🏃 Sprint Details

Sprint Number: Sprint 2

Start Date: 2025-04-04

End Date: 2025-05-02

Duration: 120 minutes for a one-month sprint

Agile Framework: Scrum

Attendees

- Development Team
- Scrum Master
- Product Owner
- Stakeholders

📝 Sprint Summary

The core objective of our project remains unchanged: to enhance the **user experience** of the interactive textbook. Our initial focus was on improving the interactive elements of the existing code, optimising the loading time for media and content, and enabling educators to gain meaningful insights through the application.

However, during the Sprint 2 implementation phase, we identified several technical limitations within the current codebase. Specifically, the loading time for media files was significantly slow, and the UI suffered from overlapping text and fixed layouts that did not respond appropriately to changes in window size, resulting in poor readability and usability across different devices.

To address these issues, Sprint 2 began with re-evaluating our architectural approach. We introduced **Cloudinary** as a backend media management solution to handle video and image delivery more efficiently. This change enabled adaptive content rendering, faster loading speeds, and reduced frontend bundle size.

Additionally, we redesigned the overall UI and restructured the layout of chapters and pages to improve readability and responsiveness. These changes required us to redesign the frontend codebase and integrate a new backend component for media delivery, marking the most significant deviation from our original Sprint plan.

In summary, while our project goal remained consistent, the technical approach evolved to better align with performance and usability requirements.

💻 Technical Requirements

Technical Requirement Update Since Sprint 1: Initially, all videos and images were uploaded directly into the application codebase, which resulted in slow loading times and unresponsive media display. For instance, videos did not scale

properly with different screen sizes, making it difficult for users to view content on smaller devices. To address these issues, the team adopted **Cloudinary** as a backend media management solution. This allows for on-demand loading, adaptive scaling, and improved performance across devices.

- **User Authentication:** Clerk is used to provide secure user authentication, including login, registration, and session management. This enables a personalised and persistent user experience across sessions.
- **Frontend Architecture:** The interface is built using Next.js and TypeScript, combining static rendering (for textbook chapters) with dynamic components (for quizzes and interactive notes).
- **Responsive UI & Accessibility:** Tailwind CSS powers the responsive design, ensuring optimal display on all devices. Dark mode support and adjustable font sizes improve accessibility and user comfort in low-light environments.
- **Media Management (Cloudinary Backend):** Cloudinary is used as a backend media delivery platform. All videos and images are now hosted and served through Cloudinary's CDN, allowing for interactive scaling, responsive rendering, and format optimisation based on user device and network conditions.
- **Deployment:** Vercel is used for deploying the application, enabling fast global access.
- **Component Integration:** Core components such as image galleries, video players, and rich text content are integrated using React's state management, ensuring seamless interaction within the interface.

🎯 Sprint Goal

In sprint 2, our main focus is on integrating the application features and content created by the previous group with the newly designed layout in the frontend and backend storage solution. We plan to enhance the user interface of the application to provide better usability for users, including reducing the loading time of images and videos in each chapter of the interactive textbook, fixing broken images on the phone application, and revising the alignment of text paragraphs.

✅ Sprint Deliverables

Completed Work | ID | User Story | Status | Notes | |----|------------|--------|-------| | US1.1 | As an educator, I want to show the whole and correct pages, so students don't miss any contents. | Done | | | US1.2 | As an educator, I want contents to be aligned on the mobile devices, so students can study comfortably on their mobile phones. | Done | | | US1.3 | As an educator, I want the video content to be optimised for fast loading, so students don't face delays when watching. | Done | Refactored and redesigned the previous groups' implementation by transferring large files to cloud storage. | | US1.4 | As an educator, I want all images on the textbook to be shown correctly so the students can have a reference of the content I am explaining. | Done | | | US2.2 | As an educator, I want to add quiz related to new chapters to verify if the student keeps learning the new chapters. | Done | | | US4.2 | As a student, I want to change the interface into dark mode so that I can study conveniently in a low-light environment. | Done | Dark mode functionality is working on all pages |

- We successfully designed a new layout of the interactive textbook, improving the readability of the application to support students' learning.
- The home page was implemented with 3 tabs: chapters, videos, and quizzes, to display as the overview of the interactive textbook. When clicking on each item, it will direct the users to the textbook content they want to learn.
- Each chapter is divided into an intro and sections of subjects for seamless navigation for users.
- The images, videos, and thumbnails were uploaded to the cloud memory space of Cloudinary instead of the local memory to shorten the lag time when calling the elements.

- The dark mode of the application was added as a new feature at the upper right of the web page to allow users to read context even in a low-light environment.
- The frame of each quiz was adjusted to a suitable size so that the users don't need to scroll the screen to see the test results.
- The interactive components were implemented with JavaScript functions successfully to avoid increasing the video file sizes. The pop-up hints are displayed after clicking on the cross buttons at the correct location, where students can read the entire message clearly.
- As the text layout was confusing to read from top to bottom, then left to right on the previous application, the alignment of text paragraphs of each section was modified to read from top to bottom on one page.
- We showcased our current progress on the project to our client with a significant change to the application.

Incomplete Work | ID | User Story | Reason for Incompletion | Next Steps| |----|-----------|--------|-------| | US2.1 | As an educator, I want to update more content of my written textbook on the application so that more knowledge can be shared to the public and students. | Awaiting for client to provide new content to add | Agree on a date for receiving content with client to ensure no delay on development | | US4.1 | As a student, I want to change the font size so that I can read the content without stressing my eyes. | Decided to drop the task since browsers' existing zoom-in function works better and more efficiently. | Focus on developing other features and avoid delays |

🛠️ Challenges

1. **Difficult to understand the structure of the original interactive textbook:** The layout of the initial application that the previous group created is quite messy, and some of the content of the sections is mixed, so we had to browse back and forth to make sure the content of each chapter for replotting the structure for the new application.
2. **Finding the right solution to backend storage:** Most of the online storage platforms require payment once the uploads pass the restriction, while the storage each provides is limited. Cloudinary is the platform that can store both image and video files, and the storage it provides matches our needs since the size of videos for the interactive textbook is large.
3. **Having a steep learning curve when familiarizing with the previous programming files:** There were a lot of programming files, and it was difficult for us to understand the structure at the start when there were multiple README files to follow up, so it took us more time to familiarize the files.
4. **Having problems in time management between the workload of this project and other subjects:** As all of us have other subjects to study simultaneously, we couldn't manage to find a common time for discussion to continue working on the project in the beginning. However, we used the When2Meet application to find out a time and scheduled 2 weekly periods for standup meetings and extra discussion if required, and eventually completed sprint 2.

📈 Sprint Metrics & Insights

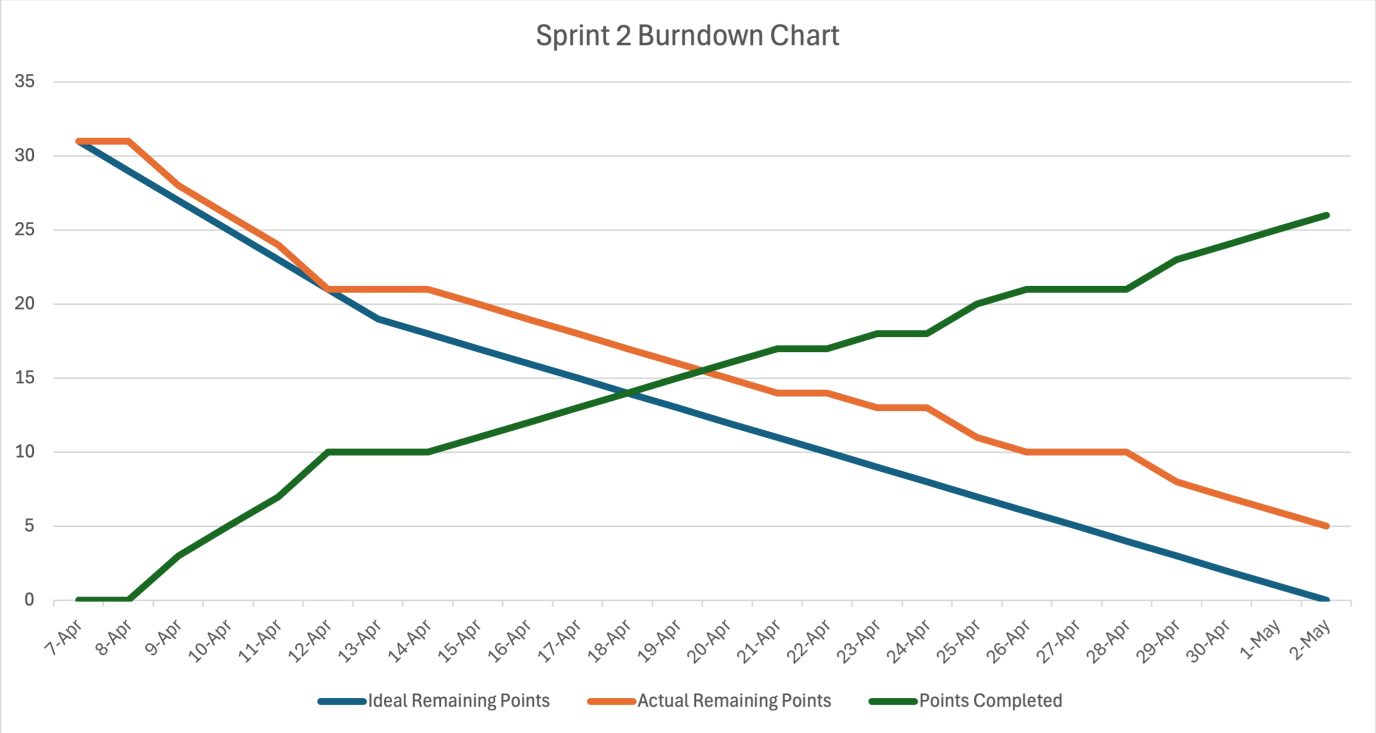
Velocity: 26 out of 31 completed

Burndown Chart

During Sprint 2 of the project, the team consistently completed most user stories at a steady pace. Initially, the burndown chart reflects that our progress lagged behind the ideal plan for completion of Sprint 2, but significant work was gained in the latter half of the sprint. After addressing early challenges and understanding the coding files from the

previous group, we were able to align closely with the ideal progress line by the sprint's conclusion, demonstrating strong teamwork, effective problem-solving, and an ability to recover and deliver within the sprint timeframe.

However, the tasks of adding new chapters to the interactive textbook and adding the feature to adjust font size weren't completed in this sprint, which left us 5 story points incomplete. Regarding the first feature, our client, Dr. Shazia hasn't had the materials ready yet as she was still organizing the content. However, we confirmed with her during the client meeting on 30/4, and she would be sending them to us by 5/5. Therefore, we will add the 3 additional chapters in sprint 3 to make the textbook comprehensive. As for the feature of adjusting font size, we decide not to implement it because the existing function in internet browsers can zoom in and out the entire page for better readability. We believe that it should be more effective for our users to use for their learning.



Quality Metrics:

- Bugs found: 1 major, 4 minor (all bugs are fixed).
- Test coverage:
  i. Interactive videos are playing properly, and the interactive components are showing the correct messages.
  ii. Displaying images by clicking the left and right buttons.
  iii. Quizzes are embedded properly.
  iv. The text is aligned within each page for the users to read comfortably.

📼 Demonstration

- **What was demonstrated**:
  i. The home page of the application, which shows 3 switch tabs for chapters, interactive videos, and quizzes for self practice.
  ii. The rolling image tiles are shown at the top of the home page as a decoration.
  iii. The "next" and "previous" buttons for flipping through pages in the interactive textbook.
  iv. The interactive components in the interactive videos.

v. The content in the textbook aligns nicely.
vi. The backend memory platform - Cloudinary for image and video storage.

- **Demo Format**: Casual demo session through Zoom meeting with the client
  Client Zoom Meeting with Demo Session
- **Feedback received**:
  i. Our client is satisfied with our progress on the project, as we have completed her assigned tasks for stage 1, and the application was improved more than she expected.
  ii. She is impressed by the rolling image tiles at the top of the home page because they roll at a comfortable speed for users to check the images.
  iii. The image for chapter 5: LEAN learning needs to be changed because it does not represent the concept of LEAN learning.

👩‍🏫 Stakeholder Feedback - Student @Bob

- Positive feedback:
  i. Every chapter page includes a "home" and "chapter" button for us to navigate back to the home page or back to the main chapter page.
  ii. The layout of the website is clean and easy to follow.
  iii. The 3 tabs on the home page are convenient for navigating to videos and quizzes directly, so there is no need to browse through the chapter pages one by one to find them.
  iv. There is a dark mode
- Suggested improvements:
  i. The "Contact", "Sign out", and "Privacy & Copyright" buttons on the website are not working right now.
  ii. I would like to minimize the sidebar to read the textbook in full page.
- Any scope adjustments based on feedback: The errors and suggestions will be completed in the next sprint.

👓 Retrospective Insights

What went well:
1. The collaboration between teammates is proceeding smoothly.
2. A new UI is implemented to present a new layout of the application.
3. A new solution for backend storage for textbook images and videos was found, which significantly reduced the lag time.
4. The alignment of all textbook components was properly implemented.
5. The dark mode feature to increase the functionality of the application was developed.

What could be improved:
1. We could ask for the content of the new chapters earlier from the client to complete the planned task.
2. More time should be spent on researching the techniques used by the previous group to familiarize the project

What could be improved:
and think of required improvements.
3. Need better tracking of story points implemented to avoid missing tasks.

Action Items	Assignee	Due Date
1. Improve the deployment of the application with the comments from our client and the stakeholder, and utilize the task board effectively to track project progress	Sangmoon	5/5
2. Add new chapters to the interactive textbook	Soyeon	11/5
3. Implement the analytics feature of user behavior when using the interactive notebook	Zona, Kate	16/5
4. Develop a table of contents for the textbook	Harold	19/5

Next Steps

- Fix the bugs that the client and the stakeholder found in the application.
- Plan sprint 3 to complete the assigned and incomplete user stories.
- Check with the client more frequently to ensure that the project's progress meets the expectations.