DEVELOPMENT OF PHYSICS VIDEO LEARNING USING MOODLE INTEGRATED FLIPPED CLASSROOM MODEL IN SENIOR HIGH SCHOOL

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STATEMENT

I hereby declare that:

1. My scientific work, the final project is in the form of a thesis with the title "Development of Physics Learning Video Using Moodle Integrated Flipped Classroom in Senior High School" is my original work.
2. This paper is purely my ideas, formulations, and research, without the help of other parties, except the supervisor.
3. In this paper, no work or opinion has been written or published by other people, unless it is clearly stated as a reference in the manuscript by mentioning the author and being included in the literature.
4. I made this statement in truth. If there are deviations in this statement, I am willing to accept academic sanctions in the form of revocation of the tittle obtained because of this paper and other sanctions following provisions of the applicable law.

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ABSTRACT

Silfi Sutri Insani, 2023: Development of Physics Learning Video Using Moodle Integrated Flipped Classroom in Senior High School. *Undergraduate Thesis*. Padang: Study Program of Physics Education, Department of Physics, Faculty of Mathematic and Natural Sciences, Universitas Negeri Padang.

Education in the 21st century requires students to have skills that can answer the challenges of Revolution 4.0. Skills that should be mastered are data, technology, and human literacy. However, the government's efforts to issue policies on implementing the 2013 Curriculum and the National Literacy Movement to boost Indonesian education have not been optimally carried out by schools. This can be seen from the lack of adoption of technology in learning tools by educators. So that students have skills in the 4.0 revolution era, learning resources are developed in the form of physics learning video using Moodle integrated Flipped Classroom. In general, the purpose of this research is to develop physics learning video using Moodle integrated Flipped Classroom, test their validity, and test practicality so that they are suitable for use in learning in senior high schools. This research was conducted using the Research and Development (R&D) model with 7 stages. The validation test was carried out by 4 experts, while the practicality test was carried out by the physics teacher and students in small groups. The results of the validity test get a score of 88 with very valid interpretation. The practicality test results scored 86 from the physics teacher's responses and 87 from the student's responses with very satisfied interpretation. From the results of validation and practicality, physics learning video using Moodle integrated Flipped Classroom are suitable for use in the learning process.

Keywords: Learning video, Moodle, Blended Learning, Flipped classroom.

ABSTRAK

Silfi Sutri Insani, 2023: Pengembangan Video Pembelajaran Fisika Menggunakan Moodle Terintegrasi Model Flipped Classroom di SMA. *Skripsi.* Padang: Program Studi Pendidikan Fisika, Departemen Fisika, Fakultas Matermatika dan Ilmu Pengetahuan Alam, Universitas Negeri Padang.

Pendidikan abad 21 menuntut peserta didik memiliki keterampilan yang mampu menjawab tantangan revolusi 4.0. Keterampilan yang patut dikuasai adalah literasi data, teknologi, dan manusia. Tetapi, usaha pemerintah mengeluarkan kebijakan penerapan Kurikulum 2013 dan Gerakan Literasi Nasional agar mendongkrak pendidikan Indonesia belum optimal dilakukan oleh sekolah. Hal ini dapat diketahui dari kurangnya pengadopsian teknologi didalam perangkat pembelajaran oleh pendidik. Agar peserta didik memiliki keterampilan di era revolusi 4.0 ini maka dikembangkan sumber belajar berupa video pembelajaran berbasis moodle dengan mengintegrasikan model flipped classroom. Secara umum, tujuan penelitian ini adalah mengembangkan video pembelajaran berbasis Moodle terintergrasi Flipped Classroom, menguji kevalidannya, serta menguji praktikalitas agar layak digunakan pada pembelajaran termodinamika di senior high school. Penelitian ini dilakukan dengan metode Research dan Development (R&D) dengan 7 tahapan. Uji validitas dilakukan oleh tenaga ahli sebanyak 4 orang dan mendapatkaan skor 88. Dari hasil uji validitas video berbasis Moodle terintegrasi Flipped Classroom diinterpretasikan sangat valid. Setelah dilakukan revisi sesuai saran tenaga ahli, dilakukan ujicoba praktikalitas-terbatas di SMAN 1 Pariaman. Praktikalitas dilakukan oleh 3 orang guru fisika dan 20 peserta didik. Didapatkan hasil praktikalitas dengan skor 86 dari tanggapan guru dan skor 87 dari tanggapan peserta. Dari hasil uji validitas dan praktikalitas maka video pembelajaran berbasis Moodle pada pembelajaran Termodinamika dengan mengintegrasikan flipped classroom dikategorikan sangat praktis sehingga layak digunakan dalam proses pembelajaran di kelas.

Keywords: Learning video, Moodle, Blended Learning, Flipped classroom

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CHAPTER I. INTRODUCTION

A. BACKGROUND

The development of science and technology that is increasingly advanced has had an impact on changes in the patterns and styles of life of society as a whole. This is felt in various fields such as health, economy, social culture, and education. These changes take place quickly and shift the position of conventional life patterns into something modern without the limitations of space and time. The change is also characterized by the decreasing human labor needed in the industrial process (Fonna, 2019). This kind of change is called the industrial revolution 4.0 or better known as RI 4.0. Industrial Revolution 4.0 has characteristics that combine digital technology and the internet in the process. In order for individuals to be able to adapt to changes in the industrial revolution 4.0, it is necessary to increase mastery of science and technology such as data, technology, and human literacy. The application of such literacy will be indispensable in all fields, especially education.

Education in the industrial revolution 4.0 is one aspect that needs to be considered to answer future challenges. The development of science and technology urges specific, qualified, and skilled human resources (Puncreobutr, 2016). For this reason, educators are the main actors in meeting the educational demands of the industrial revolution 4.0. Educators are required to produce a generation that is ready with skills and mentality and has 4C skills, namely critical thinking, collaboration, creativity, and communication in facing the industrial revolution 4.0. However, the reality found in the field is that the learning process implemented in schools has not optimally met the demands of education

in the industrial revolution 4.0. It can be seen that there is a lack of technology adoption in the learning process and tools. In addition, learning is also still teacher-centered. This makes the ability to think critically, creatively, logically, and innovatively less developed (Razi, 2012b). If this continues without any real handling, it is feared that students will not be able to adapt themselves to the development of increasingly advanced technology. For this reason, it is necessary to develop learning tools that are appropriate and meet the demands of the industrial revolution 4.0.

Referring to the 4.0 revolution education, the government in the form of encouraging the implementation of education that supports the renewal of the times. Government steps or policies in facing Revolution 4.0 include the 2013 Curriculum, Strengthening Character Education, and the National Literacy Movement (Santika, 2021). Curriculum revisions have been carried out many times since Indonesia's independence until now 2013 curriculum is implemented. The 2013 curriculum is able to improve the quality of education in line with the demands of the industrial revolution 4.0. However, the implementation of the curriculum and learning tools with their application in schools is still not optimal in collaboration with technology (ICT). Because it is not optimal, more efforts are needed to answer the challenges of the industrial revolution 4.0 in education. One of these efforts is the implementation of a learning model that combines online and offline learning processes with the help of computerization. This model is called blended learning.

An effective, efficient, and engaging learning process for learners is very much needed and blended learning is able to facilitate it. Blended learning integrates the use of technology in teaching and learning activities so that learning can adapt to each learner

(Eko Risdianto, 2019). The lack of face-to-face learning can be maximized with online learning, and vice versa (Zaid & Bahri, 2018). The blended learning model does not replace the face-to-face process completely with an online one. However, this model combines the two so as to provide an increase in the quality of learning for students (Prasetio et al., 2012). The quality of blended learning lies in the methods and strategies used between face-to-face and online. In addition, blended learning also requires the optimization of technology as a tool in education which is then expected to answer the educational challenges of the industrial revolution 4.0.

One type of blended learning model that is in line with the newness of the times is the flipped classroom. Face-to-face meetings in class and homework are reversed. Learners are given material online to study at home so that learners know before entering the class. The in-class time is used for clarification and application of that knowledge in the form of group work (Triantafyllou & Timcenko, 2015). This model emphasizes hands-on through a learning method called the flipped classroom. This model develops self-learning habits and abilities while providing more learning time for learning in schools to develop competencies (Rahayuningrum R., & Sari, 2019).

The blended learning model also requires teachers to provide a learning space or online platform for students during self-learning. Virtual learning space using cyber technology such as using E-learning. The use of E-learning can utilize the web or LMS (Learning Management System) site. The LMS that is often used in the learning process is Moodle. Moodle is a software that has the function of creating and conducting online-based courses/training/education developed by Martin Dougiamas (Prakoso, 2005). Moodle is briefly an acronym for Modular Object-Oriented Dynamic Learning-

Environment which means dynamic learning using an object-oriented model (Suhaeb, S., & Djawad, 2019).

The Moodle LMS has advantages over other online cyberspace support platforms. Moodle has important features in addition to user-friendliness because almost all components can be arranged externally and flexibly according to their respective needs, are freely available, and are given the freedom to copy, use, and modify them (Edhy, 2010). A comparison of the features that Moodle has with other types of LMS can be seen in Table 1 below.

Table 1. Feature comparison between popular LMS (Alameen & Dhupia, 2019)

Tool	Moodle	EduBrite	TalentLMS	Edmodo	Sakai
Target Customer Size	1000+	2-1000+	10-1000+	Not Provided	Not Provided
Platform	Cloud, Windows, Apple	Cloud	Cloud	Cloud	Cloud, Windows
Mobile	iOS, Android	iOS, Android	iOS, Android	iOS, Android	iOS, Android
e-commerce	No	Yes	Yes	No	Yes
Videoconferencing	Yes	Yes	Yes	No	Yes
Blended Learning	Yes	Yes	Yes	No	Yes
Virtual Classroom	Yes	Yes	Yes	No	No
Synchronous Learning	Yes	Yes	Yes	No	No
Asynchronous Learning	Yes	Yes	Yes	No	Yes
Skill Tracking	Yes	Yes	No	No	Yes

Based on the feature comparison table of several popular LMSs, Moodle is ranked superior. The advantage of Moodle is the availability of more complete essential features. All the essential features required for effective LMS implementation. Moodle supports cloud platforms, Windows, and Apple. This can make it easier for users to access from various device systems. In addition to the essential features that can be used in learning

effectiveness, Moodle provides a developer forum to share experiences, problems, solutions, and innovations.

Based on the observation conducted at SMAN 1 Pariaman, teachers understand Moodle LMS more easily than other online platforms. This was stated by most teachers. After conducting an E-learning training seminar by the provincial government during covid 2020. The type of E-learning provided by the West Sumatra Provincial government is Si Cadiak Pandai. Teachers complained about several things from this type of LMS. Among the teacher complaints is the complicated creation of online classrooms. Classes must be created one by one, even though the teacher teaches several classes at the same level and some are even at different levels. Therefore, teachers have to spend a lot of time in creating classes. In addition, class naming is long and detailed. This is because the classes that have been created will be stored in the *Si Cadiak Pandai* database and can then be accessed by everyone. If there is an error in writing it, it cannot be deleted and must be created from scratch again. Therefore, students will also be confused if they are not carefully looking for the class name and teacher. For this reason, it is easier for teachers to use Moodle.

The school has provided Moodle E-learning to support online and offline learning. However, its use is still limited to sending and collecting assignments and semester exams. Teachers have not optimized the use of E-learning to access various learning resources. Various learning resources are very helpful for students to explore knowledge. Moreover, learning resources also utilize learning media can increase student's learning motivation. Synchronized learning resources and learning media can streamline student's learning time. This can be found if teachers use learning videos. Another advantage of

using learning videos is that students can see a complicated event that occurs in a short time (Yudianto, 2017).

Various advantages of learning videos can be utilized by teachers to help students understand the material that is considered difficult. One of the lessons that is considered difficult by students is thermodynamics. Thermodynamics is one of the physics materials prepared for semester 2 classes. Based on observations made at SMAN 1 Pariaman, the physics teacher stated that thermodynamic material is included in difficult material for students. Judging from the value of each class after Minimum Completeness Criteria daily assessment does not pass the KKM limit. The average value of daily assessments that have been carried out before remedial can be seen in Figure 1 below.

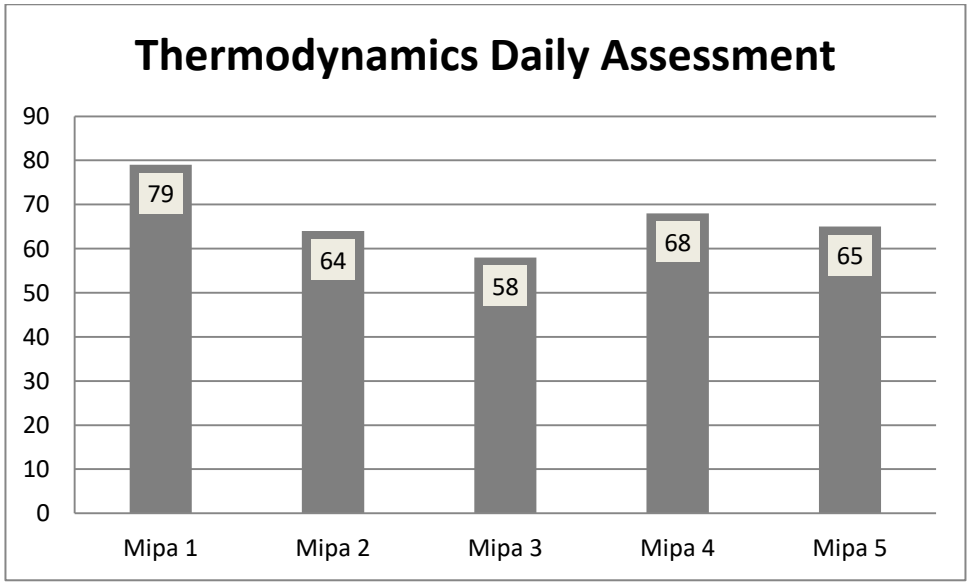

Figure 1. Thermodynamics Daily Assessment

The results of the daily assessment on Thermodynamics material are seen not passing the Minimum Completion Criteria (KKM) limit. This is due to Thermodynamics material which is considered difficult due to abstract concepts, requires a strong

imagination and is able to distinguish effort and energy with heat, effort, and internal energy.

Similar to the Daily Assessment scores above, the distribution of UN physics scores in 2019 also revealed the same thing. Mastery of thermodynamic material was found to be the lowest among other physics materials. The distribution of mastery of UN material that has been summarized by the Center for Educational Assessment of *Kemdikbud* in 2019 can be seen in Figure 2.

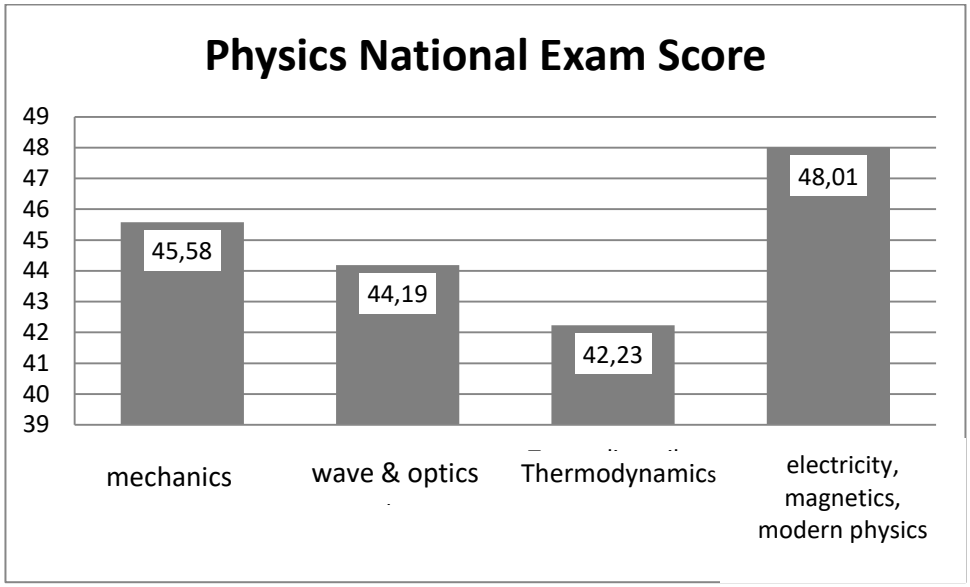

Figure 2. Mastery of UN Physics 2019 Material

With the availability of learning tools with the flipped classroom model, it is expected to be able to balance education in Indonesia with the era of the industrial revolution 4.0. Therefore, the development of learning tools with a flipped classroom model using LMS Moodle needs to be done.

B. PROBLEM IDENTIFICATION

From the description of the background of the problem above, the researcher can identify problems that can be used as the main points, namely:

1. There is limited space and time between teachers and students for skill development.
2. The limited ability of teachers to integrate technology into the learning process.
3. The absence of teaching materials that help learners explore thermodynamic material.
4. The limitations of learning media in motivating students to learn.
5. The application of the flipped classroom learning model that collaborates with technology at SMAN 1 Pariaman is not yet optimal.
6. Not optimal utilization of technology or ICT so the online media platform used in physics learning at SMAN 1 Pariaman is not optimal.
7. There is no learning tool with flipped classroom model at SMAN 1 Pariaman.

C. PROBLEM LIMITATION

From the identification of the problems above, then in this study, it is necessary to limit the problem as follows:

1. The Learning Model used in this research is Flipped classroom which is part of Blended learning.
2. As a media platform for online blended learning, a Learning Management System (LMS) using Moodle with the website lms.E-learning-silfi.com was used.

3. The learning tools produced are teaching materials in the form of learning videos on Thermodynamics material.

D. PROBLEM FORMULATION

From the background above, the problem formulations of this study can be formulated are:

1. How is the validity value of teaching materials with a flipped classroom model on thermodynamic material?
2. How is the practicality value of physics learning videos with a flipped classroom model on thermodynamic material?

E. RESEARCH OBJECTIVES

In general, the objectives of this study are:

1. Knowing the validity value of physics learning video with flipped classroom model on thermodynamic material.
2. Knowing the value of the practicality of physics learning videos with a flipped classroom model on thermodynamic material.

F. BENEFITS OF RESEARCH

With the achievement of this research, it is expected to provide benefits for various parties. The benefits to be achieved in this study are:

1. For the researchers themselves, it is to practice developing themselves in producing scientific papers and as a support for the requirements in the researcher's academic process, namely getting a bachelor's degree.
2. For teachers, it can be consideration to use as a reference and material in learning process
3. For students, it can be used as motivation in the teaching and learning process so that students can improve their learning outcomes.
4. For other researchers, it can be used as a reference and to develop research in more depth.

CHAPTER II. THEORY

A. LITERATURE REVIEW

1. Physics learning in the 2013 curriculum

a. Definition of curriculum

The curriculum is a program that contains a design for how the teaching and learning process is good so that it can be guided by educators and students. The curriculum has a very important role in achieving educational goals. Etymologically, the curriculum comes from the English language, namely Curriculum which means lesson plan. While in Greek is Curir means runner and Currere which means a racing place. The definition of the curriculum terminologically, the curriculum according to the Big Indonesian Dictionary published (Depdiknas, 2008), the curriculum means a set of subjects taught at educational institutions / a set of courses regarding a special field of expertise ". In line with the definition of the curriculum according to Indonesian Law no.20 of 2003 concerning the National Education System, the curriculum is a set of plans and arrangements regarding the objectives, content, and subject matter, as well as the methods used as guidelines for organizing learning activities to achieve certain educational goals. This is also in line with this (Hamalik, 2005) states that the curriculum is an educational program provided to teach students with this program students carry out various learning activities so that changes and developments in the behavior of students occur, in accordance with the objectives of education and teaching. From some of the above understanding can be concluded that the definition of the curriculum is a set of

lesson plans provided by educational institutions to support the teaching and learning process in schools in order to achieve the goals of education.

b. 2013 Curriculum

The rapid development of science and technology will require greater efforts to advance education in Indonesia. This is supported by a government that is responsive in equipping students to face changing times and future challenges. In addition, the government also supervises the course of the Indonesian education system. The education system that is less supportive of the times will be renewed by developing the foundation of the education system, namely the curriculum. The current curriculum in Indonesia is the 2013 curriculum. The focus of the 2013 curriculum is to require students to have 3 competencies at once, namely attitude, knowledge and skills competencies.

The 2013 curriculum is a development of the previous curriculum, namely the Education Unit Level Curriculum (KTSP). According to (Fadlillah, 2014) the 2013 curriculum is a curriculum that was deliberately developed to improve the competence of students in the aspects of attitude, knowledge, and skills. The 2013 curriculum is a curriculum that was created to strive to provide the best service so that students can think critically, independently, and innovatively so that it can have a positive impact on education. Based on (Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 59 of 2014 concerning the 2013 Curriculum for Senior High School/Madrasah Aliyah, 2014) the mindset of the 2013 curriculum is as follows:

1) Centered on learners or what is called student center learning.

2) Interactive learning (interactive between teachers-participants-educators-society-natural environment, other sources/media). This is expected to make learning sustainable.
3) Learning is designed in a networked manner (students can gain knowledge from anyone and from anywhere that can be contacted and obtained via the internet). This is so that learning resources are not centered on the teacher alone.
4) Learning that is active-seeking (active student learning to seek is further strengthened by the science approach learning model). This is so that students can understand concepts according to scientific perceptions.
5) Group learning (team-based). Not working only individually. This helps the social attitude of learners and builds the same mindset.
6) Multimedia-based learning. This utilizes media that can increase learner motivation and help independent learning.
7) Learning based on users' needs by strengthening the development of the special potential of each learner. This is to support learners to explore knowledge without dependence on the teacher.
8) Learning patterns become multidisciplinary learning. So that students are able to relate one science with other sciences so that learning becomes meaningful.
9) Critical learning. This is so that students are accustomed to having a critical attitude in exploring knowledge.

So, it can be concluded that the 2013 Curriculum exists to balance the soft and hard skills of students by fulfilling predetermined components and focusing on 3 domains of competence.

Competencies in the curriculum are core competencies and basic competencies. Core competencies are generic competencies and cover 3 (three) domains, namely attitudes, knowledge, and skills. Where this understanding is in accordance with the contents of Permendikbud no 59 of 2014. While basic competencies exist to achieve core competencies. The development of these basic competencies first pays attention to the characteristics of students, initial abilities, and the characteristics of a subject.

The presence of the 2013 Curriculum is essentially a perfection for the previous curriculum (KTSP), ideally, the curriculum must be dynamic in order to be able to answer the challenges and needs of the times. The elements of the curriculum that have been improved in the 2013 Curriculum include 4 components, namely: 1) Graduate Competency Standards (SKL), namely the improvement and balance of soft and hard skills which include attitude, skills, and knowledge competencies in all subjects; 2) Content Standards, namely competencies that were originally derived from subjects are replaced by subjects developed from competencies; 3) Process Standards, which initially focused on exploration, elaboration, and confirmation are now complemented by scientific activities known as the scientific approach; 4) Assessment Standards, which are originally from competency-based assessment towards authentic assessment including assessment of attitudes, knowledge, and skills (Nur, 2014).

The scientific approach in Curriculum 2013 designs students to be active and sustainable so that they can build concepts, laws, or principles through the 5 M stages which include: Observing, Questioning, Trying, Reasoning, and Communicating (Kemdikbud Team, 2013). The scientific approach begins with a phenomenon either naturally occurring or deliberately formed conditions that allow students to carry out observational activities, namely various activities involving their five senses. Based on the results of observations of existing phenomena, students ask questions, namely identifying by asking questions that are then formulated in the form of problem formulations. Based on the results of the problem formulation, learners are directed to think about finding temporary answers/ making hypotheses, and designing investigation activities. Furthermore, learners are given the opportunity to try, namely conducting investigation/experiment activities. Based on the results of the investigation, students can process the data obtained, then students reason by analyzing the data obtained to draw conclusions with their groups. Furthermore, learners will communicate, namely presenting their group conclusions orally or in writing.

If you look at the 5M scientific activities in the scientific approach (observing, questioning, trying, reasoning, communicating), it is an activity of Science Process Skills (KPS) inherent in science learning (physics, chemistry, biology). Science learning or known as Natural Science (IPA) trains students to discover concepts holistically, meaningfully, authentically, and actively. This is explained in article 771 part (e) of PP number 32 of 2013, namely science study materials including physics, biology, and chemistry are intended to develop student's knowledge, understanding, and ability to analyze the natural environment and its surroundings (PP RI 32 2013 concerning