

Development of the “Smart Start” E-Commerce Website Using Scrum

Aurelio Nathanael Purnomo¹, Ridwan Sanjaya², T Brenda Chandrawati³

^{1,2,3}Department of Information Systems, Soegijapranata Catholic University
Jl. Pawiyatan Luhur IV No.1, Bendan Duwur, Kota Semarang, Jawa Tengah 50234

¹21N40001@student.unika.ac.id,

²ridwan@unika.ac.id,

³brenda@unika.ac.id

Abstract— As e-commerce continues to grow, the need for effective website management is increasingly critical. Implementing an appropriate project management framework, such as Scrum, is essential to ensure projects are completed on time and meet user requirements. This study aims to implement Scrum in the development of the Smart Start e-commerce website and evaluate its impact on project efficiency and product quality. The development process follows the Scrum approach, starting from the creation of the Product Backlog through to the Sprint Review and Sprint Retrospective. Project success was measured using a Burndown Chart, while feature testing was conducted using Blackbox Testing. The study's results indicate that the project was completed on time with a 100% completion rate of a total of 54 story points. Blackbox Testing confirmed that all features functioned as expected without significant errors. The implementation of Scrum in the Smart Start e-commerce website development had a positive impact on enhancing development efficiency and ensuring the final product met user needs.

Keywords— blackbox testing, e-commerce, english course, scrum, software development

I. INTRODUCTION

With advancements in technology and information, people are increasingly using the internet in their daily lives. A new lifestyle has emerged, involving devices such as mobile phones, laptops, and various other electronic devices that have become an

integral part of modern life. One of the most significant changes is the rise of online shopping through e-commerce platforms [1].

E-commerce is a part of the digital sector that connects companies or individuals as buyers to conduct electronic transactions, such as trading goods and services or exchanging information through digital means [2]. With the advancement of time and technology, e-commerce has become the primary choice for consumers when shopping. Consumer decisions are no longer influenced solely by the services provided by companies or sellers but also by their trust in the e-commerce platform. The ease and convenience of online shopping offer consumers the opportunity to conduct transactions more efficiently and effectively, further strengthening the growth of e-commerce in the digital era [3].

According to a report by Bank Indonesia (BI), electronic transactions have continued to rise from 2018 to 2022. The value of electronic transactions in 2018 was IDR 106.78 trillion, showing a significant increase to IDR 1,177.8 trillion in 2022 [4]. The potential for increasing electronic transactions in Indonesia is even more promising, considering data from the Indonesian Internet Service Providers Association (APJII) showing that internet users in 2021-2022 reached 77.02% of the total population. In other words, 210 million Indonesians are internet users [5].

The traditional trading system will gradually be replaced by electronic commerce. With the current digital landscape

dominated by a productive-age population, e-commerce in Indonesia is expected to grow rapidly. Coupled with the demographic bonus and an increasingly consumer-driven society, Indonesia is well-positioned to seize this momentum [6].

Smart Start is a Micro, Small, and Medium Enterprise (MSME) that offers English tutoring services. With the growing number of students opting for online courses, Smart Start has started accepting students for online classes. They plan to expand their business to reach more students in distant locations through this online option.

Developing the Smart Start e-commerce website requires a flexible and dynamic software development method, suitable for projects with a short development timeline [7]. Agile methods such as Scrum are considered effective in enhancing business goal alignment between the Smart Start e-commerce website developers and the Smart Start business owner [8].

Therefore, the development of the Smart Start e-commerce website in this study utilizes Scrum. This framework was chosen because the project requires interaction between the business owner and the website developer and needs to be completed within a short timeframe.

II. METHOD

The first step in this research is to interview the business owner of the Smart Start English course. The interview is conducted to gather information regarding the website to be developed, ensuring it aligns with the business needs.

This study aims to develop a WordPress-based e-commerce website for English courses, necessitating a suitable software development methodology. Agile methodology, specifically the Scrum framework, will be utilized in this research. This methodology provides a structured framework incorporating various practices that enhance transparency, allow practitioners to monitor each stage of the project, make necessary adjustments, and implement

continuous improvements to ensure the project progresses toward its objectives [9].

Scrum defines key roles such as,

- Product Owner, which acts as the central leadership figure for the product, responsible for identifying and prioritizing business and needs [10].
- Scrum Master, which oversees the Scrum process, ensuring that the team follows Scrum principles while providing guidance and training to all project members [11].
- Development Team, which is responsible for building the product, supported by the Scrum Master, who ensures an optimal development environment for project success [12].

Scrum utilizes artifacts designed to enhance transparency, ensuring that all stakeholders have a shared understanding of critical information to facilitate decision-making. Each artifact is accompanied by a commitment to improve clarity and enable effective progress measurement [13].

- Product Backlog, which is a comprehensive list of all requirements and features for the product [14].
- Sprint Backlog, which is a selection of Product Backlog items chosen for a specific sprint, defining the work to be completed within that sprint [15].
- Increment, which is the cumulative result of all completed Product Backlog items within the current sprint, including values carried over from previous increments [16].

Scrum follows structured stages designed to maintain workflow continuity while eliminating unnecessary steps. Each sprint cycle delivers an increment, representing an iterative product release [17].

- Sprint Planning, is when the Product Owner prioritizes the Product Backlog and collaborates with the team to define the Sprint Backlog, aligning workload capacity with development goals [18].
- Daily Scrum, is a brief, 15-minute daily stand-up meeting where the development team members plan their tasks for the next 24 hours [19].

- Sprint Retrospective, is a formal meeting, typically lasting up to four hours, where the team presents the results of the sprint and showcases the developed increment [20].
- Sprint Review, is a reflective session where the Scrum team evaluates their performance during the sprint, assesses team dynamics and stakeholder interactions, and identifies areas for improvement from an individual and collective perspective [21].

Below are the stages of Scrum.

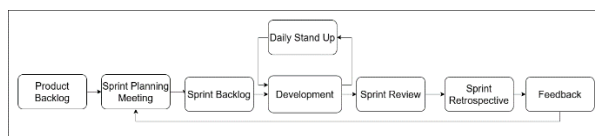


Figure 1. The Stages of Scrum

The resulting website will be tested using black box testing, which involves evaluating all features based on their functionality without examining the internal code structure. This testing approach ensures that the system meets the specified requirements by verifying inputs, outputs, and overall system behavior.

III. RESULTS AND DISCUSSION

The development of the Smart Start e-commerce website was conducted using Scrum, comprising a total of 54 story points completed within a one-month timeframe. Each Sprint was scheduled on a weekly basis, with story points distributed within each cycle.

Throughout the development process, Scrum was implemented consistently through daily stand-up meetings and weekly sessions, including Sprint Reviews, Retrospectives, and feedback discussions with the Product Owner.

A. RESULT

I. Sprint 1

Sprint 1 primarily focused on the installation and configuration of the Tutor LMS and WooCommerce plugins. Following this setup, development continued with the creation of the home page, including the design and

implementation of the site's header and footer components.

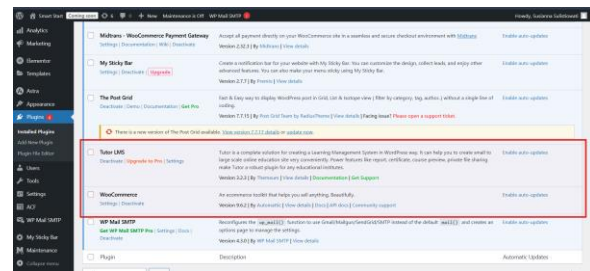


Figure 2. Plugin Page

As shown in Figure 2, the Tutor LMS and WooCommerce plugins were successfully installed. The process was then followed by the configuration phase to align the system with the project requirements.



Figure 3. Home Page

Figure 3 shows the home page of the Smart Start e-commerce website. The dashboard includes a banner section along with key information about instructors, course materials, and access.

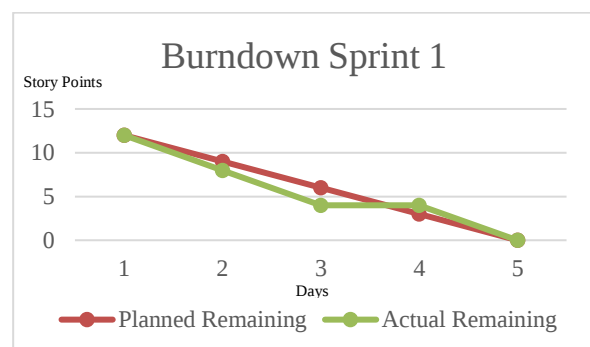


Figure 4. Burndown Sprint 1

Sprint 1 was assigned 12 story points, derived from the prioritized items in the Product Backlog. As illustrated in the Burndown Chart in Figure 4, the story points decreased steadily over time,

reflecting the consistent completion of tasks. This steady decline indicates that each completed task directly contributed to the reduction in story points, ultimately leading to the successful and timely completion of the Sprint.

II. Sprint 2

Sprint 2 focused on implementing student registration and login functionalities, followed by the development of the course page, with feedbacks from the Product Owner.

Figure 5. Student Registration Form

Students are required to register or log in before purchasing a course. Figure 5 displays the student registration form used to facilitate this process.

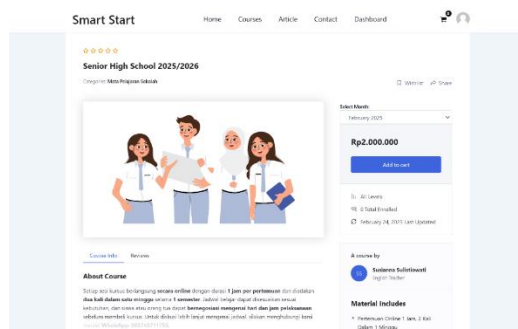


Figure 6. Course Detail

Courses can be selected from the course page, where detailed information is presented as shown in Figure 6. This includes comprehensive course descriptions, required tools, and the target audience for whom the course is most suitable.

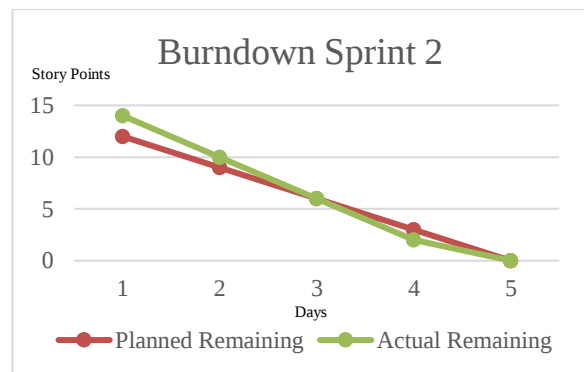


Figure 7. Burndown Sprint 2

Sprint 2 comprised 14 story points, initially planned for 12 but later adjusted to 14 due to feedback received from the Product Owner during the Sprint Review of the previous iteration. As shown in the Burndown Chart in Figure 7, the story points steadily decreased as tasks were completed, reflecting consistent progress throughout the Sprint. This adjustment and timely completion indicate the project's ability to adapt to evolving requirements while maintaining delivery pace.

III. Sprint 3

Sprint 3 focused on the development of the article, contact pages, and feedbacks from the Product Owner.

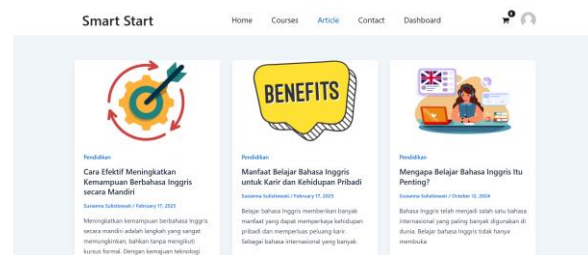


Figure 8. Article Page

The article page, shown in Figure 8, is designed using a grid structure.

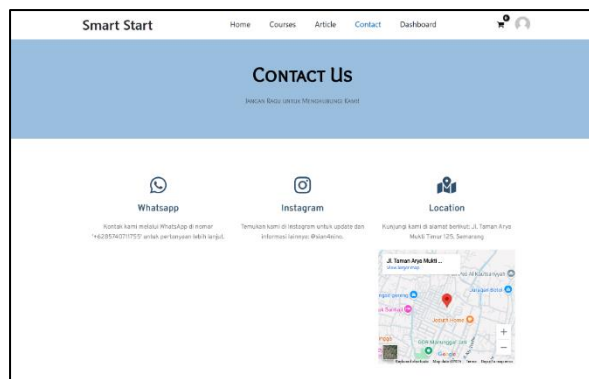


Figure 9. Contact Page

The contact page, presented in Figure 9, includes key information such as WhatsApp number, Instagram handle, and address with a map.

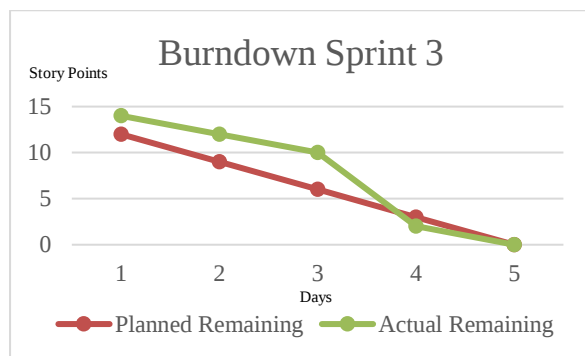


Figure 10. Burndown Sprint 3

Sprint 3 started with 14 story points, initially planned for 12, but increased due to additional feedback received, which introduced more complex tasks. In the first three days, the Burndown Chart in Figure 10 shows a higher than expected workload. Despite these challenges, the story points steadily decreased as tasks were completed, and the Sprint was finished on time, demonstrating effective adaptation and task resolution.

IV. Sprint 4

Sprint 4 focused on developing the student dashboard page and integrating it with Midtrans for course payment processing.

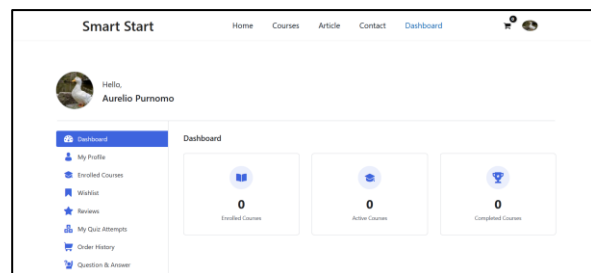


Figure 11. Dashboard Page

The dashboard page includes features such as profile management, a list of purchased courses, provided reviews, quiz attempts, and payment history, as shown in Figure 11.

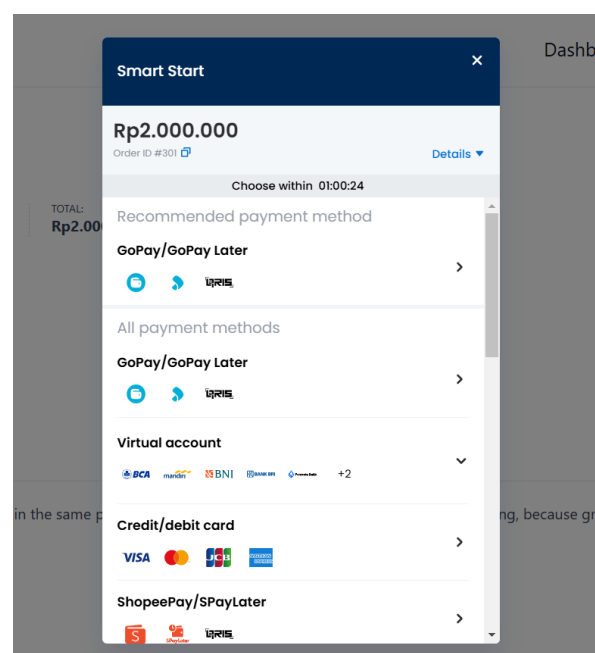


Figure 12. Midtrans Payment

Courses can be purchased by first adding them to the cart, proceeding to checkout, filling in personal details, and completing the payment via Midtrans. Figure 12 displays a pop-up list of available payment methods through Midtrans, including options such as Gopay, QRIS, and VA.

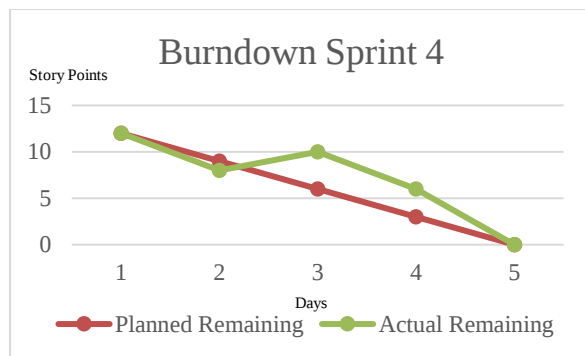


Figure 13. Burndown Sprint 4

Sprint 4 consisted of 14 story points, with a slight increase on day 3 due to the addition of a Terms and Conditions page required for Midtrans integration before going into production. The Sprint was completed on time, as shown in the Burndown Chart in Figure 13, which illustrates a steady reduction of story points as tasks were completed throughout the scheduled timeframe.

B. DISCUSSION

After the development was completed, the researcher conducted a comprehensive system test using black box testing. The testing covered various aspects, including the login page, article and course pages, dashboard features, as well as the payment process via Midtrans production and access to purchased courses. The results were as follows:

1. The student registration and login pages were successfully tested, ensuring proper display and functionality of the registration/login process.
2. The homepage displayed the latest courses and articles correctly and successfully.
3. The course, article, and contact pages were all displayed properly.
4. The process of creating a course from the admin panel to displaying it on the course page and its details was successful.
5. All course features, such as quizzes, lessons, reviews, and Q&A, functioned correctly.
6. All student dashboard features were successfully tested.

7. The process of adding courses to the cart, checking out, and making payments via Midtrans was successful.
8. The logout process was also successfully completed.

IV. CONCLUSION

The implementation of Scrum in the development of the Smart Start e-commerce website proved to be effective in managing the project within a structured and adaptive framework. Through four well-executed Sprints, planning, development, and evaluation activities were successfully carried out, enabling continuous improvement and timely delivery. The use of Burndown Charts confirmed consistent progress aligned with estimated story points, while Blackbox Testing validated that all core features including course modules, user dashboards, and payment integration via Midtrans functioned as intended. These results highlight Scrum's ability to enhance both development efficiency and product quality, making it a suitable approach for similar software projects.

REFERENCES

- [1] M. Rachmawati, "Adopsi E-Commerce UMKM sebagai Upaya Adaptasi Perubahan Perilaku Konsumen," *J. EMT KITA*, vol. 8, no. 2, pp. 695–700, 2024, doi: 10.35870/emt.v8i2.2377.
- [2] Dita Fitriani and Hwihanus Hwihanus, "Peranan Sistem Informasi Manajemen Terhadap Perkembangan E-Commerce Dalam Pengambilan Keputusan Bagi Usaha Umkm," *J. Kaji. dan Penal. Ilmu Manaj.*, vol. 1, no. 1, pp. 64–77, 2023, doi: 10.59031/jkpim.v1i1.50.
- [3] E. Marpuah and Basar Maringan Hutauruk, "Pengaruh Kualitas Produk, Kualitas Pelayanan Dan Harga Terhadap Keputusan Pembelian Di E-Commerce Bilibli (Studi kasus pada mahasiswa Universitas Pelita Bangsa)," *JEMSI (Jurnal Ekon. Manajemen, dan Akuntansi)*, vol. 9, no. 4, pp. 1205–1215, 2023, doi: 10.35870/jemsi.v9i4.1244.

- [4] E. Akibat and D. Pandemi, "Pengaruh Penggunaan Transaksi Digital Terhadap Pertumbuhan," vol. 1, no. 3, pp. 1–10, 2024.
- [5] E. Santoso, "Opportunities and Challenges: E-Commerce in Indonesia from a Legal Perspective," *J. Penelit. Huk. Jure*, vol. 22, no. 3, p. 395, 2022, doi: 10.30641/dejure.2022.v22.395-410.
- [6] E. Santoso, "Opportunities and Challenges: E-Commerce in Indonesia from a Legal Perspective," *J. Penelit. Huk. Jure*, vol. 22, no. 3, p. 395, 2022, doi: 10.30641/dejure.2022.v22.395-410.
- [7] N. Azharandi, S. Andryana, and A. Gunaryati, "E-Commerce Kedai HP Berbasis Model View Controller (MVC) dengan Metode Scrum," *J. JTIK (Jurnal Teknol. Inf. dan Komunikasi)*, vol. 6, no. 1, pp. 49–55, 2022, doi: 10.35870/jtik.v6i1.379.
- [8] K. R. Putra, S. Umaroh, N. F. Fahrudin, and M. Musrini, "Pengembangan Aplikasi E-Commerce Untuk Digital Branding MF Binary Menggunakan Metodologi Agile SCRUM," *J. Pengabd. Kpd. Masy.*, vol. 2, no. 2, pp. 139–166, 2023, [Online]. Available: <https://doi.org/10.26760/rekakarya.v2i2.139-166>
- [9] Firera, M. Al Musadieg, Solimun, and B. Hutahayan, "A Systematic Literature Review," vol. 14, no. 4, pp. 282–307, 2023, doi: 10.2991/978-2-38476-090-9_24.
- [10] M. F. Thouin and W. E. Hefley, "Teaching Scrum Competencies Using an Experiential Learning Simulation," *J. Inf. Syst. Educ.*, vol. 35, no. 1, pp. 37–47, 2024, doi: 10.62273/GXMA1727.
- [11] T. Karabiyik, A. Jaiswal, P. Thomas, and A. J. Magana, "Understanding the interactions between the scrum master and the development team: A game-theoretic approach," *Mathematics*, vol. 8, no. 9, 2020, doi: 10.3390/math8091553.
- [12] P. S. Santos Júnior, M. P. Barcellos, R. de A. Falbo, and J. P. A. Almeida, "From a Scrum Reference Ontology to the Integration of Applications for Data-Driven Software Development," *Inf. Softw. Technol.*, vol. 136, no. March, 2021, doi: 10.1016/j.infsof.2021.106570.
- [13] K. Schwaber and J. Sutherland, "Panduan Definitif untuk Scrum: Aturan Permainan," *Scrum.Org*, no. November, pp. 1–17, 2020.
- [14] P. L. Ayunda and E. K. Budiardjo, "Evaluation of Scrum Practice Maturity in Software Development of Mobile Communication Application," 2020 3rd Int. Conf. Comput. Informatics Eng. IC2IE 2020, pp. 317–322, 2020, doi: 10.1109/IC2IE50715.2020.9274625.
- [15] G. D. Mulyadi, "Perancangan Sistem Informasi Manajemen PT. XYZ Sepatu Pernikahan Online Menggunakan Scrum," *J. Pendidik. Tambusai*, vol. 6, no. 2, pp. 8941–8948, 2022.
- [16] A. Bimantara and J. Sutresna, "Perancangan Dashboard Sistem Informasi Dengan Metode Scrum Menggunakan Azure Board," vol. 3, no. 2, pp. 519–526, 2024, [Online]. Available: <https://journal.mediapublikasi.id/index.php/oktal>
- [17] I. Tahyudin and Zidni Iman Sholihati, "Pengembangan Aplikasi Tiga-Tingkat Menggunakan Metode Scrum pada Aplikasi Presensi Karyawan Glints Academy," *J. RESTI (Rekayasa Sist. dan Teknol. Informasi)*, vol. 6, no. 1, pp. 169–176, 2022, doi: 10.29207/resti.v6i1.3793.
- [18] A. Mustika, "Journal of Data Science and Information System (DIMIS) Permodelan Sistem Informasi Penjualan Barang Menggunakan Metode Scrum," *J. Data Sci. Inf. Syst.*, vol. 2, no. 1, pp. 1–8, 2024, [Online]. Available: <https://doi.org/10.58602/dimis.v2i1.97>
- [19] H. Tan, S. Robert, and I. Day, "Scrum in Practice- Multiple case study on three different levels," 2020.
- [20] J. Baijens, R. Helms, and D. Iren,

“Applying Scrum in Data Science Projects,” Proc. - 2020 IEEE 22nd Conf. Bus. Informatics, CBI 2020, vol. 1, pp. 30–38, 2020, doi: 10.1109/CBI49978.2020.00011.

- [21] M. Fuchs and M. Fuchs, “THROUGH SELF-LEADERSHIP TO HIGH PERFORMANCE: THE VALUE OF RETROSPECTIVES FOR SCRUM TEAMS,” 2023.