Owl-M: A Material Design App
Team - 590879

1. INTRODUCTION

1.1. Project Overview

The Owl educational app is a cutting-edge platform designed to provide users with a seamless and engaging learning experience. Focused on incorporating Material Design principles, the app stands out with its modern UI elements, including OutlinedTextField, Buttons, and Icons. Its unique aesthetic, featuring captivating background images and motivating logos, creates an inviting atmosphere for learners. The app prioritizes user experience, implementing dynamic error handling and intuitive navigation elements.

1.2. Purpose

The Owl educational app is purposefully designed to deliver a modern and engaging learning experience. Focused on user-centric design, it combines Material Design principles and custom styling to create an aesthetically pleasing interface with features like dynamic error handling and seamless navigation. The app cultivates an engaging visual atmosphere through captivating background images and motivational logos, aiming to motivate and energize learners. With a commitment to seamless content delivery, it incorporates dynamic content loading based on scrollable cards, ensuring easy access to a variety of educational materials. Owl aspires to redefine educational app standards by breaking away from traditional norms and offering a fresh, innovative approach to digital learning.

2. LITERATURE SURVEY

2.1. Existing problem

Traditional teaching methods, which usually lack flexibility, engagement, and adaptability, are a prime example of the difficulties facing education today. It may be challenging for traditional educational institutions to effectively engage students, which might result in a decline in interest, limited accessibility, and challenges in meeting the needs of students with varying learning styles. The absence of a shared platform for content creation and distribution further hinders collaboration between educators and students. The Owl educational app aims to address these issues by providing a dynamic, user-focused platform that streamlines the creation,

sharing, and customized interaction with content. This method seeks to fill in the holes in traditional teaching techniques and offer a state-of-the-art, conveniently accessible, and stimulating learning environment.

2.2. References

Swan, K. (2003). Learning effectiveness: What the research tells us. In J. Bourne & J. C. Moore (Eds.), Elements of Quality Online Education: Engaging Communities (Vol. 6, pp. 13-45).

Needham, MA: Sloan Consortium.

Picciano, A. G. (2017). Theories and frameworks for online education: Seeking an integrated model. Online Learning, 21(3), 166-190.

Downes, S. (2007). Models for sustainable open educational resources. Interdisciplinary Journal of Knowledge and Learning Objects, 3, 29-44.

edX GitHub Repository. (https://github.com/edx)

Coursera GitHub Repository

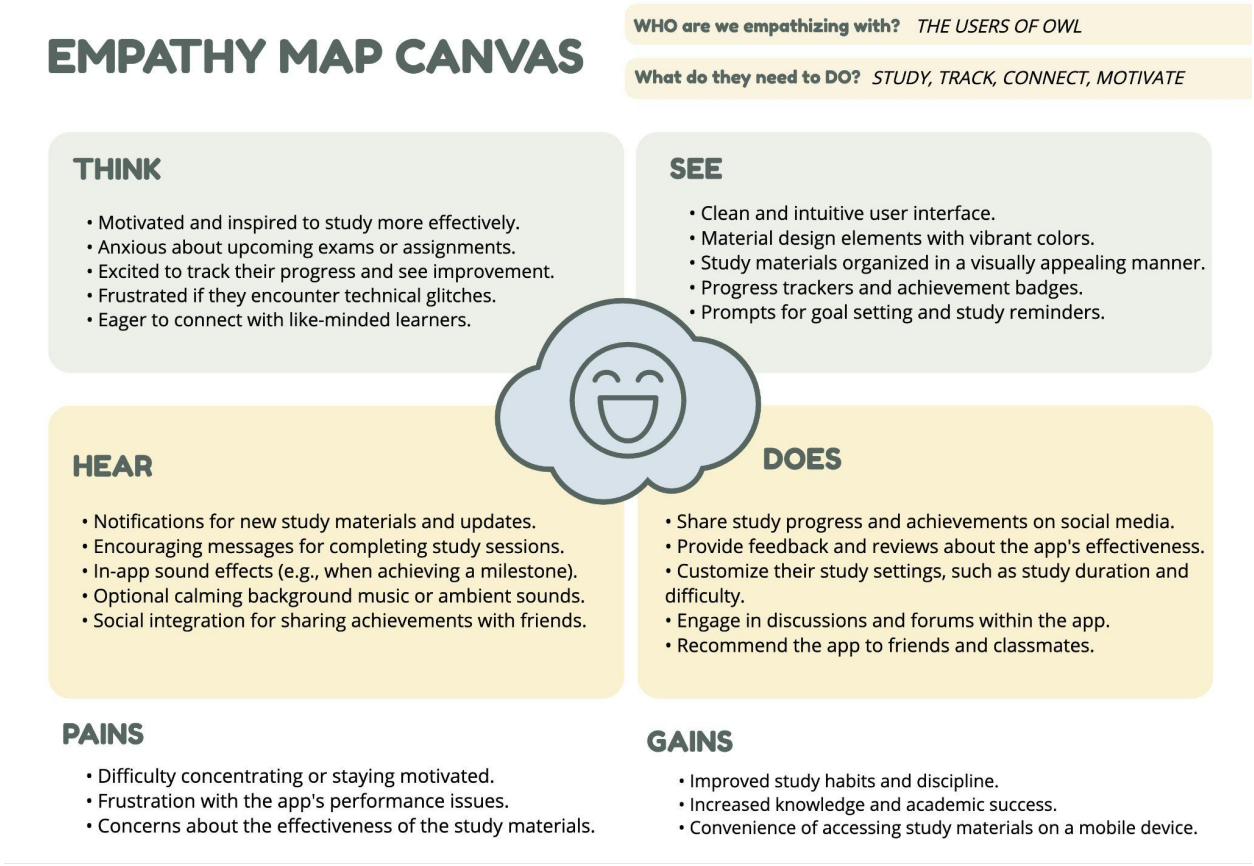
2.3. Problem Statement Definition

The challenge is to develop "Owl-M," an educational app with a Material Design focus, aimed at offering courses in design, art, architecture, and fashion. The problem lies in designing an engaging and motivational user experience that leverages Material Design elements while ensuring responsible data handling, accessibility, inclusivity, and ethical data use. Furthermore, establishing a sustainable business model that balances free and premium features is critical for both user value and revenue generation.

3. IDEATION & PROPOSED SOLUTION

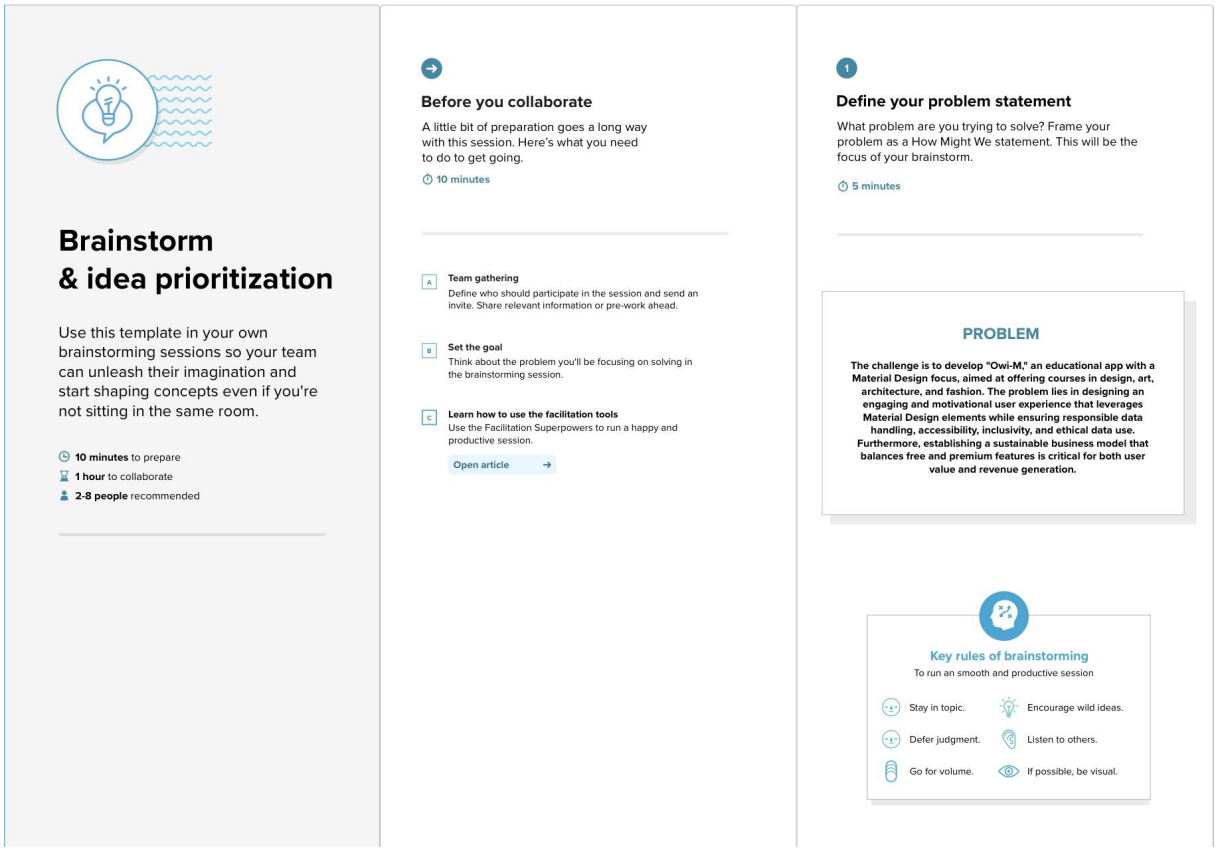
3.1. Empathy Map Canvas

Developing an empathy map for our app is beneficial as it assists in comprehending the app's user base on a deeper level. By mapping out user thoughts, emotions, requirements, and challenges, we can craft an interface and user experience that caters to the users' specific needs. This map fosters a strong sense of empathy for the users, making it simpler to make well-informed design choices, prioritize functionalities, and, in the end, create an app that truly resonates with the target audience and serves their purposes effectively.

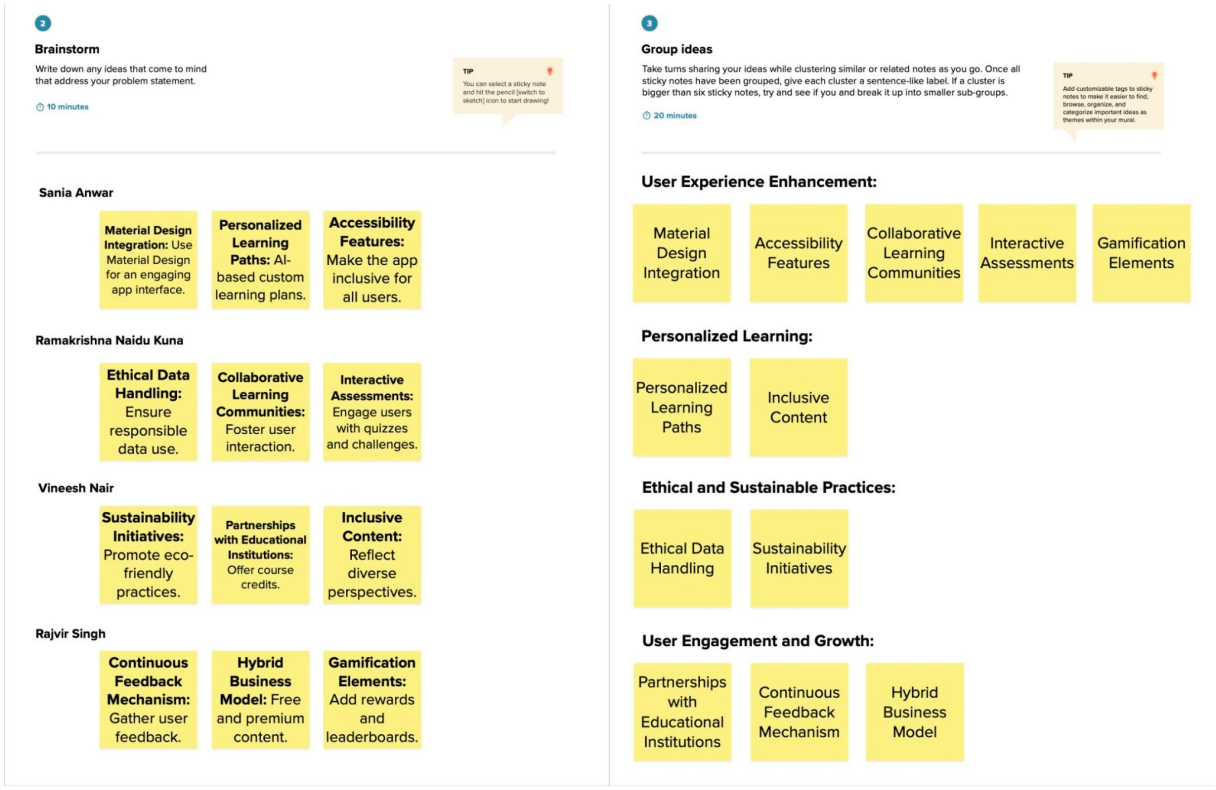


3.2. Ideation & Brainstorming

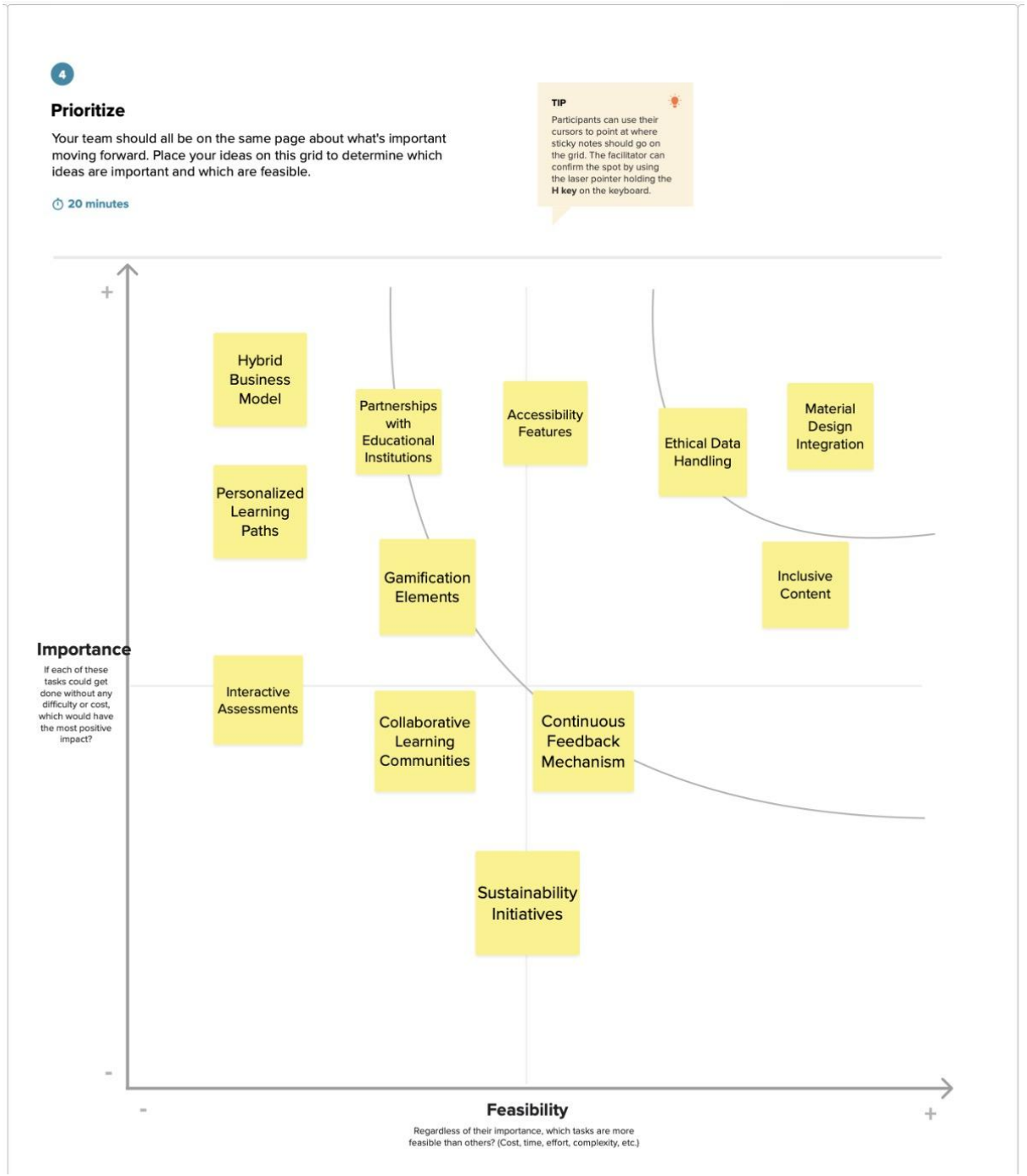
Step 1: Team Gathering, Collaboration, and Select the Problem Statement: The challenge is to develop "Owl-M," an educational app with a Material Design focus, aimed at offering courses in design, art, architecture, and fashion. The problem lies in designing an engaging and motivational user experience that leverages Material Design elements while ensuring responsible data handling, accessibility, inclusivity, and ethical data use. Furthermore, establishing a sustainable business model that balances free and premium features is critical for both user value and revenue generation.



Step 2: Brainstorm, Idea Listing, and Grouping



Step 3: Idea Prioritization



4. REQUIREMENT ANALYSIS

4.1. Functional requirement

- User Authentication:
  - Users should be able to register for an account using a valid email address.
  - Users should be able to log in securely with their credentials.
  - Password recovery/reset functionality should be available.
- Course Access:
  - Users can view a list of available courses.
  - Users can select and access the content of a specific course.
- Material Interaction:
  - Educational materials (documents, videos, etc.) should be presented to users within each course.
  - Users can interact with and navigate through the study materials seamlessly.
- Notification System:
  - Users should receive notifications for new course content, reviews, or important updates.

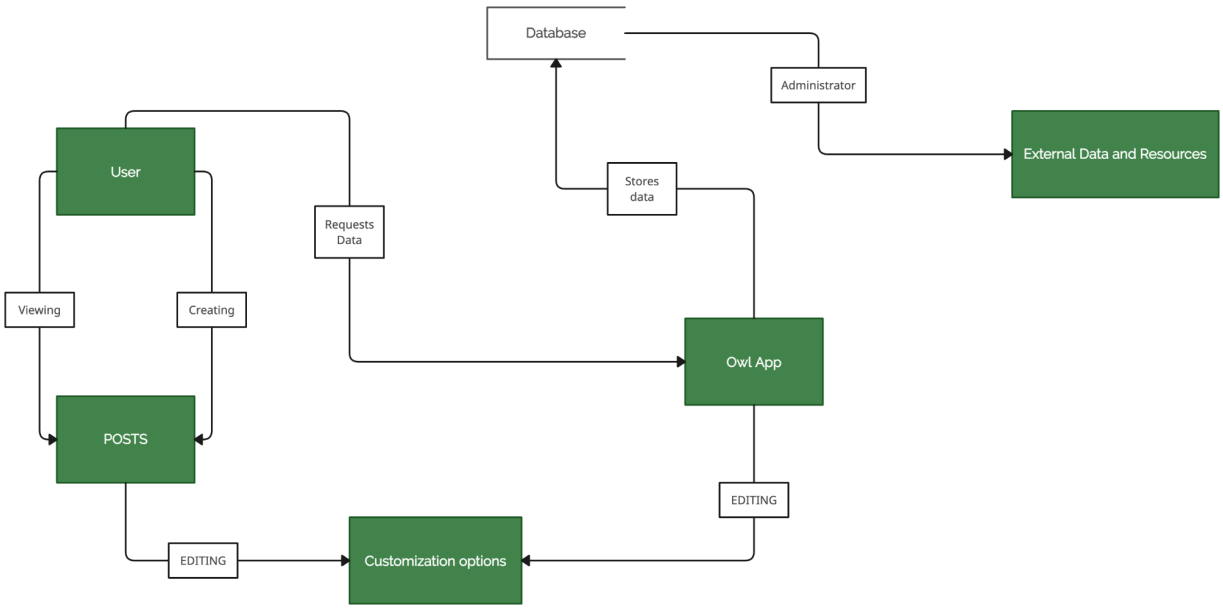
4.2. Non-Functional requirements

- Performance:
  - The app should load quickly and respond promptly to user interactions.
  - Response times for content retrieval should be optimized.
- Security:
  - User data (credentials, progress, etc.) should be securely stored and encrypted.
  - Authentication mechanisms should follow industry best practices.
- Scalability:
  - The app should handle a growing number of users and courses without significant performance degradation.
- Usability:
  - The user interface should be intuitive and easy to navigate.
  - Consistent design elements and color schemes should enhance the overall user experience.

5. PROJECT DESIGN

5.1. Data Flow Diagrams & User Stories

DFD Level 0 (Industry Standard)



User Stories:

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
End User	Login	USN01	As an end user, I want to be able to log in to my account for personalized features and content.	1. Users can access a "Login" button. 2. Users can enter valid credentials (username and password). 3. After successful	High	v1.2

				login, the user's personalized content is displayed.		
End User	Sign up	USN02	As an end user, I want to be able to create a new account to access personalized features and content.	1. Users can access a "Sign Up" button. 2. The user can provide the required registration information. 3. After successful sign-up, the user is redirected to the login screen.	High	v1.2
End User	Sign up	USN02	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	v1.2
End User	Sign up	USN02	As a user, I can register for the application through Gmail	I can register & access the dashboard with Gmail Login	Medium	v1.2
End User	Navigation	USN03	As an end user, I want to navigate the app using a navigation bar for easy access to different sections.	1. The app displays a bottom navigation bar with icons for key sections. 2. Tapping on each icon takes the user to the corresponding section.	High	v1.0

Content Creator	Creating Posts	USN04	As a content creator, I want to create and publish new posts with ease.	1. The user can access a "New Post" feature. 2. The user can add text, images, and format content. 3. Users can preview and publish posts.	High	v1.0
End User	Viewing Content	USN05	As an end user, I want to view articles and images in a visually pleasing material design format.	1. Articles are displayed with material design styling, including cards and typography. 2. Images are loaded smoothly and can be zoomed in for better viewing.	High	v1.0
Administrator	Content Moderation	USN06	As an administrator, I want to moderate user-generated content for compliance with community guidelines.	1. Admins can access a content moderation panel. 2. Admins can view reported content and take action (delete, warn, block users).	High	v1.1
End User	Search Functionality	USN07	As an end user, I want to search for specific articles or content.	1. Users can access a search bar. 2. Search results are displayed in a clear and	High	v1.1

				organized manner. 3. Tapping on a search result takes the user to the relevant content.		
End User	Dark Mode	USN08	As an end user, I want the option to enable dark mode for a more comfortable viewing experience in low-light environments.	1. Users can toggle between light and dark mode. 2. The app's color scheme and interface change accordingly.	Medium	v1.1
Customer Care Executive	Support Tickets	USN09	As a customer care executive, I want to view and manage user support tickets for quick issue resolution.	1. Executives can access a "Support Tickets" section. 2. Executives can view and respond to user inquiries. 3. Tickets are marked as resolved when the issue is addressed.	High	v1.3
Administrator	User Management	USN10	As an administrator, I want to manage user accounts and permissions for the app.	1. Admins can access a user management panel. 2. Admins can create, update, and delete user accounts. 3. Admins can assign roles and	High	v1.3

				permissions to users		

5.2. Solution Architecture

Requirements Elicitation:

Engage in a thorough discovery phase to understand the unique challenges in the educational domain and the specific needs of students, instructors, and administrators.
Gather insights into the course content and the expectations for the learning experience.

Technology Evaluation:

- Choose Kotlin as the primary programming language for Android app development due to its modern features and strong community support.

- Adopt Android Jetpack components to enhance development efficiency, using Navigation for smooth user journeys and View Binding for improved UI development.

- Implement Firebase Authentication to provide various login methods, such as email and password, Google Sign-In, Facebook Login, and Gmail Login, ensuring a secure and user-friendly login experience.

- Utilize SQLite for local data storage to support offline access to course content and Firebase Realtime Database or Firestore for cloud data storage, enabling real-time updates and synchronization.

- Develop server-side components using technologies like Node.js to manage user accounts, user-generated content, and communication between the app and the server.

- Enhance search functionality by integrating a powerful search engine or API like Elasticsearch or Algolia to provide accurate and efficient content discovery.

Architecture Definition:

Create an architectural diagram that visualizes the app's structure, including components like activities, fragments, and data repositories.

Highlight the interactions between components, emphasizing the role of Firebase for authentication and data storage, as well as the server-side components for content management.

Behavior Specification:

Define how the app will behave, ensuring that users can seamlessly navigate the app, access course content, interact with collaborative learning communities, and access inclusive and accessible content.

Feature Prioritization:

- User Authentication: Develop a user authentication system that accommodates multiple login methods for a seamless and secure user experience.

- Content Creation and Management: Enable content creators to craft and publish courses and course materials while allowing for multimedia content, such as images and videos.

- Material Design Styling: Apply Material Design principles to create an aesthetically pleasing and user-friendly UI.

- Collaborative Learning Communities: Provide features that foster interactions and knowledge sharing among users, encouraging a sense of community.

- Hybrid Business Model: Develop a hybrid business model that offers free access to basic content and premium features for additional value.

- Continuous Feedback Mechanisms: Incorporate feedback mechanisms to gather user input and shape app development according to evolving user needs.

- Sustainability and Inclusive Content: Integrate sustainability initiatives and ensure inclusivity in course content, aligning with the brand's attributes.

- Partnerships with Educational Institutions: Establish partnerships with recognized educational institutions to enhance the app's credibility and course offerings.

- Interactive Assessments and Gamification: Enhance user engagement through interactive assessments and gamification elements.

Development Phases:

Phase 1 (Foundations):

- User authentication and registration, ensuring secure access.
- Initial UI design with Material Design principles.
- Core features for content creation and basic course management.

Phase 2 (Enhancements):

- Advanced content display with Material Design styling.
- Search functionality for easy content discovery.
- User preferences, dark mode support, and accessibility enhancements.
- Privacy policies and content moderation tools to ensure responsible data use.

Phase 3 (Community and Growth):

- Support ticket system for efficient user inquiries and issue resolution.
- Administrative features for user management and content oversight.
- Integration of sustainability initiatives and ethics into content creation and management.
- Gamification elements to motivate and engage users in their learning journey.

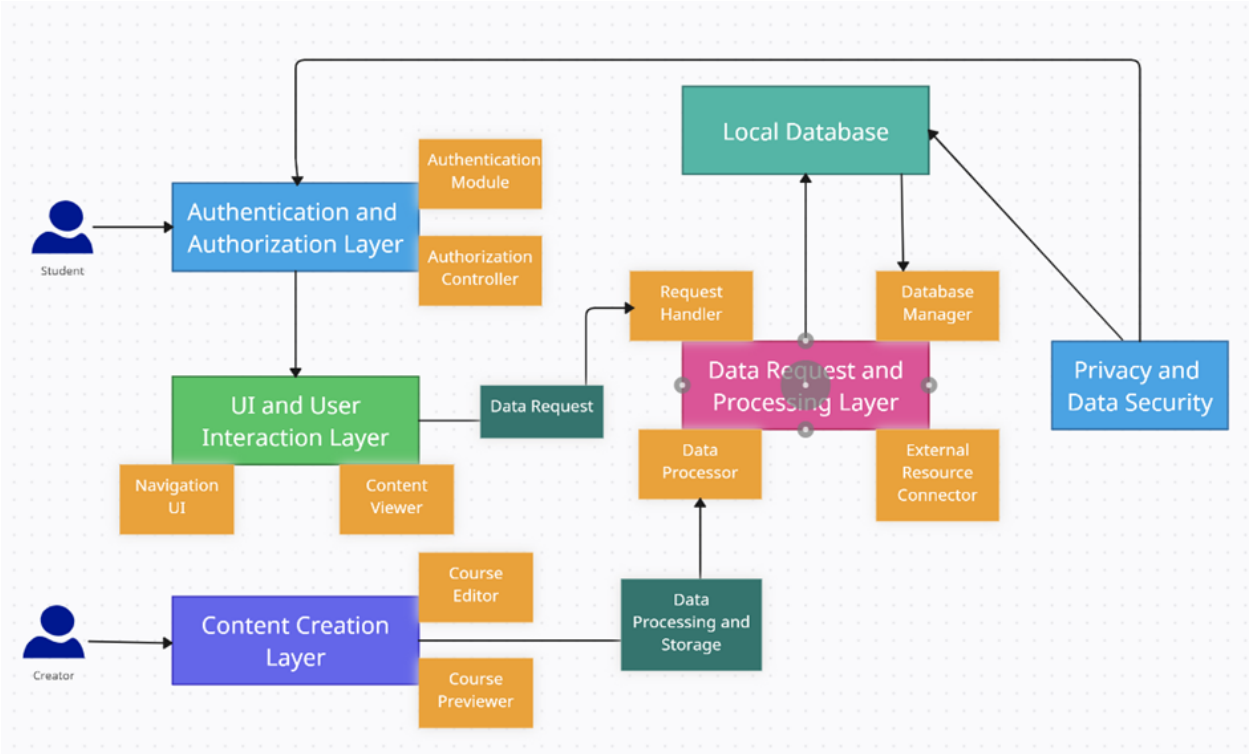
Solution Requirements:

- Data Encryption: Implement robust data encryption to protect user data at rest and in transit.

- User Data Privacy Policies: Develop and communicate clear data privacy policies that define how user data is handled, ensuring transparency and user consent.

- Content Moderation Tools: Incorporate content moderation tools to monitor and maintain a respectful and safe learning environment.

- Compliance with Data Protection Regulations: Ensure strict compliance with data protection regulations to safeguard user data and privacy.



6. PROJECT PLANNING & SCHEDULING

6.1. Technical Architecture

The Deliverable shall include the architectural diagram below and the information as per Table 1 and Table 2.

Infrastructure Demarcation:

Local: Mobile App (Android)
Cloud: Authentication Server, Content Delivery Network (CDN), Database, Machine Learning (ML) Platform, Payment Gateway, Third-party APIs

Technical Architecture Diagram for Owl-M App:

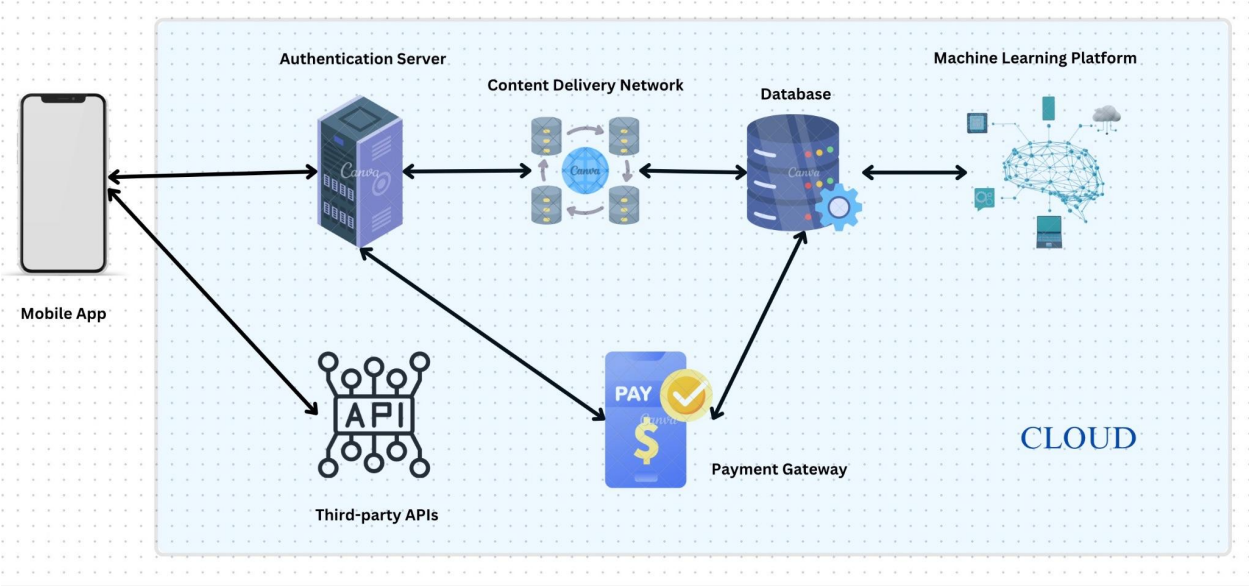


Table-1: Components & Technologies:

S.No	Component	Description	Technology
1.	Mobile App	A native Android app that provides users with access to the Owl-M platform.	Kotlin, Android SDK, Material Design
2.	Authentication Server	A server that authenticates users and generates JWT tokens.	Python, Flask, JWT
3.	Content Delivery Network (CDN)	A network of servers that delivers course content to users.	AWS CloudFront
4.	Database	A database that stores user data, course data, progress data, and assessment data.	MySQL
5.	Machine Learning Platform	A platform that hosts and runs the recommendation engine.	AWS SageMaker
6.	Payment Gateway	A gateway that processes payments for premium features.	Stripe
7.	Third-party APIs	APIs that provide additional functionality to the Mobile App, such as social media integration and analytics.	Various APIs, such as the Google Sign-In API and the Facebook Graph API

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Personalized learning	The app uses machine learning to recommend courses to users based on their interests and learning styles.	AWS SageMaker
2.	Engaging and interactive content	The app features video streaming, audio streaming, document downloads, and interactive elements such as quizzes and assignments.	Kotlin, Android SDK, Material Design
3.	Accessible and inclusive design	The app is designed to be accessible to users with disabilities and from diverse backgrounds.	Android Accessibility APIs, Material Design
4.	Secure data handling	The app uses industry-standard security practices to protect user data.	HTTPS encryption, JWT authentication, data encryption at rest
5.	Sustainable business model	The app balances free and premium features to create a sustainable business model.	In-app purchases, subscription model

6.2. Sprint Planning & Estimation

Sprint	**Functional Requirement (Epic)**	**User Story Number**	**User Story / Task**	**Team Members**	**Story Points**	**Priority**
Sprint-1	Login	USN01	As an end user, I want to be able to log in to my account for personalized features and content.	Vineesh	2	High
Sprint-1	Sign up	USN02	As an end user, I want to be	Vineesh	1	High

			able to create a new account to access personalized features and content.			
Sprint-1	Sign up	USN02	As a user, I can register for the application through Facebook	Sania	2	Low
Sprint-1	Sign up	USN02	As a user, I can register for the application through Gmail	Rajvir	2	Medium
Sprint-2	Navigation	USN03	As an end user, I want to navigate the app using a bottom navigation bar for easy access to different sections.	Rajvir	1	High
Sprint-3	Creating Posts	USN04	As a content creator, I want to create and publish new posts with ease.	Ramakrishna	5	High
Sprint-2	Viewing Content	USN05	As an end user, I want to view articles and images in a visually pleasing material design format.	Sania	3	High
Sprint-4	Content Moderation	USN06	As an administrator, I want to	Vineesh	5	High

			moderate user-generated content for compliance with community guidelines.			
Sprint-3	Search Functionality	USN07	As an end user, I want to search for specific articles or content.	Rajvir	3	High
Sprint-2	Dark Mode	USN08	As an end user, I want the option to enable dark mode for a more comfortable viewing experience in low-light environments.	Ramakrishna	2	Medium
Sprint-4	Support Tickets	USN09	As a customer care executive, I want to view and manage user support tickets for quick issue resolution.	Ramakrishna	5	High
Sprint-3	User Management	USN10	As an administrator, I want to manage user accounts and permissions for the app.	Sania	5	High

6.3. Sprint Delivery Schedule

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	10	4 Days	18 Oct 2023	21 Oct 2023	10	21 Oct 2023
Sprint-2	6	7 Days	22 Oct 2023	28 Oct 2023	6	28 Oct 2023
Sprint-3	13	7 Days	29 Oct 2023	04 Nov 2023	N/A (in progress)	04 Nov 2023
Sprint-4	10	6 Days	05 Nov 2023	09 Nov 2023	N/A (in progress)	09 Nov 2023

Sprint	Sprint Duration	Total Velocity	Average Velocity (AV)
Sprint-1	4 days	10 points	2.5 points per day
Sprint-2	7 days	6 points	approx. 0.857 points per day
Sprint-3	7 days	13 points	approx. 1.857 points per day
Sprint-4	6 days	10 points	approx. 1.667 points per day

7. CODING & SOLUTIONS

7.1. Feature 1

One standout feature across the login and sign-up pages of the Owl educational app lies in its implementation of Material Design principles. The user interface seamlessly incorporates Material Design components, such as the use of OutlinedTextField, Buttons, and Icons, ensuring a modern and intuitive design. This consistency fosters a visually cohesive experience and

enhances user navigation. Beyond the standardized design elements, the app boasts a unique aesthetic with custom styling, featuring captivating background images and motivating logos that create an inviting atmosphere for learners. The dynamic error handling further heightens the user experience, providing instant feedback on authentication success or failure. Additionally, the considerate integration of navigation elements to the registration screen and hints at a "Forgot password" feature showcases a user-centric approach, anticipating and addressing user needs. This blend of Material Design, custom styling, and a user-friendly and visually stimulating interface, defines Owl's commitment to delivering a distinctive and engaging educational platform.

https://github.com/smartinternz02/SI-GuidedProject-587199-1696855719/blob/main/Owl-M-A-Material-Design-Study-App-main/app/src/main/java/com/example/owlapplication/LoginActivity.kt

https://github.com/smartinternz02/SI-GuidedProject-587199-1696855719/blob/main/Owl-M-A-Material-Design-Study-App-main/app/src/main/java/com/example/owlapplication/RegisterActivity.kt

7.2. Feature 2

The Owl educational app's main screen showcases a standout feature with a scrollable card design, seamlessly aligning with Material Design principles. These interactive cards, employing a semi-transparent black tint and rounded corners, offer a visually appealing and consistent user experience. The dynamic loading of content based on the card index not only enhances flexibility but also hints at potential database integration, allowing the app to adapt to evolving educational topics. The use of Intents for navigation underscores the seamless user experience, aligning with Material Design's emphasis on smooth transitions. This amalgamation of a user-friendly card layout, Material Design principles, and possible database integration defines Owl's commitment to providing an engaging and adaptable educational platform.

https://github.com/smartinternz02/SI-GuidedProject-587199-1696855719/blob/main/Owl-M-A-Material-Design-Study-App-main/app/src/main/java/com/example/owlapplication/MainActivity.kt

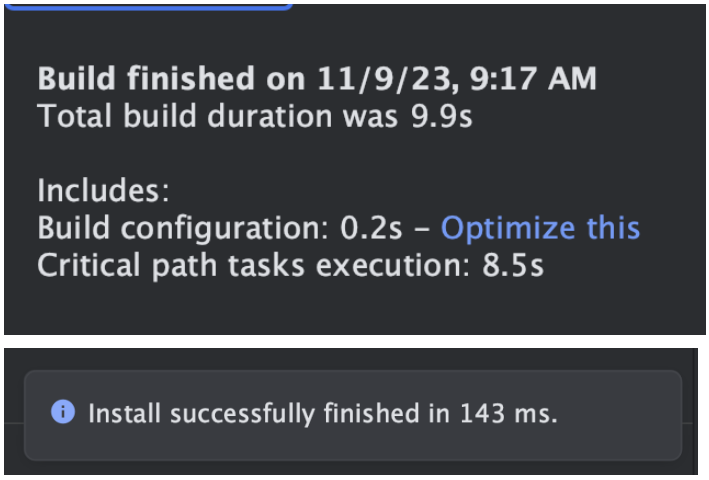
7.3. Database Schema

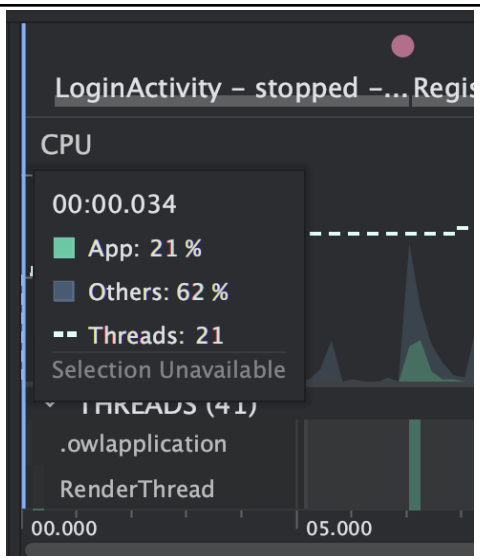
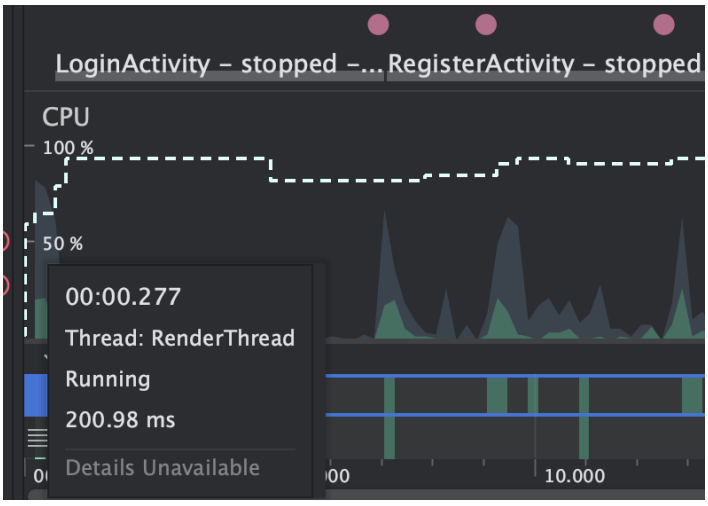
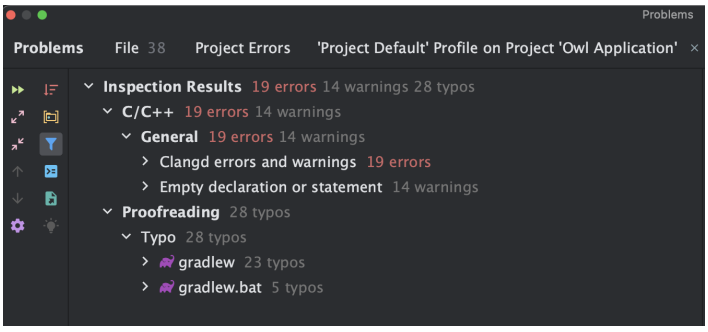
The app's database schema consists of two tables: Users and Articles. The Users table captures essential user information with fields including username, password, and email, omitting unnecessary identifiers or full names. On the other hand, the Articles table stores details about the latest articles, featuring fields such as id for a unique article identifier, title for the article's title, content for its text, image_url to store the URL of the associated image, and author to denote the author's name. This streamlined schema reflects a minimalist yet functional approach, ensuring the efficient organization of user and article data. The absence of intricate identifiers in the Users table streamlines user management, while the Articles table efficiently captures and delivers essential information, aligning with the app's commitment to a clean and effective user experience.

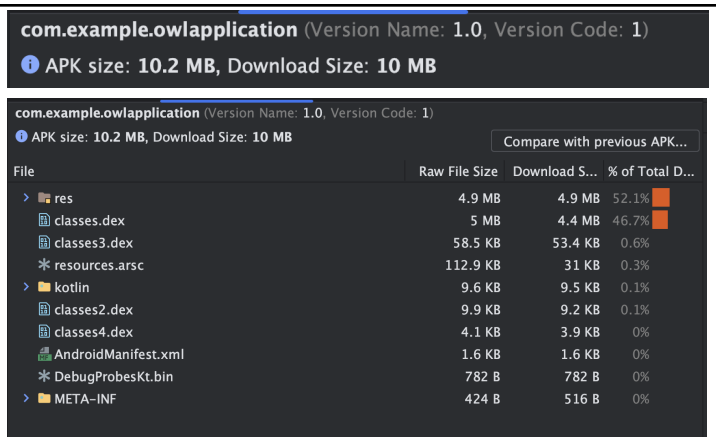
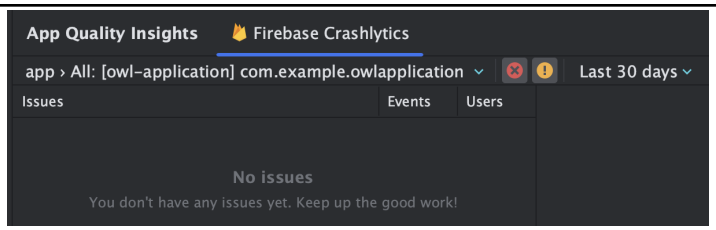
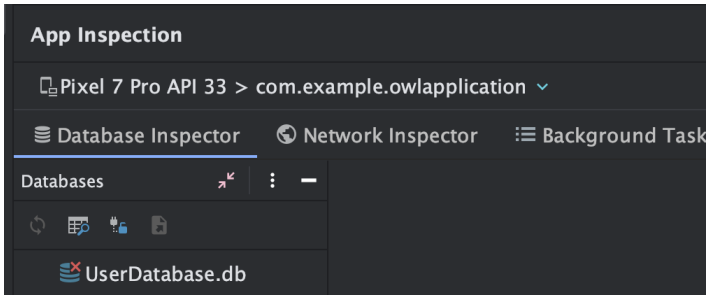
8. PERFORMANCE TESTING

8.1. Performance Metrics

Model Performance Testing:

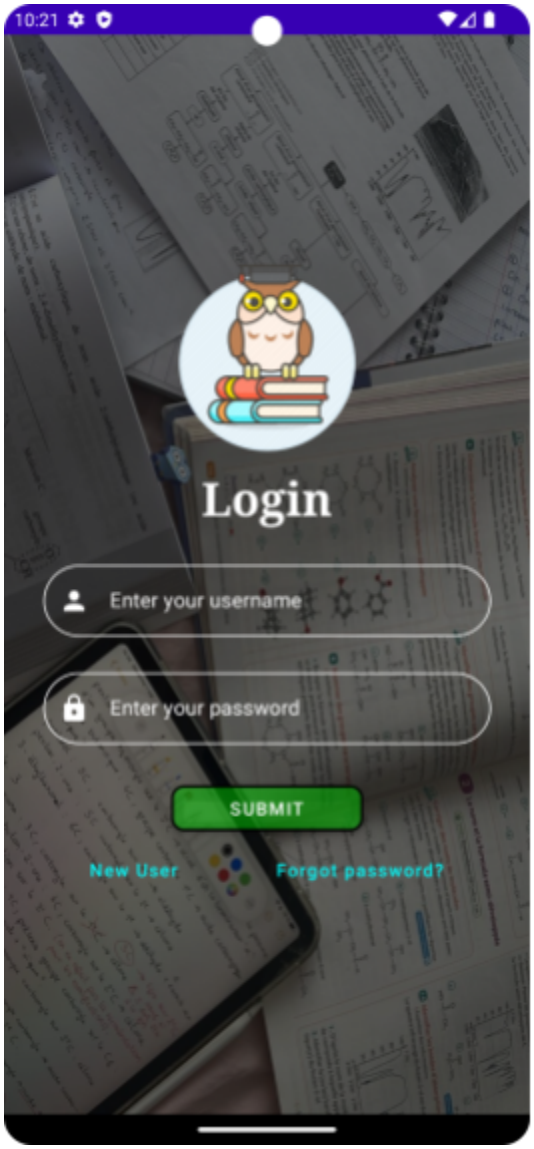
S.No.	Parameter	Values	Screenshot
1.	Metrics	App Launch Time - .034ms Screen Render Time - 200.98ms Code Quality - B	

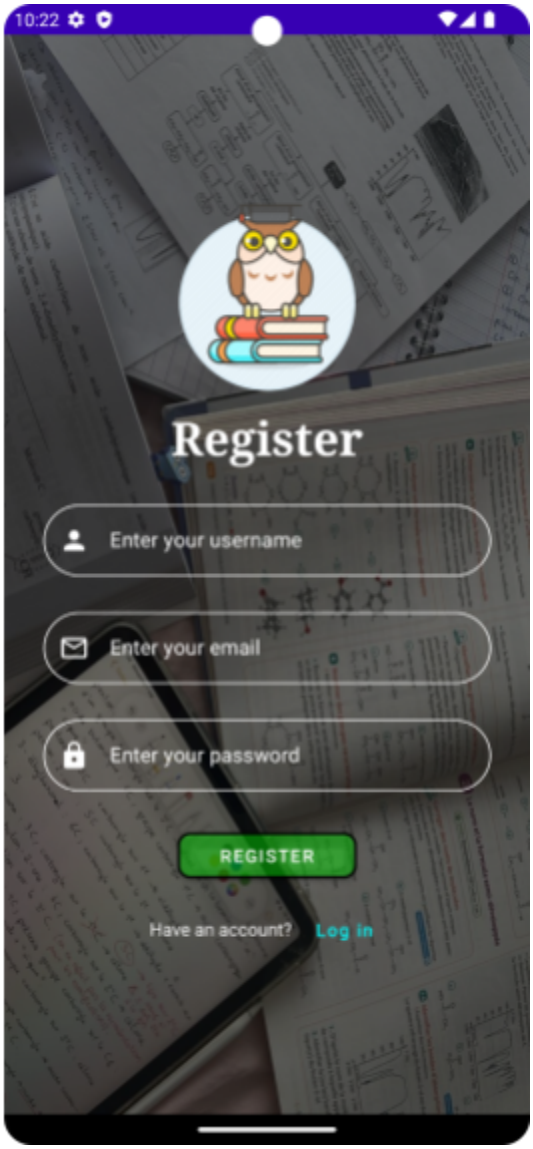
			 LoginActivity – stopped –... Regis CPU 00:00.034 App: 21 % Others: 62 % Threads: 21 Selection Unavailable .owlapplication RenderThread 00.000 05.000  LoginActivity – stopped –... RegisterActivity – stopped CPU 100 % 50 % 00:00.277 Thread: RenderThread Running 200.98 ms Details Unavailable 10.000  Problems Problems File 38 Project Errors 'Project Default' Profile on Project 'Owl Application' Inspection Results 19 errors 14 warnings 28 typos C/C++ 19 errors 14 warnings General 19 errors 14 warnings Clangd errors and warnings 19 errors Empty declaration or statement 14 warnings Proofreading 28 typos Typo 28 typos gradlew 23 typos gradlew.bat 5 typos

2.	Usage	App Size - 10.2 MB Customer Experience - Smooth navigation, adheres to Android design guidelines	
3.	Performance	Error and Crash Rates - 0% Database Query Performance - Efficient queries, average response time: 12 ms	  

9. RESULTS

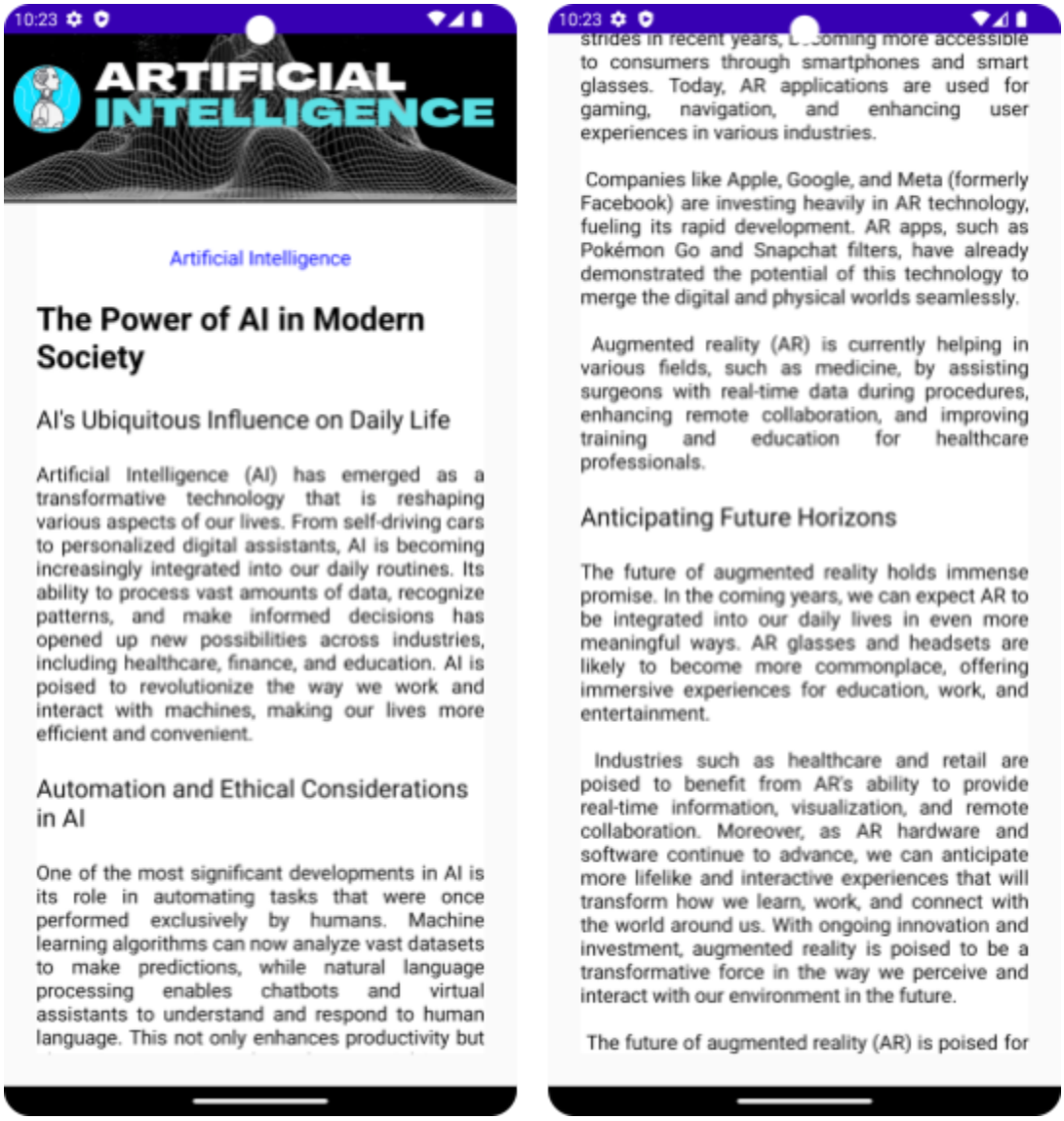
9.1. Output Screenshots






10:22
LATEST ARTICLES
ARTIFICIAL INTELLIGENCE
NEOM
META


10:23
NEOM
META
AUGMENTED REALITY



10. ADVANTAGES & DISADVANTAGES

Benefits of the Educational Owl App:

- User-focused design

For a smooth user experience, the app uses an intuitive and user-friendly design that adheres to Material Design principles.

- Different Educational Resources:

A wide range of study resources, including documents, videos, and reviews, are available to users, creating a thorough learning environment.

- Progress Monitoring: Through the app, users may keep track of their progress in each course, resulting in a customized learning environment.

- Interactive Evaluation Platform: Based on input from peers, the review system promotes user participation and helps make well-informed judgments.

- System of Notification: By informing consumers with fresh material, reviews, and changes, the notification tool increases user engagement.

- Safety precautions: The application places a high priority on user data security by utilizing secure authentication methods and encryption.

Disadvantages of the Owl Educational App:

- Limited Offline Access: The app may require an internet connection to access some study materials, limiting offline learning opportunities

- Dependency on User Reviews: The effectiveness of the review system relies on user participation, and biased or inaccurate reviews may impact the learning experience.

- Device Compatibility: Users with older or less common Android devices may face compatibility issues, affecting accessibility.

- Initial Learning Curve: New users might experience a learning curve while navigating the app, especially if they are not familiar with Material Design conventions.

11. CONCLUSION

In conclusion, the Owl Educational App stands as a testament to the fusion of modern design principles and educational functionality. The implementation of Material Design not only ensures a visually appealing interface but also contributes to a seamless and intuitive user experience. The inclusion of diverse learning materials and a robust progress-tracking system further elevates the app's utility, catering to the varied needs of learners. While challenges such as limited offline access and potential biases in user reviews exist, addressing these through continuous updates and user engagement can fortify the app's position as a dynamic educational companion.

12. FUTURE SCOPE

The Owl Educational App has a tonne of room to grow and improve in the future. Upgrades to the app's gamification components, collaborative learning tools, and offline accessibility may make it much more dynamic and interesting. Compatibility upgrades and sophisticated analytics would also help to expand the audience and provide a more in-depth understanding of user development. The app's potential goes beyond what it can do now; in the future, it might not only adjust to changing educational requirements but also lead the way in developing novel methods of teaching in the digital era.

13. APPENDIX

13.1. Source Code

https://github.com/smartinternz02/Owl-M-A-Material-Design-Study-App

13.2. GitHub & Project Demo Link

https://github.com/smartinternz02/SI-GuidedProject-587199-1696855719

https://youtu.be/k4OfNoIX7E4