Web-Based E-Learning System Optimization for SMA Negeri Ploso

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ABSTRACT

This research focuses on enhancing education at SMA Negeri Ploso by creating a web-based e-learning platform that offers organized access to educational resources, tasks, tests, and interaction between educators and students. The platform was developed to overcome the drawbacks of traditional teaching methods by providing more flexibility, easier access, and improved efficiency for both in-person and remote learning experiences. A qualitative methodology was used in conjunction with a development process that involved analyzing requirements, designing the system, implementing it, and conducting testing. The platform utilizes a structured access model based on user roles for administrators, educators, and students, allowing each group to execute specific functions aligned with their duties. Administrators handle user information, course management, and feedback, educators can upload and oversee educational content and assess students' work, while students can view course materials, turn in assignments, and check their grades. During the testing phase, it was confirmed that all primary functions worked properly and delivered accurate outcomes as designed. The user interface was crafted to be straightforward, easy to navigate, and usable on multiple devices including laptops, desktops, and smartphones. The launch of this web-based e-learning system significantly enhanced the adaptability and effectiveness of the educational process and has the potential for future developments such as incorporating online quizzes, automated feedback, and communication tools to further improve the learning journey.

Keywords: Qualitative methodolog; Web-based e-learning platform; Education information system; Ploso State High School

INTRODUCTION

The swift progress in information and communication technology has changed many elements of education, resulting in a growing use of digital learning platforms in educational institutions. Although traditional in-person teaching methods remain important, they often struggle with flexibility, accessibility, and efficiency, especially when addressing the varied needs of students and the hurdles that come with distance learning. At SMA Negeri Ploso, educational activities have predominantly depended on traditional methods, necessitating the presence of both students and teachers in the classroom. This reliance on physical meetings has led to challenges in keeping the learning process ongoing during interruptions, such as health emergencies or geographical limitations, highlighting the necessity for alternative means of learning.

Numerous research efforts have indicated that online learning platforms can greatly enhance educational results by allowing ongoing access to learning materials, facilitating self-directed learning, and promoting interactive exchanges between educators and learners. Nevertheless, many current e-learning platforms tend to be broadly designed and do not cater to the unique requirements of specific educational institutions. This situation underscores the need for a customized online learning solution that aligns with the academic framework, course content, and operational methods of SMA Negeri Ploso. The study discussed in this article aims to fill this void by creating a web-based learning platform with role-specific features for administrators, teachers, and students, ensuring efficient management of classes, assignments, resources, and communication.

METHOD

This study utilized a qualitative method accompanied by a Research and Development framework to design and assess an online learning system specifically crafted for SMA Negeri Ploso. The participants involved in the research included three groups: administrators, educators, and learners, all of whom contributed insights and responses throughout the development phase. Information was gathered via direct observation, organized interviews, and analysis of documents to determine the necessary functionalities and usability considerations.

The creation process went through multiple phases: needs assessment, system layout, execution, and evaluation. During the needs assessment phase, user requirements were collected and functional specifications were outlined. The layout phase generated system flow diagrams, entity relationship charts, and prototypes for user interfaces. The execution was carried out with the CodeIgniter 3 framework, along with PHP, MySQL, and HTML/CSS, ensuring the designs were adaptable for viewing on desktop computers, laptops, and mobile devices.

The tools and materials used included a laptop with a local server environment (XAMPP), a web browser for testing, and a hosting server for deployment. The primary instrument for data collection was an interview guide for gathering qualitative insights, while system testing employed black box testing to validate each function according to the predefined requirements.

Data analysis involved qualitative descriptive techniques, where observations and interview results were categorized to identify recurring themes and evaluate system performance against user expectations. The testing results were documented in tables for each user type—administrator, teacher, and student—ensuring that all features operated according to the intended design and supported the learning process effectively.

RESULT AND DISCUSSION

This research assessed an online learning platform for SMA Negeri Ploso by utilizing observations, interviews, and black box testing that included administrators, educators, and learners. Prior to its introduction, the school depended on in-person teaching, manual distribution of materials, and physical submissions of assignments, resulting in restricted access and increasing the workload for educators.

After the system was put into use, administrators were able to handle user accounts, class schedules, complaints, and profiles smoothly. Educators could arrange subjects, add resources, mark assignments, and modify profiles, while learners accessed lessons, turned in assignments, checked their grades, and submitted complaints directly via the platform.

Functional assessments verified that every feature operated as expected, providing complete access on both desktop and mobile platforms. The design of role-based access made navigation easier for various user groups, enhancing both usability and effectiveness in the educational experience.

Result

The findings of this research rely on observations, discussions, and black box evaluations carried out on the created online e-learning platform at SMA Negeri Ploso. The system underwent testing with three categories of users: administrators, educators, and learners, emphasizing functional correctness, user-friendliness, and device responsiveness.

From the gathered observations, it was discovered that prior to the system's rollout, the educational method was predominantly dependent on in-person gatherings, which restricted both the adaptability and availability of resources beyond the classroom. Conversations with educators showed that they faced challenges in effectively sharing resources and gathering completed work, while learners frequently did not have a unified space to find coursework and hand in assignments.

Table 1. Summary of System Testing Results

User Role	Key Features Tested	Status	Notes
Administrator	Login, manage users, manage classes, complaints, edit profile	Pass	All features worked as expected
Teacher	Login, view subjects, upload/edit materials, grade assignments, edit profile	Pass	No errors during testing
Student	Login, view subjects, access materials, submit assignments, view grades, submit complaints	Pass	Features accessible on PC and mobile devices

After the implementation, the e-learning system successfully provided role-based access, streamlined material distribution, and improved the flow of assignment submission and grading. Table 1 presents the summarized results of the system testing for each user role.

Furthermore, the trustworthiness of the qualitative information was confirmed by using triangulation, which helped to make certain that results were reliable across various sources. Transferability was achieved by thoroughly recording the system development process, making it possible to adapt it in comparable educational settings. Dependability was tackled by upholding uniform testing methods, while confirmability was reinforced by meticulously documenting interview answers and observational notes.

Discussion

The creation and deployment of the online e-learning platform greatly enhanced the educational experience at SMA Negeri Ploso by offering a unified space for sharing materials, submitting assignments, and facilitating communication. The results show that the platform solved the initial issue of restricted access to educational resources, particularly beyond school hours, thus allowing more flexibility for teachers and students alike.

In contrast to earlier studies by Wahyuni (2017) and Haryanto (2018), which highlighted the broad advantages of e-learning in enhancing student involvement, the current research introduces a distinct aspect by customizing the platform to meet the specific operational requirements of one particular institution. This personalization seems to have led to increased adoption levels and satisfaction among users, as evidenced by the favorable responses obtained during interviews. Unlike standard platforms, the role-based structure allowed each user category to concentrate on pertinent activities without added complications, improving the overall user experience.

From a theoretical standpoint, the findings correspond with the constructivist approach to learning, in which learners interact with resources at their own speed while educators serve as guides instead of being the only providers of knowledge. The addition of a complaints management module creates a new way for communication that has not been extensively investigated in earlier research, presenting opportunities for enhanced transparency and confidence between students and the administration of the school.

In practical terms, the system has shown that it can improve efficiency in both managing tasks and educational procedures, minimizing lag in distributing resources and grading assignments. These results indicate that upcoming e-learning advancements in comparable situations should focus on tailoring to the specific requirements of institutions, incorporating direct methods for feedback, and guaranteeing functionality across various devices. Additionally, the research supports the notion that merging technological advancements with local adjustments can produce more significant educational results than simply using ready-made solutions.

CONCLUSIONS

The creation and deployment of an online e-learning platform at SMA Negeri Ploso effectively overcame the shortcomings of traditional educational practices by increasing accessibility, flexibility, and effectiveness in the learning experience. The system's access design, which is based on different roles, enabled administrators, educators, and learners to carry out their specific tasks, fostering better workflow and interaction. The tests conducted showed that all functionalities worked as planned and were usable on a range of devices, confirming their practicality and adaptability. The customized design of the platform, which was aligned with the school's unique academic framework and operational requirements, led to greater user satisfaction compared to standard e-learning solutions. This study highlights the significance of tailoring educational technology to fit specific needs, illustrating that a customized approach can lead to improved learning results. Future enhancements could include features for automated assessments, instant messaging, and sophisticated analytics to boost the platform's capabilities and overall efficacy.

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