Education System Software

By: Oluwademilade Adejube,
Aimon Ajmal Mohammed
and Paula Catalán Santana

CS335: Software
Engineering and Software
Process.

PROJECT SCOPE

Our education system software encompasses a suite of functionalities including a student information system, student record management, teacher profile management, communication tools, attendance tracking, online gradebook, library management, and access to class resources. The system is designed to manage student records and personal details. It also tracks academic performance and facilitates monitoring of academic progress by generate report cards. It will also assign classes and schedules for teachers. It enables seamless communication among stakeholders, record and monitor attendance patterns, calculate grades for assignments and tests, manage library resources including book checkouts and returns, and provide access to class resources like textbooks and worksheets stored on a common server.

USER STORIES

Primary School Teacher 1

Chloe is a primary school teacher in Mullingar, a town in Co. Westmeath, Ireland. Whenever the fire alarm goes off in school, whether it is for legitimate reasoning or fire drill purposes, she considers an online attendance record of students would be more suitable in emergencies rather than the traditional pen and paper used up until now as it would guarantee access to any member of staff with an electronic device on them. She uses the new system to take attendance first thing in the morning and logs it in for other members of staff to see. Utilizing the system beyond emergencies allows Chloe to ensure that crucial attendance is recorded and allows room for action if required. Furthermore, Chloe facilitates collaboration among staff members by logging attendance data into the system for others to access. This promotes transparency and ensures that all staff members are informed and prepared to address any emergent situations effectively. In summary, Chloe's adoption of the online attendance record system reflects her commitment to student safety and administrative efficiency. By embracing modern technology, Chloe adds to the school's emergency preparedness efforts and creates a safer learning environment for her students in Mullingar.

Primary School Teacher 2

Emma is a primary school teacher in Limerick, a city in Co. Limerick south of Ireland. During her career, she has strived for a fair and efficient way of grading her students, and she believes it to be very important to be accurately assessed. She currently uses an old, outsourced software to keep her student's grades during the year which is not used by all the teachers in the school, meaning communication between departments is not productive. She wants to be able to have one shared common space where grades can be updated, saved and shared amongst all teachers. Furthermore, it is in her interest that the software can make calculations such as mean, median and mode as she usually does this by hand and would be imperative to remove the possibility of human error. By using the new system Emma can rely on the software to aid her at her job by being mathematically accurate avoiding unpleasantries with any parents or staff members and accurately recording the student's performance. She can trust the software to point out when a student has been doing poorly and needs extra help and or assistance in class. The system now allows Emma to share with her colleagues the different

student performances and as a team the different departments can tackle any issues that may need to be tended to.

Primary School Librarian

Jonathan is a primary school librarian in Kinnegad Co. Westmeath, Ireland. He currently works with a colour code system to organise all school library books by genre. Signup sheets for the withdrawal and return of the books have been used for the past 15 years and so he finds the system to be old and obsolete. His hopes for the new system include the organization and categorization of books by author, genre, and suitability for reading ability. For Johnathan, the new system would allow him to know what books have been loaned out and which need returning to the library. This way he avoids the misplacement or failure to return books. This will also allow him to know what books are in high demand and more copies of them are needed. If any books were damaged, the last temporary owner can be tracked down and compensation from the parents can be demanded. By using the new system, Jonathan can ensure that when books are taken by students, they don't keep them for too long or constantly check them out of the school system, as this may mean some students never get access to certain books. The system can cap out the number of weeks a book can be taken at a time. Jonathan would also be improving the communication between the library and other school departments allowing tasks to be achieved more swiftly by all members of the staff with access to the new library online records.

Primary School Headmistress

Lindsey is a primary school headmistress in a St. Mary's primary school in Dublin. As a headmistress, she finds it extremely important to be able to be able to swiftly communicate with her staff members when students are underperforming and might need emergency assistance. Lindsey participates in a lot of meetings with student's parents to help the students get access to afterschool lessons or extra daily reading and/or activities. By using the new system, she can now efficiently get in contact with the child's parents over the class channel and get the corresponding teacher into the conversation. She can, all in one space, reach the parents to schedule a meeting and send them evidence of what the concern for the child might be, like a series of bad-performing tests or a lack of consistent school attendance. This allows Lindsey to be more thorough in the analysis of what the child might need as well as more efficient with her time which will allow her to help more students in a shorter amount of time. The system can also schedule appointments with students in the headmistress's office automatically and can notify all parties involved promptly.

Primary School Teacher 3

Emily, a dedicated primary school teacher is committed to improving teaching practices, sees the potential in utilising technology to evolve classroom learning experiences. She suggests integrating an online textbook platform into the school's curriculum, inspired by the need to provide students with accessible and engaging resources. Emily envisions a straightforward platform where students can easily access digital textbooks, complementing traditional learning materials. By incorporating online textbooks, she aims to offer students a more dynamic and interactive learning experience. Through the platform, students can conveniently access multimedia resources, such as videos and interactive quizzes, enhancing their comprehension and engagement with the subject matter. To illustrate the benefits of the online textbook platform, Emily plans to utilises it in her classroom during a unit on local history. She assigns a chapter from the digital textbook for students to read independently, supplemented with

interactive quizzes to reinforce key concepts. During class discussions, Emily projects sections of the online textbook onto the interactive whiteboard, allowing students to follow along and interact with the content collaboratively. She encourages students to explore multimedia resources related to the topic, fostering deeper understanding and engagement.

Primary School Teacher 4

Ethan, a forward-thinking educator dedicated to modernizing primary school classroom experiences, is committed to enhancing education through the effective use of digital tools. Ethan proposes integrating an advanced Student Information System into our school's infrastructure. This integration aims to seamlessly connect the SIS with our classroom activities, ensuring every student can easily access their academic records and other essential information. Ethan firmly believes in using technology as a means of empowerment rather than a barrier. By merging the SIS with classroom activities, Ethan aims to simplify student access to crucial information, such as personal details, academic performance, and attendance records. This streamlined approach ensures that students can effortlessly delve into their academic journey, accessing necessary resources to support their learning and growth. To demonstrate the benefits of the SIS integration, Ethan plans to incorporate it into classroom activities during a lesson. Students will utilize the system to access their academic records, track their progress, and collaborate on projects. This hands-on experience not only fosters critical thinking but also enhances digital literacy skills, preparing students for the digital age ahead. By integrating the SIS into classroom activities, Ethan envisions creating a more dynamic and efficient learning environment where students can easily access and utilize their academic information to support their educational journey.

Primary School Student

Olivia, a bright and curious student at Scoil Mhuire Primary School, eagerly awaits the school's plan to integrate a new online platform for accessing class resources. Her excitement stems from her love for exploring new ways to learn, and she sees this integration as a potential game-changer for her classroom experience. Thanks to Olivia's enthusiasm and openness to innovation, she quickly embraces the new platform. With just a few clicks, Olivia finds herself immersed in a vast repository of textbooks, notes, and worksheets stored on a common server. She's delighted by how effortlessly she can access all the resources she needs to study and explore various topics. Among the features Olivia enjoys most is the interactive quizzes available on the platform. Not only do they help her review her learning, but they also infuse an element of fun into her studies, making it feel more like a game. Additionally, Olivia appreciates the platform's sharing tools, which enable seamless collaboration with her classmates on group projects. Whether it's math or English, the platform serves as a virtual classroom where students can come together to learn and support each other. Overall, Olivia finds that the integration of the online platform for accessing class resources has transformed her classroom experience, making it more dynamic and enjoyable. It has facilitated better organization, increased engagement, and strengthened connections with both peers and teachers. With the platform seamlessly integrated into her daily routine, Olivia feels a newfound sense of confidence and excitement about learning.

Primary School Teacher 5

Rachel, an enthusiastic primary school teacher dedicated to fostering effective communication among all stakeholders, utilizes the Messenger Function to streamline interactions within her classroom and beyond. Recognizing the importance of seamless communication among

teachers, students, parents, and administrators, Rachel integrates the Messenger Function into her daily routine. Rachel leverages the Messenger Function to send timely reminders to parents about upcoming events and assignments. She also uses it to share important announcements with her students, such as changes in the class schedule or reminders about upcoming tests. Additionally, Rachel encourages students to use the Messenger Function to ask questions, seek clarification on assignments, and engage in discussions related to the curriculum. To illustrate the benefits of the Messenger Function, Rachel incorporates it into her classroom activities during group projects. Students use the platform to communicate with their peers, share resources, and coordinate their efforts effectively. By utilizing the Messenger Function, Rachel creates a more collaborative and engaged learning environment where communication flows seamlessly between students, parents, and teachers.

Primary School Teacher 6

Nathan, an innovative educator committed to enhancing communication and collaboration in the classroom, harnesses the power of the Messenger Function to facilitate interactions among all stakeholders. Recognizing its potential to streamline communication, Nathan integrates the Messenger Function into various aspects of his teaching practice. Nathan utilizes the Messenger Function to send regular updates to parents about their child's progress and upcoming assignments. He also uses it to share educational resources with students, such as links to online articles or videos related to the curriculum. Additionally, Nathan encourages students to use the Messenger Function to ask questions, seek help outside of class, and engage in discussions with their peers. To demonstrate the benefits of the Messenger Function, Nathan incorporates it into his classroom activities during collaborative projects. Students use the platform to communicate with their group members, share ideas, and coordinate their work effectively. By leveraging the Messenger Function, Nathan creates a more connected and engaged learning environment where communication is seamless and transparent.

Primary School Student 2

Sophie, an eager student at Lincoln Elementary School, embraces the Messenger Function as a tool for enhancing communication and collaboration within her school community. Recognizing its potential to facilitate interactions among teachers, students, parents, and administrators, Sophie eagerly utilizes the Messenger Function to stay connected and informed. Sophie relies on the Messenger Function to receive updates from her teachers about upcoming assignments, tests, and classroom activities. She also uses it to communicate with her classmates, ask questions, and collaborate on group projects. Additionally, Sophie appreciates the platform's ability to connect her with her parents, enabling them to stay informed about her academic progress and school events. One of Sophie's favourite features of the Messenger Function is the ability to participate in discussion forums with her classmates. She enjoys engaging in academic discussions, sharing ideas, and learning from her peers outside of the classroom environment. By leveraging the Messenger Function, Sophie feels more connected to her school community and empowered to take an active role in her education.
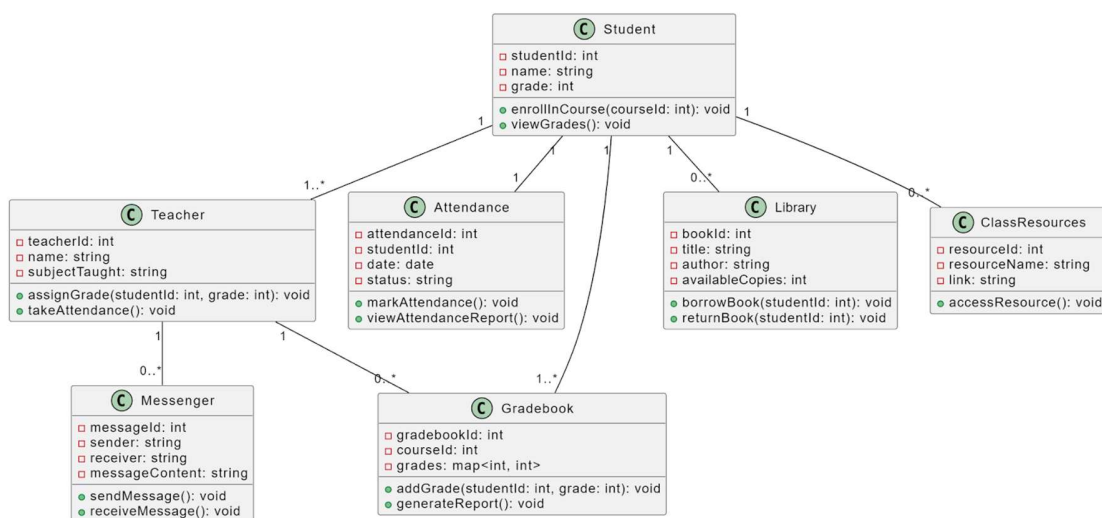
DIAGRAMS

Use Case Diagram
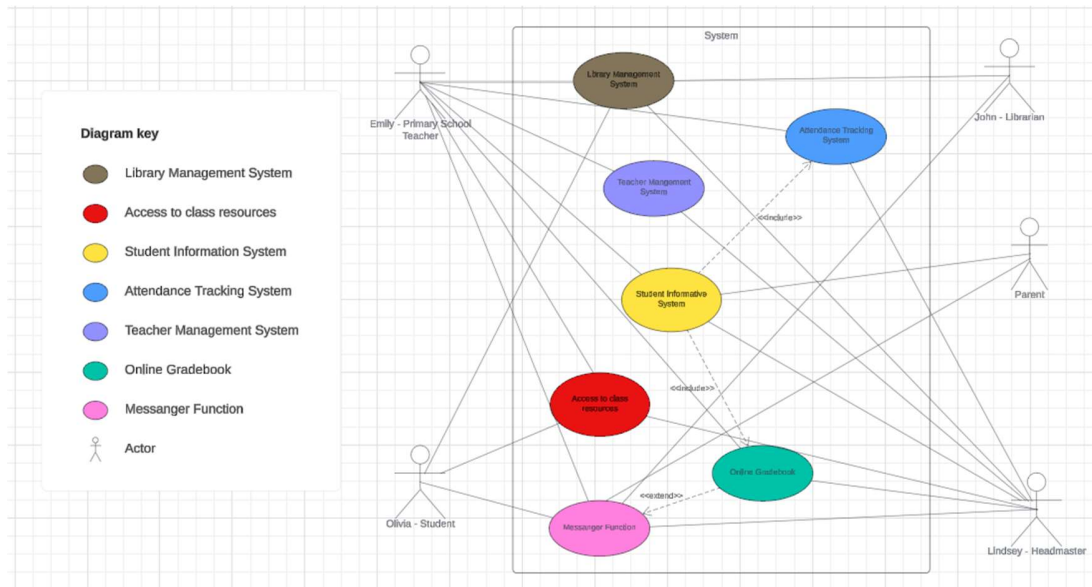
Used to visually show and define the requirements of the important parts of the system.
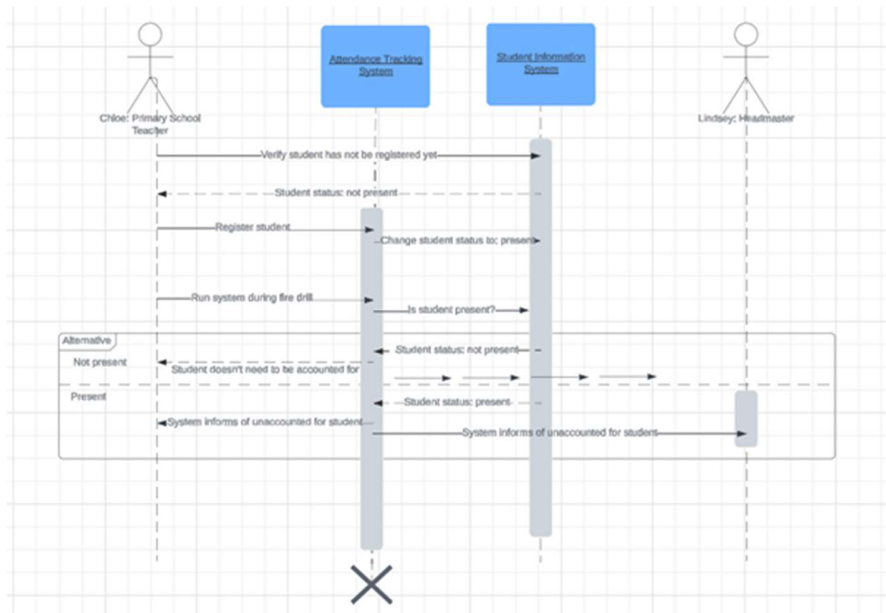
Class Diagram

The class diagram describes the structure of our system. It shows and describes the system's classes, attributes, methods, and the relationships between the objects.

Sequence Diagrams

*Used to understand the requirements for a new system and its processes.*

Primary School teacher Chloe will verify if a student is registered and then when status of student is received, she knows if the student is accounted for or not.
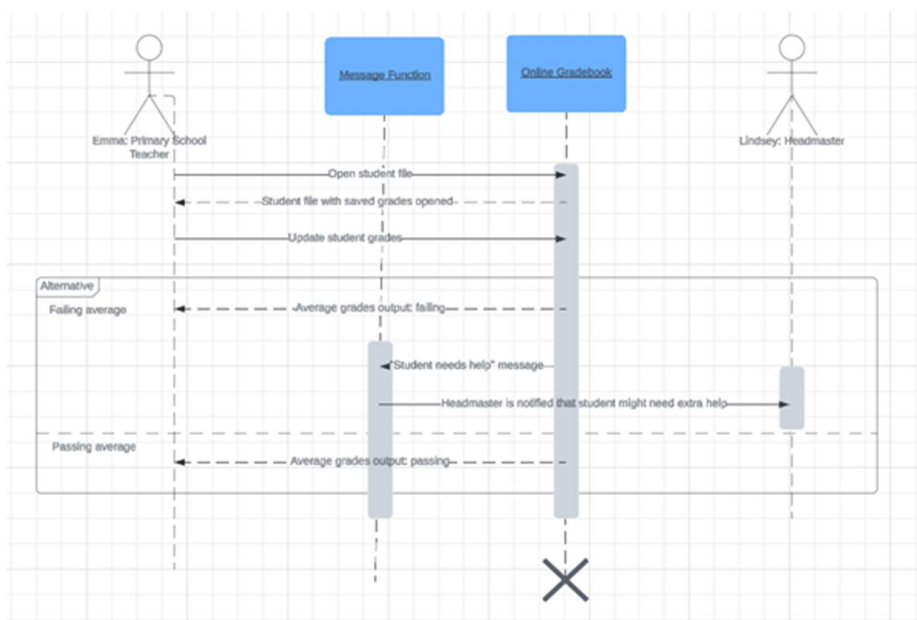
Primary School teacher Emma will check the student's grades and update them if needs be. The system will then return an alert if the student's average is below a passing threshold.
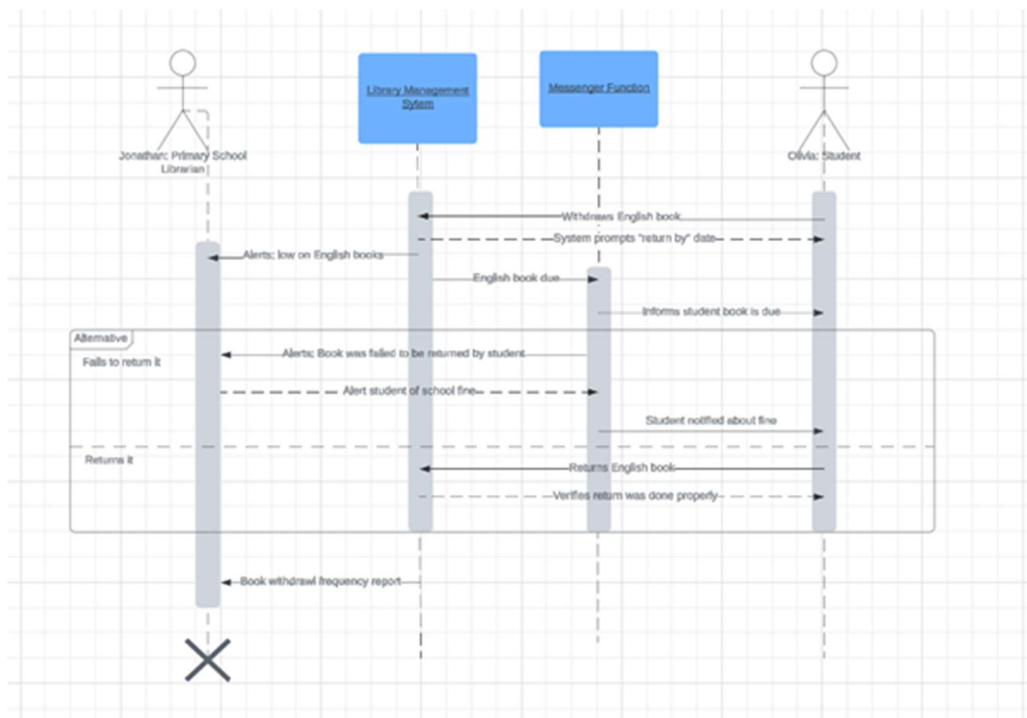
Primary School librarian Jonathan gets a system alert that there is a low stock of English books, meaning he can now order more if needs be. Both him and the student will receive a notification if a book is overdue by a student.
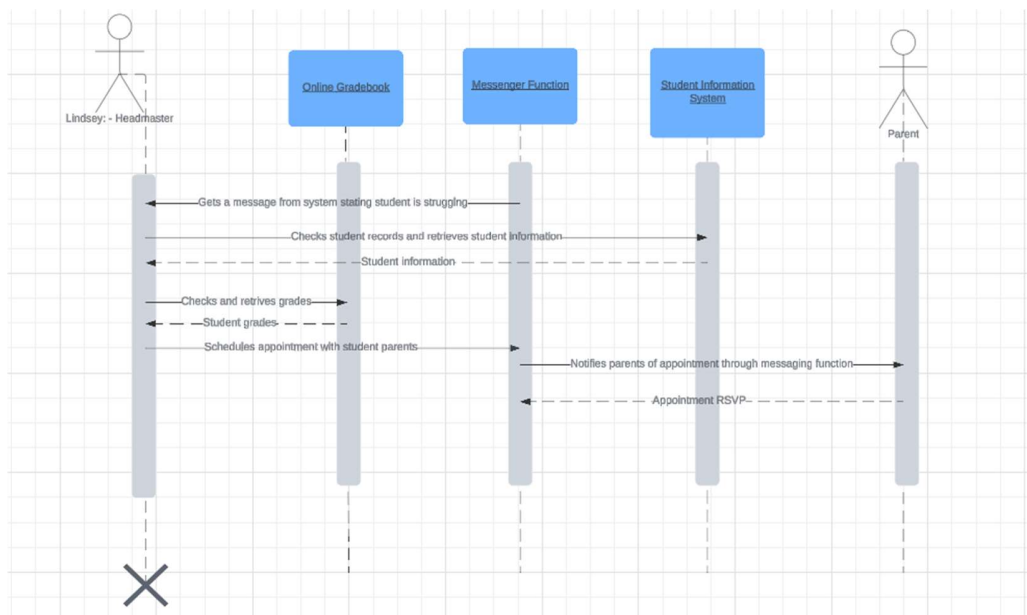

Primary School headmistress, Miss Lindsey, will receive a notification that a student is struggling to achieve the required grades. She can now, through the platform get in contact with the parents and aid the student as needed.

7
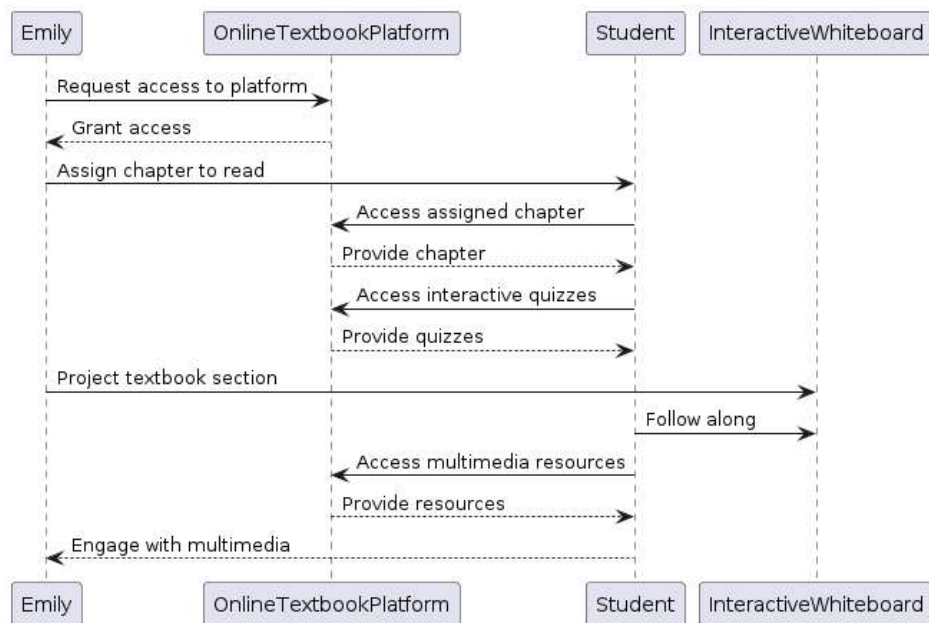
Primary School teacher Emily accesses the system and updates the online class resources to assign a chapter to be read. Students get notified and can now access the chapter to be read. They can also access other resources to help with their academic success.
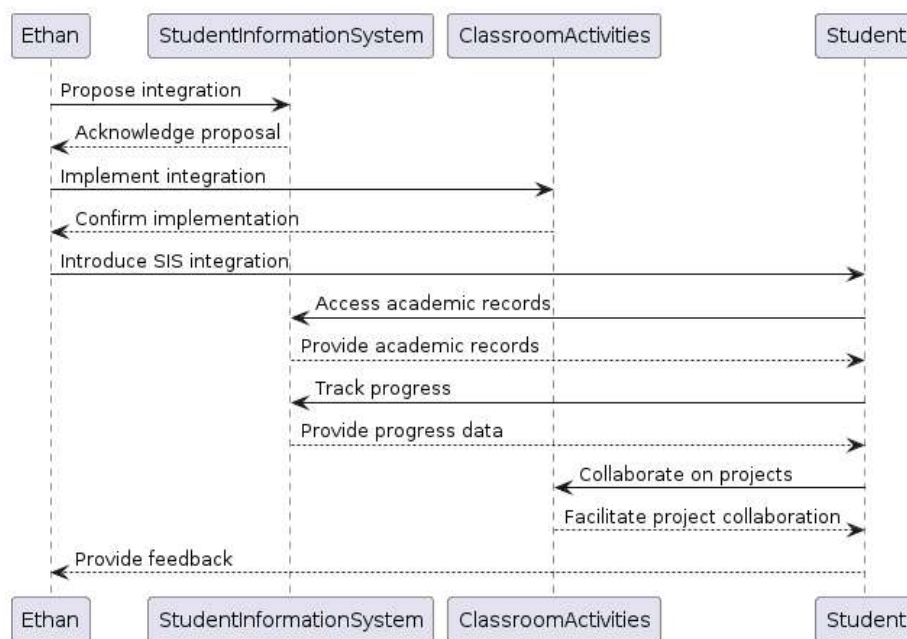

Primary School students can access their student information and keep up to date with their academic record and access their progress. Ethan, their teacher, can use this information to better his classes and taught material.
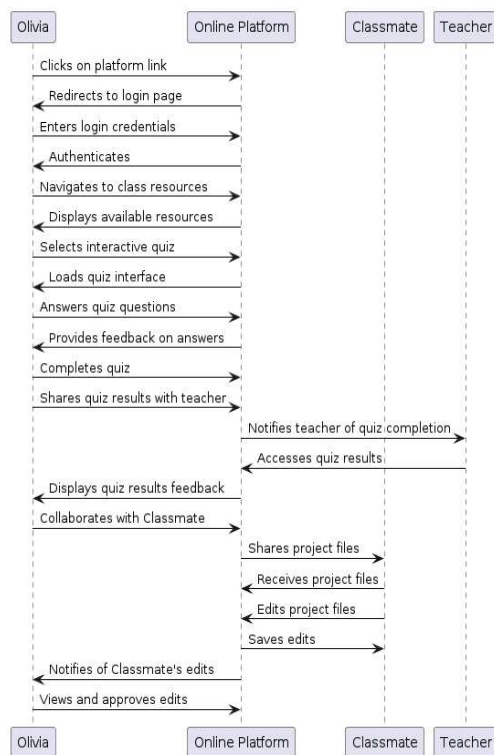
Primary School student Olvia logs into her online account within the system and accesses her class resources where she can take part in online quizzes. She gets immediate feedback, and her teacher also can receive live updates on her student's scores. Olivia can also access and edit class files if allowed by teacher.
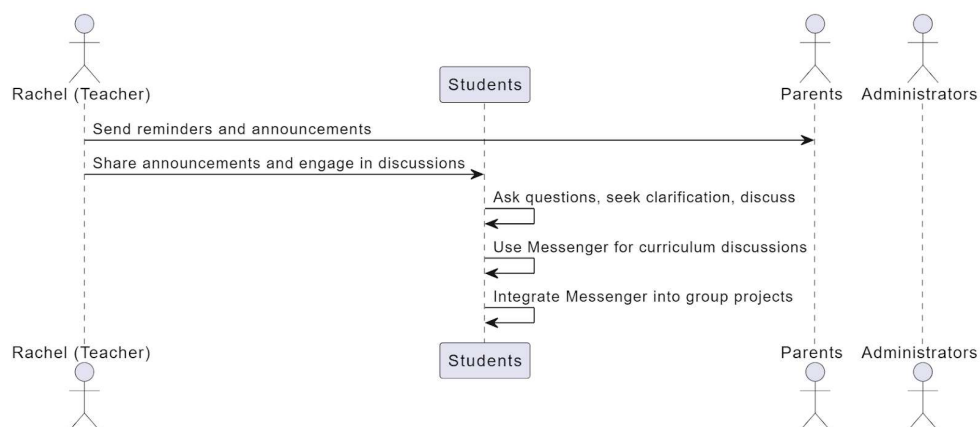
Primary School teacher Rachel shares classroom announcements not only with her students but also their parents. This allows for parents to be on top of their children's education and intervene if needs be. Students can message their teachers and solve any doubts or problems they might have effectively.
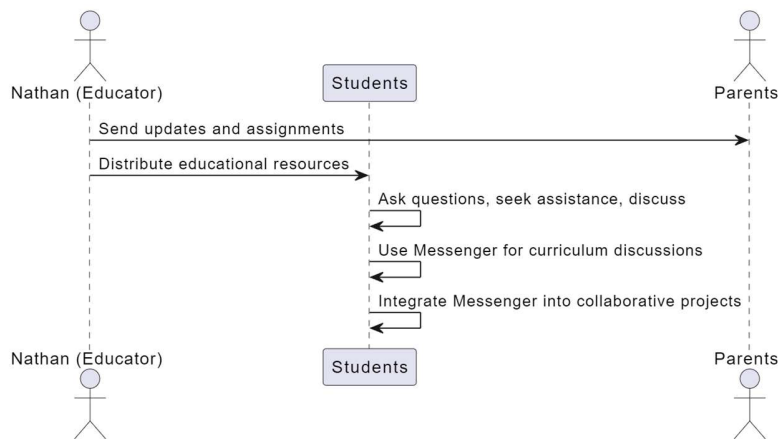
Primary School teacher Nathan uses the online messaging function to communicate with his students and send them educational resources. He can also update parents on any relevant matters.
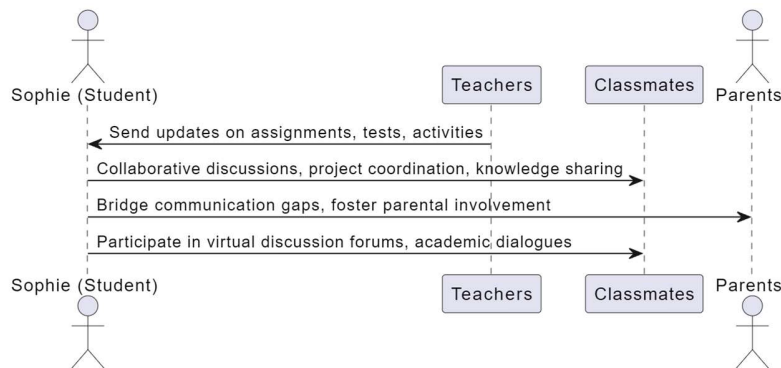
Primary School student Sophie is sent updates on assignments, tests, and activities through the messaging function in the education system. Parents can get involved by monitoring what work is being done by their children.

Architecture Diagram
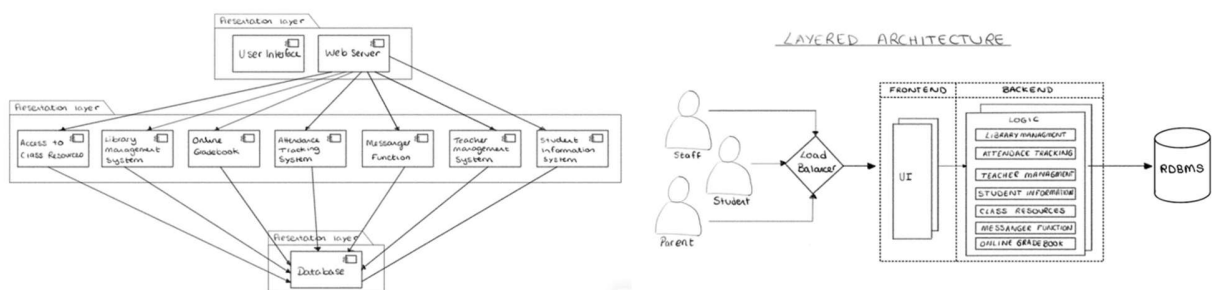
Load balancer used to improve application performance increasing response time and reducing network latency. Staff members include the headmaster, teachers, and a librarian which connect to the web server

which service the different backend components. The same components all communicate with the RDBMS which is used to hold all the data and its relations.
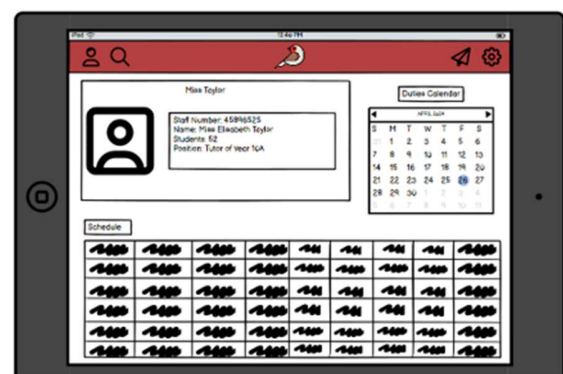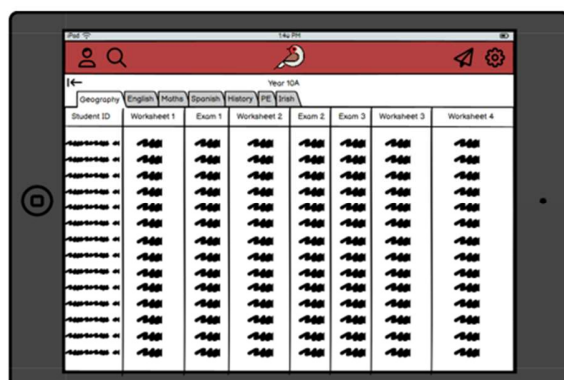
USER INTERFACE
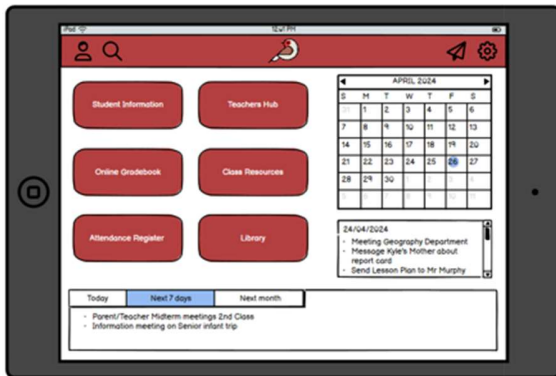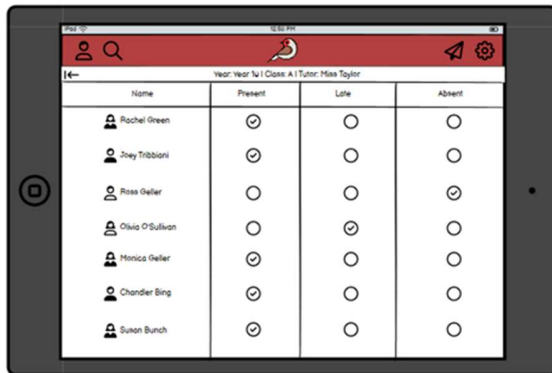

Main menu

Messenger function

Student Info.
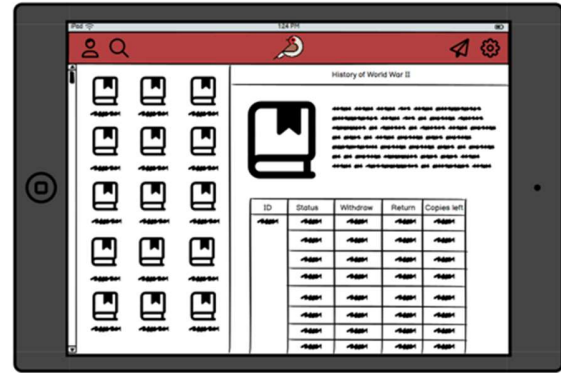

Teacher Management

Online Gradebook

Class Resources

Attendance Tracking

Library System

TEST CASES

Test Cases for Primary School Teacher 1 (Chloe):

1.1 Ensure the online attendance record system accurately logs students' attendance during fire drills.

1.2 Verify that daily attendance logging is seamless and efficient using the online system.

1.3 Confirm that attendance data is accessible to all staff members for collaboration and emergency preparedness.

Test Cases for Primary School Teacher 2 (Emma):

2.1 Validate that the new software accurately calculates mean, median, and mode for students' grades.

2.2 Ensure smooth cross-departmental communication by sharing and updating grades on the shared platform.

2.3 Verify that the software effectively identifies students in need of extra help based on their performance data.

Test Cases for Primary School Librarian (Jonathan):

3.1 Verify efficient organization and categorization of library books by author, genre, and reading ability.

3.2 Confirm that the system accurately tracks book loans and sends notifications for overdue books.

3.3 Ensure effective demand analysis and stock management by monitoring popular book titles and their availability.

Test Cases for Primary School Headmistress (Lindsey):

4.1 Ensure swift communication with parents and teachers through the class channel feature.

4.2 Verify the system's capability to schedule appointments with students and notify all parties involved promptly.

4.3 Confirm that evidence of student concerns, such as poor performance or attendance, can be easily shared with parents and teachers for collaborative action.

Test Cases for Primary School Teacher 3 (Emily):

5.1 Validate the accessibility and usability of the online textbook platform for students.

5.2 Confirm that multimedia resources, such as videos and quizzes, are easily accessible and enhance students' learning experiences.

5.3 Ensure seamless integration of the online textbook platform into classroom activities, including reading assignments and interactive discussions.

Test Cases for Primary School Teacher 4 (Ethan):

6.1 Verify that every student can easily access their academic records and other essential information through the Student Information System (SIS).

6.2 Ensure the SIS seamlessly integrates with classroom activities, allowing students to track their progress and collaborate on projects.

6.3 Confirm that the integration of the SIS enhances digital literacy skills and fosters a dynamic and efficient learning environment.

Test Cases for Primary School Student (Olivia):

7.1 Ensure smooth navigation and accessibility of class resources through the online platform.

7.2 Verify that interactive quizzes on the platform effectively reinforce learning and engagement.

7.3 Confirm that sharing tools facilitate seamless collaboration with classmates on group projects.

Test Cases for Primary School Teacher 5 (Rachel):

8.1 Validate the effectiveness of the Messenger Function in sending timely reminders to parents about events and assignments.

8.2 Confirm that students can use the Messenger Function to ask questions and seek clarification on assignments.

8.3 Ensure that the Messenger Function facilitates effective communication and collaboration during group projects.

Test Cases for Primary School Teacher 6 (Nathan):

9.1 Verify that parents receive regular updates about their child's progress and assignments through the Messenger Function.

9.2 Ensure students can use the Messenger Function to access educational resources and engage in discussions with peers.

9.3 Confirm that the Messenger Function enhances communication and collaboration during collaborative projects in the classroom.

WORK DISTRIBUTION

Oluwademilade Adejube

- 5th, 6th, and 7th User Stories
- Use case diagram.
- Sequence diagram for 5th, 6th, and 7th user stories.
- Class Diagram.
- Test Cases.
- Presentation slides 6-9.

Aimon Ajmal Mohammed

- 8th, 9th, and 10th User Stories
- Sequence diagram for 8th, 9th, and 10th user stories.
- Class Diagram.
- Architecture Diagram.
- Presentation slides 10-11.
- Video audio

Paula Catalán Santana

- 1st, 2nd, 3rd, and 4th User Stories
- Use case diagram.
- Sequence diagram for 1st, 2nd, 3rd, and 4th user stories.
- Architecture Diagram.
- User Interface Design
- Report final layout.
- Presentation slides 1-5.