Education Supplementary Application (ESA)

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Introduction

* **The Education Supplementary Application (ESA) is a software platform designed to complement traditional educational methods by providing additional resources to students, educators, and learners of all ages.**

objective

* **The Educational Supplementary Application aims to enhance the learning experience for students by providing easy access to a wide range of educational resources, including interactive lessons, quizzes, course materials, and textbooks.**

Functionalities

Functional requirements

* **User Registration and Authentication:** Users can register for an account and log in using their credentials.

* **Course Management:** Users can view and enroll in available courses, access course materials, and track their progress.

* **Discussion Forum:** Users can participate in course-related discussions through a forum.

Functionalities

Functional requirements

* **User Profile Management:** Users can view and update their profile information and track course enrollments.

* **User Roles and Permissions:** The system defines user roles and permissions for course management and administrative tasks.

* **Interactive Lessons and Quizzes:** The system provides interactive lessons and quizzes for various courses.

Functionalities of the System

Non-Functional requirements

* Usability
* Reliability:
* Performance:
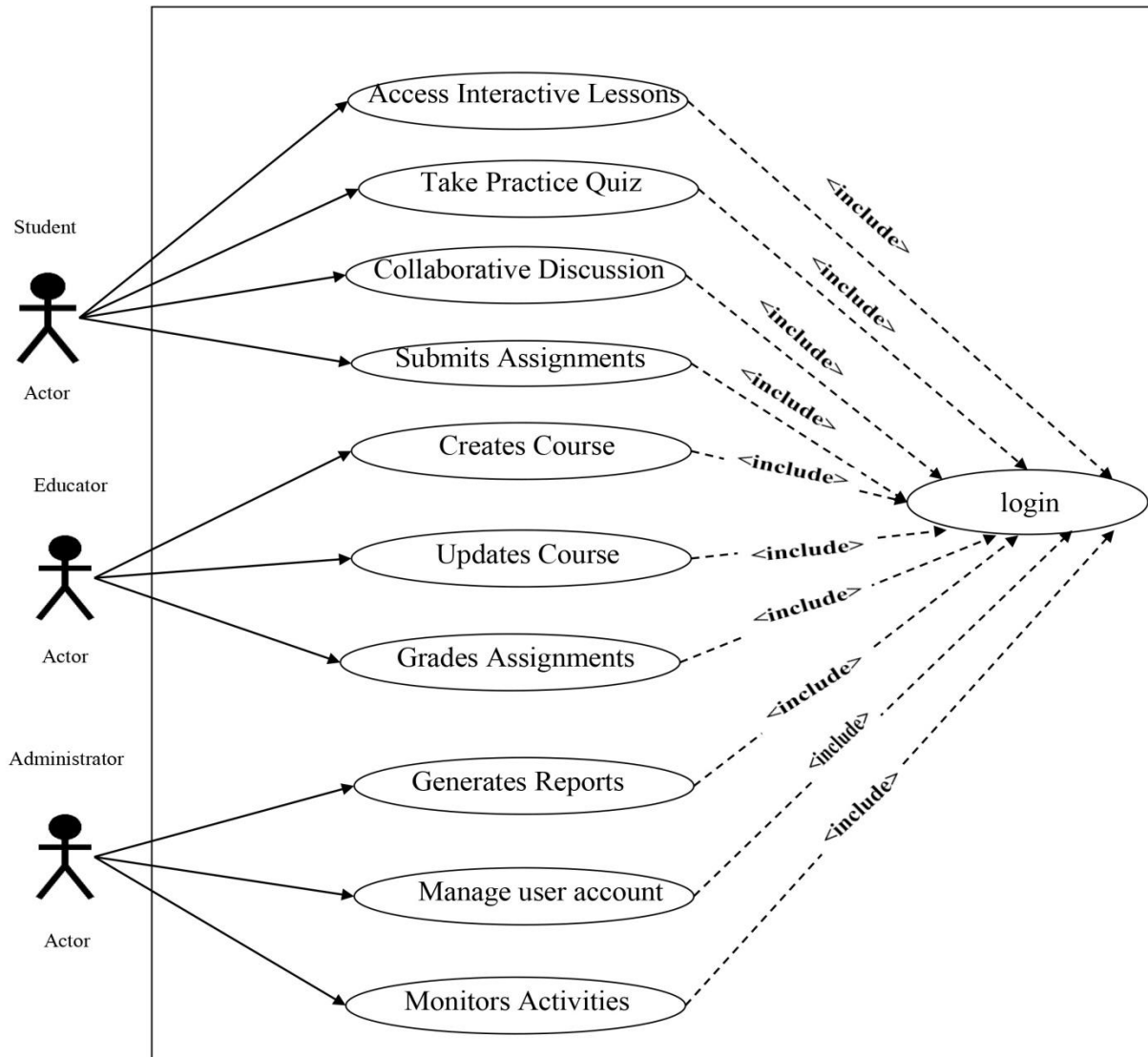* Security and Privacy:
* Compatibility:
* Accessibility:

Scope

* Educational content management and delivery.
* User authentication and data security.
* Separate user interfaces for students, educators, and administrators.
* Available for students of all ages and educational levels Covers a wide range of subjects and grades.
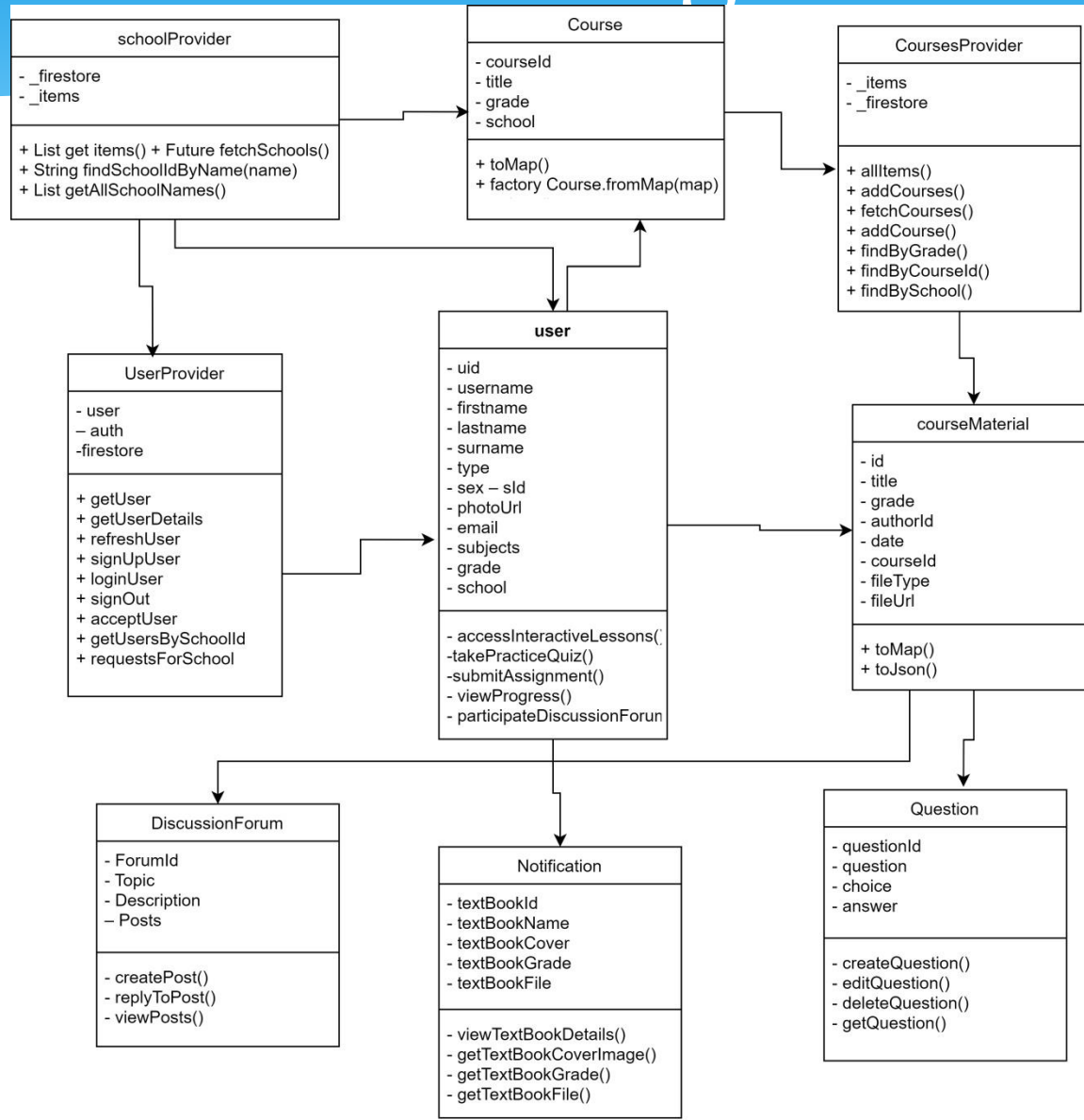* Platform accessible on mobile and web devices.

Challenges

* **Educational content management and delivery.**
* **User authentication and data security.**
* **Separate user interfaces for students, educators, and administrators.**
* **Available for students of all ages and educational levels**
* **Covers a wide range of subjects and grades.**
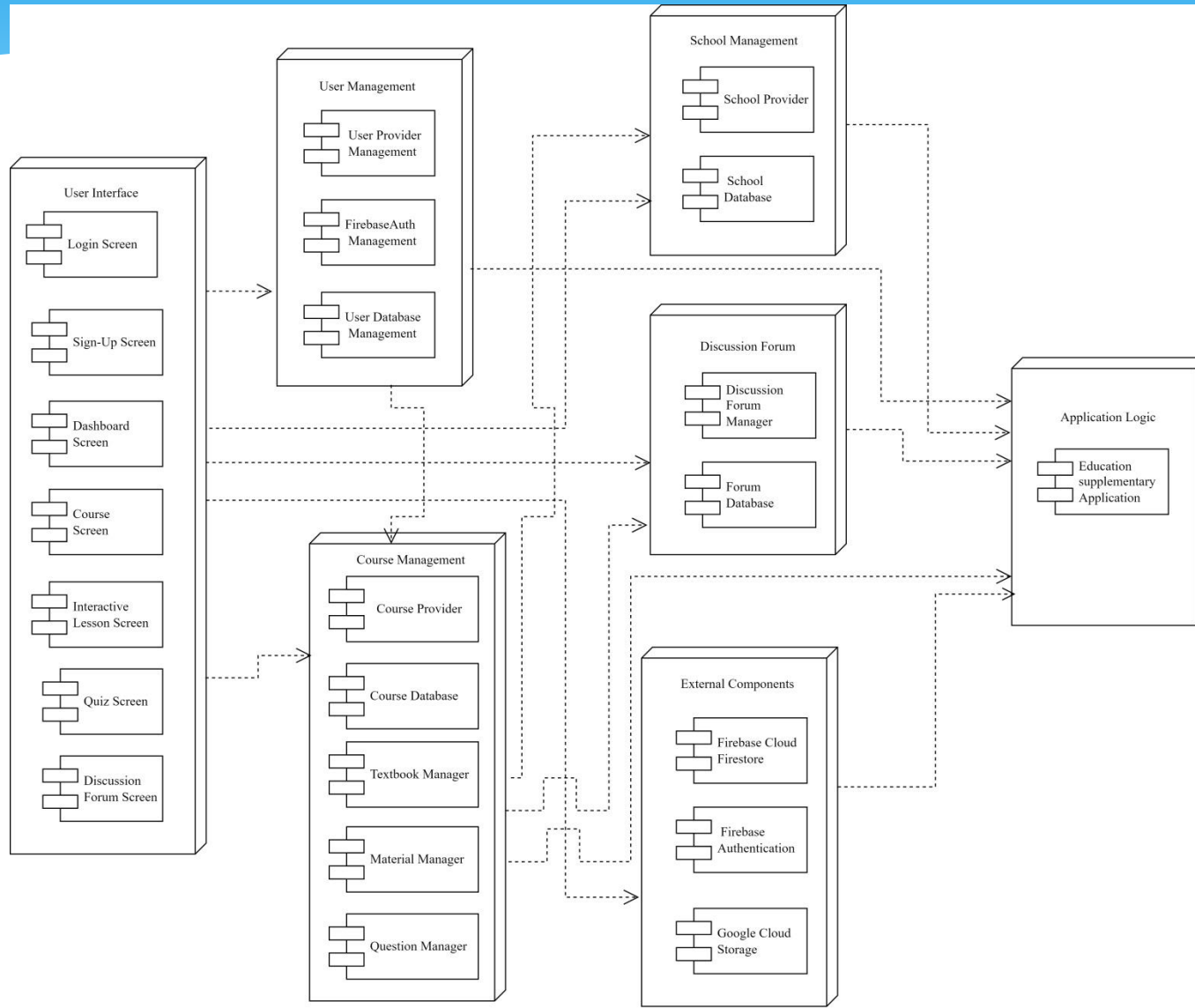* **Platform accessible on mobile and web devices.**

Use Case Diagram

Class Diagram

schoolProvider

- _firestore
- _items

+ List get items() + Future fetchSchools()
+ String findSchoolIdByName(name)
+ List getAllSchoolNames()

Course

- courseId
- title
- grade
- school

+ toMap()
+ factory Course.fromMap(map)

CoursesProvider

- _items
- _firestore

+ allItems()
+ addCourses()
+ fetchCourses()
+ addCourse()
+ findByGrade()
+ findByCourseId()
+ findBySchool()

UserProvider

- user
– auth
-firestore

+ getUser
+ getUserDetails
+ refreshUser
+ signUpUser
+ loginUser
+ signOut
+ acceptUser
+ getUsersBySchoolId
+ requestsForSchool

user

- uid
- username
- firstname
- lastname
- surname
- type
- sex – sId
- photoUrl
- email
- subjects
- grade
- school

- accessInteractiveLessons(')
-takePracticeQuiz()
-submitAssignment()
- viewProgress()
- participateDiscussionForun

courseMaterial

- id
- title
- grade
- authorId
- date
- courseId
- fileType
- fileUrl

+ toMap()
+ toJson()

DiscussionForum

- ForumId
- Topic
- Description
– Posts

- createPost()
- replyToPost()
- viewPosts()

Notification

- textBookId
- textBookName
- textBookCover
- textBookGrade
- textBookFile

- viewTextBookDetails()
- getTextBookCoverImage()
- getTextBookGrade()
- getTextBookFile()

Question

- questionId
- question
- choice
- answer

- createQuestion()
- editQuestion()
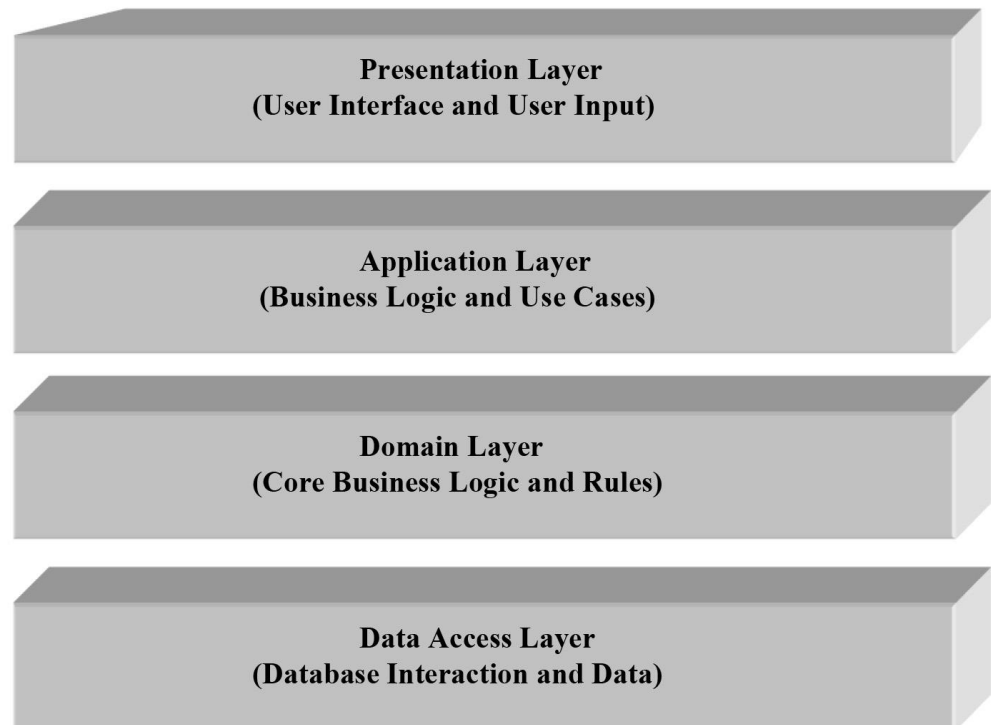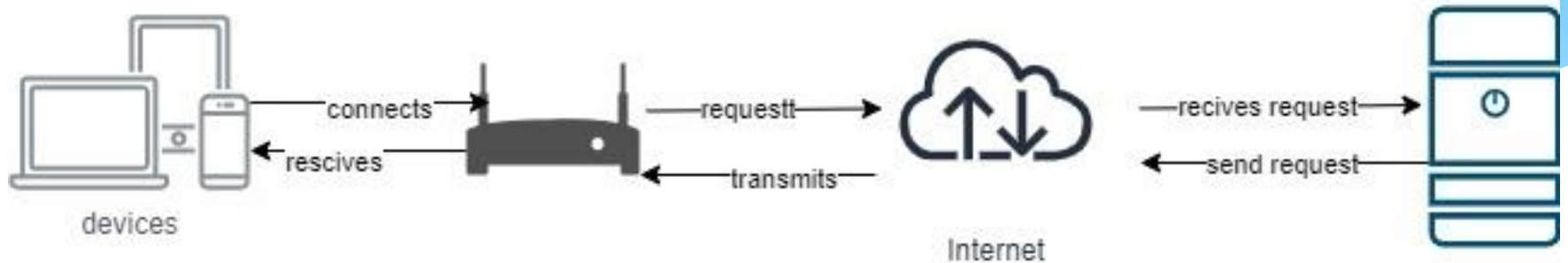- deleteQuestion()
- getQuestion()

Component Diagram

Architecture

The architecture follows a client-server model, where the client-side handles the user interface and interactions, while the server-side manages data storage, processing, and business logic.

key components
of the architecture

Presentation Layer
(User Interface and User Input)

Application Layer
(Business Logic and Use Cases)

Domain Layer
(Core Business Logic and Rules)

Data Access Layer
(Database Interaction and Data)

Architecture

* **Client/Server Relationships**

* **Use of Firebase as the NoSQL database system for distributed data storage and high availability.**

Development Tools

* For development we are using **Dart/Flutter framework.** It is a popular open-source UI toolkit for developing high-quality, natively compiled applications for mobile, web, and desktop.

* **For Database tools** we are using **Firebase.** Firebase is a mobile and web development platform owned by Google, that provides a suite of tools and services to help developers build high-quality, scalable applications.
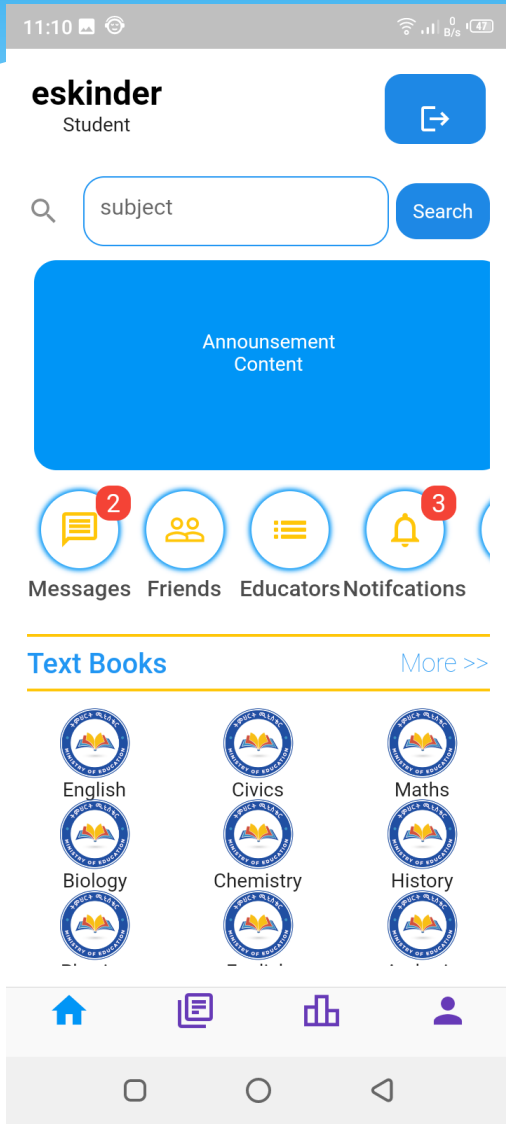
Interface
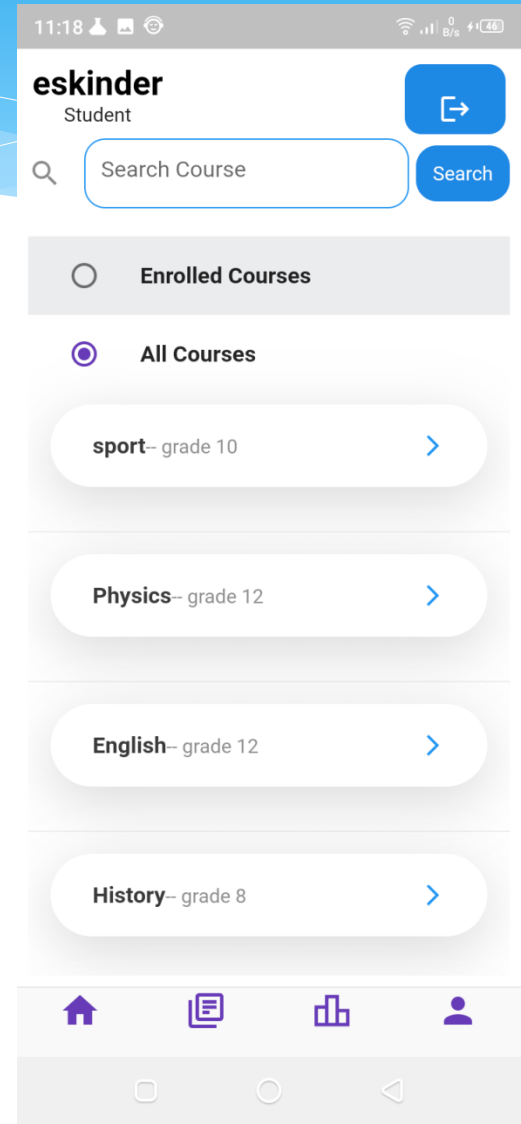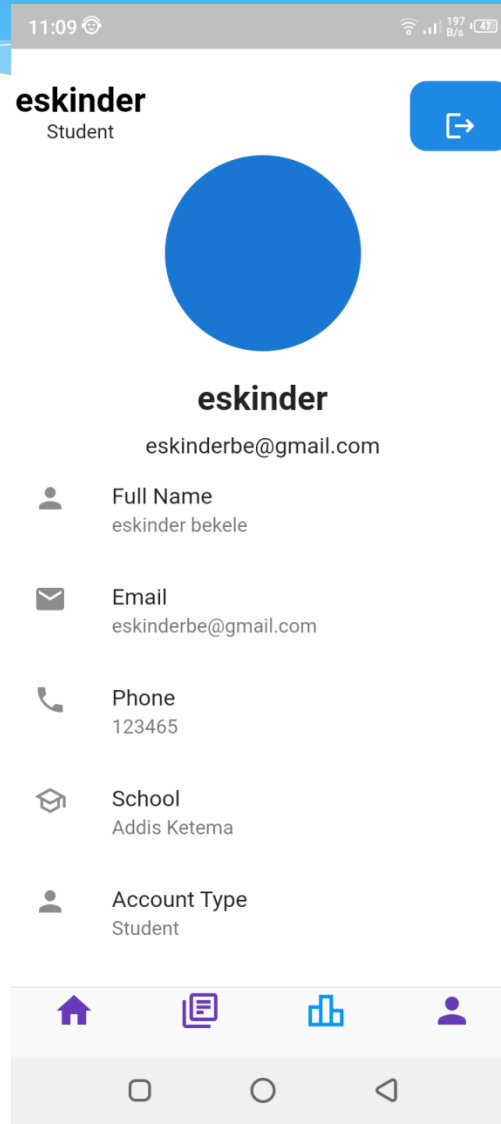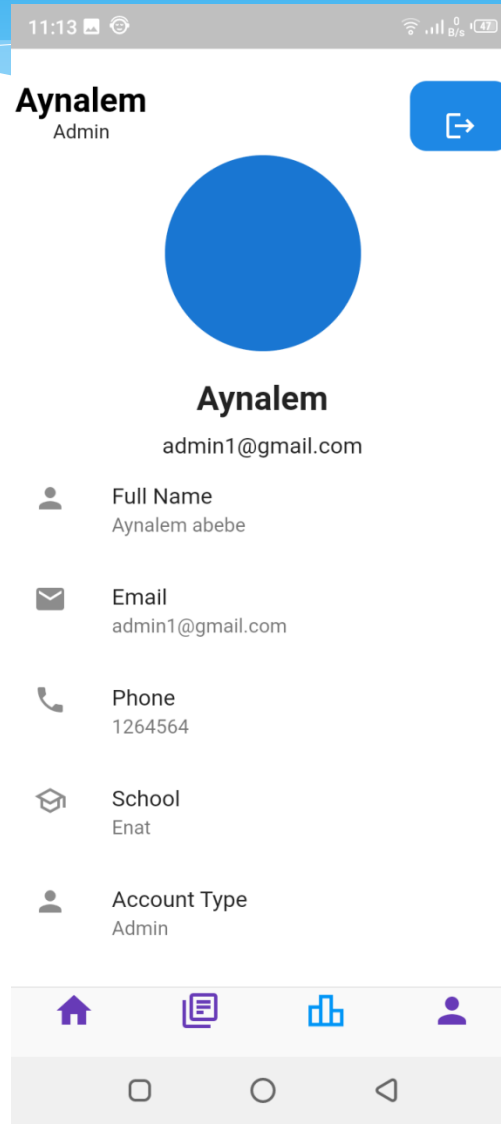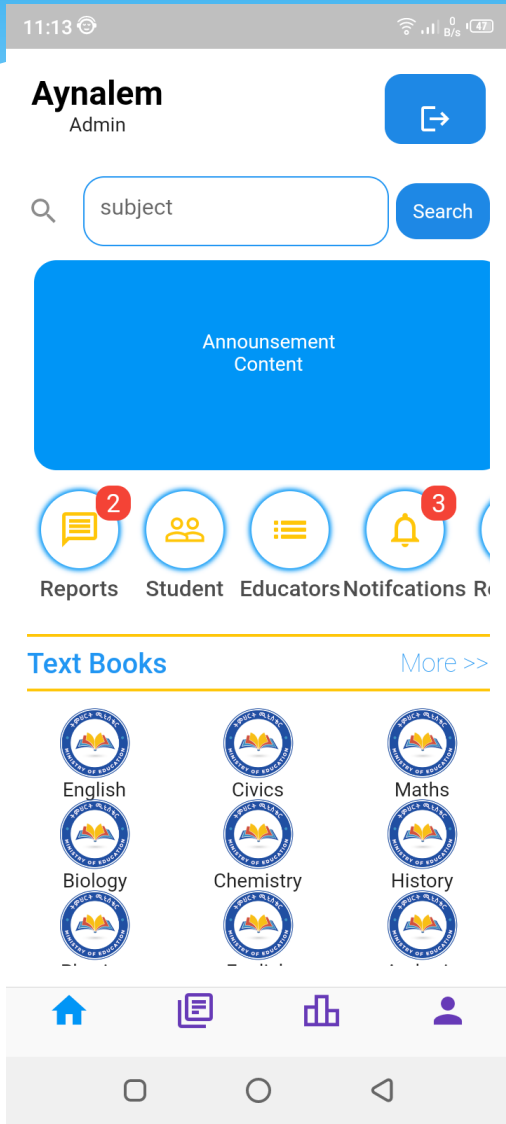
Interface

Interface

Conclusion

* The Education Supplementary Application(ESA) stands ready to empower the education sector with its user-friendly interface, reliable functionality, and potential for future enhancements.

Future work

* Enhanced Collaboration Features
* Personalization and Adaptive Learning
* Support for Multilingual Content

Thank you