🏃‍♀️ Sprint Details

Sprint Number: Sprint 3

Start Date: 2025-05-02

End Date: 2025-05-30

Duration: 120 minutes for a one-month sprint

Agile Framework: Scrum

Attendees

- Development Team
- Scrum Master
- Product Owner
- Stakeholders

📝 Sprint Summary

Building on the progress and technical improvements made in Sprint 2, Sprint 3 focused on addressing previously identified issues and aligning the platform more closely with the client's functional requirements.

The sprint began with resolving critical issues observed in the deployed environment, including resolution inconsistencies on the main page, security concerns regarding log-in, and missing contact information. These issues, which had been flagged in earlier sprints, were prioritised to ensure the platform met baseline usability and deployment standards.

Given that this sprint also marked the final development phase before the project handover, we placed emphasis on fulfilling the client's requested functionalities. Such as, User Story Epic 2 (Adding/Updating Content) and User Story Epic 3 (User Data Analytics).

For Epic 2, we collaborated with the client to confirm new content directions and subsequently integrated three new chapters into the interactive textbook. These chapters were added with improved layout structure and consistent styling to maintain visual clarity across devices.

For Epic 3, we implemented a user analytics dashboard, enabling the client to gain meaningful insights such as average time spent per page and chapter-wise visitor counts. This feature empowers educators to better understand learner engagement patterns.

In summary, Sprint 3 consolidated the development outcomes of earlier sprints while expanding the platform's capabilities through content enhancement and analytics. This phase marked a shift from structural rework to delivering concrete client-facing features that significantly elevate the usability and educational value of the application.

💻 Technical Requirements

During Sprint 3, we continued using the core technologies established in previous sprints—Next.js (frontend), Cloudinary (media backend), Clerk (authentication), and Vercel (deployment). However, the primary technical focus in this sprint was the implementation of user analytics, which introduced several new challenges in terms of security, scalability, and integration.

To meet the requirements of User Story Epic 3 (User Data Analytics), team members explored and tested multiple analytics platforms to determine the most suitable solution. Below is a summary of our technical investigation:

Cloudinary Analytics (Initial Attempt): Since Cloudinary manages all our video and image content, we initially explored its built-in analytics capabilities. These provided basic insights into which media assets were most frequently accessed and how much time users spent on videos.

However, limitations in the platform and the scope of tracking (media-only) made it difficult to gain comprehensive insights into overall user activity across the site. It was not suitable for tracking interactions with non-media content or full-page engagement metrics.

Google Analytics (Alternative Considered): Google Analytics offered a robust set of features, including custom event tracking and API integration for advanced behaviour analysis. Nonetheless, we faced multiple challenges:

- Security concerns related to embedding API keys and the need for authenticated Google accounts
- Performance issues, including potential delays in page loading during live data capture
- Insufficient real user data to fully utilise the platform's capabilities during the development phase Due to these factors, we decided not to proceed with full Google Analytics integration.

Vercel Analytics (Final Decision): Since our platform is hosted on Vercel, we explored its analytics function. It provides valuable insights such as:

- Most visited pages
- Device and location data

This aligned closely with the client’s expectations for understanding user behaviour. However, due to limitations in the free tier, real-time integration of this data into the interactive textbook was not feasible. Direct API-based embedding of analytics into the interface was restricted.

Summary: Implementing user analytics proved to be the most technically demanding task of Sprint 3. We encountered and assessed various trade-offs in terms of data accessibility, security, performance, and cost. Through experimentation and research, we ultimately selected a solution that met the client's core requirements with minimal risk, no payments, and documented our findings for future enhancement.

🎯 Sprint Goal

In Sprint 3, we continued our ongoing goal of improving usability while addressing previously identified issues, integrating new content, and implementing user data analytics features. This sprint focused on enhancing the educational value of the platform by adding new chapters, tracking user engagement, and refining the deployment environment based on client feedback and discussions. Throughout the sprint, we encountered various technical and

design challenges related to analytics implementation, media rendering, and content layout. By maintaining continuous communication with the client, we were able to adapt our development process, resolve emerging issues, and ensure that the final features aligned with user needs and expectations.

✅ Sprint Deliverables

Completed Work

ID	User Story	Status	Notes
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.	Done	3 chapters added
US3.1	As an educator, I want to know which countries my viewers are from.	Done	Vercel Analytics
US3.2	As an educator, I want to know how many visitors accessed the website.	Done	
US3.3	As an educator, I want to know which chapter has the highest number of clicks.	Done	
US4.3	As a student, I want to see a table of contents on the platform so that I can switch between chapters easily and efficiently.	Done	Sidebar function to navigate sections is working on all pages

- Three new chapters (Chapters 6, 7, and 8) were added to the interactive textbook following discussions on content structure and arrangement.
- Analytics data is now visible to the client through a Vercel/Cloudinary analytics.
- Additional analytics, including number of visitors, device types, and countries of origin, are also provided to the client for deeper user insight.
- The consistency of the web pages was improved by refining the frontend code to ensure uniform layout and responsiveness.
- We presented our updated progress to the client, showcasing major functional and visual improvements to the application.
- A new Table of Contents (TOC) navigation feature was successfully implemented, significantly improving usability and helping students navigate the textbook more effectively.

Incomplete Work

ID	User Story	Reason for Incompletion	Next Steps
US3.4	As an educator, I want to know which chapter the viewers stay the longest.	Feature partially implemented due to technical limitations in tracking user session time accurately across pages. Real-time tracking required integration with external analytics platforms, which	Currently, we input numbers manually for reading time on each page. We plan on evaluating premium analytics tools or develop a custom tracking

ID	User Story	Reason for Incompletion	Next Steps
		introduced security concerns and exceeded the functionality of free services	mechanism if detailed user session data becomes a priority.

🛠️ Challenges

1. Technical challenges in implementing user analytics: Integrating real-time user data analytics proved to be technically demanding. Rendering analytics data dynamically on the interface resulted in slower response times and degraded user experience. Additionally, due to the limited user data during development, it was difficult to validate the accuracy and reliability of the analytics output in real-time.

2. Security concerns when using external analytics services: Implementing third-party analytics platforms, such as Google Analytics, required sensitive credentials like API keys and authenticated Google accounts. This raised security concerns, especially when involving client-side setup. Asking non-technical users to manage or input these credentials added further complexity and risk.

3. Limitations of free-tier platforms: As we expanded the textbook with new chapters and large media files, our storage and bandwidth requirements grew significantly. However, the free-tier plans of platforms like Cloudinary and Vercel imposed limits on usage. To stay within these constraints, we had to break large video files into smaller segments and minimise testing frequency to conserve available credits.

4. Balancing usability with performance constraints on plan: While aiming to provide deeper insights into user behaviour, we had to make trade-offs between data detail and application performance. Embedding detailed analytics dashboards within the textbook interface risked slowing down the application, so we opted for a minimal, client-accessible dashboard hosted externally.

📈 Sprint Metrics & Insights

Velocity: 19 out of 22 completed

Burndown Chart

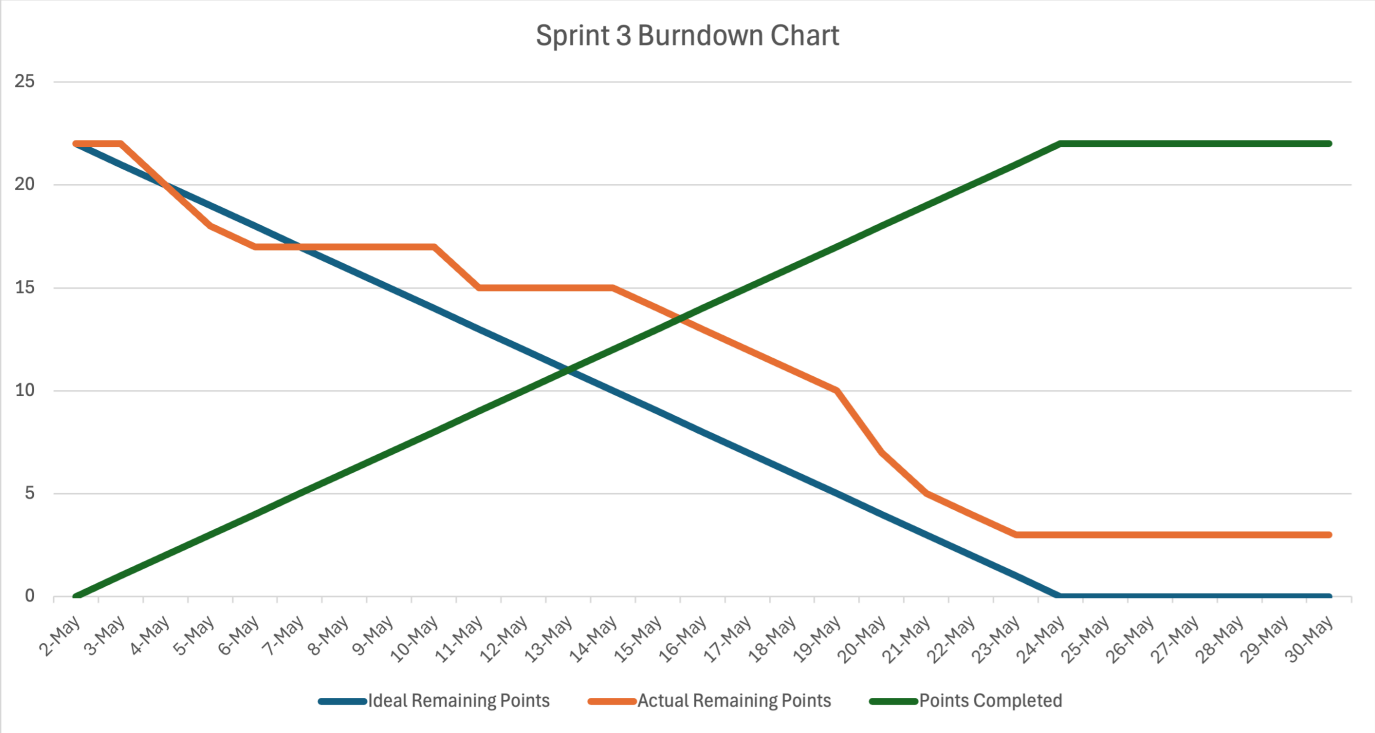
During Sprint 3, we followed the project timeline closely in the early stages, beginning with modifications to errors identified during Sprint 2. This foundational step ensured the stability and accuracy of existing features before we moved forward. Simultaneously, we focused on updating and expanding chapters in the interactive textbook. These updates aimed to enrich the learning experience for future users by providing comprehensive, well-structured content. Our improved communication with the client played a crucial role in this phase. By articulating our requests clearly through detailed emails, we efficiently received the necessary documents, feedback, and other resources, enabling smooth collaboration and timely progress.

However, our momentum slowed once we began implementing analytics features. The goal was to provide real-time usage data to help evaluate user engagement and learning outcomes. Initially, team members experimented with tools such as Google Analytics to visualize traffic and usage statistics directly within the application. Yet, we soon discovered that these solutions introduced performance drawbacks, including longer load times, and presented challenges due to

budget constraints—many analytics platforms require paid plans for full functionality. Given these limitations, we reassessed our options and explored alternative, cost-effective methods.

Since our application is hosted on Vercel, we investigated its built-in analytics capabilities. We found that Vercel does offer basic traffic insights, which could meet some of our needs without additional cost. Meanwhile, the cloud storage platform also provides the function of recording video usage, so we integrated the Cloudinary analytics into the application to reflect the information on the user data who has watched the lecture videos. While these metrics may not be as comprehensive as third-party tools, they are sufficient for our current phase. This pivot not only reflects our adaptability but also highlights our ability to make pragmatic decisions under project constraints.

Overall, Sprint 3 served as a learning experience that balanced content creation, client collaboration, and technical problem-solving. Although the analytics implementation proved more complex than anticipated, it underscored the importance of researching infrastructure capabilities early and aligning technical goals with resource availability.



Quality Metrics

- **Bugs found**:
  i. The LinkedIn link of the client's profile was broken, but it is fixed now after the client mentioned it.
  ii. The embedded Prezi frame wasn't displaying properly, and we found out that the attributes of the iframe were not set correctly, but it is working fine on the webpage now.
  iii. Some of the videos couldn't be played after deployment. After going through the code, we figured that it was due to the integration of the Cloudinary Analytics dashboard. All videos are able to play smoothly while the information can be fetched simultaneously.
- **Test coverage**:
  i. Contact page: Check if every link to Dr. Shazia's profile is correct.
  ii. Chapter section pages:
    - Verify that the content on the website corresponds to the document the client provides.
    - Click on every link and video on the website to ensure it is functioning.

- Test the quizzes and interactive components on the videos to make sure that they respond.
- Navigate to different sections in a chapter with the table of contents feature at the upper right of the webpage.

iii. Log in/out function:

- Confirm that every user can sign in as a new account member to the website or log in with the existing account.
- When clicking the "Sign out" on the home page, the user can sign out and leave the website.

iv. Analytics dashboard:

- Using the developer account, the administrator(the client) can access Vercel and see the views of chapter pages, the users' location, and the users' device type.
- Using the developer account, the administrator(the client) can access Cloudinary and track the time users spent on each video, the users' location, and the users' device type.

📼 Demonstration

What was demonstrated

1. The dark mode feature enables students to learn in a low-light environment.
2. The Cloudinary analytics dashboard to record the textbook video-related information:
    - Video views
    - The percentage of video time that the users spent on
    - The countries where the users are located
    - The devices that the users use to watch the video
3. The Vercel analytics dashboard to record the chapter pages information:
    - chapter pages views
    - The countries where the users are located
    - The devices that the users use to access the interactive textbook
4. The "table of contents" button to navigate across section pages in each chapter.

Demo Format

Our team demonstrated our product to the client via a **Zoom meeting at 2:00 pm on May 28**. However, the meeting wasn't recorded.

The formal demonstration video of the product can be accessed here.

Feedback received

1. Overall, Dr. Shazia is impressed by the development of the project. Especially, she is impressed by the analytics dashboard that we integrated into the website. She can utilise the data to adjust her teaching materials to benefit learning for her orthodontics students. For example, if she finds out that not many of her students spend much time on videos, she might consider posting fewer videos and more text reading.
2. She also checked whether the errors she reported were resolved, such as the broken LinkedIn link of her contact and reminder messages for the students to click on the interactive components in the videos to enhance the learning experience.

3. The core value of the interactive textbook is efficiency, effectiveness, and excellence. She is satisfied with the tool to show the table of contents and the 3 tabs categorising chapters, videos, and quizzes on the home page, which matches efficiency. The highlighted words in the chapter pages and the interactive components achieve effectiveness. Lastly, the website accesses smoothly without lag, and the function to fetch analytics of user behavior achieves excellence.
4. She suggested that perhaps in the later phase, adding a search bar at the home page can help learners to look for notes quickly and conveniently, but it is not a mandatory task for us.

👩‍🏫 Stakeholder Feedback - Student @Casey

Positive feedback

1. **Clean and Professional Design**: The site has a clean, modern look with a calming color palette that fits well with the orthodontics theme. The layout is intuitive and visually appealing, which gives a strong first impression of professionalism and trustworthiness.
2. **Responsive and Fast**: The website is fully responsive and performs well across devices. Pages load quickly, which is important for keeping users engaged and providing a smooth browsing experience.
3. **Clear Navigation**: The navigation bar is simple and easy to use. Key sections like “Home”, “Sign Out” and “Contact” are easily accessible, helping users find the information they need quickly.
4. **Well-Written Content**: The text throughout the site is clear and concise, providing essential information about orthodontic services without overwhelming the reader. It’s informative while maintaining a welcoming tone.
5. **Strong Branding and Visual Identity**: The use of consistent fonts, colors, and visual elements like icons and photos gives the website a cohesive identity. This helps build brand recognition and trust.
6. **Contact Options Are Readily Available**: The inclusion of a contact form and email enhances user convenience and encourages interaction.
7. **Use of Vercel Hosting**: Hosting on Vercel demonstrates a modern deployment approach, ensuring good performance and scalability. It's a solid technical choice for a frontend-focused application.

Suggested improvements

1. **Make the First Section More Engaging**: The first thing visitors see could be more eye-catching. Adding a clear message like “Start Your Learning Journey Today” and a button to book an appointment would help guide people right away.
2. **Easier Navigation on Mobile Phones**: On smaller screens, like phones, the "table of contents" button is a bit hard to see. Making it stand out more would help people find what they’re looking for faster.
3. **Add User Discussion Board**: Including a section that allows the student to discuss and ask questions to encourage proactive learning. It helps students learn faster.
4. **Make It Easier to Read for Everyone**: Some text is a little light in color, which might be hard for some people to read. Making the text darker or bolder would improve readability for all.
5. **Include Helpful Extras**: Adding a section with frequently asked questions (FAQ) or helpful articles about braces or dental care could answer common questions and make the site even more useful.

Any scope adjustments based on feedback

1. Since it has come to the end of the development phase, we can report the future improvements or add-ons and reflect the opinions from the stakeholders to our client, suggesting to her that more features can be implemented to

enhance the engagement of student learning.