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Development of Learning Management System Model and Numerical Literacy-based Message Content

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The objective of this research was how to efficiently create message content that will be given to primary students through LMS (Learning Management System). The research method used was a sequential mixed method by combining qualitative and quantitative research. The qualitative method used Research and Development research with the ADDIE model to see the quality of the products being developed, while the quantitative method was done to see the effectiveness of the product through testing the average similarity and proportions through. Some instruments such validation sheet, questionnaires, and learning achievement test were used to collect the data. 84 second grade elementary students from three different schools were involved in this research whereby they were selected by using convenient sampling. Results of this research revealed that the validity of LMS model was valid for learning tools, and very valid for model books, media presentations, and e-learning. Additionally, the practicality test showed that teacher assessment in one-to-one, small group, and field was very practical for each of assessment. Meanwhile, z test showed that the proportion of students who had learning outcomes above the minimum passing criteria at the posttest was higher than at the pretest in Classes A, B, or C.

Keywords: design model, elementary students, learning outcome, LMS, message content

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INTRODUCTION

The learning method implemented during the pandemic created a blended learning environment, namely online and offline learning. This condition raised technological and pedagogical challenges in applying blended learning methods through technological advances that offer various developments in education technology both from primary school to higher education levels. The learning system in the future demands the role of the online learning system to continue to grow from time to time. This is related to the rapidly technological development that online learning need has to be designed by well-qualified system. Certainly, the need in the future will be different that learning system also has to be developed by adjusting the current development. Additionally, this moment is the revolution era of online learning requiring the exist learning which is unlimited from time and place. The development of online learning offers a wide variety of learning media and a more effective and flexible allocation of time and place.

One of the developments in online learning, especially learning management system (LMS) is that there is the research related to message design on LMS. Message design research is very important to undertake online learning. Message content is the message displayed into account on scope, sequence, integration, articulation and continuity between the material balances (Rahmi, 2014). Moreover, it refers to the message that can be integrated to students and its function is not only as additional knowledge but as tools to make easy in self-regulated learning and guide in constructing the knowledge (G. Lin et al., 2015). Since there is message content, students do not need to ask when they have to work in LMS. This message content has to be designed optimally that it can functionate well. According to Rahmi (2014), message design helps students to interpret and construct learning message so they have ability to generalize learning and being independent learners. In addition, the message design helps students to get the message, process the message content, connect between new knowledge and prior knowledge, and ensure that the message is effective (Ross et al., 2011). Therefore, authors focus on how to design the practical and meaningful message to be presented for students by LMS in which passing through this design, elementary students are expected to be able in solving numerical literacy test.

Nowadays, it is assumed that it is difficult to avoid technological developments in the learning process because the development of educational technology is growing rapidly. Therefore, learning messages designed by teachers are expected to be able to increase students' understanding, reading, and motivating student learning. Due to that, teachers need to maximize content messages in learning using blended learning so that the learning objectives can be achieved optimally and can provide learning experiences for students both inside and outside of school. The principle of message design is very important for developing learning materials that are more easily understood by students. This principle is expected to help the teachers in which they can deliver the concept properly and optimally. The message will correlate with the expected learning motivation. Brady dan Kennedy (2007) stated that there are four things that help in compiling learning messages, namely higher order thinking, depth of knowledge, substance of dialogue, and the relationship between real life situations and the material

presented in class. The process of designing a learning system in the LMS consists of several components, namely learning objectives, materials, methods and media, students, teachers, and evaluation.

Based on the ideas above, if the message is delivered effectively, then learning can build new knowledge. The design of learning messages can produce constructivism learning through the design of messages that are manipulated from old knowledge with authentic experiences. Afterwards, the next lesson can be designed and developed based on the principles of learning messages as the principles of motivation, perception, psychomotor, learning concepts, problem solving, and attitude development. Mobile learning requires message design that must be based on community knowledge in mobile technology. Pedagogy and design of learning messages are developed based on the needs of the learning environment of students so that the use of technology in the learning process comply with the principles of message design and content in the learning media used. Therefore, the design of learning messages must follow a message design principle so that blended learning can run well.

Literature Review

Digital Content

Digital content are contents in various forms, whether in text and writing, images, video, audio, or a combination thereof converted to digital format. Contents in those forms are readable and easy to share via digital media platforms such as laptops, tablets, and smartphones (Ronchi, 2009). According to Ivanytska et al., (2021)**,**learning content is the application of pedagogical models for learning according to objectives, target groups and specific contexts or areas of knowledge. Digital content is the production or processing of data or information regarding symbols, letters, numbers, colors, sounds, images, and videos (including combinations of them) into digital formats for their further preservation and use.

The importance of digital content is to facilitate the delivery of learning objectives to students by providing benefits in learning materials according to the abilities and needs of students. Digital learning content can be a platform to support increasing the level of effectiveness of the distance learning process. By supporting the implementation of the learning process, students can increase the acceptance of lessons being taught, increase the active participation of students, and improve students' independent learning abilities. According to Beckman et al., (2018) digital learning has more meaning than digitizing traditional teaching materials. This is due to digital leaning points out on the different knowledge and new technology such as computer and internet that are beneficial for promoting the ability in using information and communication technology (Lin et al., 2017). Moreover, Lin et al. (2017) revealed that digital learning shows better positive effects on learning motivation than traditional teaching does. In addition, digital learning reveals better positive effects on learning outcome than traditional teaching does. It means that the digital learning is more effective in motivation and learning outcome than traditional teaching. The use of digital media in education creates new fields for communication, collaboration, and networking. Because digital learning is independent

of time and place, it is more flexible, individual, and mobile than conventional forms of learning. In the digital age, course lessons are created in clouds shared with others and co-developed. With the help of digital teaching, students learn early on to take more personal responsibility and improve communication and teamwork.

Amiroh (2012) says that the advantages of digital content are (a) Simple, light, efficient, and compatible because it is supported by many browsers, (b) Has easy installation process because it is also available in Indonesian (c) Has a special site management (dashboard) to manage overall content, module changes, etc. (d) Has good user management and course management, (e) Network systems and security can be managed independently, (f) Can limit access space in accordance with the desired network (g) The learning process of the system can be adjusted according to needs, (h) Has a complete set of good features for organizing distant/online learning. Borysiuk (2013) stated that the advantages of digital content are: 1) creating a more interactive experience; 2) providing unlimited resources; 3) helping build skills necessary for the future; 4) saving valuable resources; 5) updating information instantly; and 6) not taking up much space. Meanwhile, Galle stated that the advantages of digital content are 1) increasing credibility for teachers, 2) instant access to many resources, 3) automation of boring material, 4) creating a collaborative learning approach, 5) teaching core vocational skills more easily, 6) modernization of classrooms, 7) centralization of needed data, 8) enabling students to work at their own pace, 9) opportunity to learn in different ways, 10) increasing their motivation, 11) and affordability (Galle & Pilla, 2019). From these literatures, it can be synthesized that there are some advantages of digital content such as renewing the information spontaneously, constructing interactive experiences and facilitating collaborative activities that optimizing the bored material and improving the motivation, providing unlimited sources that are adjusted with the need, making easy in teaching and helping in generating the skills in the future, and making possible students to learn by their own ability.

Meanwhile, the lack of digital content according to (Amiroh, 2012b) is (a) Requires a deeper understanding of the system used. (b) In order to build the desired e-learning system, experts are needed. (c) Requires greater cost. (d) Requires special hardware (e) Must install a special application to support Moodle. (f) Requires internet network with high-speed capacity. On the other hand, according to Shatri (2020), digital content can create problems for class preparation and delivery. It can be a distraction, provide improper access, offers false information, makes cheating easier, makes it costly to maintain, and hinders basic skills.

In creating good and quality digital content, several aspects must be considered. (a) The objective of the content created has to be in the form of what is to be delivered and what final results are expected from the content provided. Contents that are up-to-date are needed so that educators can correlate content material with contexts or conditions that are more trendy so that students can easily accept and understand. (b) The choice of language that is pleasant and not stiff or too formal is also important for conveying the material narrative. (c) Contextual contents are contents that connect learning material with real life contexts experienced by students. The content presented must be based on

the needs of students. Various information is also directly aimed at the appropriate learning context. When creating content, it must be ensured that students will be able to understand what they want to know and what they need to know. (d) Often times, the design of learning content is "straight to the point", namely finding the right answer. It would be better if students were led to get to know the information first and then move on to applying knowledge and having effective discussions. Start with a hypothetical scenario and then ask for situational guesses. Present a small amount of information and ask participants to discuss the implications without knowing the full context. Finally, invite students to discover and explore and end with the discovery of knowledge. (e) Everyone must agree that cutting contents into smaller points are a good step in making digital learning content. From that, we can divide contents into smaller points and focus on one small piece. However, there is also a possibility that students will lose the big picture of the whole lesson. In addition, sometimes students also have difficulty connecting one lesson with other lessons. Dividing lessons are good but we should not lose sight of the overarching theme of the lesson. (f) Designing learning that enhances collaboration can often make students learn asynchronously and faster when using digital learning content. Often educators forget to design content for collaboration and include conversation. For this reason, teachers need to look at learning content designs that can stimulate questioning and conversation for students who are learning. Stimulating with questions will result in appropriate discussion. From there, conversations will lead to a correct answer to a question. (g) As a teacher, in making digital learning content, one often put themselves in the role of "people who know more" telling "people who don't know". Teachers treat students equally that they "know nothing". It should not be forgotten that students may already have prior knowledge. One must test students' knowledge of the lesson to be taught. (h) easy to understand and interactive. If possible, make learning experiences fun through interactivity and experimentation. Give space for students to explore. Let them play with ideas first, without the consequences or worrying about mistakes before moving on to more formal teaching. Teachers nowadays not only share their knowledge through lectures, but are also able to design and create digital learning content that can make it easier for students to understand the material being taught.

Numerical Literacy

Knowledge and skills use various numbers and symbols related to basic mathematics to solve practical problems in various contexts of everyday life. They also analyze information presented in various forms (graphs, tables, charts, etc.) in what is called Numerical literacy. Numerical literacy can be used as an interpretation of analysis results to predict and make decisions (Räsänen et al., 2009). Literacy and numerals can also be used to solve problems encountered in everyday life and not only the questions presented at school (Grasby et al., 2020; Neumann et al., 2013). According to Stacey and Turner (2015), numerals aim to form a mindset of problem solving, logical reasoning, communicating, and explaining. Where the mindset is developed based on concepts, procedures, and facts that are relevant to the problem. This problem requires a solution process involving all objects with a numerical domain.

Munn and Small (2017) stated that numerical literacy skills are one of the most basic education objectives. This opinion implies that literacy and numerical activities are the most basic abilities for basic education objectives. This basic ability is the basis for a student to have other skills. Therefore, numerical literacy needs to be developed from an early age. Each grade has a different way of implementing numeracy literacy learning. According to (Weilin, 2017), classroom teachers can create and develop literacy and numerical program designs according to their creativity and innovation. The stage of increasing teacher digital literacy competence in designing and managing online and offline learning needs to be done by providing materials and designing practical lesson plans with the latest lesson plans models, determining learning models or methods, and developing teaching materials (Herlambang & Abidin, 2022).

Learning Management System

LMS stands for Learning Management System which is a system used to manage digital learning. LMS is a system that enables educators to create an online learning environment where all students can be involved in various activities related to learning (Watson & Watson, 2007). LMS is designed to assist students in obtaining learning information sources easily. LMS can be used by a teacher to see students and students enrolled in learning, distribute learning materials, create platforms for discussing ideas, assign and evaluate assignments, provide good feedback, and assess students. This LMS can provide space for educators (both teachers and lecturers) to closely monitor and facilitate students' learning progress. On the other hand, students benefit because they are given the space and time to research according to their understanding abilities.

METHOD

The research method used was a sequential mixed method by combining qualitative and quantitative research (Creswell & Clark, 2018). The qualitative method was used to develop message content-based LMS using research and development (R & D). Meanwhile, the quantitative method was used to examine validity, practicality, and effectiveness of the developed product (Nieveen, 1999).

The R & D model used in this research was the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) model (Sugiyono, 2016). The processes used in the ADDIE model are analysis, design, development, implementation and evaluation (Aldoobie, 2015). In analysis phase, need and content analysis as the foundation to conduct the development were performed. In design and development phase, message content-based LMS was designed and then validated by five experts in language, elementary school content, media, LMS using Moodle, and curriculum. In implementation phase, message content-based LMS was tried to be implemented in three primary schools located in the western, eastern and northern regions of the city of Payakumbuh, Indonesia. A field test was carried out using the one-group pretest-posttest design (See Figure 1).

O	X	O
Pretest	Treatment	Posttest

Figure 1
The one-group pretest-posttest design in the field (Rusdi, 2018: 206)

In this design, the activity is preceded by conducting an assessment in the form of a pretest to see learning outcomes. After the pretest, students are given learning using the devices that have been developed and the ends with the provision of a posttest.

Moreover, in implementation phase, the practicality test was conducted by involved the selected elementary teachers to implement message content-based LMS in the learning process. The questionnaire was used to assess the practicality test in which there were three assessments of the practicality such as one-to-one, small group, and field group. The practicality assessment of all teachers had to be minimally practical. The data of practicality test was analyzed qualitatively.

Then, in evaluation phase, the effectiveness test was conducted in which the pretest and posttest data of numerical literacy test was analyzed. Descriptively, N-Gain unit was used to describe the enhancement of students' numerical literacy skills. Meanwhile, inferentially, T test was used to examine the significance of the enhancement of students' numerical literacy who learnt using message content-based LMS. Additionally, Z proportion test was used to examine the enhancement of students' proportion who had the average score above minimal completeness criteria when carrying out pretest and posttest.

FINDINGS

The part of these findings is explained some items such as validity, practicality, and effectiveness. Particularly, the validation process presents the results related to the eligibility of some developed items such as e-learning, presentation media, model book, and learning tools. Additionally, the practicality process shows the results regarding the practicality test whereby there are three conditions practiced in the classroom consisting of one-to-one test, small group test, and field group test. Moreover, the effectiveness process reveals the results of the examination of message content-based learning management system on numerical literacy skills.

Validity

Content message design books and learning tools from learning models were validated and assessed from several components such as content, language, and graphics. The validation results are presented in Figure 2.

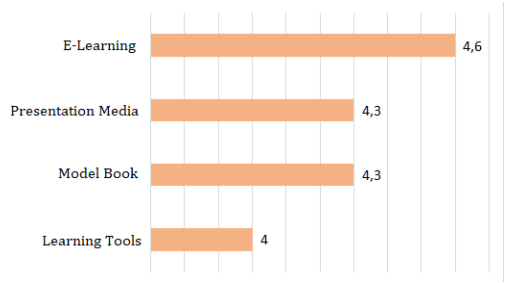


Figure 2
Results of book validation model and learning tools

Based on Figure 2, product development is valid with a fairly high score. This means that the product is feasible to be implemented in learning with a blended learning model.

Practicality

Furthermore, learning tools were tested for practicality through a questionnaire given to students. The student questionnaire consisted of three forms of learning implementation, namely one-to-one tests for three students, small groups for 6 students, and field tests (Field Group Trial) for 84 students from 3 schools. There are three assessments such as graphic, language, and content. The results of the practicality assessment can be seen in Table 1.

The practicality assessment of the syllabus and lesson plans were carried out through observation by the observer team. Observers are a team of researchers and teachers. The results of the observations indicated that the implementation of the syllabus and lesson plan was practical to use.

Tabel 1
Tabulation of practicality assessment summary of learning tools

Group	Total Respondants	Learning Components	Average
One-to-one tests	3	Lessons	4.4
		Presentation Media	4.4
		E-Learning	4.5
Small Group tests	6	Lessons	4.5
		Presentation Media	4.5
		E-Learning	4.6
Field group tests	28	Lessons	4.6
		Presentation Media	4.2
		E-Learning	4.8

Effectivity

Descriptive Statistical Analysis

Then, effectivity was assessed based on descriptive and inferential analysis. Descriptively, the analysis was carried out on the average pretest and posttest learning outcomes of students from three classes in three different primary schools. The three

classes were selected based on the school's location. Class A is in the western region, Class B is in the eastern region, and Class C is in the northern region of the city of Payakumbuh, Indonesia. The results of the descriptive statistical analysis can be seen in Table 2.

Table 2
Analysis of learning outcomes test results on overall students

	Class A		Class B		Class C	
	Pretest	Postes	Pretest	Postes	Pretest	Postest
Numbe of Students	28	28	28	28	28	28
Minimum Score	30	50	35	75	30	73
Maximum Score	87	99	83	100	83	100
Average	63.93	86.32	62.54	89.29	63.14	89.43
Variance	196.66	104.30	192.63	60.43	216.87	63.81
Deviation Standard	14.02	10.21	13.88	7.77	14.73	7.99
Percentage of Students above the Minimum passing criteria	3.6%	75.0%	3.6%	85.7%	3.6%	89.2%
Average of N-Gain	0.63 (fair)		0.74 (high)		0.76 (high)	

Based on the table, it can be seen that the average learning result during the pretest was 63.93 and increased during the posttest to become 86.32. This shows an increase in the average student score of 22.39 points in class A, 26.75 points in class B, 26.29 in class C. In other words, it is proven that there was an increase in the average student learning outcomes before and after given learning using a given device that occured in all three classes. Viewing the average N-Gain data, the increase in pretest and posttest scores belongs to the medium category in class A and high in class B and C. The following is the distribution of student scores as a whole. The distribution of student data can be seen in Figure 3.

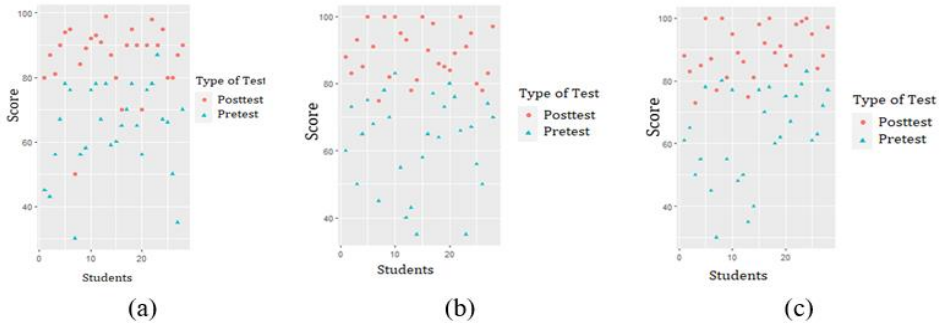
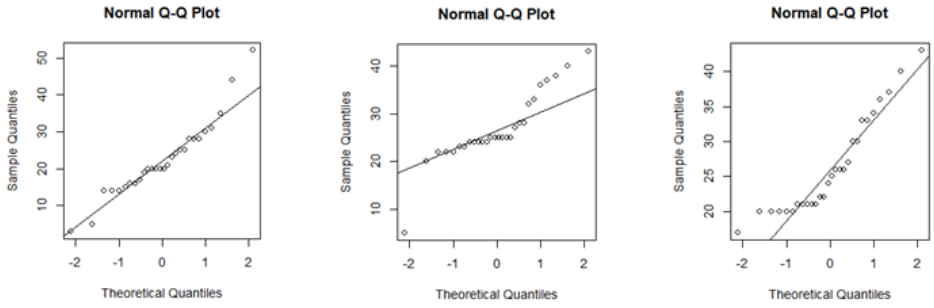


Figure 3
(a) Distribution of class A pretest and posttest data; (b) Distribution of class B pretest and posttest data; (c) Distribution of class C pretest and posttest data

Inferencial Analysis

The results of testing the assumption of normality on the posttest and pretest difference data for class A using the Shapiro Wilk test resulted in W = 0,93342, p-value = 0,07525 > 0,05 resulting in H_0 accepted. With the significance at 0,05, it can be concluded that the posttest and pretest difference data are distributed normally. Then, the paired t-test in class A was obtained t = -6,7031, df = 21, p-value = $6{,}199 \times 10^{-7}$ < 0,05 resulting in H_0 rejected. Therefore, at a significance of 0.05, it can be concluded that there was an increase in the average learning outcomes of class A students.

The results of testing the assumption of normality on the posttest and pretest difference data for class B using the Shapiro Wilk test resulted in D = 0,14086, p-value = 0,1654 > 0,05 resulting in H_0 accepted. At a significance of 0,05, it can be concluded that the posttest and pretest difference data are distributed normally. In the *paired t-test* in Class B, it resulted in $t = -10.72, df = 27, p-value = 1{,}564 \times 10^{-11}$ < 0,05 H_0 rejected. With the significance at 0,05, it can be concluded that there was an increase in the average learning outcomes of class B students.



(a) (b) (c)

Figure 4
(a) Class A Data Q-Q Normality Plot; (b) Class B Data Q-Q Normality Plot; (c) Class C Data Q-Q Normality Plot

It can be concluded that there was an increase in the average learning outcomes of class B students. W = 0,91747, p-value = 0,03005 < 0,05 resulting in H_0 rejected. With the significance at 0,05, it can be concluded that the posttest and pretest difference data are distributed abnormally. As a result, the Mann Whitney non-parametric test was used through the Wilcoxon test to see the average similarity. The Wilcoxon test in class C resulted in W = 28, p-value = $2{,}515 \times 10^{-9}$< 0,05 H_0 rejected. At a significance of 0,05, it can be concluded that there was an increase in the average score of student learning outcomes. The boxplot of pretest and posttest data for Classes A, B, and C can be seen in Figure 5.

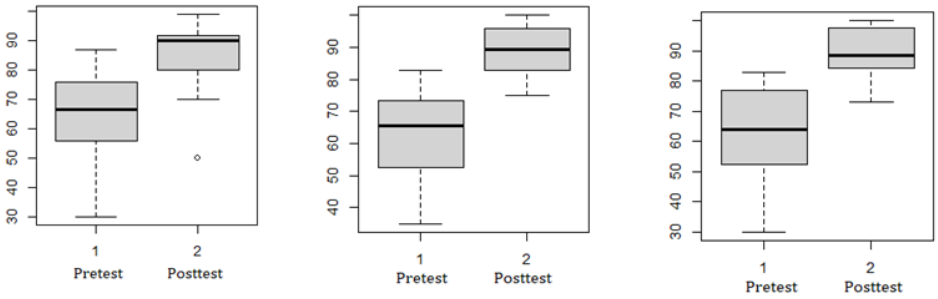


Figure 5
(a) Boxplot pretest and posttest test data results of learning in Class A; (b) Boxplot pretest and posttest test data results of learning in Class B; (c) Boxplot pretest and posttest test data results of learning in Class C

When compared to the minimum passing criteria, which was 80, the proportion of students who passed the minimum passing criteria was higher. The figure also showed that there was an outlier in the post-test data in Class A. In Class B, the proportion of students who scored above the class average in the posttest was almost the same as the proportion who scored below the class average. However, the proportion of students with scores above the minimum passing criteria was higher than those below the minimum passing criteria. For Class C, the proportion of students who scored above the class average in the posttest was greater than the proportion of students who scored below the class average. Then, the proportion of students with scores above the minimum passing criteria was also higher than those below the minimum passing criteria. Based on the boxplot display above, it can be concluded that there was an increase in the proportion of students who had posttest scores above the minimum passing criteria compared to the proportion of students who score below the minimum passing criteria. Once it is known that there was an increase, then it is proceeded with testing the proportions. The z test for Class A resulted in $\chi^2_{count} = 48{,}29 > \chi^2_{0.05} = 3{,}84$ and p-value = $3{,}68 \times 10^{-12} < 0{,}05$ resulting in H_0 rejected. The z test for Class B resulted in $\chi^2_{hitung} = 38{,}23 > \chi^2_{0.05} = 3{,}84$ and p-value = $6{,}30 \times 10^{-10} < 0{,}05$ resulting in H_0 rejected. The z test for Class C resulted in $\chi^2_{hitung} = 41{,}35 > \chi^2_{0.05} = 3{,}84$ and p-value = $1{,}27 \times 10^{-10} < 0{,}05$ resulting in H_0 rejected. At a significance at 0,05, the proportion of students who had learning outcomes above the minimum passing criteria at the posttest was higher than at the pretest in Classes A, B, or C.

DISCUSSION

This part will discuss the validity of learning tools, the practicality of learning tools, and the effectiveness of learning tools. Every discussion is explained in the following subsection.

Learning Tools Validity

Based on what was done by the 5 validators, it was concluded that the product developed in this research met the valid criteria. Even though the assessment met valid criteria, this product was still corrected according to input from expert lecturers so that this product was truly feasible for use in the field. Once repaired, the product is ready for use in the field.

This model book product is valid because the writing process is guided by the learning process, which can be used as a reference when carrying out activities. When teachers find it difficult to manage a class, this model book can be used for the learning process. Because when the teacher does not use examples when teaching, students will get bored and learning objectives will not be achieved. This type of learning can be used to develop learning styles in certain fields of research. Teachers can show how to solve problems, how to analyze information and how to acquire knowledge. The role of the learning model itself is to guide planners and teachers when planning and implementing learning. In line with Rusman's opinion, (2017), learning models are principles that can be used to shape curriculum (long-term learning plans), design learning materials, and guide learning in class or elsewhere. The learning model is a principle that can be used to design face-to-face teaching styles in class, to identify learning materials or tools, including books, learning media, and curriculum (Fitria, 2018). The model can be interpreted as a pattern used to regulate the curriculum, design and deliver material, organize students, and choose media and learning methods and conditions (Taufik et al., 2009). This model book product serves as a guide for educational planners and teachers in planning and carry out learning so that this product meets valid criteria.

This presentation media product is valid because during the learning process it is structured by conveying information through computer programs and through visual aids that we usually call projectors. In this program, presentation providers deliver Microsoft PowerPoint with pre-programmed resources. The appearance should be as beautiful as possible so that the audience is happy to see it. This display method can be used to send a message to the organizer or send a message. In line with Sanjaya's opinion (2012) presentation is a learning process by conveying through explanation of information by the messenger (lecturer, teacher, student who is responsible for presenting an idea or discovery). Presentation is the act of speaking in front of many people to present or convey information or ideas. The aim is to persuade or convince the message and to convince someone about the message sent to him (Umbaran, 2013). Presentation media is information or content that will be delivered and entered into a computer program that is issued from a display device (projector) (Aristo, 2008). This excellent presentation media product, with Microsoft Power Point makes it easy for the messenger to deliver the message so that the product meets the valid criteria.

This e-Learning product is useful because it is supported and can be used in the educational process, not only in the delivery of learning materials, but also in the change and ability of different student skills. By learning online, students not only listen to material explanations from the teacher, but also observe, work on, present, and so on. In addition, e-learning is also a learning process that uses internet technology to facilitate, deliver, and facilitate distance learning processes. Therefore, learning can be done remotely. In line with the opinion Dahiya et al. (2016), e-learning is information and communication technology that allows students to learn anytime and anywhere. E-learning as teaching and learning that uses electronic networks (LAN, WAN or Internet) to deliver content education, interaction or guidance (Elyas, 2018). E-learning is an asynchronous learning program through electronic computer devices that receive learning materials according to their needs (Hany, 2002). E-learning is a product that can make it easier for students to learn internally (online) because this product meets proper standards.

This lesson plan syllabus product is valid because in the curriculum planning process it is fulfilled for a long time what the teacher does as a guide for him. The curriculum contains qualification criteria, core competencies, subjects/learning, learning activities, assessments, assessments, time limits and learning resources/materials/tools. Curriculum as lesson plan is very important in the learning process at school because after the teacher plans the curriculum, it will be applied when learning continues, the teacher sees the learning process of the subject. From there the teacher can find out what activities will be carried out in the classroom, because these activities have been planned before learning. Through the lesson plan program, teachers can achieve planned and implemented objectives effectively. In line with the opinion Kunandar (2012) a learning implementation plan is a plan that describes the learning process and organization to achieve the qualifications set out in the content standards and set out in the syllabus. The curriculum is essentially a long-term learning plan for a subject and/or subjects which contains competency standards, core competencies, topics/learning, learning activities, presentations, assessments, deadlines. and sources/objects/learning tools (Asep, 2006). Lesson plan is a guide for teachers in the curriculum. Because basically the lesson plan will determine the overall quality of education. Lesson plan is a very important thing that aims to ensure the success of the student learning process (Haryazeti & Ahmad, 2022). lesson plan syllabus is very useful for teachers, especially as a reference during learning, so that this product meets valid criteria.

The Practicality of Learning Tools

Based on the results of observations made at 3 primary schools in Payakumbuh City, it was found that schools had not yet implemented digital learning. The lesson delivery still used conventional models, namely lectures. There was no innovation from the learning model. The availability of a variety of learning innovation models based on information technology requires teachers to be able to collaborate in using technological advances to increase the efficiency of the quality of educational outcomes. The urgency of the problem of the quality of education in Indonesia is because of the low quality of learning outcomes. This is caused by the lack of use of learning media by teachers.

The function of learning media is to facilitate the process of delivering learning material and clarifying the meaning of what is delivered in order to achieve the objectives of learning (Rogers et al., 2009). Teachers only take existing learning media even though teachers can create their own learning media through existing digital technology. If teachers use technology in learning, it means that the teacher has digital pedagogical competence. In addition, digital pedagogical literacy is also important for teachers and students to understand. This is because the ability of students is only limited to obtaining information, evaluating, and reflecting on information but unable to understand the information that has been obtained.

Based on the observations of researchers at the beginning of the activity, all students were ready and very enthusiastic to take part in learning through digital-based LMS. Students were very interested and serious about learning to use their respective laptops (Chrome Book) (Kaur, 2020). Chrome Books are provided by the school as a facility to support learning. Students are very serious about listening to the introduction from the principal and class teacher.

PembelajaranSDnusantara.com's LMS learning tools for implementation in 3 primary schools showed practical results. Practicality is influenced by distinctive characteristics, namely: combining theory and practice, creating and thinking, fostering creativity, play and problem solving, encouraging participation, collaboration, and public engagement which aims to increase critical understanding of the digital environment (Lewin & Lundie, 2016). Therefore, the practicality of learning tools needs to be proven to prove the usefulness of these learning tools for subjects. Practical learning tools are important because they can help students learn and develop personal abilities, learning discovery, generative learning, and independent learning.

Based on the tests that have been carried out, one of the findings in the implementation of this model is the enthusiasm of students and the persistence of teachers to learn. Students are very enthusiastic about participating in learning using this digital pedagogy model. Apart from that, students were also happy to be able to use their cell phones for learning activities. Students who usually use cell phones as a means of communication and entertainment can now use cell phones for learning objectives lacking digital content according to (Amiroh, 2012a). Furthermore, observation of learning research using the LMS was carried out. Learning went well that all students were very enthusiastic and active. The use of LMS has also been ran well without any significant problems (Wang & Wang, 2020). From the results of observations and tests, it was found that this research had high practicality.

Effectiveness of Learning Tools

The assessment of the effectiveness of implementing literacy-based thematic digital pedagogical models in primary schools consisted of assessments in the three experimental classes observed during learning activities and discussion of FGD results. Effectiveness assessment is carried out by triangulation of observational data, interviews with students, and interviews with teachers, as well as learning achievement tests.

Based on the researchers' observations, the initial steps of implementing the learning carried out by the teacher went accordingly, the video on the LMS was well connected, and students could see it on their respective LMS. Students admitted that initially they had difficulty accessing the LMS because it was the first time using a laptop. Teachers also revealed that they had to try to make students understand first in accessing the LMS link at the beginning of learning. According to Kadafi et al., (2022) an assessment of the success of this program can be seen from: 1) The existence of learning administration is carried out online, 2) The existence of learning administration is carried out with the LMS, 3) Monitoring the presence of participants learning online, 4) Tracking the presence of participants learning is carried out with LMS, 5) Improving the quality of learning, 6) Learning is carried out online, 7) Utilization of Moodle-based LMS for synchronous and asynchronous learning, 8) Available guidebooks for using Moodle-based LMS, 9) Teachers are able to operate LMS for learning activities, and 10) Learning participants are able to use LMS for learning activities.

During the lesson, the teacher also displays an ice breaking video which aims to make students not bored while learning. Based on observations, all students were very happy and enthusiastic about following the teacher's directions when doing ice breaking with an interesting video display. This was reinforced by the recognition of students who felt happy when watching videos and doing ice breaking. Students found learning to be more fun than usual. Teachers also claimed to be more enthusiastic about teaching because learning is not monotonous. Ice breaking that helps teachers inhibits them and creates solutions to overcome weaknesses in learning. Ice breaking really helps the teacher in the on-going lesson process. The advantages of ice breaking are helping students to focus on learning, helping students to be more enthusiastic about learning, helping sleepy students become awake again, and helping students not get bored while attending lessons in class. Weaknesses include that student being bored with the same ice breaking all the time. There were no other variants of ice breaking making students not want to take part in the ice breaking. Besides that, there were one or two students who did not participate in ice breaking because they were busy with themselves and did not pay attention to the teacher. To overcome the weaknesses of ice breaking, a teacher must be close to all students. Teachers must also not apply monotonous ice breaking so that students do not get bored with the ice breaking. Teachers must use ice breaking that is not excessive so it does not make the class crowded and controlled (Mahmudah, 2019).

When the lesson is related to practices such as folding cloth, students only need to pay attention to the step-by-step pictures provided in the LMS and then practice them. Moreover, students can immediately understand the steps given properly and correctly. Teachers also find it helpful when giving practical steps because students can immediately just look at the pictures in the LMS (Wang & Wang, 2020). This shows that there was an increase in students' literacy skills because the display of information provided is different than usual, more interesting, and easy to understand.

In general, the use of thematic LMS which is the main product in this research really helps a teacher's work. Teachers can easily organize learning materials according to existing themes so that teachers are more organized. Teachers also find it helpful to see

the progress of student learning because it has a ranking list. Students also claim to be enthusiastic about this ranking list because they can see and compare the learning progresses between themselves and their friends so that they can be more motivated to study harder (Kadafi et al., 2022). The effectiveness of using literacy-based thematic digital pedagogy models was also seen when students who took a quiz of 10 questions in 15 minutes. Students took the quiz directly on the question sheet by selecting the most appropriate answer. After the quiz was completed, students can find out their respective scores. Then the teacher asked who got all the quiz answers correct and almost all students answered correctly all the quiz answers given.

Information was obtained thatstudents understood more easily and remembered the learning material that had been learnt while researching with this thematic digital pedagogy model that when taking quizzes, they did not find it hard. The teacher also revealed that there was an increase in students' quiz work. Students who usually got low quiz results have now experienced an increase. Based on the explanation above, it can be concluded that the use of literacy-based thematic digital pedagogy models is effective in increasing students' ability to solve problems in learning.

CONCLUSION

This research provides the information that message content-based LMS instruction has been developed well in which the content, language, and graphic of the prototype have been valid. Additionally, the implementation of message content-based LMS instruction is practical in the learning classroom conducted by elementary teachers. Moreover, this instruction is effective in enhancing elementary students' numerical literacy skills. This indicates that message content-based LMS instruction can be alternative way to be implemented in elementary school in enhancing students' numerical literacy skills,

It can also be concluded that designing message content in the literacy-based learning LMS of Nusantara Primary School helps teachers in designing and creating message content that will be given to primary students through the LMS. The development of the LMS model and message content based on numerals has met all the criteria where this model was declared valid and practically applied in the learning process as well as effectiveness in assisting the learning process. Then, the development of the LMS model and numerical literacy-based message content contributed to the learning process. It created a highly innovative learning for the primary school level. So long as it has good message management and learning environment facilities, teachers and students can construct their knowledge and experience. The LMS model and literacy-based message content can be used in the learning process. Obstacles found in this research are the content of learning messages that are still lacking and not neatly arrange and the questions given to students were still little. So, for other researchers who want to do research on the topic, they can try to design message content in a numerical literacy-based learning LMS.

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