasing reading habit and they are: increased access to other forms of entertainment like streaming services and social media, shorter attention spans, and the perception that reading is time-consuming. Additionally, the rise of digital media and online learning platforms is shifting educational practices away from traditional books.

- **Exploit:** We narrowed down the most common issues and concentrated on the underlying causes. **Impatience is one of the reasons why people read less** if the book is hard to understand.

This approach allowed us to generate a focused understanding of what users truly need.



2.1.2 Interaction:

We interacted with book readers through:

- One-on-one interviews with students: Gave insights why they are not reading books and Some students are ready to read book if it suits their style and genre.
- Consultation with Library Staff: They provides the available book information and allows us to proceed our solution implementation

These conversations with readers validated the need for an efficient, book explorer for selection of books.

2.1.3 Tools and Strategies Used:

Reader interactions helps to define the problem statement.

Observation (Shadowing, Fly-on-the-Wall)

By hearing students reasons we find that

- They are spending more time on selecting the book
- Sometimes selected book doesn't match their style of reading

Empathy Maps

We created empathy maps based on reader interviews, categorizing what readers:

- **Say:** "We want book that suits our style of reading."
- **Think:** "Why can't this be online?"
- **Do:** Spending more time on selecting than reading
- **Feel:** Needs some other way.

Surveys & Questionnaires

We distributed a Google Form with key questions on:

- Do you read book regularly?
- Are you feeling any problem while selecting a book?
- Do you feel, there should be a better way?
- Do you need a book explorer to solve this issue?

→Stakeholder Maps:

We visualized stakeholder roles and their influence. For example:

- High Influence, High Interest: College Admin
- High Interest, Low Influence: Students

This guided our priority when designing features.

Persons

We created user personas such as:

Zeynep - a second- year student needs a book that suit her style of reading - novel, dramatic – prefer advanced grammer

Bindhu – a third- year student needs a book on a specific subject like java(academic related).

2.2 Define:

The **Define** phase helps in making sense of the data collected during the Empathy stage. It involves analysing and synthesizing observations to define the core problem(s) that need to be addressed. A clearly defined problem statement drives the ideation and prototyping phases in a meaningful direction.

The define phase is also known as problem definition phase or problem framing phase

2.2.1 Point-of-View (POV) Statements

A Point of View statement is a powerful narrative tool used in design thinking to synthesize observations about a user. It encapsulates who the user is, what their needs are, and why those needs are important in a concise and compelling way.

Examples:

- Rahul - a first year student feels time consuming to select a book in the library based on his genre (fiction, fantasy, novel, poetry,) .
- Bhanu - a first student feels difficulty in selecting a book based on her language understanding level((easy, medium, difficulty)

These POVs reflect the frustrations and expectations of real users and serve as the foundation for ideation.



How Might We + **Intended Action**
(as an action verb) + **For** + **Potential User**
(as the subject) + **So That** + **Desired Outcome**



2.2.2 How Might -We(questions)

How Might We (HMW) questions are reframed problem statements derived from POVs. They are open-ended and encourage innovative thinking.

HMW Examples:

- How might we help readers discover books that match their interests and moods?
- How might we simplify the process of finding high-quality or lesser-known books?
- How might we provide engaging preview pages that help readers decide if a book is right for them?
- How might we help users discover books that align with their learning or career goals?
- How might we create a space where readers can follow favorite authors or genres?

These HMW questions inspired brainstorming sessions and helped the team explore multiple directions for the solution.

2.2.3 Journey Maps / User Story Mapping

A **Journey Map** is a step-by-step **visual representation** of a user's interaction over time, showing:

- *What the user is doing*
- *How the user is feeling*
- *What problems they encounter*
- *What touchpoints they use (digital, physical, human)*

User Journey Map – Without a Book Explorer

Stage	Emotions	Touchpoints	Pain Points
Need arises	Curious, unsure	Personal thoughts, friends	Too many choices, unclear where to start

Stage	Emotions	Touchpoints	Pain Points
Searching	Hopeful, overwhelmed	Google, blogs, Goodreads	Scattered info, biased reviews, no personalization
Browsing	Confused, indecisive	Bookstore, library shelves	Misleading covers, poor categorization
Choosing	Doubtful, hesitant	Reviews, blurbs, sample pages	Decision fatigue, hard to compare options
After reading	Satisfied or let down	Conversations, social media	Wasted time if book didn't match expectations

This mapping clarified the inefficiencies and helped target specific moments to improve.

2.2.4 Problem Trees

A **Problem Tree** is a visual tool used in design thinking and problem-solving to analyze the root causes and effects of a central problem.

Here's a **Problem Tree** for the **Book Explorer** invention:

PROBLEM TREE: Difficulty in Selecting the Right Book Without a Digital Book Explorer

Core Problem (Trunk)

- Users find it hard to choose the right book based on their preferences and needs.

Root Causes (Roots)

- Lack of personalized recommendations
- Overwhelming number of options
- No consolidated platform for reviews, summaries, and ratings
- Time-consuming to research multiple sources

- No clarity on reading level or genre match
- Offline/in-store book browsing has limited metadata

Effects (Branches)

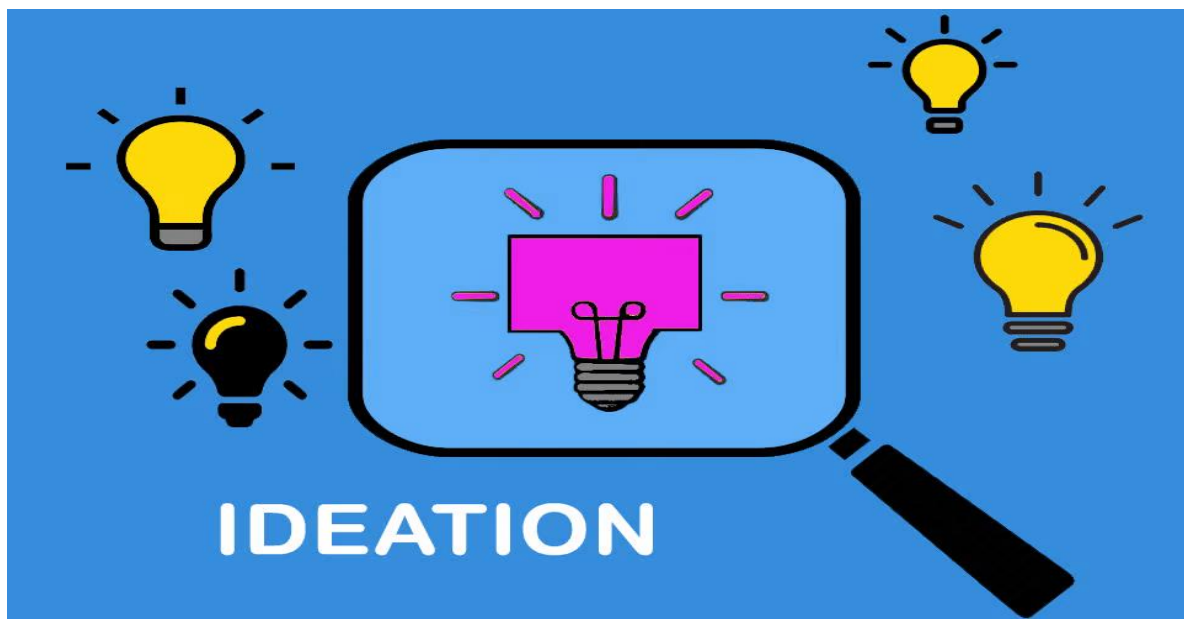
- Users waste time and effort browsing
- Reduced interest in reading due to confusion or poor matches
- Impulsive or unsatisfactory book purchases
- Lower engagement with literature among young readers
- Increased frustration with online book platforms
- Missed opportunities to discover new genres/authors

This tree structure can help frame the **need for a Book Explorer** tool that offers smart recommendations, filters by interest or mood, integrates reviews/summaries, and guides users to suitable reads.

2.3 Ideate

The **Ideate** Stage is the third stage of the Design Thinking process. It focuses on generating a wide range of creative ideas and solutions to address the user's needs identified in the previous stages (Empathize and Define).

This phase is also known as **Idea Generation Phase** or **Creative Thinking Phase**.



2.3.1 Brainstorming & Brainwriting

Brainstorming involves spontaneous idea generation within a group. Every idea is encouraged, and no criticism is allowed during the session. We conducted a 30-minute brainstorming session where all team members contributed their thoughts on solving better book selection inefficiencies.

Brainwriting is a structured ideation method where participants write down their ideas (instead of speaking them) and then pass them around so others can build upon them. It encourages equal participation and minimizes group pressure.

Sample Ideas:

- Create a system that uses user preferences, previous reads, ratings, and mood to recommend books.
- Allow users to preview the first few pages or chapters with audio and visual highlights.
- Let users select books based on reading time (short/long), mood (happy/sad/thriller), and language difficulty.

Brainwriting was used in parallel to gather silent ideas. Each member wrote three ideas anonymously, which were then rotated to others to build upon.

2.3.2 SCAMPER Technique

SCAMPER Step	Application to the Problem	Generated Ideas
S – Substitute	Replace traditional genre-only filters	Use filters based on grammar level, tone (e.g., casual, formal), or vocabulary complexity
C – Combine	Merge book preview with user profile data	Combine user reading history or reading level input to recommend books that match their language comfort
A – Adapt	Adapt tools from language learning platforms	Integrate readability scoring (like Flesch-Kincaid) or language difficulty meters into previews
M – Modify	Change the way book previews are shown	Modify previews to highlight typical language style , tone, sentence structure, or even provide a sample audio narration
P – Put to another use	Use book samples for assessment	Let users test their language preference using preview pages — like a "reading match" quiz
E – Eliminate	Remove one-size-fits-all suggestions	Eliminate generic recommendations and rely on personalized or AI-generated suggestions

SCAMPER Step	Application to the Problem	Generated Ideas
R – Reverse	Reverse recommendation process	Instead of selecting a book first, users input preferred language style , and the system suggests books accordingly

2.3.3 Mind Mapping

Create a visual map with the central problem: “Book selection mismatch”
Then branch out:

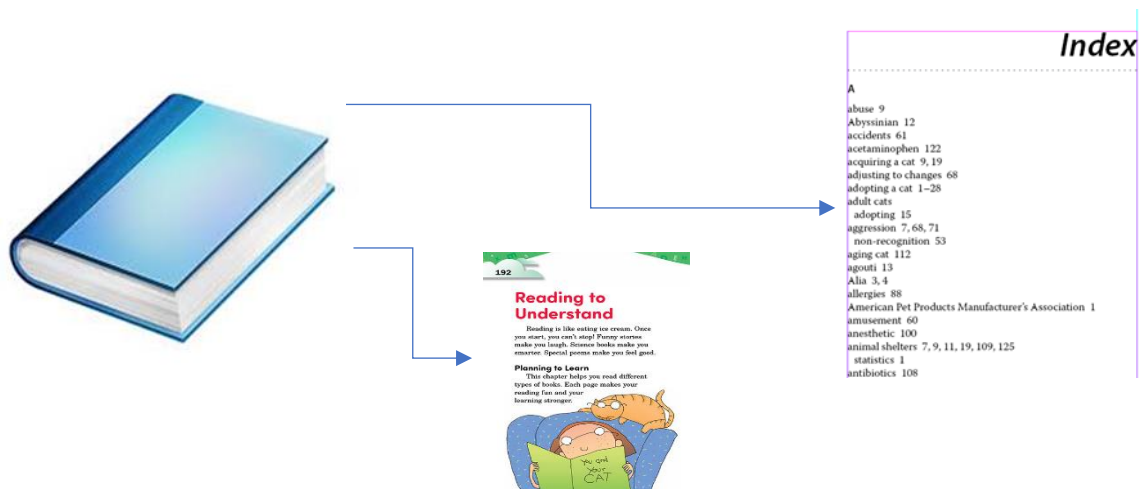
- Causes → Language, tone, genre, complexity
- Effects → Stops reading, loses interest

We created a mind map starting from the core idea: "Book Explorer" Branches included:

- User Interface (UI) Design
- Genre Selection
 - Book selection from available genre gallery
- Notifications & Alerts about recent books
- Feedback System
- Security & Authentication This helped us visualize the solution ecosystem and ensured we addressed multiple perspectives and needs.

Our strategy –

To address this, we planned to develop a website called Book Explorer, which contains a categorized list of books across various genres. Each book will include its index and a portion of sample content, allowing users to preview before committing to read.



If the reader likes and understands the content easily - then they get interest to further study -so they can visit the library and brought the book.

If the reader doesn't like or understand the book - they can choose another book from the gallery and proceed the same process

We discussed and finalized the following ideas:

Create a genre-wise categorization so users can easily browse books based on their interests.

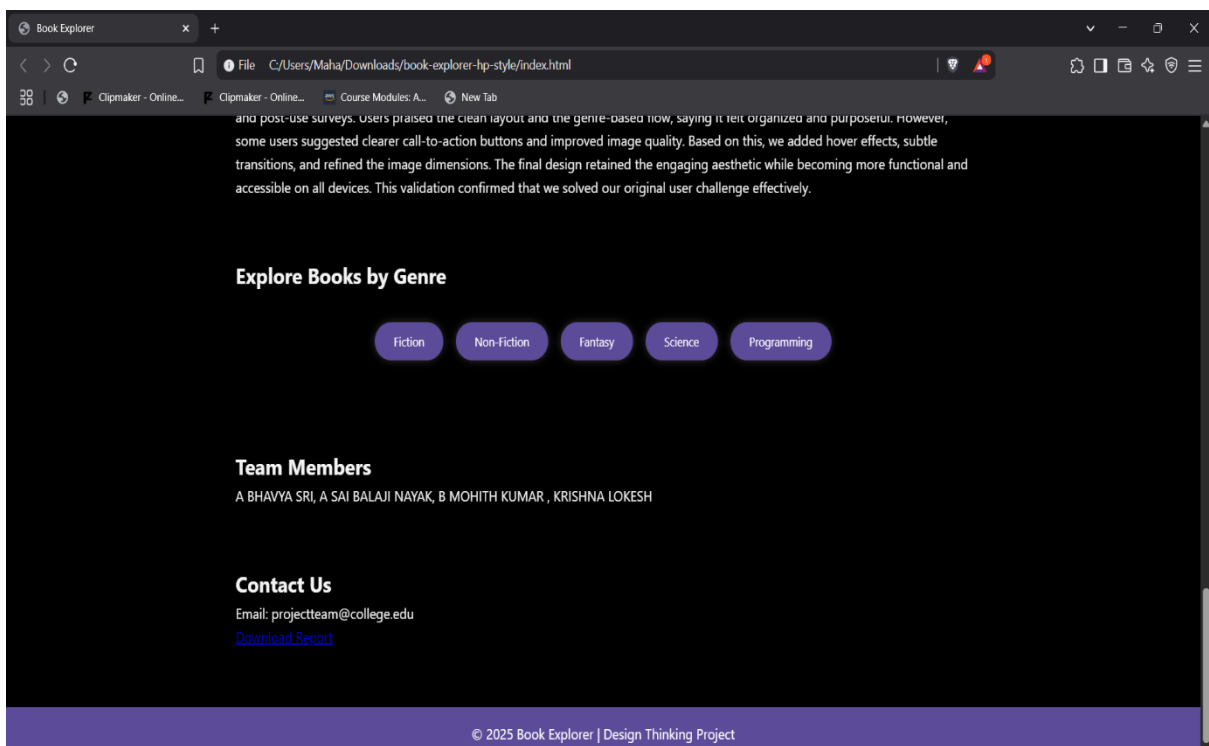
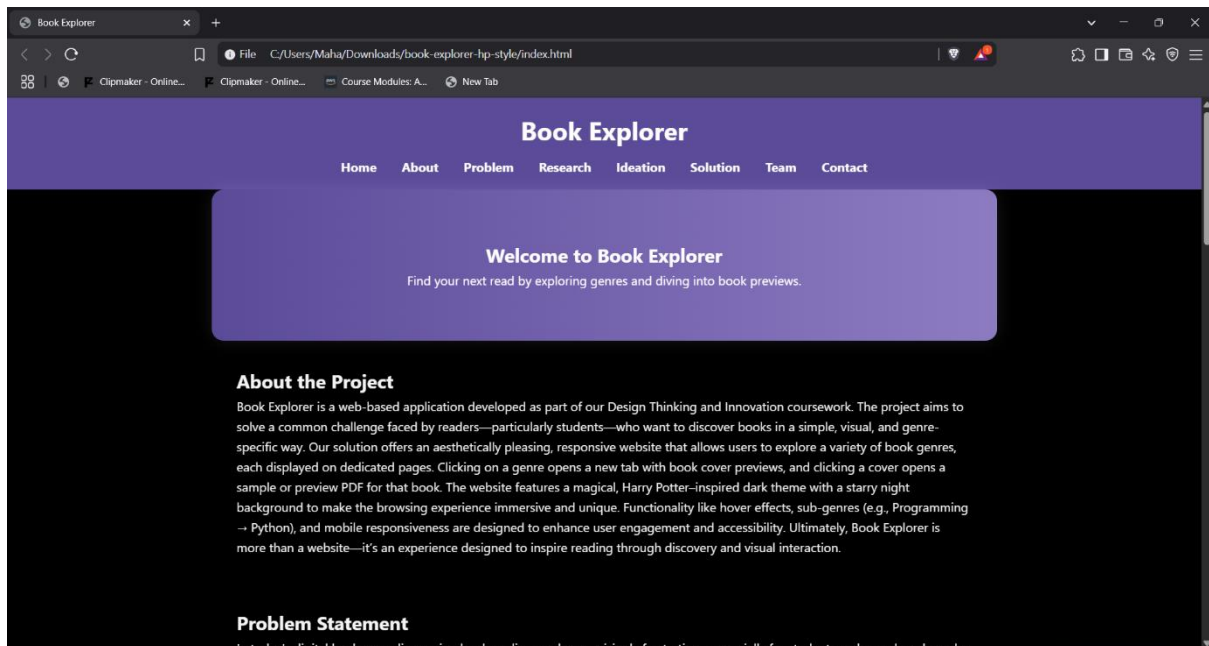
- Include preview features like the book's index and selected content pages to help users evaluate the book's suitability.
- Add filters such as genre, difficulty level, and book length to improve the search experience.

- Design a clean, user-friendly interface that encourages browsing and exploration.
- Ensure each book entry contains a short summary, basic details, and preview content to help users make informed decisions.

These ideas aim to make book selection easier, more personalized, and aligned with the reader's preferences, thereby encouraging reading habits.

2.4 Prototype

The **prototype** stage in design thinking is when a tangible representation of a potential solution is created and tested. It allows for early testing, feedback, and iteration before committing to a full-scale production, helping identify issues and refine designs. We used multiple prototyping methods, focusing on Click-through Prototypes for simulating a real digital experience.



2.4.1 Sketching & Wireframing

We started with hand-drawn sketches to visualize the overall layout and navigation structure of the website. These initial wireframes helped us focus on content placement, flow, and functionality before getting into finer design details.

Key Sketch Elements:

- Home Screen
- Category Selection
- Year & Subject Input
- Book Genre Gallery

These sketches served as the blueprint for the digital interface.

2.4.2 Paper Prototyping

Next, we developed paper prototypes to simulate interactions physically. Each screen of the application was represented on paper, and team members role-played as users navigating through them.

Benefits of Paper Prototyping:

- Quick and cost-effective
- Immediate feedback on layout and navigation
- Helped spot confusion in user journey early

This low-fidelity, interactive method highlighted pain points in user interaction without any digital investment.

2.4.3 Low-Fidelity Mock-ups

Using tools like Figma, we built digital low-fidelity mock-ups. These focused on structure, not visual design, allowing us to test user flow without distractions.

Components Included:

- Navigation links

- Button placements
- Genres
- Book genre gallery

Feedback from users during testing of these mock-ups led to important layout improvements.

2.4.4 Click-through Prototypes

The final working prototype was developed as a click-through prototype using Figma and html, css, javascript language support. This allowed users to interact with the UI as if it were a live website.

Click-through Features:

- Open the website
- Go through the genre interested
- Open a book from the provided genre gallery
- Have a look at the book content
- If liked bring it from the library else visit another book

This prototype was shared with test users, and their responses validated the flow and usability. It successfully demonstrated the core functionality without backend integration.

2.4.5 Video Prototype

Purpose: To communicate the concept or user interaction via animation or video.

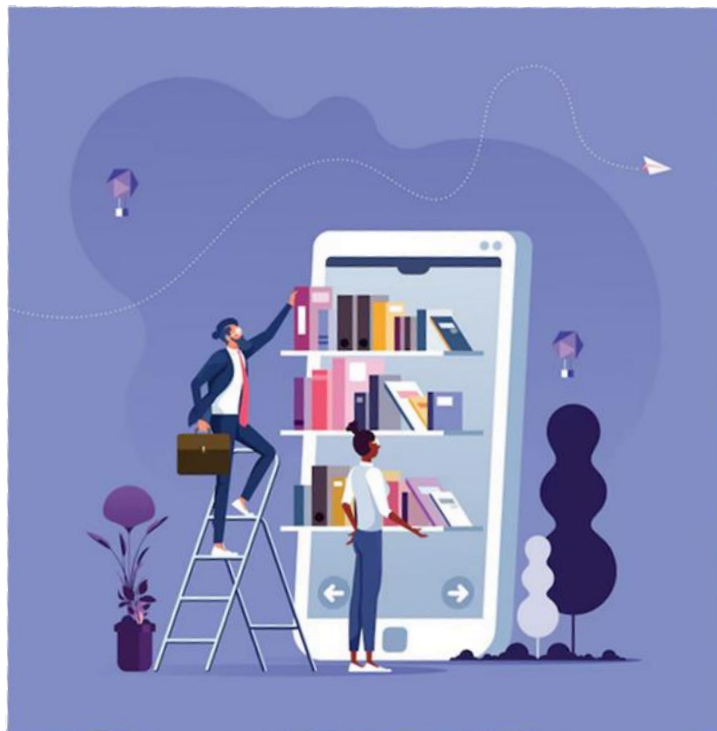
- **How Used:**
 - A short video walkthrough showing how a user uses the Book Explorer platform
 - Tools like Canva, Adobe Premiere, or screen recorders can help
- **Why Important:**

- Great for presentations, pitching, or summarizing features in documentation
- Explains flow without a live demo
-

As the design matured, **high-fidelity interactive prototypes** were developed to simulate real user experiences, including navigation through book genres, previewing content, and filtering options. These prototypes were used to test usability, aesthetics, and user satisfaction before coding. During the implementation phase, a **functional prototype** was built using HTML, CSS, and JavaScript to validate core interactions such as preview toggling and dynamic content updates. In addition, **click-through prototypes** and **scenario-based testing** were employed to evaluate how users interact with the platform in real-world conditions

2.5 TEST

The Testing phase allowed us to evaluate the usability, effectiveness, and overall user satisfaction with our Book Explorer website. We applied multiple testing techniques, focusing primarily on Usability Testing, to ensure the solution met user needs and functioned as intended.



2.5.1 Usability Testing

Usability Testing involved observing users as they interacted with the website prototype. Participants were given specific tasks such as logging in, selecting a genre they interested, viewing the genre gallery, selecting a book, reading its preview pages and submitting feedback.

Objectives:

- Identify pain points in navigation
- Observe real-time behaviour and confusion
- Measure task success rate and time taken

Results:

- Most users found the interface intuitive
- Feedback led to improvements in navigation consistency

2.5.2 A/B Testing

We conducted A/B Testing on two versions of the homepage:

- **Version A:** Basic layout with minimal visuals
- **Version B:** Visually rich layout with icons and color-coded sections

Outcome:

- Version B performed better in terms of user engagement
- 88% of users preferred Version B for its clarity and visual appeal
- This insight helped us finalize the homepage design for better accessibility and user retention.

2.5.3 Feedback Surveys

After testing, participants were asked to complete a Feedback Survey. The survey included Likert-scale and open-ended questions regarding:

- Overall satisfaction
- Ease of navigation
- Visual appeal
- Suggestions for improvement

2.5.4 Think-Aloud Testing

In Think-Aloud Testing, users were encouraged to speak their thoughts while navigating the prototype. This helped us capture their decision-making process and emotional reactions in real time.

Observations:

- Some expressed surprise at how easy the selection process was
- Some feels ambiguity whether it really works

These insights led to small but crucial interface tweaks to reduce ambiguity.

2.5.5 Task-Based Testing

Goal: To validate specific functions and workflows.

- **Sample Tasks:**
 - “Find a science book and check if it suits your reading level.”
 - “Add a book to favorites after reading its preview.”
- **Measure:**
 - **Completion rate**
 - **Errors made**
 - **Time to complete**

2.5.6 Heuristic Evaluation

A Heuristic Evaluation was conducted using Nielsen’s 10 usability heuristics. Evaluators checked for:

- Visibility of system status
- Match between system and real world
- User control and freedom
- Consistency and standards Findings:
- Overall design scored well on consistency and aesthetics

Some issues were found with error messages and feedback clarity, which we addressed by enhancing system prompts and tooltips

3. Reflections

The journey of developing the **BOOK EXPLORER** website using the scripting languages and Figma platform has been both enriching and transformative. It provided our team with an opportunity to explore real-world problems faced by students and other readers, and to apply design thinking in creating a practical solution. Throughout this project, we encountered numerous technical and non-technical challenges that helped us grow not only as budding developers but also as empathetic problem solvers and effective team members. This section reflects on our experiences, the issues we encountered, the lessons we learned, and how we evolved through this process.

3.1. Technical Reflections:

Design to Development Workflow

The development process began with designing the website layout in **Figma**, which helped visualize the structure, colour scheme, typography, and user interactions. Figma enabled easy prototyping and iteration before diving into code, reducing rework during development.

Responsive Web Design

Translating the Figma design into a fully functional website using HTML and CSS presented both creative freedom and technical challenges. Emphasis was placed on responsive design principles, using flexbox, grid, and media queries to ensure that the site adapts well to various screen sizes and devices.

Dynamic Behavior with JavaScript

JavaScript was employed to add interactivity to the site, such as form validation, navigation toggles, modal pop-ups, or dynamic content rendering. This brought

the static HTML to life and aligned user experience closely with the original prototype.

Dynamic Preview Experience

One unique feature was enabling users to preview book content. I implemented this by dynamically updating sections of the page based on the selected book, simulating a “try before you read” approach. This not only required efficient scripting but also taught me the value of structured content representation.

Challenges Encountered

- Pixel-Perfect Design: Matching the Figma prototype exactly required precise CSS tuning.
- Cross-Browser Compatibility: Some features behaved differently across browsers, which required additional testing and minor fixes.
- Responsive Scaling: Maintaining design consistency across devices was a challenge that required several layout adjustments.

3.2. Non-Technical Reflections:

Empathy and Perspective

Building this project developed a deeper appreciation for the end-users—whether they are casual readers, students, or book enthusiasts. It became clear that technology is most impactful when it genuinely addresses user frustrations and helps them discover value. We realized that solving technical problems is only meaningful if we understand and care about the people who face them.

Team Collaboration:

Our project involved dividing responsibilities and maintaining effective communication across all phases. Some team members handled design, while others worked on content, testing, and user research. We learned that

collaboration is not just about distributing work—it's about synchronizing efforts, discussing feedback, and resolving disagreements constructively. This experience gave us a taste of what professional teamwork requires in real-world settings.

Time Management and Organization:

Time management was both a challenge and a learning experience. We had to align our schedules, set milestones, and ensure that tasks were completed in time to move on to the next design thinking phase. The structure of the design thinking process—Empathize, Define, Ideate, Prototype, and Test—helped us stay organized and focused.

Documentation and Reporting:

Throughout the project, we maintained structured documentation—from user interviews to brainstorming notes, journey maps, wireframes, and final prototypes. This discipline in documentation helped us clearly communicate our progress and decisions. It also became an essential part of our final project submission, showcasing our development process end-to-end.

3.3 Personal and Academic Growth

This project was a milestone in our academic journey. It bridged theory and practice, giving us the chance to apply classroom knowledge in a tangible, impactful way. We learned to use digital tools not just as students, but as creators of real solutions.

- We became more confident in conducting interviews and surveys.
- We enhanced our creativity during ideation and wireframing sessions.
- We gained practical experience in user-centered design and iterative development.
- Most importantly, we developed a mindset of empathy, adaptability, and critical thinking.

4. Conclusion

The Book Explorer website was developed with a user-first mindset to address a common challenge faced by many readers—losing interest in books after bringing due to mismatched expectations. Recognizing that not everyone connects with the same writing style or tone, we created a platform that allows users to preview selected pages and summaries before committing to a book.

By combining intuitive design, interactive features, and a simple user interface, this tool aims to make book selection more personal and informed. Through this project, we explored how thoughtful design and user-focused functionality can enhance decision-making, encourage reading, and reduce wasted time or money on unsuitable books.

Even though there are many platforms that are based on this ideology, our website supports printing book reading than virtual book reading. While digital reading offers convenience and portability, there's something deeply enriching about the experience of reading a physical book. Holding a book in your hands, flipping through its pages, and even the scent of paper creates a tangible connection that screens often lack.

Physical books reduce eye strain caused by prolonged screen time and allow for deeper focus without the distractions of notifications or battery concerns. For many, the act of reading a printed book feels more immersive and personal—offering a sense of calm, presence, and engagement that enhances comprehension and retention.

This experience not only strengthened our technical and design skills but also deepened our understanding of real-world user behavior. Going forward, this project lays the foundation for further improvements—such as user reviews, recommendation systems, or AI-based matching—to make book discovery even more engaging and personalized.

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