



Optimization of the Web based Learning Management System (LMS) Application for PJOK Learning at SMA/SMK Equivalent Level in North Sumatra

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Abstract

This study aims to develop a website-based E-learning management system (LMS) application product that can become a PJOK learning medium by Learning Management System (LMS) in which all learning is focused on one medium, as well as an information medium for available Physical Education, Sports and Health (PJOK) class packages so that they can be read in detail and completely. This study involved 62 physical education sports and health teacher subjects (PJOK) and 50 student subjects. The research was conducted in two stages. The first stage of the small-scale trial consisted of 5 students from SMK Negeri 10 Medan. The second stage of the large-scale trial consisted of 3 state schools namely SMA Negeri 1 Binjai, SMK Negeri 2 Medan and SMK Negeri 10 Medan where each school consisted of 1 student as a representative. This type of research uses the type of development research (research and development) by involving media/IT experts. Material experts, expert practitioners of learning, namely practitioners who use teachers and students. Based on the results of the trial by media/IT experts, the application rating was obtained with a score of 4.54 in the Very Good category and declared "decent". Meanwhile, for the test subjects, student users received an assessment of having a total average score of 4.6 out of 5.0 which, when converted for the feasibility of this product, was in the "very good" category and declared "decent". The test subjects using PJOK teacher practitioners received an assessment of 4.75 out of 5.0 in the Very Good category and "deserved" to be tested on learning practitioners and users. Based on the data above, the website-based e-learning management system (LMS) application product is feasible. used to streamline and streamline the teaching and learning process to be better and more innovative.



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INTRODUCTION

One of the impacts of technological developments is in the field of education, where learning media is mandatory for the Indonesian government as stated in Government Regulation no. 19 of 2005 Article 1 Paragraph 8, that Information and Communication Technology (ICT), is part of the standards and infrastructure needed to support the learning process (Rahmanto et al., 2020, p. 62). This progress can be seen in the development of computer technology which offers many conveniences, one of which is in the field of education. Multimedia is a combination of text, images, graphics, animation, audio and video, as well as interactive delivery methods that can generate interest and have high graphic artistic value in their presentation. (Oetomo & Santoso, 2022; Priyanto, 2009, p. 3; Vaughan, 2005). Multimedia is usually used in the world of entertainment, business and education. In the world of education, multimedia is used as a teaching medium, both in class and individually. Relevant technological developments on smartphones can also be used as portable learning media, which means they can be used anytime and anywhere (Rendi, 2021).

Innovative learning can improve students' abilities in the learning process rather than the lecture method. One aspect that causes student learning outcomes to have low results is because the teacher as an educator is only limited to providing learning methods with the lecture method, so students have boredom, and students are less motivated to learn (Nuryani, 2015). The COVID -19 pandemic requires the education sector such as schools to make various changes as well as innovations and adaptations so that the learning process continues to run well. One of the online learning methods that is currently being

developed and starting to be used is Google Classroom. (Nurhayati et al., 2019) in her research suggested that the use of Google Classroom was practical and fun for students, but the lack of features presented confused its users. With a more practical user experience, Google Classroom is more suitable to be used as a learning support/complementary. The flexibility of Google Classroom which can be associated with any model or method has been proven to support successful learning (Sukmawati & Nensia, 2019). Judging from the potential problems above, the next step is to find information in the field. Based on the observations that have been made so far, the PJOK learning process is still a lot of teachers using learning applications that incorporate all subjects, such as Google Class Room (GCR), so researchers intend to develop the Google Classroom (GCR) application into an E-Learning Application. A website-based Management System (LMS) with more direct focus on PJOK subjects. Utilization of learning media is a creative and systematic effort to create experiences that can teach students so that in the end educational institutions will be able to produce quality graduates. Based on this, learning media is an integral part of educational institutions. Seeing the limitations inherent in conventional media, it is time for conventional media to improve its quality or even replace it by developing a more innovative and interactive learning media, one of which is learning media designed using computer assistance in the form of applications. (Priyanto, 2009). For this reason, the author wishes to research related "Website-Based E-Learning Management System (Lms) Application Development for High School/Vocational High School Level PJOK Learning".

METHOD

The type of research in this research is qualitative research; development studies used in a study must be based on the issues raised. Research and development in this process uses a quantitative approach and uses a Research and Development (R&D) research design according to Sugiono (2013).

Participant

This research was conducted at SMK Negeri 10 Medan, the subjects tested in this study were 50 students and 62 PJOK subject teachers at SMA/SMK level in North Sumatra, who were taken by sampling technique by distributing Google forms with certain considerations in accordance with the research objectives.

Sampling Procedure

The subject taking technique in this study was to use a total sampling technique. The reason for taking total sampling is because according to Sugiono (2007) the total population is less than 100, all populations are used as research subjects.

Materials and Equipment

In the process of developing the Website-Based E-learning management system (LMS) Application in PJOK learning, techniques and instruments are needed to get more in-depth information and what needs to be done so that quality products are obtained and are suitable for use in learning or not. The following data collection techniques and instruments are needed in this study:

1. Closed Questionnaire

The following is an assessment instrument in a closed questionnaire.

- E-Learning Application Validation Instrument for Media Experts

- E-Learning Application Validation Instrument for Material Experts.
- E-Learning Application Template Validation Instrument
- Questionnaire Validation Instrument

2. Open Questionnaire

This open questionnaire was used by researchers to find out the responses of teachers and students regarding the development of a Website-based E-Learning management system (LMS) application.

Procedure

Research and development in this process uses a quantitative approach and uses a Research & Development (R&D) research design. According to Sugiyono(Palmizal et al., 2020)

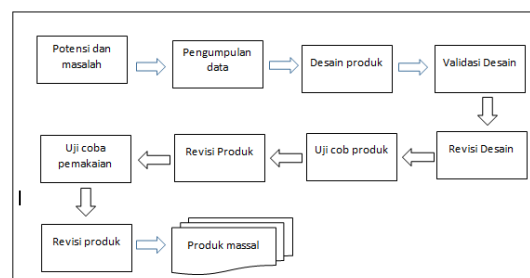


Figure 1. Research & Development (R&D) Development Steps(Palmizal et al., 2020)

The research design used in this study is in accordance with the steps for using the Research and Development (R&D) method by Sugiono (Palmizal et al., 2020). Then the procedure for this development research is summarized as follows: 1) Identification of Potential Problems, 2) Information Gathering, 3) Product Design, 4) Product Validation, 5) Product Revision, 6) Product Testing, 7) Final Product

Data collection technique

The techniques used for data collection in this study used questionnaires, interviews, documentation, and observation. The questionnaire was

used to find out the respondents' opinions on the website-based E-Learning management system (LMS) application for PJOK learning at the senior high school/vocational school level in North Sumatra. Observations are used to see the needs that are needed in the field. Questionnaires are data collection tools that contain a number of questions or statements that must be answered by research subjects. Based on its shape, questionnaires can be open and closed

Data analysis technique

Data analysis techniques carried out in research using numbers. Percentages are intended to determine the status of something that is presented and presented in the form of a percentage.

Table 1. Likert Scale Category(Sugiyono, 2013)

Evaluation	Mark
Strongly Disagree	1
Don't agree	2
Disagree	3
Agree	4
Strongly agree	5

With a Likert scale, the variables to be measured are translated into variable indicators. Then these indicators are used as a starting point for the preparation of instrument items which can be in the form of statements or questions. The data obtained through a questionnaire was then tested using a percentage test. The collected data were analyzed using a quantitative descriptive technique which was expressed in the distribution of scores and percentages of the research scale categories that had been determined. After presenting it in percentage form, the next step is to describe and draw conclusions about each indicator. The suitability of aspects in the development of a website-based E-Learning management system (LMS) application for PJOK learning can use the following table 1:

Table 2. Likert Scale Category (Arikunto, 2014)

Achievement Percentage	Interpretation
< 21 %	Strongly Disagree
21 % - 40 %	Don't agree
41 % - 60 %	Disagree
61 % - 80 %	Agree
81 % - 100 %	Strongly agree

Table 2. mentions the percentage of achievement, value scale, and interpretation. To determine the feasibility of using learning applications. Table 3.8 as a reference for assessing data generated from expert validation.

RESULTS

The following is the result of activities that have been carried out at each stage:

1) Product Development Findings Compilation of Product Design (Design)

The preparation of the product design or design stage has several activities carried out, namely determining competencies and indicators followed by learning materials into product materials. Website-based learning applications for PJOK learning that are developed utilize several innovative media components, such as text, images, video, sound with an interactive display. Utilization of various types of media has been adapted to the material or information conveyed in the learning process. In addition, the design evaluation to determine the achievement of learning objectives will be in the form of multiple choice question exercises through the Website-based learning application. Multiple choice practice questions (multi choice) are found in the Assignment menu which consists of 10 questions and 3 answer choices (A, B,)

2. Website-based Learning Application Supporting Document Design

From the results of observations, preliminary studies and needs analysis that have been carried out by researchers, researchers are interested in developing a Website-based E-Learning Management System (LMS) application that can support the learning process, which was previously done by joining other subject matter, namely in the Google Classroom, Document design of website-based learning media products consisting of flowcharts, learning application syntax and storyboards. The results of each website-based learning application product document are, 1) flowchart, 2) website-based learning application syntax based on flowchart flow, and 3) storyboards.

3. Website-Based E-Learning Management System (LMS) Application Product Development.

This web-based learning management system learning application is a web-based software program for management, documentation, monitoring, reporting, administration and distribution of educational content, training programs, technical manuals, instructional videos or digital library materials, and learning and development projects. The idea of Learning Management System comes from e-learning. E-learning developed out of the need for inexpensive, accessible, easy-to-use, dynamic and collaborative educational content and training tools. E-learning platforms provide an Internet infrastructure where learning occurs through various participatory techniques. This integrated digital web-based learning application is only a small part of the many learning applications.

4. Design Revision for Website-Based E-Learning Management System (LMS)

Application Development for PJOK Learning.

After the researcher made a Website-Based E-Learning Management System (LMS) Application design for PJOK learning, the researcher then submitted the design to educational material experts, IT experts and sports lecturers. The aim is to get input and revisions regarding the application design of the Website-Based E-Learning Management System (LMS) application which will be developed to improve the results of the research carried out.

5. Product Feasibility Test Results

The feasibility trial of the website-based learning application in the PJOK subject was carried out by several experts, namely application IT experts, material experts, as well as assessment or validation by learning practitioners who are PJOK teachers at SMA Negeri 1 Binjai.

Media/IT Expert Validation

IT media validation in this product was carried out by the Head of the Multimedia Teacher Department at SMK Negeri 10 Medan, namely Afdal Syukri, Head of the Multimedia Department and IT expert staff at the Government Education Office of North Sumatra Province. Data originating from application experts is used to guide revisions to this website-based learning application product, and the instrument for validating it is a questionnaire.

Results of IT Media Validator Expert Assessment 1

Based on the results of the analysis of the acquisition of the media validator I score, a total score of 99 (maximum score of 110) is obtained, with an average of 4.50, the category is Very Good and declared "appropriate" for practitioner trials and user trials. The

media validation process is then carried out by the media validator II. The product resulting from the media development process is validated by learning media experts, namely the PJOK learning media based on the website, the following is the result of the assessment from the media validator II

Results of IT Media II Validator Expert Assessment

Based on the results of the analysis of the acquisition of the media validator II score, a total score of 103 (maximum score of 110), with a score of 4.68 is in the Very Good category and declared "proper" to be carried out for practitioner trials and user testing. As a note for researchers from the IT expert team, the learning application is suitable for use, it's just that in operation the researcher gets a revision, namely the account for each PJOK teacher must be separated and not joined to the learning classes of each PJOK teacher who uses the application, so that student assessment data cannot be seen by other PJOK teachers.

a. Material Expert Validation

The validation of the material in this material was carried out by the Head of the Subject Teacher Consultation (MGMP) at the Medan City Vocational High School Level, namely Dumpang Parluhutan, S.Pd., AIFO so that they are experts in the field of PJOK material. The data from the expert is used as a guide for revising the material in this learning application. The instrument for this validation is a questionnaire.

Material Validator Assessment Results I

The results of the analysis of the acquisition of the material validator score I, get a total score of 59 (maximum score of 65), with an average value of 4.53 which is included

in the "very good" qualification declared "appropriate" for practitioner testing and user testing. However, the website-based PJOK learning application product still needs to be improved according to the suggestions from the material I validator giving suggestions, namely: the description in sentence form is too long. Thus, writing material can be shortened even more and viewing learning videos in the form of YouTube is better in the form of a flat layout when broadcast.

Material Validator Assessment Results II

Results analysis to acquire score validator material ii, get total score of 61 (maximum score of 65), score of 4.69 very good category and stated "worthy". However, the website-based corner media product still needs to be improved based on the suggestion that the material validator ii gives suggestions, namely: the short distance running material immediately includes the distance that is contested and places an image on the material

b. Practitioner Validation (Guru PJOK)

Product application learning based website This must pass stages evaluation in a manner of practitioner learning Which in study This validated by 1 corner teacher at SMA Negeri 1 Binjai. Use instrument on part validation using a scale of 5 and the value will be converted to product eligibility criteria.

Results of Assessment by Practitioners I and II

The results of the assessment by 2 learning practitioners. The results of the analysis of the score obtained by practitioner I, got a total score of 72 (maximum score of 75), a score of 4.80 in the Very Good category. Furthermore, the assessment was carried out by practitioner II with a score of 71 (maximum score of 75), with an average score of 4.73 which

is included in the Good qualification. So, based on the acquisition of the average score of practitioner I and practitioner II, which is 4.80 and 4.73 respectively, namely 4.75 out of 5.0 in the Very Good category and "deserves" to be tested on learning practitioners and users.

c. Practitioner Validation by Users (Students)

In the implementation stage, the activities carried out by the validator or product evaluation of the website-based Physical Education, Sports and Health (PJOK) learning application by the user aim to determine the feasibility of the product according to the characteristics of the user, namely high school/vocational school students in the ranks of North Sumatra. The following is a series of validator activities regarding practicality tests carried out by students in website-based learning applications.

1. Individual trials (one to one)

This trial involved three subjects, namely class X students of SMK Negeri 10 Medan. website-based Physical Education, Sports and Health (PJOK) learning application product assessment by students is carried out online using a Google form questionnaire. Previously, students were given a web link to access the application file, and then filled out an assessment sheet with an assessment scale, namely a scale of 1-5, students carry out the process of filling out the assessment sheet online via the Google form. The following shows the results of individual testing (one to one) by three (3) students on website-based learning application products. So the conclusion obtained based on this individual test is that this website-based learning application product has a total mean score of 4.6 out of 5.0 which, if converted to the feasibility of website-based learning application products, is in the "very good" category and declared "worthy".

2. Small Scale Trials

The implementation of the small-scale trial involved five (5) subjects, namely class X students of SMK Negeri 10 Medan. Evaluation of website-based learning application products that are still carried out online or online by students through Google form which is distributed. The following is a description of data acquisition for the implementation of small-scale trials on the feasibility of website-based learning application products. So that the overall results of the student assessment on the scale trial small (five students) to the feasibility level of application-based learning products website is 4.4 out of 5.0 included in the "very good" category if converted mark For appropriateness product that product Which has tested try it on small scale declared "worthy" For used.

3. Large-Scale Trials

Field trials will involve all class x students as representatives for vocational and high school researchers took a sample of 3 schools, namely SMK Negeri 10 Medan, SMK Negeri 2 Medan and SMA Negeri 1 Binjai with amount 3 schools where each school consists of 1 student as a representative. The aspects that are used as indicators for the assessment of students who take part in field trials or large trials are still the same as the use of indicators in aspects of individual trials and small-scale trials. The following is a description of data acquisition on the implementation of field trials on the feasibility of website-based learning application products.

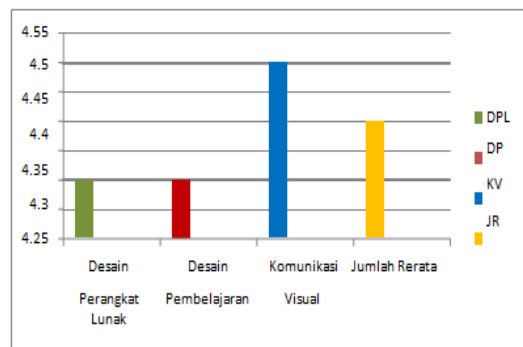


Figure 4. Results test try field to learn application based website.

So that overall the results of student assessments at each school in the large trial field trials which was attended by 3 schools, namely SMK Negeri 10 Medan, SMK Negeri 2 Medan and SMA Negeri 1 Binjai with amount 3 schools on the feasibility level of website-based learning application products is 4.4 out of 5.0 is included in the "very good" category which, if converted to the product feasibility value, means that products that have been tested in field tests are declared "proper" to be used as applications in the implementation of sports and health physical education learning (PJOK).

DISCUSSION

At the beginning of the development of a website-based e-learning management system (LMS) application in this learning corner, it was designed and produced into an initial product in the form of a learning application for students and teachers in the teaching and learning process in the future. This study presents the results of using learning applications whether it is feasible to be used by testees. The development process through research procedures. Through some planning, production and evaluation, then the product is developed with the help of someone who masters making the

application, after the initial product is produced it needs to be evaluated by experts through expert validation and needs to be tested on students. The evaluation stage was carried out on media/it experts, media experts and practitioner experts. The media/it expert validation process produces data that can be used for initial product revisions. In the process of validating material experts and practicing experts, researchers used two stages, namely stage I and stage II. Phase I validation data is used as a basis for revising the product to improve it until the product is ready for trial use. after completing the validation of material experts and practicing experts, then immediately validate it to Media / IT experts. From the media/it experts, two data, suggestions and input were obtained to improve making teacher accounts separate for the class and not visible to other teachers which is being developed. In the media/it validation process the researcher went through two stages, namely stage I, stage II. Phase I Media/IT expert validation data is used as the basis for revising the product.

The quality of the "web-based E-learning Management System (LMS) application development" is included in the 'proper' category of the three experts, both media/it experts, material experts and practitioner experts, as well as in the assessment of small group trials and group trials. big . students feel happy and enthusiastic about this product because respondents are interested in being more enthusiastic about learning in order to improve learning outcomes, especially in PJOK subjects. This product can be disseminated to other testees. there are advantages of this product, but there are also weaknesses in this product, including in viewing YouTube teaching videos, the video display is still horizontal, and it can be set to landscape when we set the student's cell phone screen and the class

of students entering has not been separated into classes, meaning it is still made one class. some of these weaknesses, it is hoped that attention will be given to further development efforts to obtain better product results. This fact will further open opportunities for continuous improvement in the future.

CONCLUSION

From the results of the research that has been done, the researcher concludes that this website-based E-Learning Management System application product is feasible to use as a learning application on PJOK subjects at the SMA/SMK level in North Sumatra. With the development of website-based lms e-learning application products that researchers have developed, teachers and students can more easily carry out teaching and learning activities and can also be used as evaluation material, especially in improving student learning outcomes. This development research produces a website-based learning management system (lms) application product, which is expected to work effectively and efficiently so that it can become an attraction for students and teachers in activities for the teaching and learning process of pjok learning and for further researchers. This website-based LMS e-learning application product is expected to provide convenience in implementing the process of teaching and learning activities for students as well as in increasing learning achievement results.

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REFERENCES

- Arnidah, A., Syamsiah, D., Sinaga, A. V., & Aswan, D. (2022). The Development of Blended Learning in Learning Evaluation Subject in Universities in Makassar City. *AL-ISHLAH: Jurnal Pendidikan*, 14(3), 3289-3302.
- Arikunto, S. (2014). *Prosedur Penelitian: Suatu Pendekatan Penelitian*. In Rineka Cipta.
- Nurhayati, S. (2022). Efektivitas Pembelajaran Pai Dengan Menggunakan Metode Kooperatif Tipe Stad Kelas Viii Di Smp Ybl Natar Lampung Selatan. *Uin Raden Intan Lampung*.
- Nuryani, P. (2015). The Application of Cooperative Learning Model in Pedagogic Course. *Edutech*, 14(1), 68–86.
- Oetomo, B. S. D., & Santoso, S. (2022). The Influences Of The Learners Ability And The Information Technology On The Learning Effectiveness In The E-Learning Era. *International Journal of Information, Business and Management*, 14(2), 128–139.
- Palmizal, A., Pujiyanto, D., Nurkadri, & Laksana, A. A. N. P. (2020). Development of a creative gymnastics model to improve basic locomotor movements for students in elementary school. *International Journal of Human Movement and Sports Sciences*. <https://doi.org/10.13189/saj.2020.080714>
- Priyanto, D. (2009). Pengembangan Multimedia Pembelajaran Berbasis Komputer. 14(1), 1–13.
- Rahmanto, Y., Randhika, M. F., Ulum, F., & Priyopradono, B. (2020). Aplikasi Pembelajaran Audit Sistem Informasi. 14(2), 62–67
- Rendi, A. (2021). Penerapan Augmented Reality Pengenalan Jenis Olahraga Berbasis Android. *Prodi Teknik Informatika*.
- Sembiring, J., Hernawan, H., & Puspitorini, W. The Learning Model of O'brien Shot

- Put for High School Students. *Journal Physical Education, Health and Recreation*, 4(2), 65-72.
- Sugiyono, D. (2007). *Metode penelitian pendidikan pendekatan kuantitatif, kualitatif dan R&D*.
- Sugiyono, D. (2013). *Metode penelitian pendidikan pendekatan kuantitatif, kualitatif dan R&D*.
- Sugiri, W. A., Priatmoko, S., & Basori, B. (2020). Flipped classroom learning design using the ASSURE model. *Teknodika*, 18(2), 124-132.
- Sukmawati, S., & Nensia, N. (2019). The Role of Google Classroom in ELT. *International Journal for Educational and Vocational Studies*, 1(2), 142–145. <https://doi.org/10.29103/ijevs.v1i2.1526>
- Usman, K., Karo-karo, D., & Silalahi, W. (2022, December). Development of Outcome Based Education Concepts in Elementary School Physical Education Courses. In *Proceedings of the 4th International Conference on Innovation in Education, Science and Culture, ICIESC 2022*, 11 October 2022, Medan, Indonesia.
- Vaughan, R. (2005). *Multimedia: What it is and What it can do for our Students*. IATEFL Issues, Aug/Sept 1999.