STUDY SPARK: AN ONLINE LEARNING PLATFORM WITH LIVE PEER LEARNING AND PROGRESS TRACKING

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Abstract

This project introduced Study Spark, an online learning platform aimed at improving student engagement through live peer learning and progress tracking. It addressed common online learning challenges such as low motivation and isolation by incorporating real-time communication, progress dashboards and gamification. Using an adapted waterfall methodology, the project underwent planning, design, development, testing and documentation. Functionality tests showed 100% success, and User Acceptance Testing with 30 participants reported high satisfaction. While the platform proved effective, areas for improvement include lack of features like AI-driven recommendations and video conferencing. Future work should focus on enhancing user experience and scalability.

Keywords*: Online Learning Platform, Peer Learning, Progress Tracking, Real-Time Communication, User Acceptance Testing*

1. Introduction

The shift to online education has brought challenges such as low student engagement, isolation and lack of motivation (Hari et al., 2024). Study Spark was developed to address these issues by offering a web-based learning platform that emphasizes live peer interaction and real-time progress tracking. The main objectives of this project are to identify the key requirements for an effective online learning platform, design and develop a web-based learning platform and evaluate the developed learning platform using functionality and user acceptance test. The scope of the project includes features such as live chatrooms, progress dashboards and leaderboards to promote engagement, along with tools for instructors to manage courses and quizzes (Gnanapriya & Dinesh, 2024). The system supports real-time communication and operates locally, with evaluations involving university students and lecturers to ensure relevance and usability. This platform aims to create a more engaging and supportive online learning environment.

2. Methodology

This project employed an adapted waterfall model, structured into five phases, planning, design, development, testing and documentation (Amron et al., 2022). In the planning phase, system requirements were identified through literature review and analysis of current e-learning challenges. The design phase involved the creation of sitemaps, data flow diagrams (DFD), entity relationship diagrams (ERD) and user interface mock-ups to guide development. The development phase utilized HTML, CSS, PHP, MySQL, and MongoDB to build the platform, supporting key roles, student, lecturer and administrator with functionalities such as live chatrooms, course management and progress tracking. During the testing phase, functionality testing was conducted to ensure each feature worked correctly, including login, course enrollment, chat functions and leaderboard tracking. Test cases were designed for each user role and executed with expected outcomes documented. Results showed a 100% success rate across all core features, validating the system's reliability and performance. User Acceptance Testing (UAT) was then conducted with 30 participants. Using the metrics such as Perceived Ease of Use (PEU), Perceived Usefulness (PU), Attitude (ATT) and Behavioral Intention (BI) were assessed. Feedback indicated high user satisfaction, with recommendations for user interface and long-term engagement improvements. The documentation phase compiled the entire development and testing process for future reference and maintenance.

3. Results / Findings

The evaluation of Study Spark was conducted through functionality testing and User Acceptance Testing (UAT). The functionality testing phase validated all major system features, including user login, chatrooms, discussion forums and leaderboard tracking. All test cases passed successfully with a 100% functionality rate, confirming the platform's operational reliability. The User Acceptance Testing (UAT) involved 30 participants, including students and lecturers. Results showed high levels of satisfaction across key dimensions, Perceived Ease of Use (PEU), Perceived Usefulness (PU) and Attitude (ATT). However, the Behavioural Intention (BI) score was slightly lower, suggesting that while users appreciated the system, long-term usage motivation could be improved. Participants highlighted the platform's real-time interaction, progress tracking and gamified elements as engaging features. Suggestions included enhancing the user interface and integrating more advanced functionalities like video conferencing and AI-based recommendations.

4. Novelty of Project

The novelty of Study Spark lies in its unique integration of live peer learning, real-time progress tracking and gamification within a single web-based platform, specifically tailored to address the key limitations of current online learning systems, low engagement, procrastination and learner isolation. While many existing platforms offer content delivery and assessments, they often lack dynamic peer interaction and real-time accountability features. Unlike traditional e-learning systems, Study Spark enables synchronous peer collaboration through live chatrooms and discussion spaces, allowing students to support and learn from one another in real time. The progress tracking dashboard and leaderboard motivate users by making learning performance transparent and goal-oriented. Additionally, the platform supports multi-role access, providing lecturers with intuitive tools to manage courses and monitor student activity effectively. This project also combines dual-database integration, using MySQL for structured content and MongoDB for real-time progress tracking, offering flexibility and performance optimization. The emphasis on real-time engagement and social learning dynamics introduces a practical, community-driven approach to online education, distinguishing Study Spark as an innovative solution in the digital learning landscape.

5. Conclusion or Future Work

Study Spark successfully enhances online learning through live peer interaction and progress tracking. While the platform meets current educational needs, future work should focus on improving the user interface, integrating AI-driven recommendations and adding video conferencing to further enrich engagement and scalability.

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