

Development of Physics Lesson Plan with Discovery Learning Model Assisted by Software Lectora Inspire

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Abstract

The objective of the study is to find out whether or not a Lesson Plan (RPP) was feasible to use, it is developing Lesson Plan of discovery learning assisted by Lectora Inspire software in the sound and light wave subjects at high school level was valid, practical and effective to use in the learning teaching process. The Lesson Plan was validated by 3 experts of education and 3 experts of IT. The samples of this research were class XI MIPA₅ Senior High School of 5 Kendari consisted of 20 students. To collect the data, the researcher gave observations and questionnaires and the material about the feasibility of learning, student activities, teacher responses, student responses and test descriptions. To analyze the data, the researcher used descriptive quantitative. The result showed that the validation of the Lesson Plan of discovery learning assisted by Lectora Inspire software in the sound and light subject wave developed, based on Lesson Plan expert of education got a very valid category as indicated by the final agreement index value of 4.80 and another one by expert of Information and Technology said that the final agreement index reaching 4.05, means that the Lesson Plan was very valid. Second, the Lesson Plan by Lectora Inspire software was stated to be practical as indicated by the implementation of learning in each meeting and find out a very good category with the final agreement index was 3.75 and the activity of students was increasing of categories. Third, the Lectora Inspire Software assisted lesson plan was declared effective as indicated by the results of student and teacher responses, as well as students' completeness test scores obtained from the results of high n-gain analysis.

Keywords: Lesson plan, Discovery Learning, Software Lectora Inspire

1. Introduction

The last few years the development of technology and information in all fields so fast, one in the field of education. The importance of the role of ICT (Information Communication and Technology) has implications for government policies, especially in preparing the device and its resources (Bahrini and Qaffas, 2019; Kawuri et al. 2019). Sangra & Gonzales (2010) stated that in the field of education, every educational institution is expected to integrate the ICT-based curriculum implemented. It is in giving illustrates that our future life can not be separated from development and ICT related products, including well in the learning process that only computer-assisted and

computer-based learning. Computer technology into a solution to the limitation of current information and learning resources (Ghafiyekr & Rosdy, 2015).

Curriculum 2013 is a new curriculum launched by the government to improve the quality of education in Indonesia. Curriculum changes made will have an impact on the components of supporters. Each part related to curriculum change must come refurbished and adapted so that no problems in implementation. One such element is a learning device.

The implementation of the 2013 curriculum requires teachers to develop and develop learning tools by referring to the guidelines contained in the Minister of Education and Culture Regulation of the Republic of Indonesia. Based Permendikbud No. 65 on Standard Process, preferred learning model in the implementation of Curriculum 2013 is a model of Inquiry-Based Learning, Discovery learning model, the

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model of project-based learning and problem-based learning model (Ashadi, 2017).

Characteristics of a kind learning model the model of learning that can construct the mindset of students from the knowledge he had received with previous experience to build new knowledge that can be applied in everyday life and remember in a long time (Darling-Hammond, 2019). One such model is discovery learning.

Some high school physics subject matter often found in daily life, especially sound wave and light topic. The utilization of such knowledge encountered in various fields so that students can easily associate the item they are learning in school with things they met in the neighbourhood.

Previously, there had been much research on the development of lesson plans. However, today's lesson plan developed mostly still in draft or handout and did not utilize software or multimedia in the process of development and implementation. It is related to the enforceability of the objectives of the curriculum in 2013, especially in terms of making the appropriate learning tools for learning. The development of information technology systems is a significant supporter to realize the development of learning tools that can be accessed anytime and anywhere with functions that can be tailored to the needs, either as a supplement or complement (Zhu et al. 2016). When this has provided many application programs that can be used as a communication and information technologies for educational purposes, one of them is Software Lectora Inspire. Lectora Inspire software is suitable to utilize for educational purposes because it has features with various types of publications both for online and offline. One software Lectora Inspire output is varied so that it can be adapted to the needs of learning. Therefore, the researcher wants to develop Lectora Inspire Software as a supporting software in making RPP on sound and lightwave topic.

2. Research Method

This type of research is a type of Research and Development that adapts the Borg & Gall (1989) model through 10 stages to produce specific products. Researchers try to develop a lesson plan in the form of software using Lectora Inspire software.

However, in this study, the ten steps of the Borg & Gall (1998) model are simplified into five main stages, which are adjusted to the research to be conducted. Study design with the seven levels of the study is as suggested by Borg & Gall (1989).

Data collection techniques in this study were obtained from accurate sources and relevant materials, namely from the process of observation,

documentation and questionnaires that were developed based on reasonable requirements. The validation instruments of media / IT experts, material experts and teachers use devices in the form of surveys.

The practicality of the lesson plan is obtained from the questionnaire of the implementation of learning and student activities by two observers. While the effectiveness of the lesson plan is derived from the completeness assessment sheet and the questionnaire responses of teachers and students.

The data analysis technique used to process data from the results of the assessment of the validity and practicality of the lesson plan by the validator and observers during the learning process takes place using quantitative descriptive analysis techniques in the form of measurement scales and qualitative data analysis techniques in the way of statements.

Determination of the level of validity of the lesson plan developed for limited testing, the categorization of measurement results using a Likert scale. Data obtained from the results of the assessment by experts and observers in the form of quantitative data (numbers). The data was collected from questionnaire sheets made by researchers and analyzed descriptively, with the following steps.

- a) Collection of rough data includes giving scores.
- b) The score that has been obtained is then used to calculate the expert agreement index (Rater Agreement) to show agreement on the results of the expert's assessment of the validity, both for items and for the apparatus (Aiken, 1980).

$$V = \frac{\sum s}{N(c-1)} \quad (1)$$

, where $s = r - l$

Where,

r = rating

l = lowest category evaluator

c = highest category

N = number of evaluators/respondents

- c) To interpret the value of content validity obtained from the above calculations, the validity classification is used as shown in Table 1.

Table 1. Expert validity criteria

Validation Interval Results	Validity Criteria
$0,80 < V \leq 1,00$	Very high
$0,60 < V \leq 0,80$	High
$0,40 < V \leq 0,60$	High enough
$0,20 < V \leq 0,40$	lace
$0,00 < V \leq 0,20$	Very low

On the validation sheet, the maximum score is five, while the minimum score is 1, then the Aiken index calculation refers to the expert validation criteria table. From the calculation of index V, quantitative data are obtained. Then an item or device can be categorized based on its index and converted to qualitative data.

V is the Aiken index value. The range of number V that might be obtained is between 0 and 1. The higher the number V (close to 1 or equal to 1), the validity of a measured indicator or device is also higher, and the lower the number V (close to 0 or equal to 0), the validity of a steady index or instrument is even more moderate (Aiken, 1980).

Analysis of the effectiveness of the lesson plan is obtained through data on the completeness of the indicators and questionnaire responses of students to the learning process by using the lesson plan that was developed. Analysis of the completeness test of signs was obtained from the pretest and posttest questions. Achievement of competencies is determined according to the Minimum Mastery Criteria (KKM) of Physics in Senior High School of 5 Kendari. The equations used to calculate the completeness of individual learners is as follows.

$$A = \frac{B}{C} \times 100\% \quad (2)$$

Where,

A = Individual completeness

B = Number of scores obtained by students

C = Total total score

Criteria for mastery learning individually can be seen through the gain score with the following calculation:

$$g = \frac{\% (S_f) - \% (S_i)}{\% (S_{maks}) - \% (S_i)} \quad (3)$$

Where,

g = n-gain Score

S_f = Posttest Score

S_i = Pretest Score

S_{maks} = Maximum Score

The gain score is interpreted according to the criteria according to Hake according to Table 2.

Table 2. Normalized gain criteria

Score Interval	Gain criteria
(g) ≥ 0,7	High
0,7 > (g) ≥ 0,3	Medium
(g) > 0,3	Low

Furthermore, the data obtained were analyzed using quantitative descriptive. Mathematically the percentage of each response can be calculated using equation (4), while the criteria convert the rate of students' reactions as in Table 3

$$P = \frac{D}{E} \times 100\% \quad (4)$$

Where,

P = Percentage of each response

D = A total score of student answers

E = Maximum response score

Table 3. Categorization criteria for assessing the effectiveness of lesson plan (Sugiono, 2005)

Score Interval	Rating Category
81% – 100%	Very good
61% – 80%	Good
41% – 60%	Good enough
21% – 40%	Not good
0% – 20%	Not good

Obstacles during the implementation of learning are obtained through observers, and researchers provide notes about the barriers or obstacles that occur when implementing learning assisted by the Lectora Inspire software discovery learning model (discovery learning).

Eligibility requirements for lesson plan assisted by Lectora Inspire Software are said to be suitable as learning tools if the expert validator (education and media / IT) shows valid or very valid to be used as the lesson plan or final agreement index value (Aiken Index) between 0,6-0,8, the results of the analysis of the practicality of the learning tools measured through the learning achievement sheet and the student activity sheet as well as the study of the effectiveness of the learning tools measured through the indicator completeness test instrument, the teacher's response questionnaire and the student's questionnaire response score in either sound or excellent category.

3. Result and Discussion

In this development research, there are three problems to be explained. Namely regarding the validity of the lesson plan, the practicality of the RPP and the effectiveness of the lesson plan produced. The developed lesson plan in the form of a soft file which contains the components of the lesson plan and the media to be used.

The initial stage of making the lesson plan is to do research and collect initial information including needs analysis, task and material analysis, learning objectives to be achieved by students as well as an analysis of the level of ability and characteristics of the target user. Next is the design of the components of the lesson plan which will be presented in the Lectora Inspire Software, a compilation of the lesson plan sketches, preparing evaluation instruments, making storyboards as well as gathering the materials needed in the development of lesson plan assisted by Lectora Inspire Software. The next stage is the development stage (development), at this stage, the lesson plan is made by the design that has been prepared in the two previous stages. I am making lesson plan using Lectora Inspire Software which will produce an RPP in the form of soft files. The lesson plan information can be seen in Figure 1, Figure 2, Figure 3.



Figure 1. Initial display of the learning implementation plan

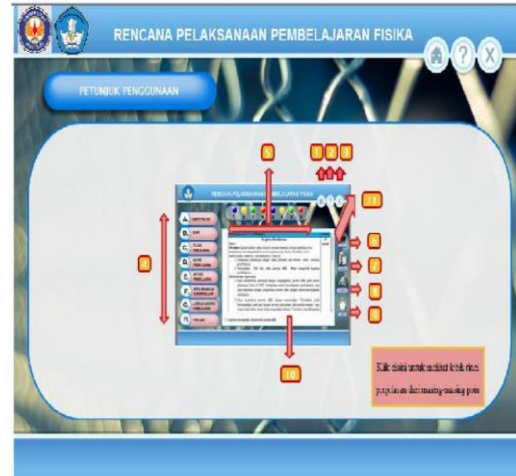


Figure 2. Display of lesson plan room usage instructions



Figure 3. Display room main menu lesson plan



Figure 4. Display room lesson plan

After passing the above stages, a lesson plan assisted by Lectora Inspire Software is produced on the

subject matter of sound waves and light. The developed lesson plans were validated by three education experts, three media / IT experts and three evaluation experts before they were used in learning activities. A trial was conducted to see the practicality and effectiveness of the developed lesson plans. Based on limited tests and data analysis obtained:

a. The Validity of the Learning Implementation Lesson Plan

The developed lesson plan consists of 8 meetings whose development process must reflect the learning model used, namely the discovery learning model (Discovery Learning). Learning activities focus on concept discovery activities based on data presented by the teacher and experiments related to the material taught. Events in the discovery learning model in question include activities that stimulate problems, identify problems, collect data, process data, verify and draw conclusions.

Before being implemented, the first lesson plan that is developed will be validated by the validator to check the validity of the lesson plan that will be used. Based on the results of the analysis of the validation of the lesson plan by educational experts, the validator's final agreement on the validity of the lesson plan for all aspects is 0,95 categorized as very valid with very high validation criteria. The results are obtained by repeatedly revising based on the suggestions given by the validator. Furthermore, the determination of the validity of the lesson plan according to media / IT experts got a validator agreement on the validity of the lesson plan index for all aspects of 0,78 categorized as valid with high validation criteria.

The results of the lesson plan validation both by education experts and IT experts above are shown through a validator agreement index (rater agreement) which is an index to indicate deal on the results of the experts' assessment of the validity of the lesson plan, suggests that the RPP developed is valid with very high validation criteria and can be used by making a few revisions through the suggestions given by the validator. The advice given by the validator are related to the completeness of information about the implementation of learning.

b. The practicality of Learning Implementation Lesson Plan

1) Implementation of learning

The effectiveness of learning is assessed based on observations during the learning process carried out by two observers. Observations were made in class XI MIPA 5 for eight meetings. In general, all scenarios at each meeting were carried out in either category with a

final observation agreement index of 0,71 high validity criteriov.

2) Student activities

During the learning process by implementing a physical learning implementation lesson plan with the discovery learning model (Discovery Learning) assisted by Lectora Inspire Software. There are 11 aspects observed to be assessed by both observers during the learning process. Based on the results of the assessment analysis of the observations of the activities of students at each meeting showed an increase in the implementation of the activities of students.

3) Constraints in the learning process

Some of the obstacles or obstacles encountered by researchers during the learning process took place, including: (1) The time needed to organize students in groups requires a long time; (2) Students are not accustomed to listening and processing information from data provided by teachers to find a particular concept and are embarrassed to express their opinions.

The obstacles faced by teachers in implementing the lesson plans that are developed certainly cannot be eliminated just like that. Still, these obstacles can be minimized through alternative solutions that can be done by teachers with the help of students.

4) Effectiveness of learning program lesson plan

The effectiveness of the developed lesson plans is assessed using indicators of completeness tests for aspects of knowledge acquired from the necessary competencies of education and students' questionnaire responses to the learning process in class.

At the time of the pretest, none of the learning indicators meets the specified Minimum Mastery Criteria, but at the posttest, almost all indicators meet the specified Minimum Mastery Criteria with n-gain scores, which are mostly categorized as high. This shows that there are differences in values in aspects of students' knowledge at the time before and after the implementation of the lesson plan.

Questionnaire sheets given to students containing ten statements will be filled out by students through the provision of a checklist, while for the teacher's questionnaire responses contained 14 question items and divided five assessment categories (Strongly Agree, Agree, Fairly Agree, Disagree, Strongly Disagree).

Teacher and student responses to learning that takes place so far can be used as a reference for the effectiveness of teaching. If the teacher and students respond positively, then the teaching given so far is

considered to be undoubtedly able to facilitate the teacher in planning learning and help students in understanding and discovering concepts in sound and lightwave material.

The results of the analysis of the responses of teachers and students showed that teachers and students gave an excellent response to the lesson plans and learning activities they participated in for eight meetings overall with a percentage of more than 70% of students responding very well. That is, lesson plans that are developed and implemented in learning activities can help students in understanding the sound wave and light material taught. While the percentage of teacher responses obtained answers with outstanding category with a final agreement index of 3 teachers amounted to 0,89.

4. Conclusion

Based on the results of the data analysis, the results of the discussion and research findings concluded that the Learning Implementation Plan of the Discovery Learning model assisted by Lectora Inspire Software that was developed as a valid, practical and effective category so that it is appropriate to be used on the subject matter of sound waves and light levels of Senior High School.

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