SE 201.3 – System Analysis and Design

Group Assignment

System Specification of Student Record Management System

Sunshine Primary School

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Group Members

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Table of Contents

1. Introduction to the system

Sunshine Primary School, a distinguished institution serving grades 1-5, currently grapples with numerous inefficiencies due to its dependence on a paper-based student record management system. This antiquated method of managing student records introduces various challenges, such as increased potential for human error, substantial delays in accessing and sharing vital information, and difficulties in maintaining data integrity. The manual nature of this system means that administrative staff must devote considerable time and effort to tasks that could be automated, leading to decreased productivity and increased operational costs. The reliance on physical documents raises the risk of data inconsistencies and misplacement of files. Important student information, such as academic records, attendance, and behavioral reports, can easily be lost or damaged, leading to gaps in student histories and complications in providing consistent support. The lack of a centralized system further exacerbates these issues, limiting the ability of teachers and administrators to collaborate effectively. This fragmentation of information hinders data-driven decision-making, which is crucial for tailoring educational strategies to meet the diverse needs of students.

In response to these challenges, we have developed a robust digital application tailored specifically to the needs of Sunshine Primary School. Our application is designed to replace the current paper-based system with an efficient, secure, and user-friendly digital platform. This system will centralize all student records, making it easier for authorized personnel to access, update, and share information quickly and accurately. By digitizing student records, we aim to eliminate the risk of data loss and ensure consistency and reliability in record-keeping. The app will facilitate real-time collaboration among teachers, administrators, and parents, enabling more informed and timely decisions regarding student support and development. Enhanced data analytics capabilities will allow the school to track and analyze student performance and engagement more effectively, leading to better-targeted interventions and improved educational outcomes.

Our digital solution aspires to transform the administrative processes at Sunshine Primary School, promoting a more organized, efficient, and responsive educational environment. By embracing modern technology, the school can continue to uphold its commitment to providing high-quality education while optimizing its administrative functions.

2. Feasibility study

Feasibility study for a Student Record Management System (SRMS) at Sunshine Primary School would involve an in-depth analysis across several key areas to determine the viability of the project.

2.1 Technical Feasibility:

- System Requirements: Assess whether the current IT infrastructure can support the SRMS.
- Software Compatibility: Ensure the SRMS is compatible with existing software tools used by the school.
- Data Migration: Evaluate the process of transferring existing records into the new system.

2.2 Economic Feasibility:

- Cost-Benefit Analysis: Compare the costs of implementing the SRMS with the expected benefits, such as time savings and error reduction.
- Budget Allocation: Determine if the school's budget can accommodate the SRMS without compromising other essential services.

2.3 Legal and Compliance Feasibility:

- Data Protection Laws: Verify that the SRMS complies with local and international data protection regulations.
- Record Retention Policies: Ensure the system adheres to statutory record-keeping requirements.

2.4 Operational Feasibility:

- Staff Training: Assess the training needs for staff to effectively use the SRMS.
- Change Management: Plan for the transition from paper-based to digital records, considering the impact on staff workflows.

2.5 Social Feasibility:

- Stakeholder Acceptance: Gauge the willingness of teachers, parents, and students to adapt to the new system.
- Cultural Fit: Ensure the SRMS aligns with the school's values and educational mission.

2.6 Schedule Feasibility:

- Implementation Timeline: Develop a realistic timeline for the SRMS rollout, including testing and training phases.
- Resource Availability: Check the availability of technical and human resources required for the project.
- By addressing each of these feasibility areas, Sunshine Primary School can ensure that the proposed SRMS is practical, cost-effective, legally compliant, operationally sound, socially acceptable, and can be implemented within a reasonable timeframe.

3. Requirements & Methodology

To develop the digital student record management system for Sunshine Primary School effectively, an agile methodology is recommended. Here's how this methodology can be applied along with the requirement collection methods and the breakdown of different types of requirements.

3.1 Agile Methodology Application:

1. **Requirement Collection Methods:**
    - **Stakeholder Interviews**: Engage with school administrators, teachers, parents, and IT staff through interviews to understand their pain points, expectations, and specific needs related to student record management.
    - **User Stories and Workshops**: Collaborate with stakeholders to define user stories that capture their requirements and conduct workshops to refine these stories.
    - **Prototyping:** Develop prototypes to visualize the system and gather feedback early in the development process.
    - **Surveys and Feedback**: Collect feedback through surveys or focus groups to ensure all perspectives are considered.
2. **Requirements:**
    - **Business Requirements:**
        - **Efficiency**: Simplify data entry and retrieval processes to reduce time spent on administrative tasks.
        - **Accuracy:** Ensure data integrity and provide real-time updates to ensure accurate records.
        - **Accessibility**: Enable secure access to student data from multiple locations and devices to facilitate collaboration and decision-making.
        - **Security:** Implement robust security measures (e.g., encryption, access controls) to protect sensitive student information.
        - **Scalability**: Design a system that can accommodate growth in data volume and user base over time.

- **User Requirements**:
    - **Administrators:** Require efficient data management tools and customizable reporting capabilities.
    - **Teachers**: Need easy access to student profiles, attendance records, and academic performance data.
    - **Parents:** Desire user-friendly portals to monitor their child's progress and communicate with teachers.
- **Functional Requirements**:
    - **Data Management:** Allow for easy data entry, retrieval, and updates.
    - **Automated Notifications**: Send alerts for important events (e.g., absence, grades) to stakeholders.
    - **Customizable User Roles**: Provide different levels of access based on user roles (e.g., teacher, parent, and administrator).
    - **Integration**: Integrate with existing systems (e.g., school management software, communication platforms).
- **Non-Functional Requirements:**
    - **Performance:** Ensure system responsiveness and scalability to handle concurrent users.
    - **Reliability**: Minimize downtime and ensure data availability and integrity.
    - **Usability:** Design an intuitive interface to facilitate adoption and reduce training needs.
    - **Security**: Implement encryption, access controls, and audit trails to protect student data.

3.2 Development Process:

1. **Iteration Planning:**
    - **Backlog Refinement**: Prioritize user stories and requirements into sprint backlogs.
    - **Sprint Planning**: Define sprint goals, tasks, and timelines based on backlog priorities.

2. **Iterative Development:**
    - **Daily Stand-ups**: Conduct daily meetings to review progress, identify obstacles, and adjust tasks.
    - **Continuous Integration and Testing**: Implement features incrementally and conduct regular testing to ensure quality and functionality.
    - **Feedback Loops**: Gather feedback from stakeholders at the end of each sprint to validate progress and adjust requirements.

3. **Adaptation and Improvement**:
    - **Sprint Reviews**: Demonstrate completed features to stakeholders and gather feedback for iterative improvements.
    - **Retrospectives**: Reflect on the development process, identify areas for improvement, and implement changes in subsequent sprints.

3.3 Agile Principles and Benefits:

- **Collaboration:** Regular interactions with stakeholders ensure alignment with user needs.
- **Adaptability**: Ability to accommodate evolving requirements and priorities throughout the development lifecycle.
- **Transparency**: Stakeholders have visibility into the development progress and can provide timely feedback.
- **Continuous Improvement**: Emphasis on incremental enhancements and iterative refinements based on feedback.

By adopting an agile methodology, Sunshine Primary School can successfully develop a modern student record management system that meets the diverse needs of its stakeholders while delivering tangible business benefits such as efficiency, accuracy, and enhanced communication. This approach ensures that the system is responsive to changing requirements and ultimately contributes to improved administrative efficiency and academic support for students.

4. Graphical illustrations

4.1 DFD Diagram:

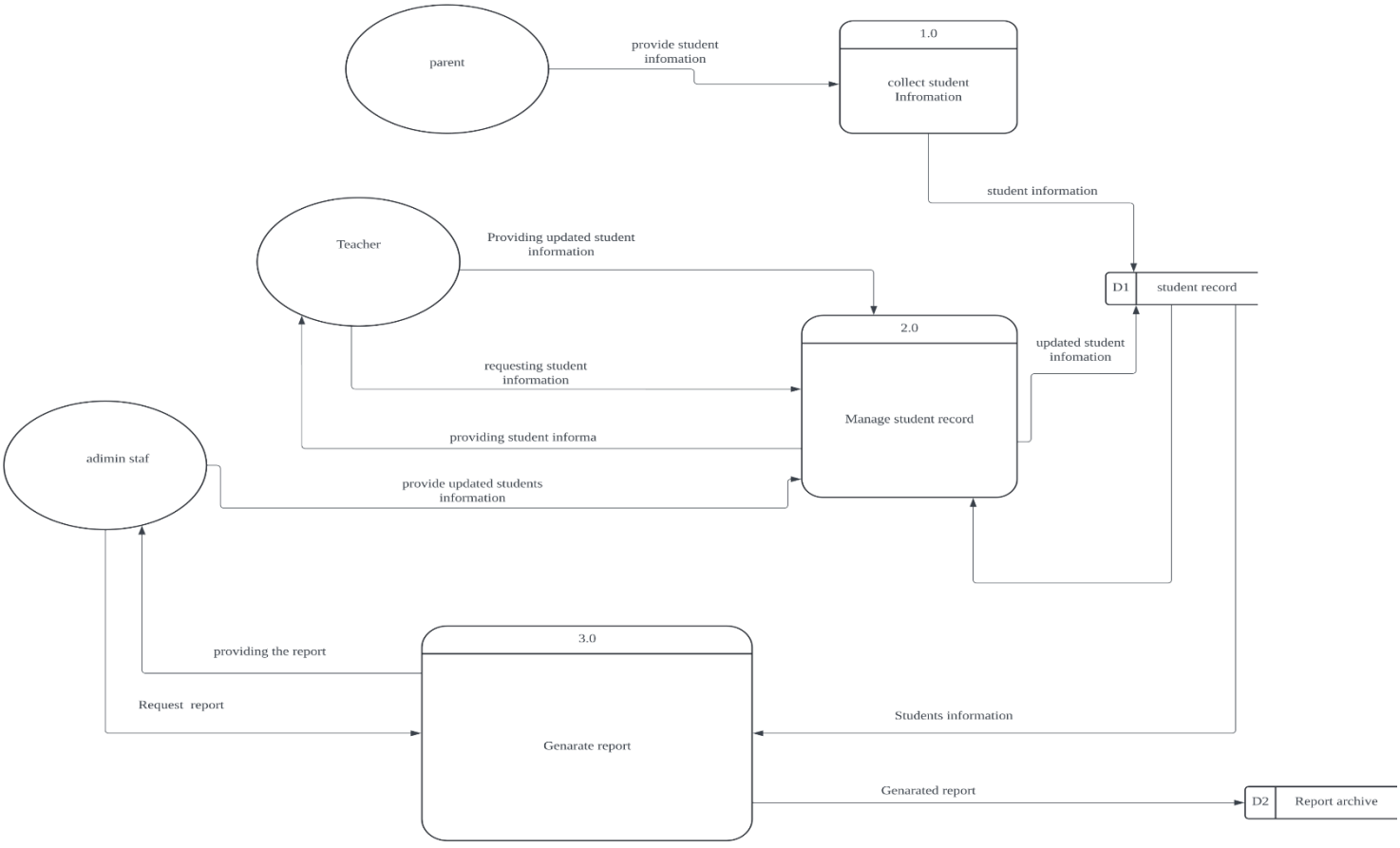

Figure 1

4.2 Use Case Diagram:

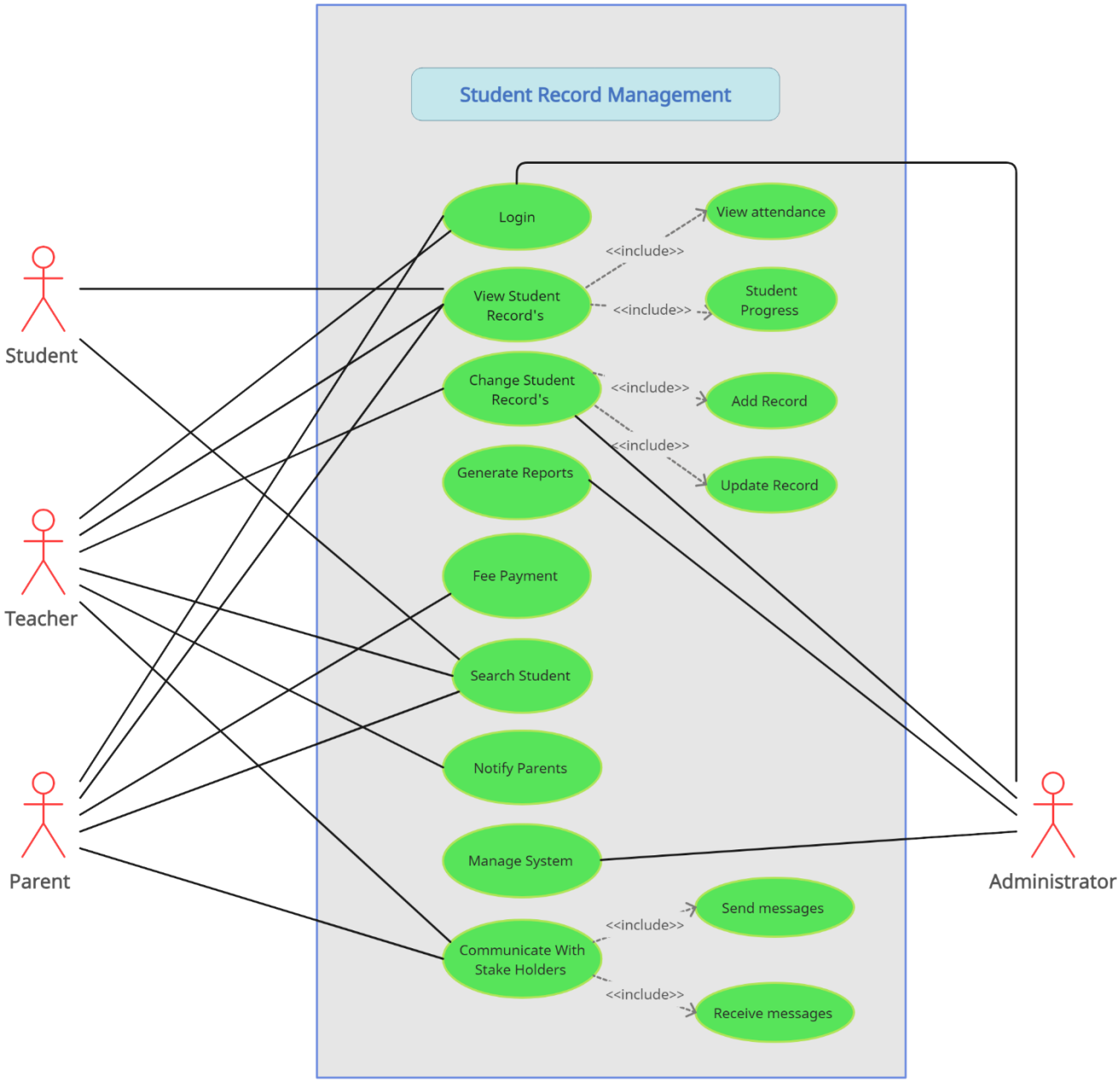

Figure 2

4.3 Class Diagram:

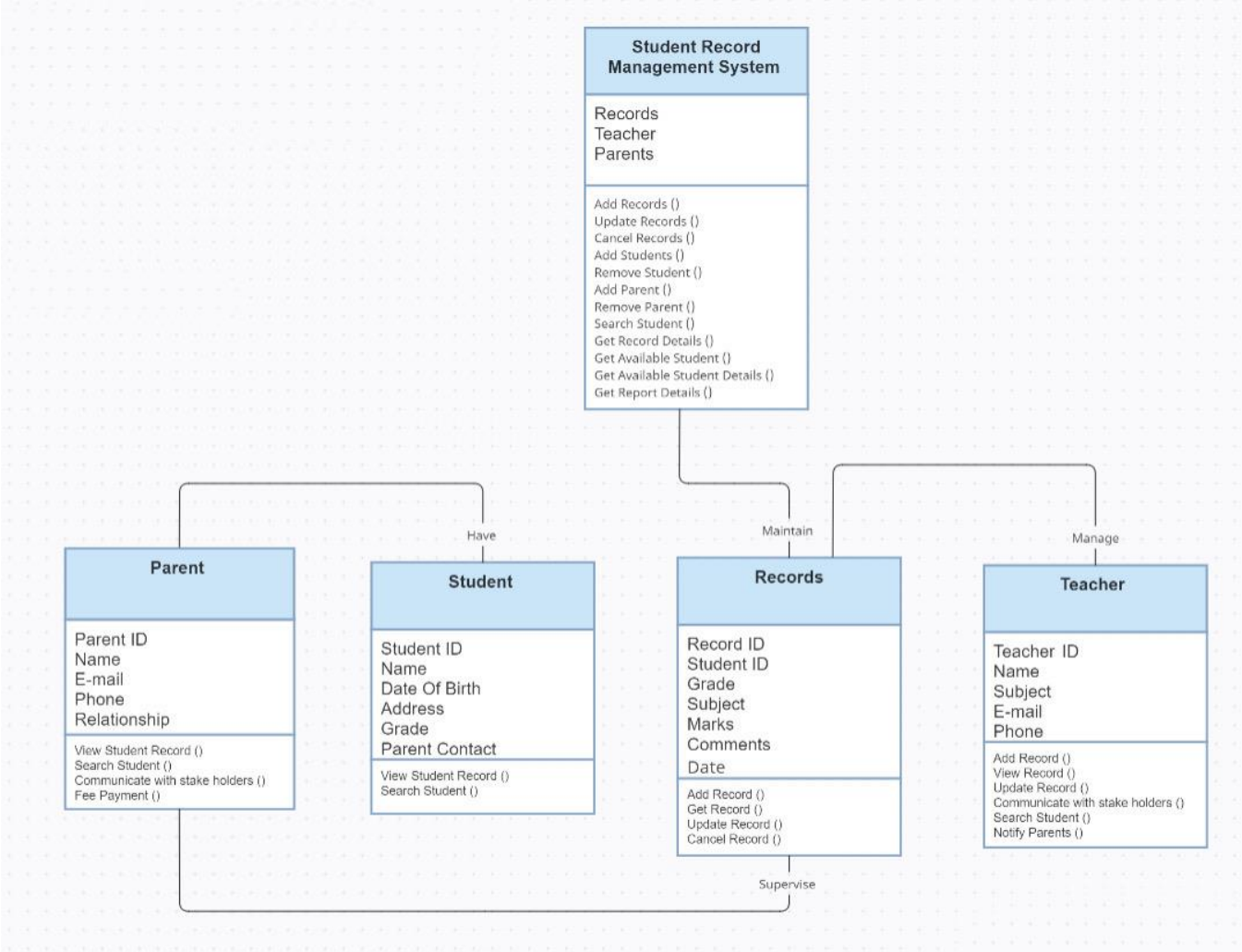

Figure 3

4.4 ER Diagram:

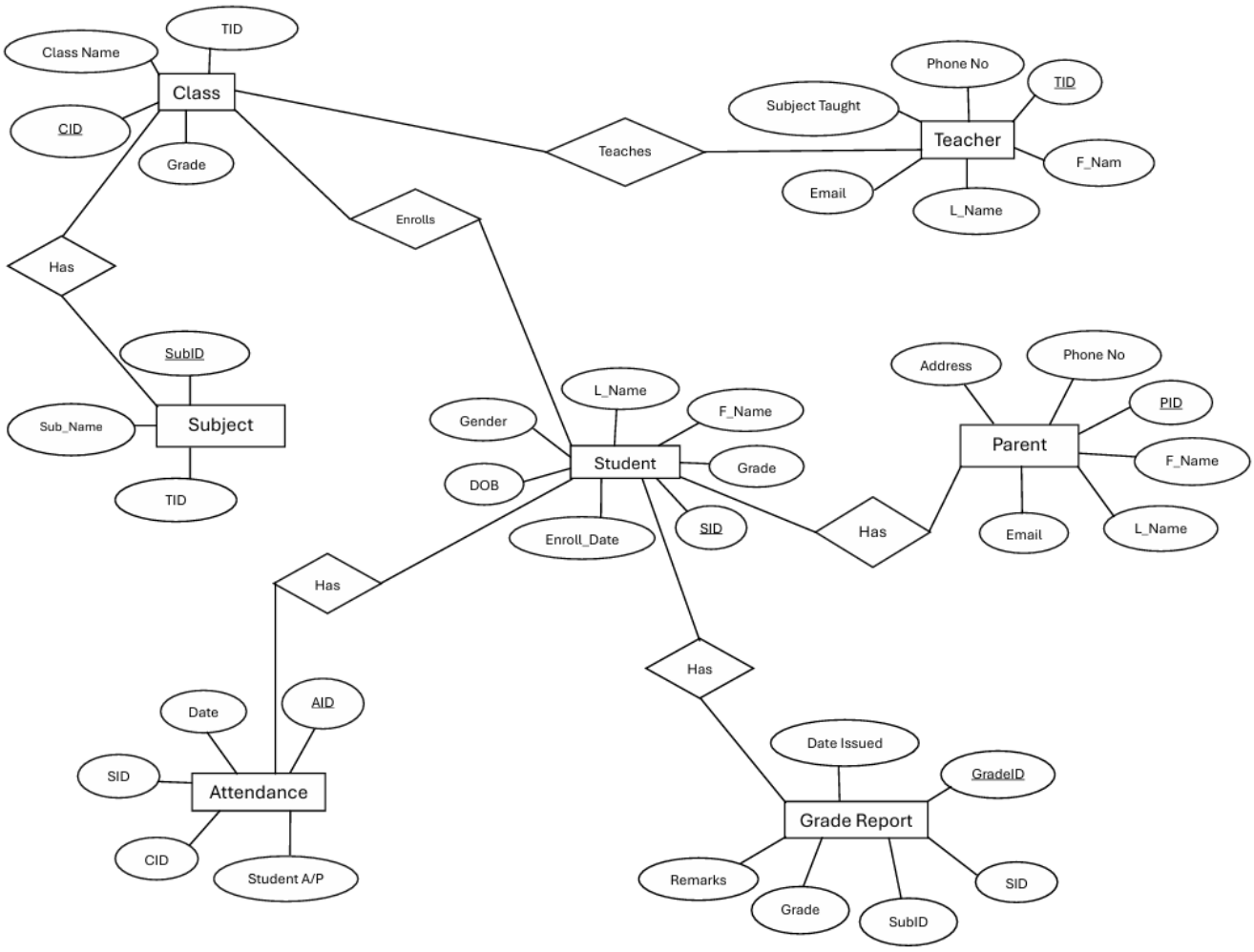

Figure 4

5. UI Designs:

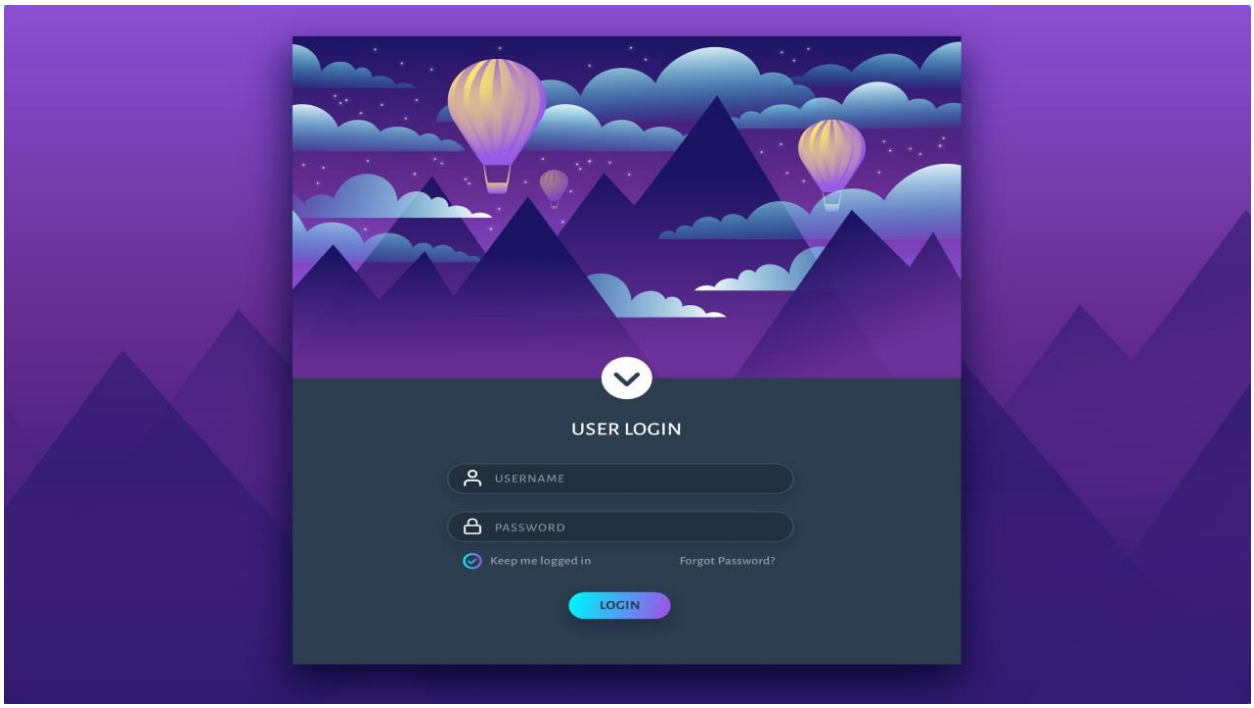

Figure 5: Login Form

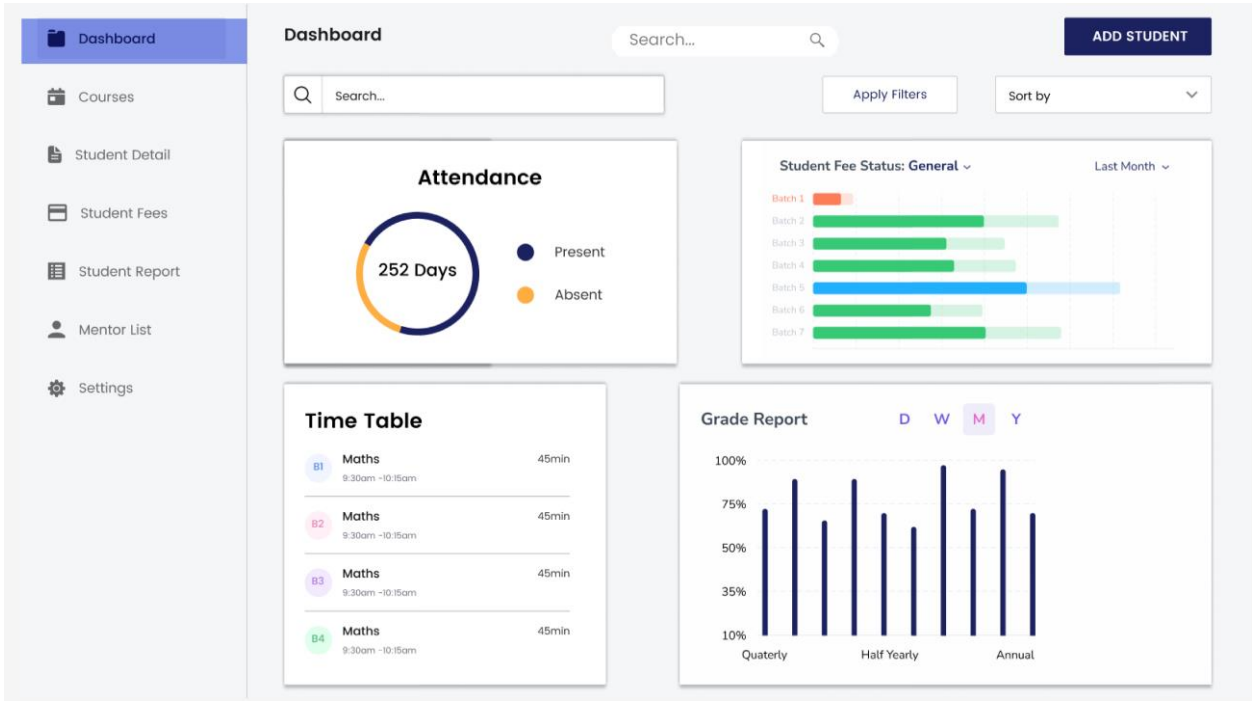

Figure 6: Dashboard UI

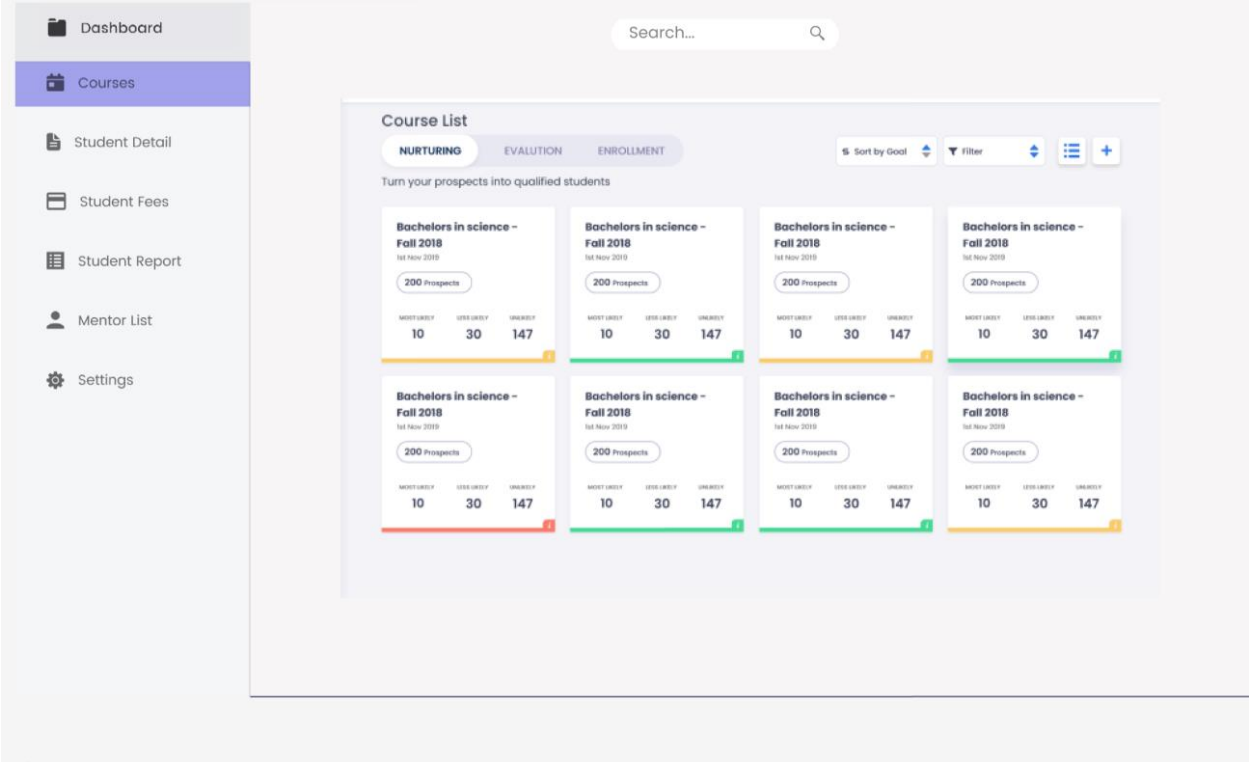

Figure 7: Course UI

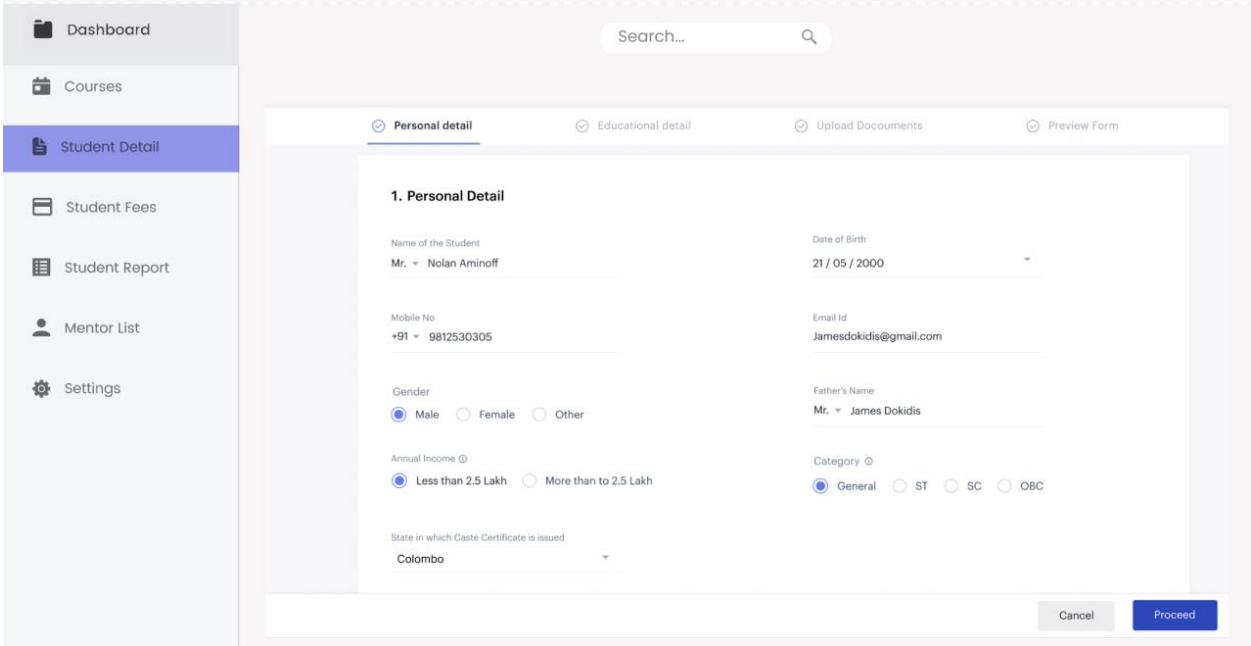

Figure 8: Student Details

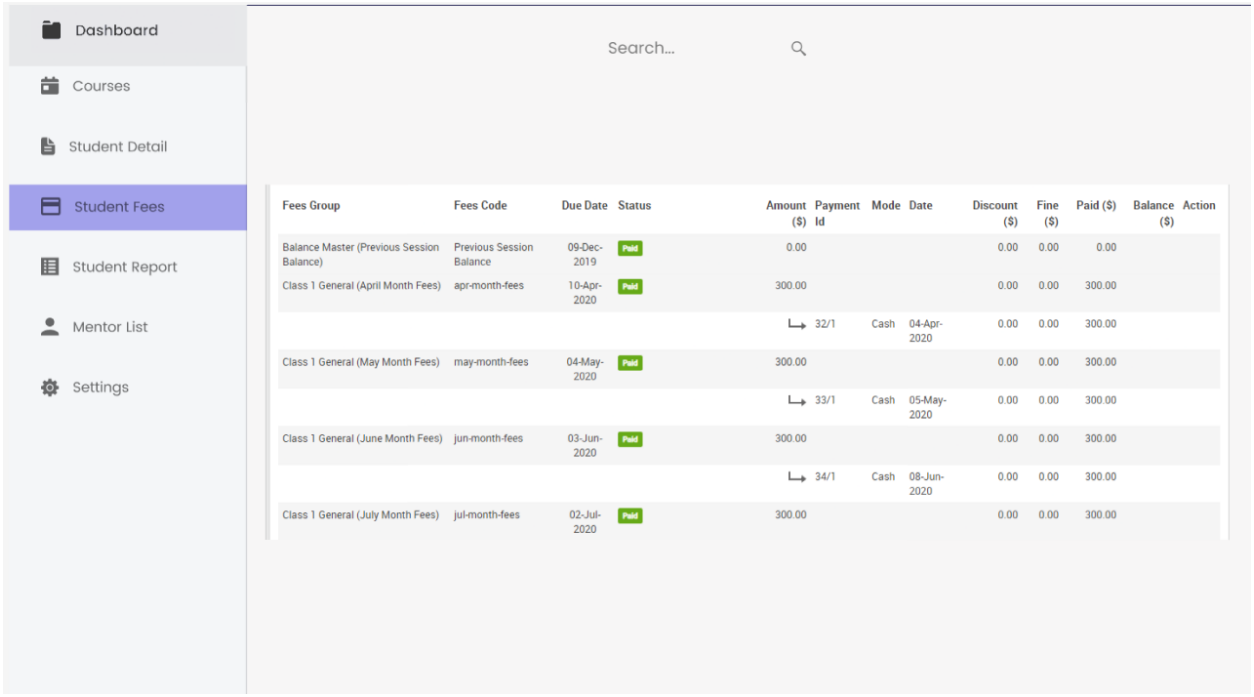

Figure 9: Student Fees

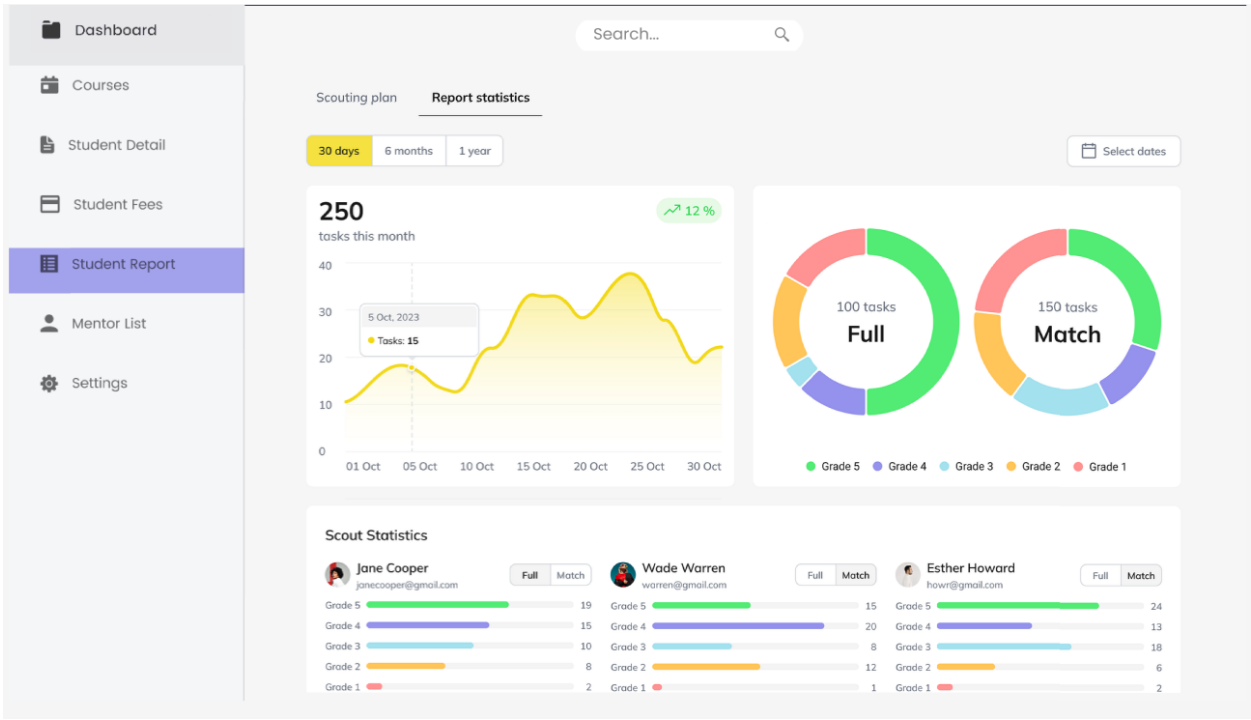

Figure 10: Student Report

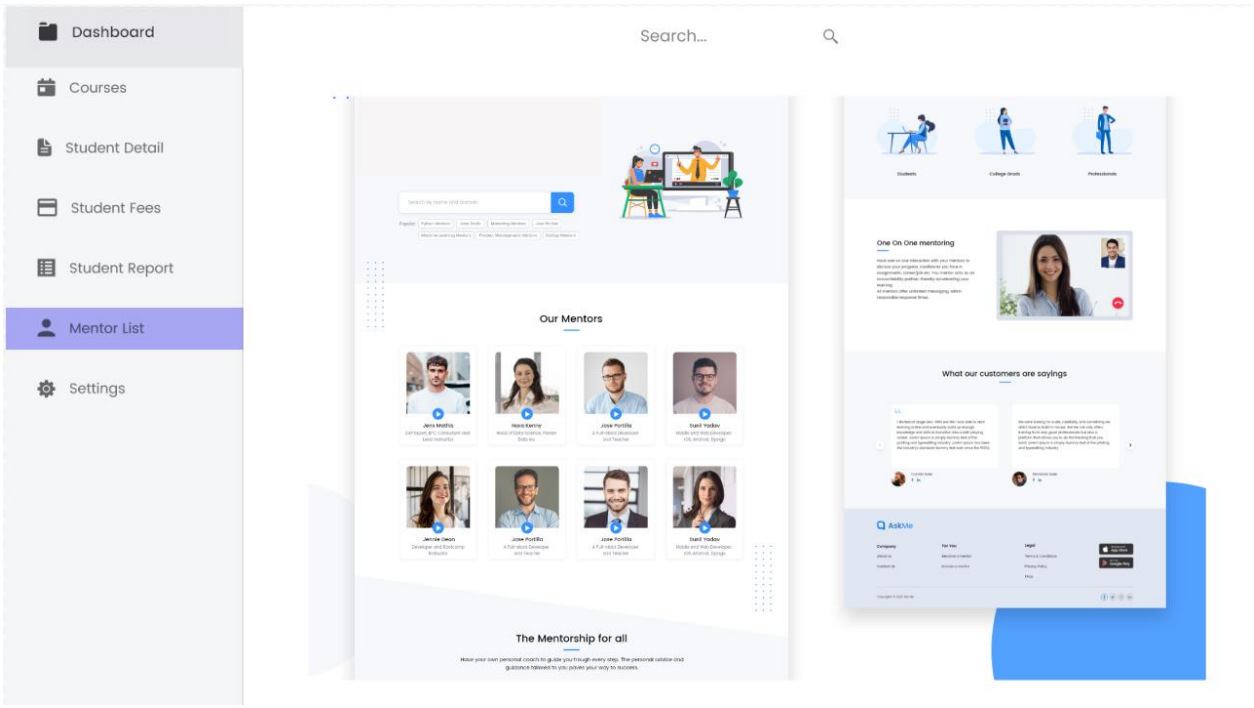

Figure 11: Mentor List

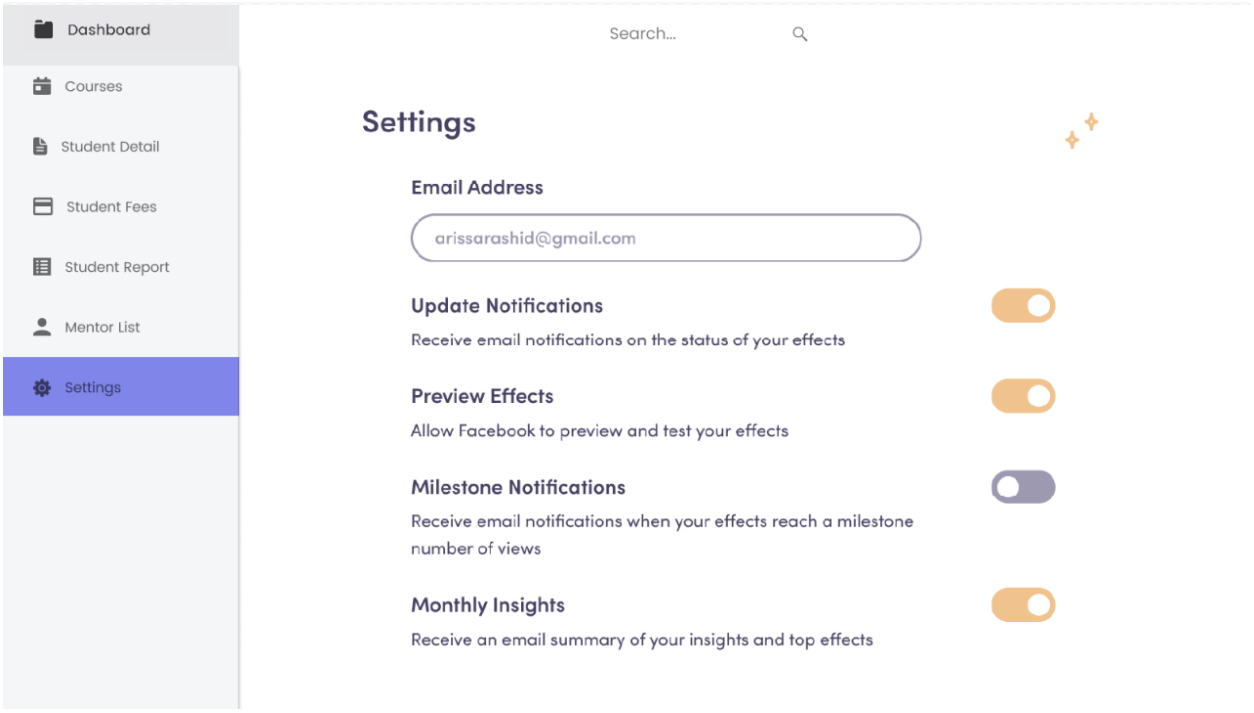

Figure 12: Settings

6. **Testing plan**

A testing plan for transitioning from a paper-based student record management system to a digital system.

1. Requirements Gathering and Analysis:

Review the current paper-based system and identify all essential functionalities required in the digital system. Gather input from stakeholders including administrators, teachers, and parents to understand their specific needs and expectations from the new system.

2. System Design and Development:

Develop a prototype or beta version of the digital student record management system based on the gathered requirements. Ensure the system includes features for student data entry, storage, retrieval, security measures, and user access controls.

3. Testing Phases:

3.1. Unit Testing:

Test individual components/modules of the system in isolation to ensure they function correctly. Verify that each module performs its intended functions accurately and efficiently.

3.2. Integration Testing:

Test the integration of different modules to ensure they work together seamlessly. Verify data consistency and integrity during data transfer between modules.

3.3. System Testing:

Test the system as a whole to ensure it meets the specified requirements and user expectations. Verify functionalities such as student data entry, retrieval, editing, and deletion.

3.4. User Acceptance Testing (UAT):

Involve end-users (administrators, teachers, and parents) to test the system in a real-world environment. Allow users to perform common tasks such as adding new student records, updating information, and generating reports. Gather feedback from users regarding usability, performance, and any issues encountered during testing.

4. Performance Testing:

Evaluate the system's performance under different load conditions to ensure it can handle multiple users concurrently. Test response times for data retrieval and updates to ensure they meet acceptable standards.

5. Security Testing:

Test the system's security measures including user authentication, access controls, and data encryption. Verify that sensitive student information is adequately protected from unauthorized access or data breaches.

6. Data Migration Testing:

Develop and execute a plan to migrate existing paper-based student records to the digital system. Verify the accuracy and completeness of migrated data to ensure no information is lost or corrupted during the transition.

7. Training and Documentation Testing:

Test training materials and documentation provided to users to ensure they are comprehensive and easy to understand. Conduct training sessions for administrators, teachers, and parents to familiarize them with the new system and its functionalities.

8. Post-Implementation Testing:

Monitor the system after implementation to identify any issues or bugs that may arise in a production environment. Address any reported issues promptly through bug fixes or system updates.

9. Continuous Improvement:

Establish processes for collecting user feedback and monitoring system performance post-implementation. Plan regular reviews and updates to the system based on user feedback and evolving requirements.

10. Contingency Planning:

Develop a contingency plan to address potential system failures or disruptions. Backup procedures should be established to ensure the safety and availability of student records in case of emergencies.

By following this testing plan, Sunshine Primary School can ensure a smooth transition to a digital student record management system while minimizing disruptions and maximizing the system's effectiveness in meeting the needs of administrators, teachers, and parents.