

## Developing A Moodle-Based Learning Management System (LMS) for Slow Learners

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### ABSTRAK

Tujuan dari penelitian ini adalah untuk mengembangkan *Learning Management System* (LMS) berbasis Moodle yang disebut eLSIDA (*e-Learning* STKIP PGRI Sidoarjo Asistif), yang valid digunakan oleh mahasiswa lamban belajar di STKIP PGRI Sidoarjo. Penelitian ini menggunakan 3 dari 5 model ADDIE, yakni *Analysis*, *Design*, dan *Development*. *Expert judgment* dalam penelitian ini terdiri dari dua ahli, ahli materi dan ahli media. Adapun instrument penelitian yang digunakan untuk memperoleh data penelitian adalah kuisisioner. Data yang telah diperoleh lantas dianalisis menggunakan analisis deskriptif. Hasil validasi dari ahli materi diperoleh skor sebesar 92,5%, sedangkan hasil validasi ahli media diperoleh skor sebesar 95%. Berdasarkan penilaian *expert judgment* tersebut menunjukkan bahwa eLSIDA yang telah dikembangkan secara umum dapat dinyatakan *valid* dan layak digunakan. Media yang telah dikembangkan dapat diakses melalui laman <http://lms.elsida.ac.id/>. Walaupun pengembangan eLSIDA ini telah dinilai valid namun keefektifan media pada eLSIDA perlu diuji lebih lanjut.

### ABSTRACT

This study aimed to develop a Moodle-based Learning Management System (LMS) called eLSIDA (*e-Learning* STKIP PGRI Sidoarjo Asistif), which is validly used by students slow to study at STKIP PGRI Sidoarjo. This study used 3 out of 5 ADDIE models, namely *Analysis*, *Design*, and *Development*. *Expert judgment* in this study consists of two experts, material experts, and media experts. The research instrument used to obtain research data is a questionnaire. The data that has been obtained is then analyzed using descriptive analysis. Validation results from material experts obtained a score of 92.5%, while the results of media expert validation obtained a score of 95%. Based on the expert judgment assessment shown that eLSIDA that has been developed in general can be declared valid and worth to be used. The media that has been developed can be accessed through <http://lms.elsida.ac.id/>. Although the development of eLSIDA has been considered valid, the effectiveness of the media on eLSIDA needs to be tested further.

Keywords:  
*Development*  
*Moodle*  
*LMS*

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## Introduction

In recent years, information technologies have advanced at a rapid pace, and education systems cannot stay oblivious to these changes. Technological developments have occurred making several parts of modern lives more simply controlled and accomplished through

computer and online-based technologies. Then, with the advent of social and content sharing networks such as YouTube, Instagram and Facebook, it has become incredibly simple to instantly share photographs, videos, and content with hundreds or even millions of individuals with a single click. As a result of such tools becoming readily available, common home and work-related actions, such as buying food, seeking for shop discounts, and applying for employment, have become obligatory to complete online. Education and academics are also benefiting from this improvement, even if at a far slower rate (Pardo, et al., 2012). As a result, it is worthwhile to consider the potential risks that learning settings that integrate technology systems may pose.

In the scientific literature, there are two aspects about information and communication technology (ICT). To begin, it is critical to incorporate ICT into science teaching. ICT facilitates student collaboration and knowledge development. It also provides interactions with environment and instruments for real-time data logging in the context of science education (Juuti, Lavonen, Aksela, & Meisalo, 2009). Moreover, ICT produces a transformative learning environment that provides an individual approach and is tailored to the needs of the students. It also assists students in acquiring and applying knowledge, skills, and attitudes required for professional action. Second, ICT is underutilized in the classroom. Although ICT can be utilized as an essential instrument of laboratory-based practical activities to increase students' learning processes, as a virtual alternative to real-world practical work, or as a pedagogical tool for teachers, classroom use remains limited.

E-learning is a new type of learning organization in the twenty-first century (Seok, 2008). E-learning is the use of ICT (for example, the internet, a computer, a mobile phone, a Learning Management System (LMS), televisions, radios, and other devices) to improve teaching and learning activities. A learning management system (LMS) is a strong integrated system that supports a variety of activities carried out by teachers and students during the e-learning process. An LMS is used by teachers to create web-based course notes and quizzes, connect with students, and track and grade student progress. It is used by students for learning, communication, and cooperation. LMSs employ the internet as an extension of learning, allowing users to access content at any time and from any location. With more learning activities taking place online, it is becoming increasingly vital for educators to collect relevant and accurate data from these activities in order to track their students' progress (Aldowah, Al-Samarraie, & Fauzy, 2019).

In essence, such transformations should begin with systems and processes then progress to incorporate changes in characteristics such as institutional dynamics and culture. Often, such sequential development is compromised because the systems and process transformation effort encounters roadblocks in higher-level characteristics like as institutional dynamics and culture (Cordella & Tempini, 2015). In education field, such as at university level, this should contribute to ensuring that online learning which well-known as e-learning is accessible, inclusive, fair, and valuable to society. However, it is difficult to apply especially during pandemic Covid-19 which has been spread around the world as its effects.

STKIP PGRI Sidoarjo, for instance, as one of the private universities in Sidoarjo that has obstacle to apply e-learning in this difficult situation. Based on the pre-survey conducted, it showed that most of the students had difficulties in academic achievements especially for slow learners. As a result of these issues, learning effectiveness was low, and lecturers required more time to explain the materials. As a result, the researchers believe that we will need to develop a Learning Management System to assist our students in learning this course efficiently.

Slow learners are individuals who learn more slowly than their peers but do not have mental disorders because they can achieve good academic accomplishment despite being

slower than other students (Vasudevan, 2017). According to the IQ test intelligence, slow learners received scores of 75-90 or have been classified as below average, and they underperformed in practically all courses (Suarez, Berdud, & Gueton, 2017). Academic accomplishment enhancement becomes critical to be produced in order to aid in learning implementation. As a result, these individuals can attain superior learning outcomes.

Those living through the current year will never forget it. A global pandemic on a never-before-seen scale has taken humanity totally off guard. As a result, every aspect of life has been disrupted, and we have been forced to adapt in previously unimaginable ways. Even some of the most basic activities have been halted as a result of lockdowns and social distancing norms. Education, for example, has been the most severely disrupted. In the Covid-19 era, e-learning has experienced tremendous growth, as the imperative is to enable students to study from anywhere and at any time. This is to ensure that they can study in a virus-free environment. It is widely accepted that traditional methods of teaching and learning have become outmoded, particularly at STKIP PGRI Sidoarjo.

E-Learning environments can contribute to the process of teaching and learning, but only if they are integrated within the framework of educational and technological pedagogy. Numerous researchers have emphasized the value of the e-learning environment, which in the context of science education employs a variety of visual aids to aid in the illustration of scientific phenomena and the enhancement of understanding of abstract and complex issues (Martens, Gulikersw, & Bastiaensw, 2004). Creating customized e-learning programs requires the use of authoring tools such as Dreamweaver and Flash, which focus primarily on design, programming, and time. A viable alternative to such applications is the implementation of course or learning management systems (Herrington & Oliver, 2000). Moodle is one such system that has been gradually gaining worldwide popularity. Moodle is a set of tools for creating, designing, organizing, and managing courses/lessons at various levels of information and communication technology (ICT) (Brandl, 2005). The primary advantage of Moodle is its code transparency, which enables users and developers to adapt the platform to their specific needs and develop new, advanced features and add-ons (Dobrzański, Honysz., & Brytan, 2006). This study demonstrates the benefits, capabilities, and characteristics of development for Moodle as e-learning system as a cutting-edge tool for distance education and interactive communication with and between slow learners at STKIP PGRI Sidoarjo as the impacts of Covid-19 pandemic where the academic achievements were low. On the other hand, during the pandemic Covid-19, the conventional model was only on the discussion happened through WhatsApp Group (WAG) and virtual classroom by explanation materials using PowerPoint (PPT). As a result, there were slow learners who had difficulties in understanding the materials during the virtual classroom. This urgency is needed to develop a new way in developing new environment such as e-learning such as Moodle-based.

Furthermore, in order to increase slow learners' academic results at STKIP PGRI Sidoarjo, it is required to design a system that can facilitate the process of active learning for slow learners in classes. Adaptive systems, when combined with technological innovation, attempt to provide individualized resources and activities depending on the learner's competencies and knowledge (Vasudevan, 2017). A trust-based e-assessment system is presented to ensure a secure environment and authorship validation in online or even blended learning environments while eliminating the time and physical space limits imposed by face-to-face examination.

Because its software systems are built to support students' learning activities, a Moodle-based LMS becomes the solution (Ellis & Calvo, 2007). They often include a variety of presentations, gamification, assessment, communication, and management methods. Gamification is one of the Moodle components that may be developed in an LMS to encourage

students to learn. Gamification includes the use of motivating affordances to encourage specific activities (Fouh, Hamouda, Farghally, & Shaffer, 2016). It is recognized as key motivational sources and stated that cognitive (achievements and accomplishments) motives and demands should impact game and learning system design. The goals of this study were to develop a Learning Management System (LMS) using Moodle (<http://lms.elsida.ac.id/>) that enable interactive activities combining simulations, short videos, virtual experiments, and games for curricular and extracurricular teaching, enhancing constructivist-based interactive learning for both students especially slow learners and lecturers to develop skills for intelligent information and technological communication.

## Method

The Research & Development (R&D) method with the designation ADDIE, Analysis, Design, Development, Implementation, and Evaluation, was applied as propose by (Sugiono, 2015). During the analysis phase, Analysis aids in the process of analyzing and identifying problems that arise in the context of where an idea or a feeling emerges in order to better understand the product that will be developed. Analyses at the beginning and end aid in the analysis of a student's needs, a new technology, a learning situation, a problem that a student is experiencing, and a need for further development due to students' problem. The second point is design. The design process is guided by a needs analysis. The design process begins with the specification of multimedia products, materials, the designing of RPS, and the creation of new product of LMS. It is best suited for multimedia elements as as interaction, animation, audio, and video. Following that, RPS was introduced as a learning material that would be included in eLSIDA (*e-Learning STKIP PGRI Sidoarjo Assistif*), as the LMS product developed. Development is the process of refining and improving the eLSIDA development model in accordance with the results of the refining. Experts' judgements were applied in order to gain the quality of eLSIDA including media and contents validation. During the implementation phase, the product is ready to be delivered to the users. Evaluation is a task that is carried out in order to produce a product that meets the specifications that have been established, as well as to improve the quality of eLSIDA products that have already been developed.

This research was done completely in phase development of product. The research subjects were the students of the History Education Study Program at STKIP PGRI Sidoarjo for the 2020/2021 academic year in the “*Bahasa Inggris untuk Pendidikan Sejarah*” or “English for History Education Study Program” course. The research instrument used a questionnaire with a Likert-Scale of 4 categories (Table 1). The criteria for the questionnaire were as follows (Arikunto S. , 2013).

Table. 1 Criteria of Questionnaire

Score	Criteria
4	Very Good
3	Good
2	Enough
1	Very Poor

After the data were collected, the data were processed using a formula (Purwanto, 1996). The data were analyzed using quantitative descriptive analysis techniques which were showed in the distribution of scores and percentages of the predetermined rating scale categories. The suitability of aspects in the development of eLSIDA used the criteria in the Table. 2 (Sugiono, 2015).

Table. 2 Percentage Scale Table

<b>Eligibility Percentage</b>	<b>Interpretation</b>
76% – 100 %	Feasible
56%-75%	Feasible Enough
40%-55%	Less Feasible
0%-39%	Not Feasible

## **Results and Discussion**

### *Analysis*

The researchers determined the objects and learning issues throughout this step. Learning units had been designed. To assist the research, data relevant to the established LMS, as well as the related studies from other studies, were gathered. The examination of the needs assessment resulted in a preliminary LMS idea that would be developed. During the development of eLSIDA, it is required to examine information related to initial needs by: (1) analyzing user needs; (2) content analysis or subject matter; and (3) hardware and software requirements analysis. Problem identification and required solutions are defined before going on to the user requirements analysis process. Students continued to struggle with research and discussions concerning operating system teachings, according to classroom learning observations, interviews, and past relevant studies. One reason was that they had not used a variety of independent instructional tools. Making educational materials can be utilized to solve a variety of difficulties.

The researchers next investigated at which courses at STKIP PGRI Sidoarjo are too tough for slow learners to comprehend. According to learners, "English for History" was the most demanding course. It was reasonable because many of the concepts in this course were difficult to visualize. Lecturers needed more time to clarify subjects in greater depth. Some instructors struggled to illustrate and explain all of the materials at the same time. Students also need extra time to comprehend the explanations due to inadequate representation. They also required some flash animations in order to recognize some educational resources.

When it came to selecting software for eLSIDA, it was discovered that there are a variety of open-source options for LMS development. Blackboard, Desire2Learn, and Moodle were among the software packages used. Moodle was chosen as the software for eLSIDA after some considerations. It was discovered that numerous universities both within and outside of our country employed Moodle-based software to construct LMS. Furthermore, an analysis of user requirements was carried out in order to determine the user requirements for the product that was developed. The need was determined based on the data from the observation and the results of the survey, which are shown in the Table. 3:

The data shown that developing LMS was needed as the results of the observation and the interview conducted. In the availability of learning resources showed that the students still needed to find out the supporting references to gain the information during the lesson. On the other hand, the quality of learning media given by lectures was still limited to PowerPoint slides. Thus, the students mostly had difficult to understand the materials. Furthermore, lecturer still had difficulty to manage the class regarding that the students were lack of attention during learning process. Knowing this condition, eLSIDA was developed as the solution for learning process during pandemic Covid-19 at STKIP PGRI Sidoarjo.

Tabel. 3 Observation and Interview Results

No	Observation Results and Interview	Description
1	Observed course	<i>Bahasa Inggris untuk Pendidikan Sejarah</i>
2	Learning process	Explaining, discussion, presentation, assignment.
3	Availability of learning resources	Have to look for reference books to the library and other sources come from the internet.
4	Quality of learning media	Still limited to PowerPoint slides which its use is still rare, and the media used has not varied.
5	Students' condition	Difficulty understanding the material and the lecturer must explain repeatedly; hard to find reference source.
6	Lecturers' obstacles in teaching	Students lack motivation in learning because the lessons are considered difficult; students do not pay attention and do not take their studies seriously; students are busy with their respective smartphones to social media and play games.
7	Required media	Auxiliary media that can attract students' interest and attention, there can be material, videos to clarify the material, and quizzes to add insight in learning skills.

Using Moodle, users can integrate a wide range of resources, from chats and forums to an online booklet, a variety of questions, collections of problems and exercises, and lecture notes; you can also include any type of text-based or HTML-formatted document, multimedia resources such as graphics, video, or audio (for example, Mp3 files), PowerPoint presentations, Flash-based applications, and Java applets (Godwin-Jones, 2003). It is possible to link lesson tasks in Moodle to any resources that have been uploaded to one's server or that are publicly available on the Internet. It is simple to evaluate and provide feedback to students on their exploration of any of the content-based resources by utilizing any of the Moodle-based evaluation and feedback tools. Because of the built-in HTML editor in Moodle, it is a very powerful tool for content creation.

#### *Content Needs Analysis*

The next step after identifying user needs is content analysis. The content of the analysis is linked to the content of eLSIDA, which is material related to the identified learning objectives. In eLSIDA, sources and learning objectives were listed. In addition to defining the material, other things that had been included in the learning materials need to be defined first, especially in the form of interactive videos, gamifications and practice questions in the form of quizzes. Interactive videos and gamifications contained material according to the lesson plans for these courses. Based on the analysis of user needs, quizzes were given so that students could add learning skills to improve their understanding (Baneres, Rodríguez, Guerrero-Roldán, & Baró, 2016).

#### *Phase of Design*

During this step, the researchers designed the eLSIDA based on the previously developed need analysis. The researchers used Moodle software to create the eLSIDA. As a result, eLSIDA is used online. We validated the eLSIDA to the validators after it was generated, therefore there were enhancements in terms of content and media features. The LMS media

was verified by the media validators based on its simplicity, integration, emphasis, balance, and colors. The LMS media was approved by the content validators in terms of content fidelity and language. The mean validation scores for media features from two media validators were 3.80. According to Kiswanto, our designed eLSIDA LMS was legitimate in terms of media features (Kiswanto, 2012). In addition, we evaluated the LMS with content validators. The mean validation ratings for content fidelity and language from two content validators were 3.85. It was discovered that our produced e-learning was also valid in terms of content fidelity and language proficiency (Arikunto S. , 2013). The following figure 1 is the landing page of eLSIDA:

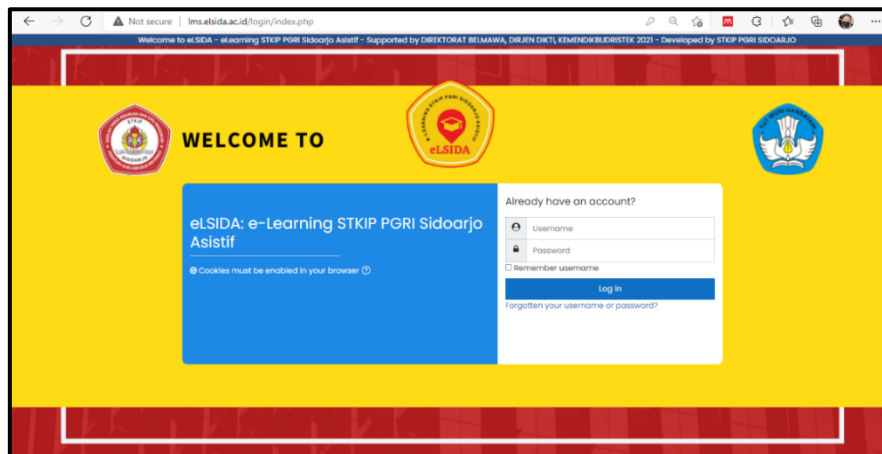


Figure 1. Landing Page eLSIDA

On the first page of the eLSIDA website, there are several items, including a 'running text' that serves as a welcome message, a thank you message to the LMS's developers, and information about the product's development. In addition, there is a section that contains information about users and passwords that can be used to gain access to eLSIDA.

### *Phase of Development*

#### *Judgement of media experts and materials experts*

The results of the instructional media design were validated by 2 (two) media experts and 2 (two) material experts. Based on the results of media and material validation, it was found that the learning media designed were in the "Feasible" category. The design of learning media was improved according to suggestions and comments from media and material experts. After repairs were made, the learning media was tested on 10 students. Based on the trial, it was found that the learning media was in the "Feasible" category, so that the learning media could be continued to the implementation stage. This is in accordance with the results of previous studies which stated that the learning media developed were suitable for use in the learning process (Dharmayanti & Oktarika, 2019). After the product has been developed, then experts' validation was carried out. Validation was carried out to determine the relevance of the material and product design whose feasibility can be known before being tested on students. Recapitulation of expert validation data can be seen in the Table. 4:

Table. 4 Media Expert and Material Expert Validation Results

<b>Experts</b>	<b>Average</b>	<b>Percentage</b>	<b>Criteria</b>
Material	85	92.5%	Feasible
Media	90	95%	Feasible

The average validator's assessment results obtained the “Feasible” achievement criteria. Product assessment results that reach a value of 76%-100% can be implemented directly without making revisions (Sugiono, 2015). The results of the validation contained several notes of comments and suggestions from the validator, so the researchers revised it before being used for testing on students. The eLSIDA LMS was designed as an interactive learning model by combining several components such as video animation, video interactive, images, audio, interactive quiz, gamification and writing that could facilitate students in the lecture process during the Covid-19 pandemic. The development of interactive learning media models can create two-way interactions, especially between users and the media, so they don't get bored quickly. It is consistent with research that learning using interactive multimedia can improve students' conceptual understanding (Arda, 2015). The use of multimedia in the classroom can improve students' understanding, interest, and ability to memorize (Gilakjani, 2012). The following figures 2 and 3 are presenting the examples of contents and media used in eLSIDA:

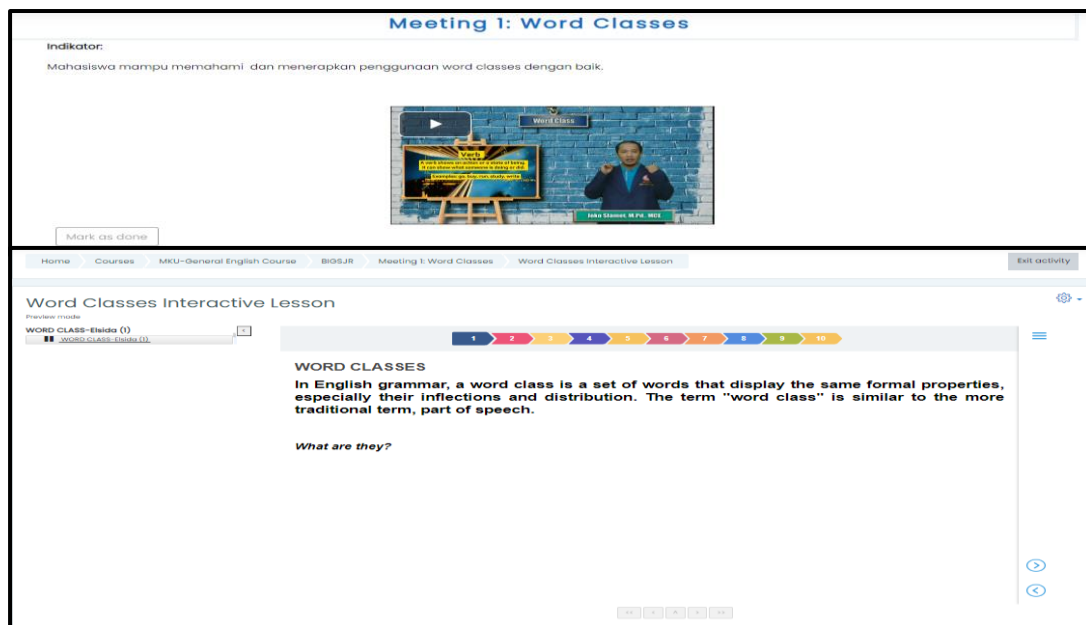


Figure 2. Video and Interactive Lesson in eLSIDA

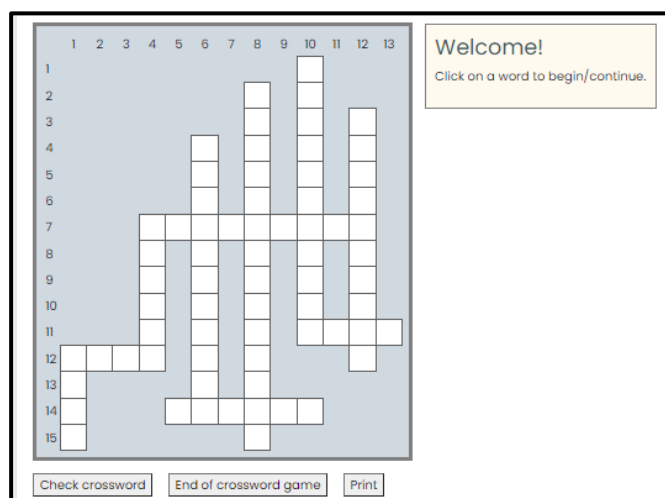


Figure. 3 Example of Gamification



Although the development of eLSIDA meets the feasibility requirement, some suggestions need to be considered. First, using eLSIDA may be “More Effective” when compared to learning media that were often used by lecturers. This is reinforced by the results of Arahim’s research (2018), that learning using digital student worksheets with visualization is more effective than conventional learning. To examine this statement further research needs to explore the efficacy and effectiveness of eLSIDA through experiment design. Second, further research needs to finish all procedures that are finished yet in this research. By finishing all procedures, from the implementation and the evaluation stage, it can be known the limitless of eLSIDA and what aspects need to be improved.

## Conclusion

eLSIDA was created as a Moodle-based LMS at STKIP PGRI Sidoarjo for the “English for History” course in order to aid slow learners in their learning process. The design adhered to Sugiyono’s proposed Research & Development (R&D) method of the ADDIE Model (2015). During the Analysis Phase, the researchers determined the objectives and learning materials needed to create certain learning units and collect data related to the generated eLSIDA that was employed, as well as other related studies that supported our research. During the Design Phase, the researchers created the eLSIDA as an example for creating the LMS that would be constructed. In the Development Phase, the Moodle-Based LMS was developed into a comprehensive LMS called eLSIDA, which we applied in the Implementation Phases on one-to-one, small group, and classroom settings. It has also carried out the review and correction processes during the Evaluation Phase. The mean validation scores for media features from two media validators and two content validators were 92.5% (media) and 95% (content). It was discovered that our developed eLSIDA was correct in terms of media and content aspects. As a result, media developed through eLSIDA can be used in learning activities at the STKIP PGRI Sidoarjo, but it still needs to be examined its effectiveness when eLSIDA implemented.

Due to the fact that it was developed in accordance with the teaching approach that emphasizes the construction of knowledge through active and interactive learning, as well as the learning multi-sensory experience through multimedia, Moodle has pedagogical advantages to offer. Moodle is a learning management system that focuses on providing educators with the best tools to manage and promote learning. It also allows teachers to organize, manage, and deliver course materials. From a didactic standpoint, the use of multimedia tools to create visually appealing activities makes the learning process more pleasant for students to participate in. Because of this, students' interest in their studies is increased as a result of participating in these activities. Teachers have the ability to provide students with a large number of resources that they are unable to demonstrate in the classroom due to time restrictions. In addition, it is suggested that other researchers can conduct similar research by exploring other features in Moodle, such as BigBlueBotton as a video conference tool, Scorm Package, and H5P Interactive lesson.

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