

Development of Science Learning Interactive Media Based Lectora Inspire to Improve Students' Critical Thinking Skills

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Abstract

Interactive learning media is one of the digital learning media that is used as a means of delivering two-way or more communication information in learning. The purpose of this study was to determine the validity, practicality, and effectiveness of interactive media based lectora inspire on students' critical thinking skills. The type of research used is research and development (R&D). The research subjects in this study were 26 students class VII of SMPN 5 Jember in the academic year 2022/2023. The results of the development research show that: (1) the validation test shows an assessment of interactive media based on lectora inspire obtained from experts 82.95% is declared valid, (2) the practicality test obtains a percentage value of 92.19% which is stated to be very practical to use in learning , (3) the N-gain test obtained a score of 0.61 which was declared effective for improving students' critical thinking skills in learning science.

Keyword: Critical Thinking Skills, Interactive learning media, Science Learning.

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INTRODUCTION

Critical thinking skills are individual cognitive skills that involve systematic and detailed analysis of a problem, being able to understand problems carefully and thoroughly, being able to identify, and being able to process information properly to organize strategies to find solutions in solving problem (Anasia dkk., 2020). The process of solving problems by using critical thinking skills involves three main things is paradigm, connection with the world, and the environment (Siddin dkk., 2021).

Critical thinking skills will help students make decisions more quickly to solve a problem, be able to analyze situations that occur, be able to accept and evaluate an opinion, and be able to draw conclusions correctly. But in reality, according to the results of the 2018 Program for International Student Assessment (PISA), Indonesian students' critical thinking skills are classified as low, having the lowest score of 396 which ranks 69th out of 77 countries in the field of science.

The results of interviews with the science teacher obtained information about the critical thinking skills of class VII students at a low-level score percentage of 20%. The statement was analyzed from the results of the learning tests and the responses of students who were less active during learning. According to Sundari and Sarkity (2021), students with low critical thinking skills will find it difficult to solve a problem, and creating the perception that the material is hard to learn furthermore will reduce students' interest and academic achievement in learning natural science material.

Students' critical thinking skills are influenced by internal factors such as learning style, motivation, and interest in learning, as well as activeness and external factors including the role of the teacher when determining the model or learning media (Wulandari dkk., 2019). The results observations during learning activities on learning media were that teachers only used printed books. The characteristics of science learning include four complete elements consisting of a scientific attitude, process, product, and apply (Wahyuni dkk., 2017). The essence of learning science is to make it the basis for the development of competence in scientific understanding by providing direct experience to students (Sari dkk., 2022). Science material requires a more real picture of objects to make it easier to understand the material and

guidance the thinking process so that students' critical thinking skills can increase. Therefore, the science learning process requires interactive media that can be developed using the Lectora Inspire application.

According to Yulianto & Juniawan (2022), the Lectora Inspire application from the Trivantis company is used as a tool for developing e-learning-supporting media. Lectora Inspire has several advantages, the manufacturing process is carried out without coding, ready-to-use templates are available, and it can publish project results in various output forms.

Previous studies have been conducted by Ristiani et al. (2021) "Development of Media Lectora Inspire Version 12 on STEM-Based Science Learning to Grow Students' Creative Character." The results study obtained feasibility data with a percentage of 69% for valid criteria. Based on this statement, interactive media based on lecturer inspiration is suitable to be implemented in the science learning process.

Based on this description, the researcher developed interactive media based on Lectora Inspire to improve critical thinking skills that are focused on the science learning process.

METHOD

In this study, we used research and Development (R&D) types of research. This study uses the ADDIE development model. According to Branch (2009), the ADDIE development model includes five stages: analysis, design, development, implementation, and evaluation. The product of this development research is in the form of interactive learning media based on Lectora Inspire. Data collection for this study was carried out in April 2023 at SMPN 5 Jember. The research subjects were class VII F students, with a total population of 26 students.

Data Collection Technique

Data collection techniques and instruments are in the former tests, questionnaires, interviews, observation, and documentation. The test uses questions in the form of descriptions that have been adapted to indicate indicators of critical thinking skills, with two implementations during the pre-test and post-test. Questionnaires, interviews, observations, and documentation are non-test techniques to determine the response to the

usage interactive media based Lectora Inspire in the learning process.

Data Analysis Technique

Data analysis techniques used in this study include:

1) Validation analysis

The validation results by the validator are calculated using the formula:

$$V = \frac{TS_e}{TS_M} \times 100\%$$

Notes :

V : Percentage value validity

TS_e : Total score obtained

TS_M : Maximum total score

The values obtained are calculated according to the formula above, and the next stage will be analyzed for validity based on the value criteria on a certain scale that can be observed in Table 1

Table 1. The level of validity of learning media

No.	Percentage (%)	Validity Category
1	85-100	Very valid, can be used without revision
2	75-84	Valid, usable with minor revisions
3	50-74	Invalid, it is recommended not to use it because there are many revisions
4	25-49	Invalid and cannot be used

(Akbar, 2012)

2) Practicality Analysis

Product practicality can be obtained by analyzing the results of the learning implementation sheet. After obtaining the data on the results of the practicality sheet, the researcher enters the data with the formula:

$$Vp = \frac{\Sigma TSEp}{S - max} \times 100\%$$

Notes :

Vp : Practicality percentage

ΣTSEp : Total score obtained

S – max : Maximum total score

The percentage value will be obtained after entering the data into the formula above, and researchers can categorize the practicality of development products based on Table 2.

Table 2. Practicality criteria

No.	Percentage (%)	Criteria
1	81-100	Very practical
2	61-80	Practical
3	41-60	Quite practical
4	33-40	Less practical

(Arikunto, 2014)

3) Effectiveness analysis

The effectiveness analysis used instruments in the form of rubrics for assessing critical thinking skills and student response sheets. Critical thinking skills are measured using the N-gain score formula as follows:

$$N \text{ gain score} = \frac{Sp_{\text{post}} - Sp_{\text{pre}}}{Sm_{\text{ideal}} - Sp_{\text{pre}}}$$

Notes :

(g) = Normalized gain average score

S_{post} = Student's final test average score

S_{pre} = The average score of the student's pre-test

S_{m-ideal} = Ideal maximum score

Furthermore, the results of the gain score will be categorized according to the criteria for the gain results, which can be observed in Table 3

Table. 3 Effectiveness Criteria

N-Gain	Category N-gain score
$g \geq 0,70$	High
$0,30 \leq g < 0,70$	Medium
$g < 0,30$	Low

(Hake, 1998)

The formula below is used to measure the results of the response sheets given by students:

$$Presentase \text{ respon peserta didik } (P) = \frac{\Sigma x}{\Sigma i} \times 100\%$$

Notes :

P : Percentage of student responses

Σx : The total number of answers from respondents

Σi : Total maximum score

The values obtained from the above calculations were analyzed based on the student response criteria, which can be observed in Table 4

Table 4. Student response criteria

Student response intervals (%)	Criteria
$80 \leq Na < 100$	Very positive
$60 \leq Na < 80$	Positive
$40 \leq Na < 60$	Quite positive
$20 \leq Na < 40$	Less positive
$Na < 20$	Very less positive

(Arikunto, 2010)

RESULT AND DISCUSSION

The ADDIE development model in this development research has five stages, the following is the elaboration:

1. *Analyze*

The analysis phase is the first stage of this research. This stage conducts activities to analyze the curriculum used by the school, analyze student character, analyze the learning media that are implemented, and analyze the level of students' critical thinking skills. The results of the analysis are used as a reference for developing learning media products based Lectora inspire with the aim that the products developed are effective and efficient in their use.

2. *Design*

Interactive media-based Lectora-Inspire product design for science learning uses the Lectora Inspire version 18 application. The process of designing products includes selecting multimedia elements, compiling multimedia elements, and publishing interactive media for learning science based on Lectora Inspire format single executable file (.exe). The selected multimedia elements are customized to the needs of the material. Multimedia elements in learning media-based Lectora-inspire are format text, images, animations, gifs, videos, and audio. Interactive science learning media-based Lectora Inspire is structured and designed to have four main subject contents concluding primary competencies, learning zones, quiz play zones, and creator biodata.

3. *Development*

This stage is required by the validator. The validator validates learning devices and media. The validator's assessment of the product being developed can be observed in Table 5.

Table 5. Interactive media based Lectora Inspire validation results

Validity aspect	Validity score			Percentage (%)	Criteria
	1	2	3		
Content	14	13	13	83,33	Valid
Construct	57	61	61	82,87	Valid
Average validator value	71	74	74	82,95	Valid

Product development results are certified for validation before being implemented in learning activities intended at leveling validity. There are two components that are validated, namely content validation and construct validation. The average result of the three validators obtained a value of 82.95% with valid criteria, can be implemented but slightly revised. Content validity collected a rate of 83.33% and is included in the accurate category because interactive media learning science based on Lectora inspire includes content or material according to learning indicators, media products have been arranged sequentially based on learning activities logically, and they are feasible to be implemented in the learning process. Construct validity obtained a value of 82.87% and is included in the valid category. Construct validity consists material, language, soft engineering, and media design. According to Hapsari and Fahmi (2021), learning media that obtain a validation score of ≥ 60 can be said to be feasible and can be implemented in the teaching and learning process. Based on this statement, it can be definite that interactive media based on Lectora Inspire is appropriate to implement in the science learning process.

4. *Implementation*

Products trial a required after going through the validation process. The product was certified in learning at SMPN 05 JEMBER with 26 students. The implementation products development trial in learning implementation, data collected from the assessments of three observers during research activities. The results of the learning implementation data worn for practicality tests.

Table 6. The results of the implementation of learning

Activities	Percentage average (%)	Criteria
Orientation	95,84	Very practical
Core	89,06	Very practical
Closing	91,67	Very practical
Overall average	92,19	Very practical

Practicality from Van Den Akker (1999) is the level of the user's consideration of a positive intervention and its use under normal circumstances. Product practicality in this study was collected based on the results of the learning implementation sheet. The results analysis of the implementation of learning data (Table 6) obtained a percentage of 92.19% with high practical criteria. Learning media implemented for learning activities in class is easy to use and simple to explain because the navigation buttons are by their functions, so their use will be easier. Besides that, the media developed is also equipped with many features and supporting multimedia elements that help students process information and build integrity. I admit with Desyandri (2019) that the product developed can be declared practical if it is easy to use and easily understood by users.

5. Evaluation

The evaluation stage is to assess and achieve learning by implementing development products in the study. The evaluation was carried out on the results of the critical thinking skills test using the gain score test and the results of the responses given by the students.

Table 7. Details of the effectiveness of critical thinking skills test results

Component	Class of VII F		N-gain <g>	Criteria
	Pre-test	Post-test		
The number of students	26	26		
Lowest value	21	46	0,61	Medium
The highest score	58	96		

The data above shows that the N-gain score obtained was 0.61. The state has increased after using interactive science learning media based on Lectora Inspire with moderate criteria.

Table 8. The results of the recapitulation of student response sheets

No.	Aspect	Percentage (%)	Category
1	Interest	71,27	Positive
2	Media	79,49	Positive
3	Language	62,98	Positive
Average student response		71,25	Positive

The data above shows that students give a good response, which is indicated by a value of 71.25%.

The effectiveness of applying interactive science learning media based Lectora Inspire was analyzed by analyzing the results of critical thinking skills tests and student responses. The development test prescribed at SMPN 05 Jember with 26 students in 4 meetings. Based on the results of the effectiveness test of Lectora inspire-based interactive media products, N-gain score 0.61 collected for moderate criteria, so stated that the developed media was able to improve students' critical thinking skills. The response sheets given by students showed an average value of 71.25% for good criteria. According to Lestari and Putra (2020), it be effective if student responses are at least in the high category. Based on this, this research obtained an average student response value of 71.25%, which was in the high category, the meaning usage from interactive media for learning science can be effective.

CONCLUSION

Interactive learning media is one of the learning media with several advantages, including audio-visual, interactive, and independent characteristics. Interactive learning media can created using the Lectora Inspire software. Interactive media is feasible and appropriate applied in science learning because science material requires a more picture of objects to make it easier for students to understand the material, assist the thinking process, and help improve critical thinking skills. The results of the analysis, namely the validity test of interactive media learning science based on Lectora Inspire, obtained a valid category so that it was declared feasible to implemented in learning activities; the practicality test obtained very practical criteria because it was easy to use and easily understood by students; the effectiveness test conclude N-gain score of 0.61; it stated that students' critical thinking skills increased after interactive media based on

Lectora Inspire was implement in the science learning process; and the results of the analysis of the responses given by students obtained a percentage score of 71.25% included in the high category. Thus, conclusion that interactive media effectively used in the science learning process.

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