

EASY LEARN: SIMPLIFYING EDUCATION WITH AUTOMATED PLANNING AND LEARNING MATERIALS

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ABSTRACT

EasyLearn is an Android application that automates a variety of academic duties for both educators and students, all based on AI and automation that facilitates tasks like the ones of timetable generation and one-on-one applications for learning assistance. Developed using Kotlin with Firebase integration, the app increases efficiency and saves labor in the educational sector. The paper studies the development and outcome of EasyLearn in advancing thirteen efficiencies.

Keywords: Academic Automation, AI-powered Learning Tools, Personalized Learning, Educational Technology.

1. INTRODUCTION

In today's education sector, the rampant phase of technological growth has made this a clear realization of how technology is being used to do the work of those who participated in the education and training of students of how important it is to have such solutions. There are many reasons for this development. On the one hand, teachers face the hardest pressure but on the other hand, students are also needed to perform academically in a more progressive way; it has become essential to automate tedious duties. A recent global survey conducted by the World Economic Forum has projected that by 2025, robots can replace 40% of the jobs in different sectors. This situation is expected to be felt in the teaching sector too as tasks that include time-tabling, setting assignments, and assessing students take up the time of both the teachers and the students to do some important work as teaching and learning.

2. OBJECTIVES

The primary objective of the **EasyLearn** project is to develop an Android-based application that automates essential academic tasks for both teachers and students. The application aims to reduce manual effort and enhance productivity through automation and AI-powered tools. Specific objectives include:

1. **Automating Teacher Tasks:** To provide tools like the Automatic Timetable Generator, Pre-Lecture Planner, and Unit Assignment Generator that simplify and optimize teachers' workflows.
2. **Enhancing Student Learning:** To offer features such as the Automatic Question Generator, AI-powered Doubt Solver, and Answer Accuracy Measurer to support personalized and efficient student learning.
3. **Seamless Real-Time Data Management:** To integrate Firebase for real-time synchronization between teachers and students, ensuring that data, assignments, and feedback are updated instantly.
4. **Simplifying Report Generation:** To enable the Project Report Generator, which automatically formats and compiles reports, reducing the workload on students.
5. **Improving Academic Productivity:** To increase overall productivity in academic institutions by streamlining repetitive tasks through automation and AI.

Current Market Needs and Problems: Traditional academic processes are often time-consuming and prone to human error. Teachers spend countless hours managing schedules, preparing assignments, and grading papers, while students face challenges in accessing tailored academic resources and guidance. A study conducted by McKinsey Global Education revealed that teachers spend about 20 hours per week on administrative tasks, leaving less time for direct student engagement. Similarly, students lack personalized learning support, leading to inefficiencies in exam preparation and academic performance.

BACKGROUND:

Educational technology (EdTech) has evolved significantly over the past decade, with digital tools becoming increasingly central to learning environments. According to a 2023 report, the global EdTech market is expected to reach \$404 billion by 2025, driven by increased demand for automation and AI in education. Key terms in this field include **academic automation**, which refers to the use of software to streamline tasks like assignment creation and timetable generation, and **AI-powered learning**, which enhances personalized support for students and teachers. Android-based applications like **EasyLearn**, developed using **Kotlin** and integrated with **Firebase**, represent the latest advancements in simplifying academic workflows.

3. LITERATURE SURVEY

1. **Automation in Education:** Studies show that teachers spend up to 40% of their time on administrative tasks like assignment creation and lesson planning (McKnight et al., 2021). Current tools, such as Google Classroom and Microsoft Teams, offer basic automation but require manual input for tasks like assignment distribution and question generation. Few platforms provide complete automation, leaving gaps in productivity for educators.
2. **AI in Education:** AI tools in education, like adaptive learning platforms, can enhance personalized learning by providing tailored content and real-time feedback (Zawacki-Richter et al., 2019). However, existing solutions are often limited in scope or expensive. Tools like Socratic use AI for specific tasks, but comprehensive, multi-subject AI-powered tools for tasks like doubt resolution or grading remain underdeveloped (Luckin et al., 2016).
3. **Real-Time Academic Management Systems:** Real-time data synchronization between teachers and students is critical for effective academic management. Firebase, an open-source platform for real-time database management, has been used in educational apps to track attendance, monitor student progress, and manage academic records.

However, many of the existing applications utilizing Firebase are primarily focused on student management and missing tools for teachers such as automated pre-lecture planning and timetable generation.

To bridge this gap, researchers like **Kumar et al. (2020)** have advocated for the creation of integrated platforms that not only track student progress but also automate tasks for teachers. Despite this, few platforms have been successful in simultaneously addressing the productivity needs of both students and educators within a unified system.

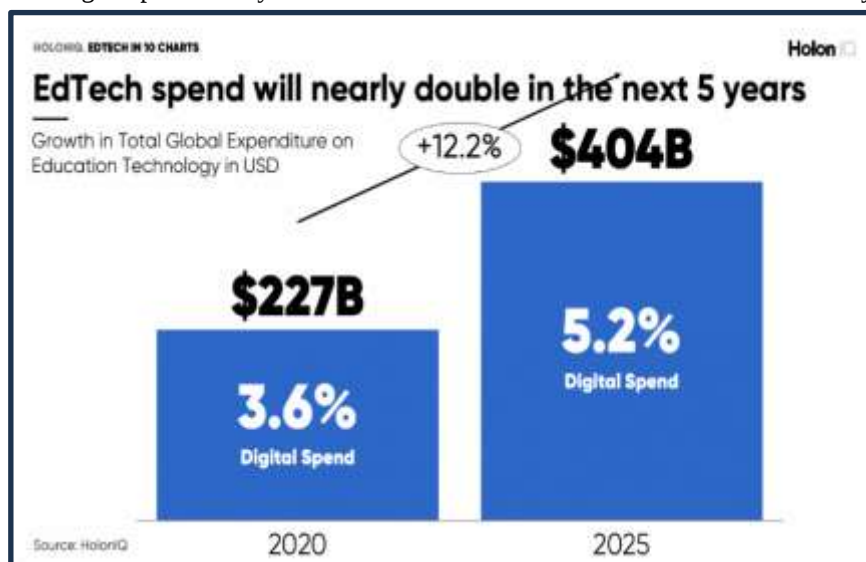


Fig. 1. EdTech market global expenditure between 2020 to 2025

4. GAPS IN EXISTING SOLUTIONS

While these tools and studies provide valuable insights into the current state of academic automation, many gaps remain unaddressed. Existing solutions often:

- Lack of comprehensive integration of tools for both teachers and students within a single platform.
- Require significant manual input for task execution, making the user experience less efficient.
- Do not provide real-time AI-powered solutions for personalized student support or automated content generation (e.g., assignments, textbooks, and reports).
- Fail to automate repetitive tasks like timetable creation, assignment distribution, and student progress tracking, which are essential for enhancing productivity.

How EasyLearn Fills These Gaps:

EasyLearn addresses these limitations by offering a **fully integrated platform** that automates both student and teacher tasks using AI and real-time data management. By incorporating features like the **Automatic Timetable Generator**, **Unit Assignment Generator**, and **AI-powered Doubt Solver**, it not only reduces manual work but also provides real-time, personalized academic support to students. Moreover, its integration with **Firebase** ensures that data synchronization between teachers and students is seamless, improving communication and efficiency.

Where other platforms focus on fragmented solutions, **EasyLearn** brings together a complete academic automation package, making it a unique contribution to the field of EdTech.

5. FEATURES AND WORKING :

1. **Automatic Micro-Project Generator:** This tool simplifies micro-project report creation for students. It takes user details (team info, institute details, subject, guide name, etc.), project problem statement, and a brief description as input. Using Gemini AI API 1.5 Flask with a predefined prompt, it generates report content (abstract, introduction, main content, summary, etc.) in .docx format. FilePicker handles document processing, requiring the user to provide the report format.



Fig. 2. Micro-Project Report Generator-EasyLearn

2. **Doubt Solver Assistant:** Designed for students, this tool helps clarify doubts by providing detailed explanations. It takes a concept name as input and returns information such as its introduction, origin, background, common doubts, real-world examples, and exam-related questions. It generates responses using Gemini AI Text Generation API 1.5 Flask with a predefined prompt.



Fig. 3. Doubt-Solver Assistant-EasyLearn

3. Automatic Unit-wise Assignment Generator: This tool helps teachers create assignments efficiently. It requires inputs like branch, subject name and code, number of questions, and whether the subject is theory or MCQ-based. The tool generates assignments in the required format using Gemini AI API 1.5 Flask with a predefined prompt and processes documents with FilePicker and XWPdf class.

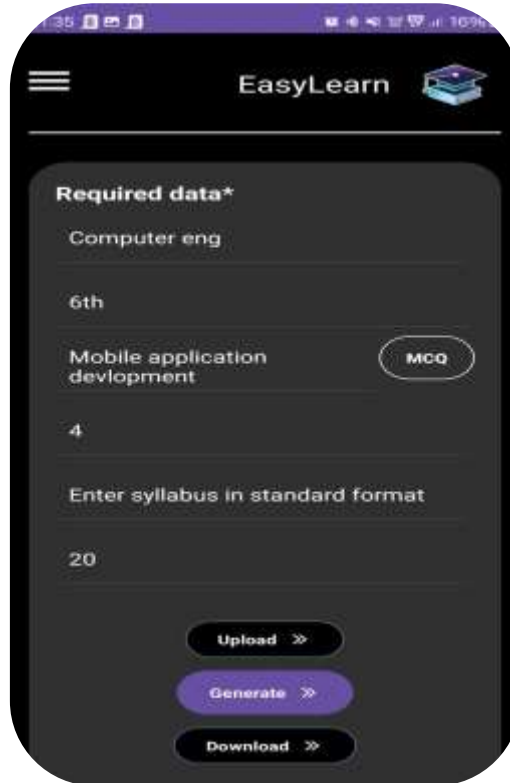


Fig. 4. Automatic Assignment Generator-EasyLearn

4. Pre-Lecture Planner: This tool assists teachers in lecture preparation by consolidating essential information. Given a topic name, it provides an introduction, history, core concepts, real-time examples, and related exam questions. It delivers text-based outputs using Gemini AI Text Generation API 1.5 Flask with a predefined prompt.

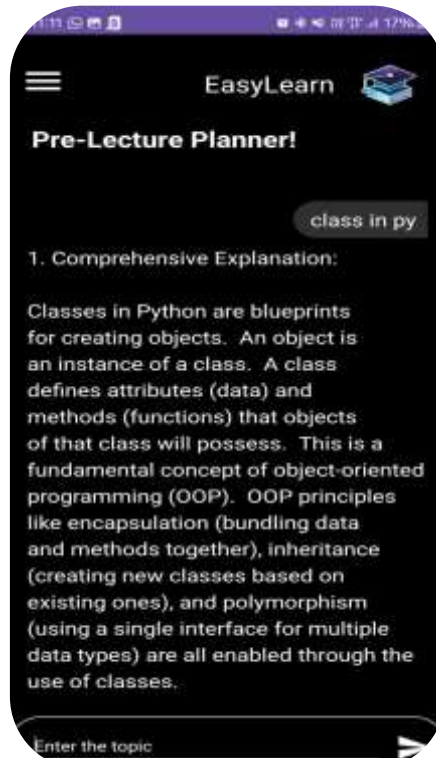


Fig. 5. Pre-Lecture Planner -EasyLearn

5. Automatic Timetable Generator: This tool prevents overlapping lectures by generating an optimized timetable for an entire department. It takes inputs like the number of classrooms, divisions, subjects per class, and teachers. A custom algorithm efficiently generates the schedule, and FilePicker with XWPdf class manages document output.
6. Unit-wise Workbook Generator: Designed for teachers, this tool creates workbooks to aid student revision. It requires inputs like subject name, code, number of questions, branch name, and desired .docx format. The tool arranges questions based on their weightage (2, 4, or 6 marks) and includes writing space for answers. It utilizes Gemini AI Text Generation API 1.5 Flask with a predefined prompt and handles document creation with FilePicker and XWPdf class.

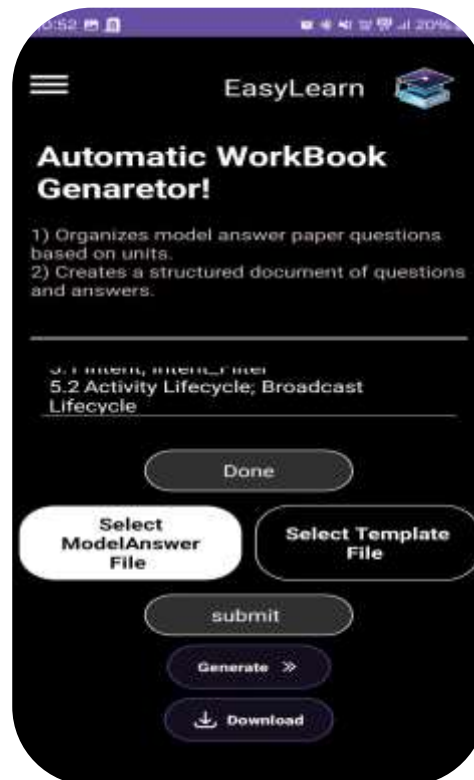


Fig. 6. Automatic Workbook Generator -EasyLearn

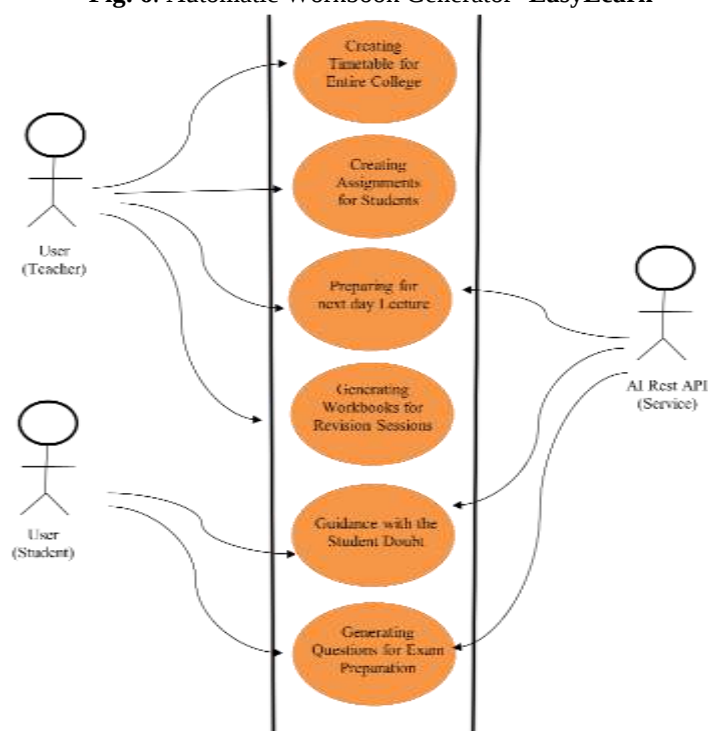


Fig. 7. Use Case Diagram- EasyLearn

PROPOSED SYSTEM:

1. System Overview

EasyLearn is an Android-based app that automates academic tasks for teachers and students using AI and Firebase for real-time data synchronization. Built with Kotlin, it streamlines workflows and reduces manual effort.

2. Key Features

Timetable Generator: Creates conflict-free timetables.

Assignment Generator: Automates assignment creation based on syllabus, notes, and exam papers.

Textbook Generator: Produces unit-wise revision materials.

Pre-Lecture Planner: Prepares teachers with relevant lecture content.

AI Doubt Solver: Solves student queries in real time.

Report Generator: Automatically compiles academic reports.

3. System Architecture:

The client-side Android app handles user input, while Firebase manages real-time data synchronization for seamless communication between teachers and students.

4. Modules:

Teacher Module: Includes tools like the Timetable and Assignment Generators.

Student Module: Offers the Doubt Solver and Question Generator.

5. Data Flow

user inputs are processed by AI algorithms and Firebase, displaying real-time outputs like timetables and assignments, ensuring smooth interaction between teachers and students.

6. AI Integration

AI powers the Doubt Solver and Question Generator, offering tailored support by analyzing input data and previous content.

7. Expected Outcomes

EasyLearn will automate academic tasks, boost productivity, and enhance personalized learning for students while reducing teachers' workloads.

8. System Requirements:

Platform: Android 5.0 and above

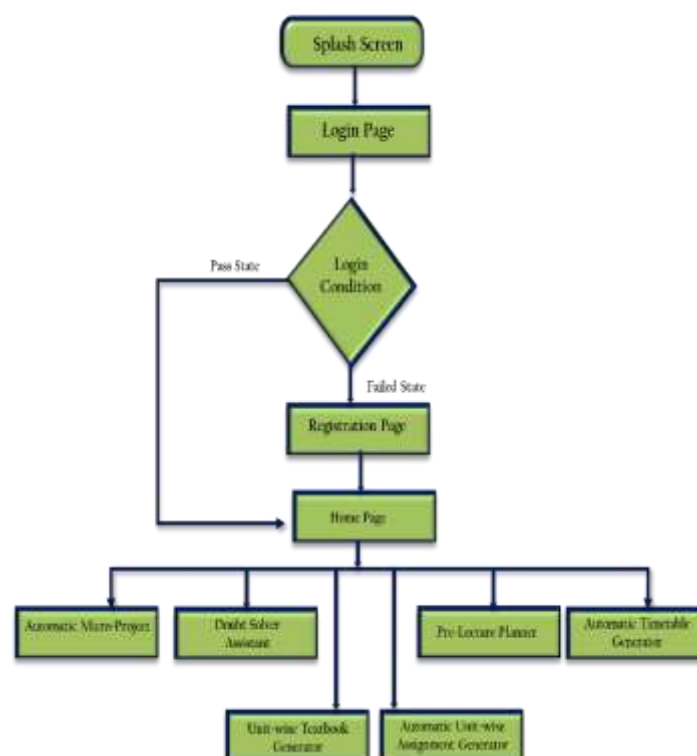


Fig. 8. Data Flow Diagram - EasyLearn

Programming: Kotlin

Backend: Firebase

AI Tools: TensorFlow Lite, Google's Gemini API

Storage: Cloud-based

6. CONCLUSION

EasyLearn addresses the challenges of managing academic tasks for both teachers and students by automating processes like timetable generation, assignment creation, and doubt resolution. Integrating AI and Firebase improves efficiency, reduces manual effort, and offers personalized support. The app's features, such as real-time data management and automatic report generation, streamline academic workflows, allowing teachers to focus on teaching quality and students to benefit from tailored assistance. Future updates could enhance its AI capabilities and expand its platform reach, making it even more adaptable to evolving educational needs.

7. REFERENCES

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