

Access to Quality Education

Lab 1: Access to Quality Education

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Version 1

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1 Introduction

Access to quality education remains a pervasive issue, particularly in underserved communities and for individuals with diverse learning needs. Traditional teaching methods often fail to address different learning styles, disabilities, or socioeconomic challenges, leaving many students without the necessary resources to thrive. Despite advances in technology, the education system struggles to integrate tools that promote equitable and personalized learning opportunities at scale.

A survey by the American Instructional Resource Survey shows that teachers in poverty zones and less experienced teachers are more likely to report the provided materials are too hard for their students. Of the teachers that reported their materials are too challenging for their students, math teachers reported that they were less likely to use their materials for their class instruction time. In economically challenged cities such as Baltimore, the proficiency rates for students are below average. A study conducted by the National Assessment of Educational Progress showed that 81% of fourth graders that qualified for free or reduced had lower literacy levels and were four times less likely to graduate high school. The United States as a country spends more money on average for student education than most of the other Organization for Economic Cooperation and Development countries.

A potential solution to fixing this problem would be a mobile application that allows students and teachers to bridge the gap their materials cannot accomplish. This application should have personalized learning, which can be accomplished via adaptive lesson plans, multimodal accessibility tools, and gamified modules such as those found in applications like Duolingo. It should foster collaboration with dashboards for students, teachers and parents while providing a resource library for subjects covered in their schools' curriculum. The application should also leverage modular learning, cloud technologies and real-time communication. This platform enhances engagement and ensures equitable education for all.

Minnow provides this solution. Minnow provides an education platform that personalizes learning experiences through adaptive lesson plans, and multimodal tools such as text-to-speech voiceovers and close captioning. It will have accessibility features with gamified modules and multilingual support. Minnow will be the primary tool for making education inclusive and engaging at scale.

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2 Product Description

Minnow is an adaptive learning platform designed to enhance education through personalized lesson plans and interactive engagement. It supports diverse learners with accessibility features and a collaborative dashboard for tracking progress. While Minnow supplements traditional education, it does not replace formal schooling, provide certifications, or guarantee academic improvement. Instead, it offers a flexible, curriculum-based resource accessible anytime with an internet connection. The following figures describe the current process flow that is elaborated on in the introduction, and how Minnow plans to address that flow.

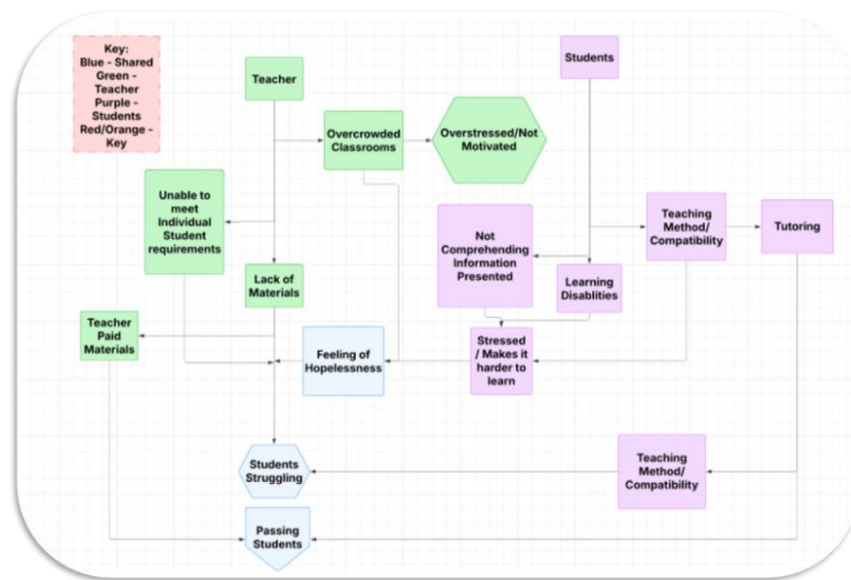


Figure 1: Current Process Flow

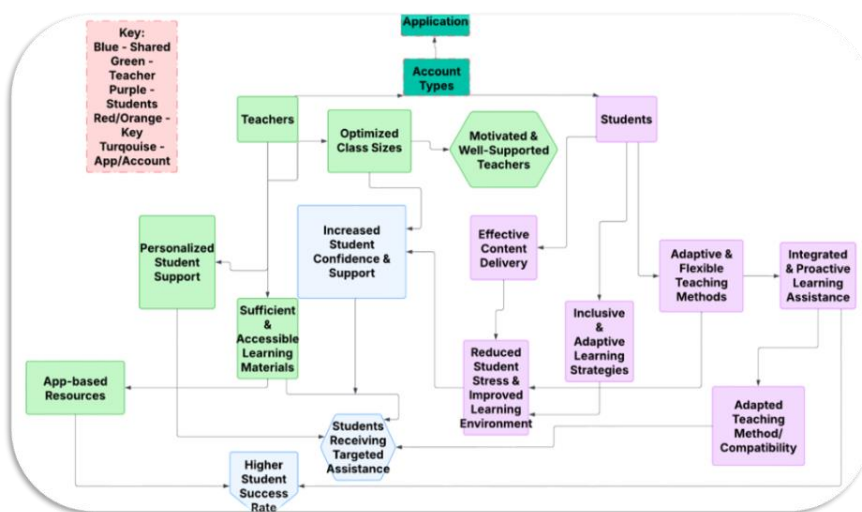


Figure 2: Solution Process Flow

2.1 Key Product Features and Capabilities

Minnow tailors lesson plans to individual student needs, adapting to strengths and weaknesses for a personalized learning experience. It incorporates accessibility tools such as text-to-speech, closed captioning, and visual aids to support diverse learners. Gamified modules enhance engagement through interactive lessons and quizzes, while a collaborative dashboard connects students, teachers, and parents for real-time progress tracking. The platform also includes a resource library with videos, exercises, and virtual tutoring options, ensuring a comprehensive and flexible learning experience.

2.2 Major Components (Hardware/Software)

Below is a diagram of the major components that our software intends to implement in order to achieve the features specified in the previous section.

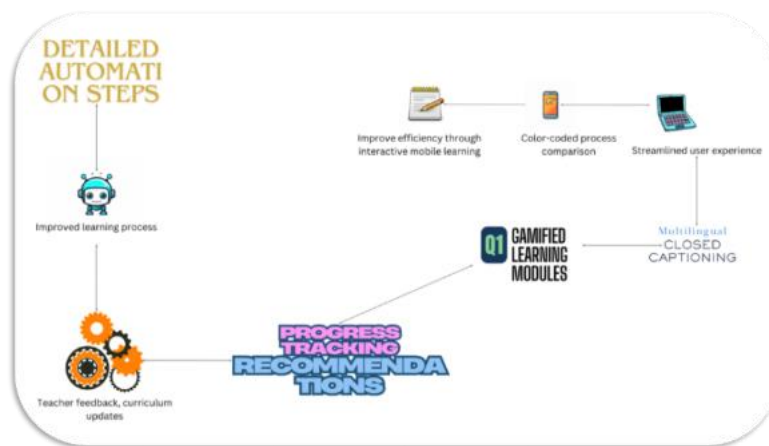


Figure 3: Major Functional Components Diagram

The software will require something like a LAMP stack, using Docker, React, PostgreSQL, and NodeJS. The software being developed will be an online based mobile application that provides dynamically updated and gamified quiz activities for a wide range of educational purposes. As such, it will require a hosting provider to ensure online functionality.

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3 Identification of Case Study

This product's primary target is low resource educators who do not have funding or other tools to enhance their classrooms. Students are the main users who will use the activities; however, it is teachers that will be assigning them and ensuring that learning targets are met. Teachers that are provided with adequate resources through our tool will be able to focus more of their effort on individual student outcomes rather than creating their own resources which may take up much of their time outside of work. Future use outside of the classroom will include fully self-paced subjects, as well as the ability for parents to help homeschool their children by covering areas they may not be experts in.

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4 Glossary

Accessibility Tools - Features such as text-to-speech, closed captioning, and visual aids that support diverse learners.

Gamification - The use of interactive lessons, quizzes, and rewards to enhance student engagement.

Multimodal Learning - An approach that integrates various forms of content delivery, including visual, auditory, and interactive methods.

Personalized Learning - Adaptive lesson plans that adjust based on a student's strengths and weaknesses.

Role-Based Access - A security feature that ensures users (students, teachers, parents) have appropriate permissions based on their role.

Secure Authentication - Measures to protect user privacy and maintain data security.

Virtual Tutoring - Online support resources designed to assist students outside of traditional classroom settings.

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