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Enhancing Knowledge Sharing through Student Forums in a Learning Management System

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Abstrak

Penelitian dan pengembangan ini menghasilkan sebuah Learning Management System (LMS) yang dilengkapi dengan fitur utama berupa forum diskusi untuk mendukung aktivitas belajar siswa. Forum tersebut berfungsi sebagai sarana untuk memperkuat proses berbagi pengetahuan antarsiswa. LMS yang dikembangkan dapat diakses melalui perangkat berbasis web maupun smartphone. Tujuan pengembangan ini adalah menghasilkan LMS yang mampu memfasilitasi pembelajaran daring berbasis diskusi serta mendorong siswa untuk saling berbagi pengetahuan selama proses pembelajaran berlangsung. Produk yang dihasilkan termasuk dalam kategori valid dan layak digunakan sebagai media pembelajaran daring. Analisis data dilakukan menggunakan pendekatan kuantitatif dan kualitatif. Model pengembangan yang digunakan adalah Web-based Instructional Design yang dikemukakan oleh Davidson-Shiver, Rasmussen, dan Lowenthal. Hasil validasi menunjukkan bahwa LMS dinyatakan sangat layak dan valid untuk digunakan, dengan persentase penilaian dari ahli media sebesar 97,22% dan dari ahli materi sebesar 92,5%. Selain itu, hasil uji coba lapangan memperoleh persentase sebesar 88,53%, serta analisis terhadap komentar siswa menunjukkan respons yang cenderung positif. LMS ini terbukti mampu mengoptimalkan pemanfaatan forum diskusi dalam memperkuat berbagi pengetahuan, khususnya melalui fasilitasi diskusi langsung baik secara asinkron maupun sinkron melalui forum diskusi dan video conference, sehingga memungkinkan siswa untuk berkomunikasi, bertukar ide, dan berbagi pengetahuan secara efektif.

Kata Kunci: *Learning Management System; Forum Siswa; Diskusi; Video conference.*

Abstract

This development study resulted in a Learning Management System (LMS) featuring a discussion forum as its primary component to support student learning activities. The forum serves to strengthen students' knowledge sharing processes. The developed LMS is accessible via both

web-based platforms and smartphones. The purpose of this development was to produce an LMS capable of facilitating discussion-based online learning and enabling students to share knowledge during the learning process. The resulting product was categorized as valid and feasible for use in online learning. Data were analyzed using both quantitative and qualitative approaches. The development model employed was the Web-based Instructional Design model proposed by Davidson-Shiver, Rasmussen, and Lowenthal. The LMS was declared valid and feasible for instructional use, as indicated by the media expert validation score of 97.22% and the subject matter expert validation score of 92.5%. Field trial results showed a feasibility score of 88.53%, and analysis of student feedback revealed predominantly positive responses. Overall, the Learning Management System was able to optimize the use of student discussion forums in strengthening knowledge sharing, particularly by facilitating direct interaction through discussion forums and video conferencing, allowing students to communicate, exchange ideas, and share knowledge effectively.

Keywords: *Learning Management System; Student Forum; Discussion; Video conference.*

INTRODUCTION

The advancement of information and communication technology has brought significant changes to educational practices, particularly in the implementation of online learning. Teaching and learning activities increasingly depend on digital platforms and software applications to support instructional delivery, interaction, and learning management (Wibawanto, 2020). To ensure that online learning is conducted effectively, appropriate learning software must be selected and utilized. The use of communication-based applications alone, such as video conferencing tools, is often insufficient, as they primarily function as verbal communication media. Effective online learning environments also require integrated features for attendance management, assignment distribution and submission, discussion forums, and assessment processes (Sutiono et al., 2022).

E-learning refers to the implementation of learning activities through electronic devices by utilizing information technology. Examples of e-learning include web-based learning and virtual classrooms. Web-based learning delivers instructional content through the internet or websites and serves as a medium for communication between teachers and students (Fadli, n.d.). The learning content within e-learning environments may be presented in multimedia or text-based formats. Such content is stored within a Learning Management System (LMS), enabling students to access learning materials anytime and anywhere (Agustina, 2013).

A Learning Management System (LMS) is a web-based software application designed to deliver instructional materials online and manage learning activities and outcomes. An LMS functions as a virtual learning environment where teachers and students interact and collaborate digitally. Through an LMS, teachers can upload learning materials and assignments, while students can participate in discussions, submit assignments, and complete quizzes (Foreman, 2017). LMS platforms provide essential features for online learning, including user access management, course management, learning resources, learning activities, grading systems, and learning visualization (Purwandani, 2016; Raharja, 2011). Thus, an LMS can be understood as a system that manages the entire online learning process (Rizal & Walidain, 2019). Common learning activities supported by an LMS include accessing learning materials, submitting assignments, and conducting assessments (Dini, 2022). Additionally,

LMS features that support learning processes include group discussions, assignment submission and evaluation, discussion forums, chats, quizzes, and teacher evaluations (Al-Hudhud, 2015).

In addition to commonly used LMS platforms such as Moodle, Google Classroom, Edmodo, and Claroline, alternative digital applications have recently been explored for educational purposes, including Discord. Discord is a voice and text-based communication application originally developed for online gaming communities to facilitate interaction among users. The application offers a simple, practical, and user-friendly interface that can be accessed across multiple digital platforms (Raihan & Putri, 2018). Discord has gained popularity due to its support for Voice over Internet Protocol (VoIP) and real-time messaging, enabling users to communicate effectively in virtual environments (Lacher & Biehl, 2018).

Despite the availability of various digital platforms, challenges remain in implementing discussion-based learning in online environments. Teachers often rely heavily on lecture-based methods, resulting in limited opportunities for student interaction and collaborative learning. Students frequently experience difficulties in communicating with peers, sharing knowledge, exchanging ideas, and reaching collective agreements during online learning activities (Kurniawan, 2020). Furthermore, organizing group discussions using conventional video conferencing tools often requires additional technical procedures, such as creating breakout rooms, which may reduce instructional efficiency and consume valuable learning time. These issues indicate the absence of a learning platform that effectively and efficiently supports discussion-based online learning (Awaluddin, 2018).

One strategy to facilitate discussion-based learning in online environments is through student online forums. Online forums provide a space for students to freely discuss learning materials or specific topics during online instruction. These forums may be implemented through LMS discussion features or integrated with video conferencing tools. However, many existing LMS platforms offer limited discussion functionalities, such as the absence of notification systems, restricted multimedia sharing, and poorly structured discussion threads.

Based on these limitations, student forums within existing LMS platforms have not yet been optimally utilized to support effective knowledge sharing during online discussions. Therefore, this development study aims to produce a Learning Management System that optimizes student forums to strengthen knowledge sharing, particularly by facilitating both asynchronous discussion forums and synchronous video conferencing. Through this system, students are expected to communicate more effectively, share knowledge, and exchange ideas collaboratively in online learning environments.

METHOD

This study employs the Web-Based Instructional Design (WBID) model developed by Davidson-Shiver, Rasmussen, and Lowenthal (2017). The WBID development model is widely used in the design and development of relatively complex web-based systems due to its systematic and sequential structure (Davidson-Shiver et al., 2017).

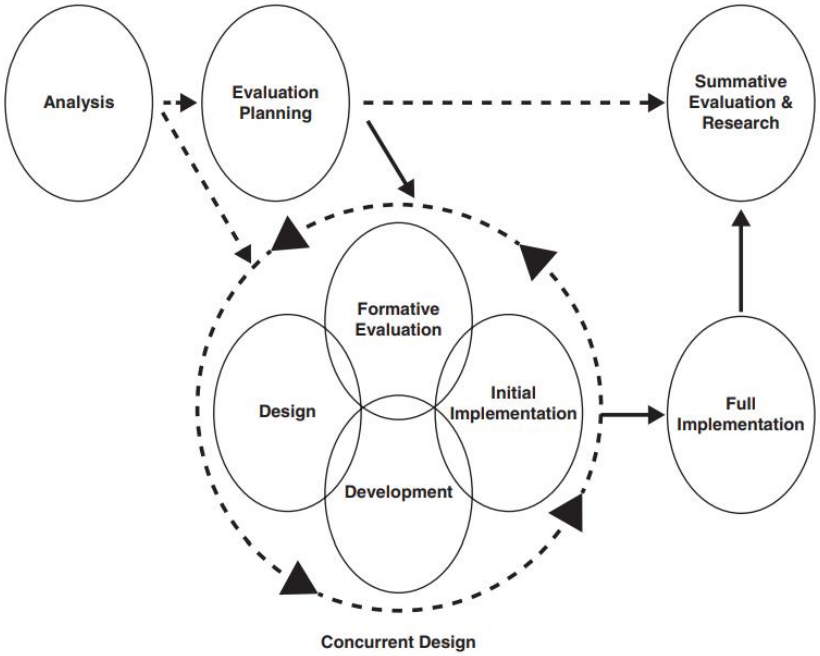


Figure 1. The WBID Model by Davidson-Shiver, Rasmussen, and Lowenthal (2017)

The development process consisted of five stages: (1) Analysis; (2) Evaluation Planning; (3) Concurrent Design, which includes Design, Development, Initial Implementation, and Formative Evaluation. The Concurrent Design stage may be repeated several times until the product is ready for use; (4) Full Implementation; and (5) Summative Evaluation and Research.

The first stage of the development model is analysis, which involves two types of analysis: problem analysis and instructional component analysis. Problem analysis aims to identify instructional problems and determine appropriate solutions. Instructional component analysis is conducted to examine the roles and functions of each instructional component involved in the learning process.

The Evaluation Planning stage is intended to determine the evaluation objects. Evaluation items are defined by developing instruments to measure the efficiency, effectiveness, and attractiveness of the product. The evaluators or validators consist of subject matter experts and media experts. The evaluation method employs questionnaires, and the evaluation was conducted at MA Hidayatul Mubtadiin, Malang City, in the Indonesian History subject for tenth-grade students. The research subjects comprised 25 students from class X IPS.

The Concurrent Design stage involves four main activities: product design, product development, initial product testing, and formative evaluation. The design phase focuses on designing the Learning Management System using the Discord application. The development phase involves developing the Learning Management System using Discord, which can be accessed via Android, iOS, web, and desktop platforms. During the initial testing phase, the Learning Management System was tested by the developer, subject matter experts, and media experts. The formative evaluation stage aims to assess the validity of the product based on evaluations from subject matter and media experts.

The Full Implementation stage consists of field testing the Learning Management System with students during online learning activities. The final stage of the model is summative evaluation, which aims to determine students' responses and perceptions regarding the use of the Learning Management System.

The validation of the Learning Management System involved one subject matter expert and one media expert. The subject matter expert instrument consisted of 10 items, while the media expert instrument consisted of 18 statement items. The student response instrument consisted of 15 statement items. All instruments employed a four-point Likert scale: Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1) (Widoyoko, 2012).

The validation results produced both quantitative and qualitative data. Quantitative data were obtained from expert validation questionnaires (subject matter and media experts) and student response questionnaires, while qualitative data were derived from comments and suggestions provided by experts and students. Data analysis employed both quantitative and qualitative approaches. Quantitative analysis was used to analyze the results of expert validation and student response questionnaires, while qualitative analysis was used to analyze comments from experts and students. The overall validation percentages from expert evaluations and student responses were calculated and then interpreted according to the validity criteria proposed by Arikunto (2010).

Table 1. Validity Criteria (Arikunto, 2010)

Percentage	Criteria
81% - 100%	Highly Valid
61% - 80%	Moderately Valid
41% - 60%	Low Validity
< 40%	Invalid

RESULT

The initial stage of this development model is the analysis phase, which consists of problem analysis and instructional component analysis. The results of the analysis revealed several challenges in online learning, including the need for an application that supports discussion-based learning methods and facilitates communication and knowledge sharing between students and teachers as well as among students.

The instructional component analysis comprises three main components. The first component is the analysis of learning objectives, which form the instructional content of the LMS application. In this study, the learning objectives were derived from four basic competencies in the Indonesian History subject. The second component involves an analysis of the learning context. The findings indicate that during online learning, students predominantly use smartphones, although some also use laptops or desktop computers, and the most commonly used application is WhatsApp Group. The third component focuses on analyzing student characteristics. The analysis shows that students are motivated to learn when using technology, possess a high level of curiosity, and are already familiar with the use of digital technologies.

During the Design and Development stages, the product was designed and developed based on the needs of teachers and students, as well as to address the problems identified in the analysis stage. The developed Learning Management System (LMS) resulted in a server built on the Discord application, which can be accessed via web browsers and smartphone applications. The user interface of the LMS differs when accessed through desktop devices

and mobile devices. The resulting LMS includes several features, such as a registration page for accessing the server, user guidelines, a materials page enriched with images and videos, discussion forums for interaction between students and teachers, assignment spaces, assignment submission facilities, and video conferencing rooms designed to support both group discussions among students and virtual face-to-face learning sessions with teachers.

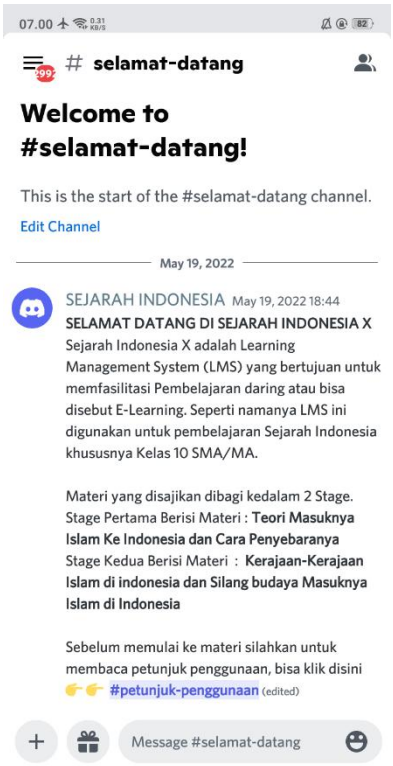


Figure 2. Home page display on the LMS on a smartphone

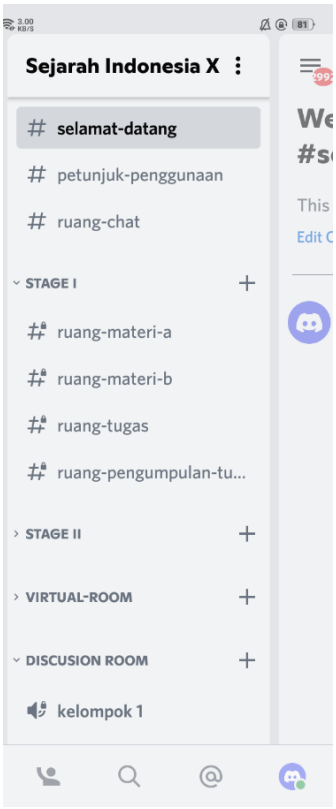
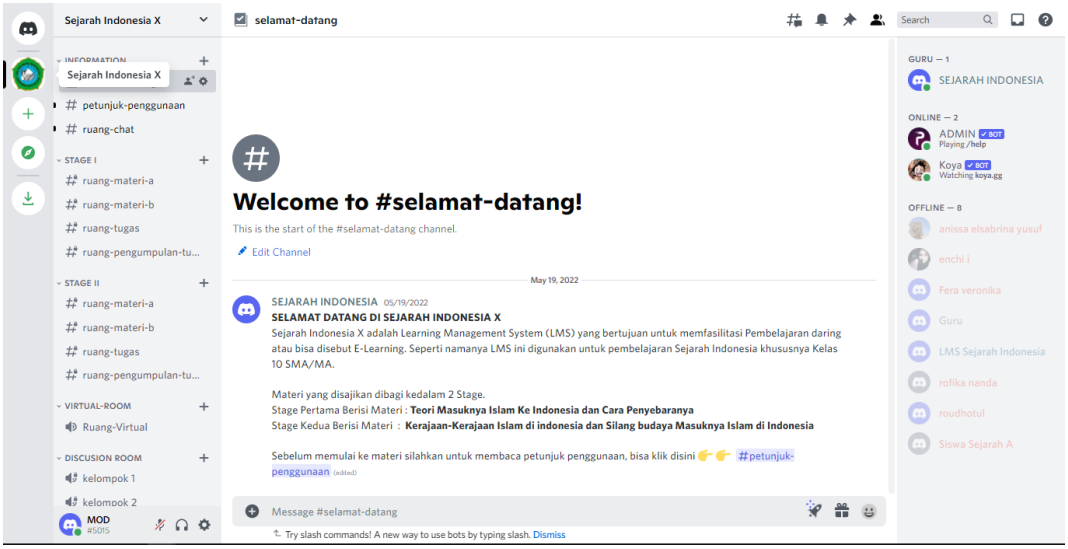


Figure 3. Menu list display on the LMS on a smartphone



- Figure 4. LMS home page view on desktop/computer

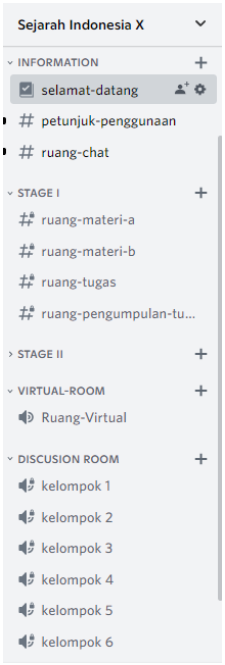


Figure 5. Display of the LMS menu list on a desktop/computer web browser

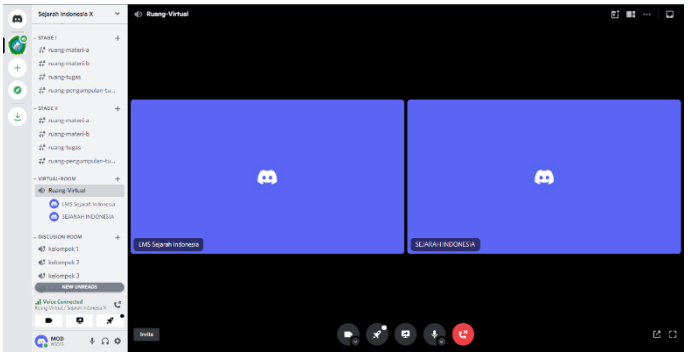


Figure 6. Video conference view on the LMS

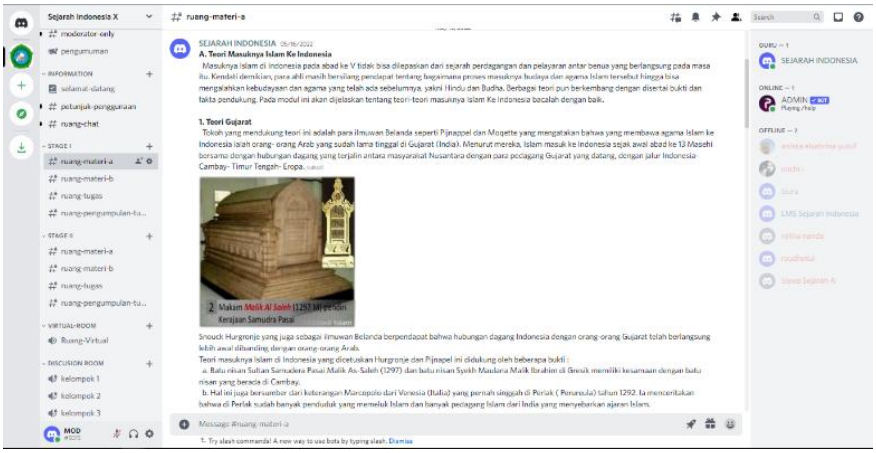


Figure 7. Display of materials on the LMS

After the Learning Management System (LMS) was developed, the next step was to conduct validity testing with media experts and subject matter experts to ensure that the Learning Management System (LMS) was valid and feasible for use by students in the learning process.

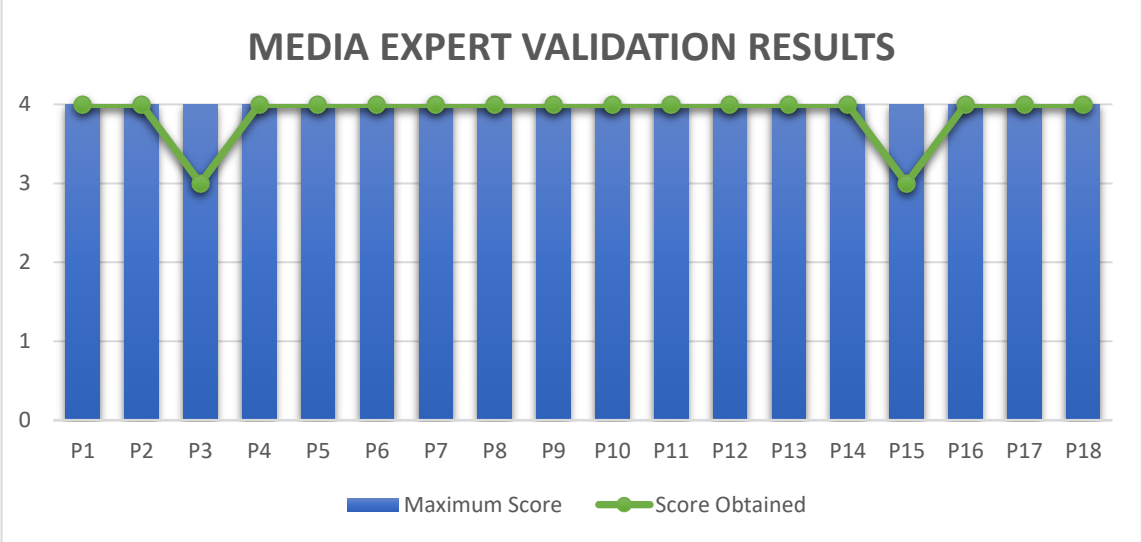


Figure 8. Media Expert Validation Results

Based on Figure 8, 16 out of 18 items received a score of 4 (Strongly Agree), while 2 items received a score of 3 (Agree). The results of the Learning Management System (LMS) validation by the media expert showed a percentage score of 97.22%. The media expert's feedback indicated that, in general, the LMS was already of good quality; however, it could be further optimized, particularly in the graphical/visual aspects. Suggested improvements included displaying images of the user institution (such as school photos and logos) on the homepage, as well as providing user guidelines in the form of a video screencast. Overall, the developed LMS received positive responses and was proven to be valid and feasible for use in learning activities, with recommendations from the media expert serving as input for further application refinement.

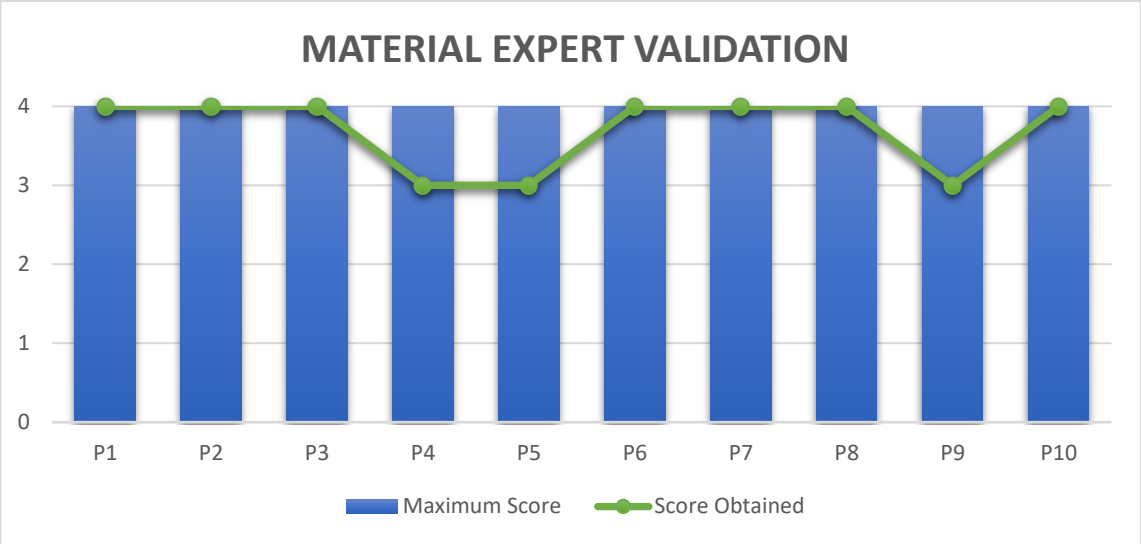


Figure 9. Material Expert Validation Results

Based on Figure 9, 7 out of 10 items received a score of 4 (Strongly Agree), while 3 items received a score of 3 (Agree). The results of the material validation conducted by the subject-matter expert showed a percentage score of 92.5%. The subject-matter expert stated that learning using the LMS was very good and could be implemented in online learning; however, a challenge remains in that teachers still need more in-depth training to fully understand and effectively use the application. In addition, the application facilitates teachers in organizing classes and enables them to implement discussion-based learning methods with students. Based on the material expert validation results, it can be concluded that the materials presented in the LMS received positive responses, were valid, and were feasible for use, and could be implemented in learning activities.

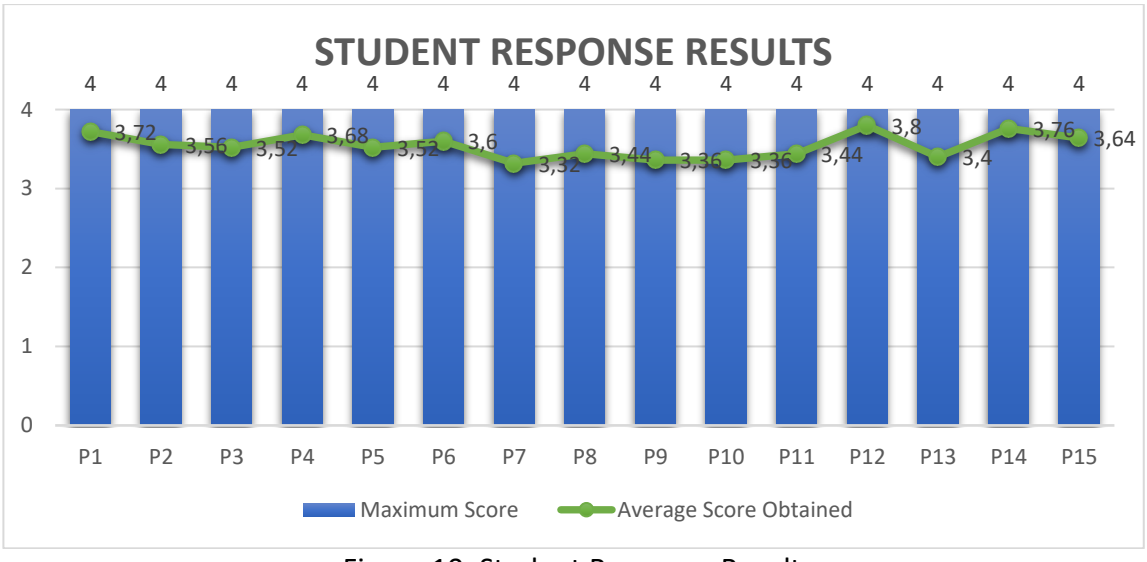


Figure 10. Student Response Results

Based on Figure 3, the results of the student response questionnaire in the field trial were collected from tenth-grade students of MA Hidayatul Mubtadiin, Malang City, involving 25 students. Overall, the LMS obtained an average score of 3.54, which corresponds to 88.53%

of the maximum expected score of 4.00. Based on the responses obtained, the LMS received positive feedback and was considered feasible for use in the online learning process.

DISSCUSSION

A Learning Management System (LMS) is an online learning management system integrated through website-based software (Hildayanti & Machrizzandi, 2021). The implementation of LMS in online learning assists educational institutions in improving the learning process. LMS can be accessed without limitations of time and place, and learning activities can be conducted more efficiently and simply (Wiragunawan, 2022). Other studies indicate that LMS makes learning more effective because it focuses on student-centered learning activities. Students can access learning modules anytime and anywhere, thereby optimizing the learning process (Sa'diyah et al., 2020).

Learning Management System (LMS) can be used to support online learning activities. This statement is supported by Hidayat, Hartono, and Sukiman, who explained that learning activities using LMS include account registration and management, access to learning materials, completion and submission of assignments, monitoring learning outcomes, discussion forums, consultation, and assessment (Hidayat et al., 2017). LMS also facilitates independent learning among students. This is supported by Alfina (2020), whose study concluded that the use of LMS as a supporting tool in online learning provides significant benefits in guiding learners to understand materials in a structured manner and to learn independently.

The Grade X Social Studies teacher stated that the current online learning implementation is limited to the use of WhatsApp groups, and synchronous meetings are conducted using Zoom or Google Meet. The teacher also revealed that switching between applications (from WhatsApp to video conferencing platforms such as Zoom or Google Meet, or setting up conference rooms) consumes valuable instructional time. This condition is supported by findings from several educational institutions that still rely on instant messaging applications such as WhatsApp for communication, discussion, material delivery, and assignment coordination. In this case, such practices are considered less effective because applications like WhatsApp are not designed for online learning purposes. Similarly, relying solely on Zoom or Google Meet has not yielded optimal results, as these platforms are limited to verbal communication. Effective online learning requires integrated features such as material management, online group discussions, discussion forums and chat, attendance lists, assignment management (distribution and submission), user account management, and grading systems (Al-Hudhud, 2015; Nita & Lukas, 2022; Sutiono et al., 2022).

The developed LMS is implemented in the form of a server integrated into the Discord application. According to Lacher, Discord is a Voice Over Internet Protocol (VOIP) and messaging service that is popular among gamers and streamers and offers features similar to Skype and other social media applications (Wulanjani, 2018). Although Discord was not originally designed for educational purposes, research by Tjahjadi et al. (2021) indicates that Discord has the potential to serve as an innovative platform for facilitating online learning. Discord offers several advantages, including being open source (free), flexible in use, data-efficient, familiar among adolescents, and easy to operate.

According to Efriani et al. (2020), the learning process using the Discord application offers flexibility in terms of time and space, can be applied across different subjects and classes, provides interactive communication features, allows learning with more than one teacher, and supports interaction through both voice and text channels. One unique communication

feature of Discord that is not commonly found in other applications is its telephone-like voice feature, which teachers can use to deliver learning materials. Additionally, Discord supports video conferencing, enabling verbal interaction between teachers and students. During video conferences, teachers can share their screens, similar to features available in Zoom and Google Meet (Rakhmawan et al., 2020).

The utilization of LMS in online learning for Grade X Indonesian History includes flexible learning without time constraints, availability of Indonesian history learning materials, group assignments, online assignment submission, student presentations through video conferencing, and interactive discussions via discussion forums and live video conferences. Two main features that significantly support knowledge sharing among students are discussion forums and video conferencing.

The LMS discussion forum feature allows students and teachers to communicate, discuss, share knowledge, exchange ideas, and reach agreements. Hamzah, Ariffin, and Hamid (2017) found that students tend to prefer online discussion forums where they can interact directly with peers and educators. This finding emphasizes the importance of utilizing discussion forums in web-based learning, as they positively impact student engagement and knowledge sharing. The LMS forum provides facilities such as sending images, various file types, and videos via embedded links (e.g., YouTube). The forum also supports threaded conversations, allowing discussions to remain organized and topic-focused. Threads can be set with an expiration period, after which all conversations are archived and remain accessible in read-only mode.

The LMS also includes a video conferencing feature designed for both group discussions and virtual face-to-face learning sessions with teachers. Similar to Zoom and Google Meet, this feature supports screen sharing for presentations and collaborative video viewing. Video conferencing enhances the sense of real-time interaction in online learning, as teachers and students can engage directly. Without video conferencing, discussions conducted solely through forums often require longer response times due to delayed replies. Therefore, video conferencing shortens discussion time and facilitates more efficient knowledge sharing (Al-Hudhud, 2015). Kuntarto, Sofwan, and Mulyani (2021) stated that video conferencing in learning enhances interaction between teachers and students, increases student engagement, provides variation in online learning, and creates a more enjoyable and interactive learning atmosphere.

The advantages of the developed LMS include ease of use, clarity, practicality, aesthetic appeal, user comfort, and a simple interface. The LMS provides features for creating specific channels or virtual rooms, message notifications, and user status indicators (online/offline), which teachers can utilize for attendance tracking. The LMS also offers a materials page supported by images and videos. Learning content can be enriched with various formats such as text, audio, images, and videos, allowing teachers greater flexibility in material presentation. Additionally, the LMS is data-efficient.

Optimization of student forums through LMS features strengthens knowledge sharing, including chat forums, discussion forums, video conferencing, threaded discussions, and file-sharing capabilities. The developed LMS is considered more efficient than existing LMS platforms. Its features support effective and optimal knowledge sharing during online learning. This aligns with the findings of Pratomo and Wahanisa (2021), who reported that LMS technology significantly contributed to educational effectiveness during the pandemic, benefiting students, teachers, and lecturers by making learning more structured and efficient.

Despite its advantages, several limitations were identified during product development. First, network stability issues were reported, as some students experienced slow access due to the absence of a dedicated Indonesian server, requiring the use of servers located abroad. Second, the LMS does not yet provide assignment deadline or time-limit features. Third, since the LMS is based on the Discord application (which was not originally designed for educational purposes) it remains relatively unfamiliar to teachers and students, necessitating comprehensive orientation and training.

The developed Learning Management System (LMS) was proven to be valid and feasible for use in online learning, as evidenced by expert validation results. Material expert validation categorized the LMS as valid and appropriate for online learning based on Arikunto's validity criteria, with a percentage score of 97.22%. Media expert validation resulted in a score of 88.53%, indicating that the LMS is valid and suitable for online learning (Arikunto, 2010). Prior to field testing, the LMS was revised according to expert suggestions. Field trial results involving 25 students yielded an average score of 3.54 out of an expected maximum score of 4.00. Students responded positively, noting that the LMS features support online learning, facilitate independent and collaborative learning, enhance understanding of materials, are easy to use, support discussions, are data-efficient, simplify assignment submission, offer a simple and attractive interface, and enable learning anytime and anywhere.

CONCLUSION

The Learning Management System (LMS) includes student forum features that function to strengthen knowledge sharing, particularly by facilitating direct student discussions through discussion forums and video conferencing, enabling students to communicate, share knowledge, and exchange ideas. The LMS was proven to be valid and feasible for use in online learning, based on the results of product validity testing conducted by media and content experts, as well as field trial results involving students.

Several recommendations for future research include conducting broader trials and dissemination of the LMS, implementing it across different teachers, subjects, and class levels, providing more comprehensive training for teachers and students to ensure effective use of the application, adding more learning topics to the discussion forums, incorporating additional features not yet available in the LMS, and improving the existing limitations of the developed system.

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