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Validity of Interactive Learning Media Integrated Critical and Creative Thinking Skills Aided by the *Lectora Inspire* Application

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Abstract

The importance of the ability to think critically and creatively in the learning process, especially in physics, is a challenge for educators to continue to improve the quality of learning, both in implementing the learning process and developing appropriate learning resources. This study aims to develop valid interactive learning media with the help of the Lectora Inspire application to improve the critical and creative thinking skills of high school students, especially in straight and parabolic motion material. The research design used the ADDIE model, including the stages of analysis, design, development, implementation, and evaluation. This research is being developed through validation activities from three validators from the Padang State University physics department. The instrument for collecting data was an interactive learning media assessment sheet validated by experts. The subjects of this study were experts from the physics department lecturer Padang State University. The data analysis technique used Aiken's validity index. The validation results of learning media product development are in a very valid category, with an average value of 0.816. This indicates that interactive learning media that integrates critical and creative thinking skills with the help of the Lectora Inspire application have a very valid category. This validity component shows the feasibility of the product in material substance, audio-visual communication display, learning design, software utilization, assessment of critical thinking skills, and assessment of creative thinking skills.

Keywords: Critical & Creative Thinking; Interactive Learning Media; Lectora Inspire; Straight Motion and Parabolic Motion; Validity

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INTRODUCTION

In essence, education is a process of self-development in dealing with the difficulties and problems that a nation will confront to evolve. As a result, in order to encourage student learning achievement, teacher innovation in the learning process is required. Learning innovations can help to establish a joyful and enthusiastic learning environment in the classroom. The teacher plays a vital role in optimizing the learning process to ensure students can learn independently and in class. Therefore, improving the

quality of education is very important and fundamental (Margaria, 2014; Sodirjonov, 2020) in preparing the next generation to work directly with the community in understanding competencies in accordance with the demands of the industrial revolution 4.0 (Hussin, 2018; Soenarto et al., 2020)

The growth of the industrial revolution 4.0 is distinguished by technological advances, also known as Science and Technology. This is a new challenge in the educational sector. Advances in this technology are expected to fulfill the demands of the 21st century, where students can support growth in their abilities and problem-solving skills (Dinni, 2018; Rizki et al., 2021; Saputri et al., 2021). Students' capacity to think critically, link knowledge to the actual world, grasp information technology, communicate, and collaborate are all valued in the 21st century (Anggraeni & Sole, 2018; Hartini et al., 2020). 21st-century skills are usually referred to as 4C skills, including communication, collaboration, critical thinking, and creative thinking skills (Misbah et al., 2022; Redhana, 2019). 4C skills are *soft skills* that can be used in everyday situations.

The higher the level of human capability, the more crucial it is to create innovations to improve learning effectiveness and efficiency. Using learning media is one alternative innovation educators might employ to attain the goals as mentioned above (Hartini et al., 2017; Khairunnisa & Ilmi, 2020). Modern education is currently utilizing the availability of information and communication technology as one of the tools, in the form of media and learning resources, to acquire knowledge with a very broad range and at a comparatively low cost (Mulyono & Ampo, 2021; Mushfi, 2019). The goal of learning media that is combined with the usage of information technology is to provide convenience to teachers and students (Tahel & Ginting, 2019; Zainuddin et al., 2019).

Learning media can be defined as a tool for communicating information and learning materials between teachers and students (Rahim et al., 2022). Learning media plays a significant function in assisting students in comprehending the material offered by educators (Kurniawanet et al., 2017). This convenience is obtained because learning media has an interactive nature. Using interactive learning media is supposed to improve students' responses to teacher-proposed information (Istiqlal, 2017). This is possible because the media utilized can stimulate students' curiosity, particularly when learning physics.

The usage of interactive learning media can increase students' interest in learning. This is consistent with the research findings of Nursidik et al. (2018), which found that if interactive learning media can be used effectively, students' interest in learning can rise. Furthermore, interactive learning media is intended to help students construct and discover their knowledge, improving their 4C skills (Putri & Ardi, 2021).

Interactive learning media can encourage students to learn independently, improving 4C skills, including critical thinking skills (Festiyed et al., 2019). One of the learning media innovations that can be implemented is the creation of interactive learning media using the *Lectora Inspire* application. The Trivantis software produced the *Lectora Inspire* application, an electronic learning tool (Agustina et al., 2019). Furthermore, the selection of this software refers to the research (Tambunan & Purba, 2017) employing learning media created with the *Lectora Inspire* application. Students learning outcomes improved as a result of the findings in this research.

Furthermore, choosing the *Lectora Inspire* application could make it easier

for teachers to create and apply to students (Putri et al., 2016). This application has several advantages, including the fact that it does not require a specific programming language that it may mix photographs record videos, contain animations or merely the teacher's voice, and that it includes interactive evaluation questions. Learning materials can be made more entertaining by using the *Lectora Inspire* application (Dahlia et al., 2022)

Previous research on the use of learning media was also carried out by Muthoharoh (2019) by utilizing PowerPoint media in the learning process. Most teachers, however, solely utilize this tool for media presentations. In essence, PowerPoint media is used for presenting media; nevertheless, PowerPoint can be used to generate interactive and fascinating learning media in a variety of ways; nonetheless, most teachers use content from Google. Furthermore, some teachers' power slides include crucial points in a text, making studying uninteresting and monotonous. As a result, for certain teachers who wish to create learning presentation media as well as interactive learning media quickly, *Lectora Inspire* is the correct, effective, and efficient tool to use.

The research of Masithoh (2017) disclosed the research's findings to establish the viability of teaching media using the Lectora Inspire application, but this research only looked at natural science material. In this research, the researchers concentrated on mechanics material in class X because mechanics material is the basic and connecting material for the following materials.

Based on the material needs analysis findings, which correspond to actual field conditions, one of the student's abilities to answer problems in the 2019 Physics National Examination. The results showed that 39% of students correctly answered questions in straight-motion content, while 22% correctly answered questions in parabolic motion material (Puspendik, 2019). This value indicates that it remains low and has not yet reached 50%. As a result, efforts must be made to enhance the material for straight and parabolic motion. Furthermore, this content is a foundation for students to learn sophisticated material concepts such as Newton's law, work and energy, momentum and impulse, and so on.

Students should be able to grasp and collect information from the graphs presented in this case to assess based on assertions connected to the events that transpired (Aminah & Haryanto, 2018). In addition, the results of the preliminary data collection were obtained through questionnaires and interviews with students and teachers.

Furthermore, the results of the basic competencies analysis carried out for basic competencies 3.4 and 3.5 and competency demands are at the analysis stage. The analysis stage is the stage of the C4 cognitive level in Bloom's taxonomy. In the analysis stage, students can grasp and identify and distinguish a concept. Moreover, they can relate the concept to the events (Fitriani et al., 2021).

As a result, the researchers used this challenge to create a learning media that can include motion occurrences from everyday life into classroom learning while being entertaining and interactive. Consequently, it is hoped that students would better understand the properties and principles of this motion, particularly when applying it to physics problems. Physics education is meant to be a place where students may address problems in their surroundings by applying critical and creative thinking abilities that students can develop in order to face the challenges of the 21st century (Novela et al., 2019)

Moreover, the needs analysis results connected to learning media were

gathered by class X students through observation, interviews, and the completion of questionnaires. According to the data, the learning media employed by high schools in Padang were not entirely interactive. Figure 1 depicts the study's findings on the use of learning media.

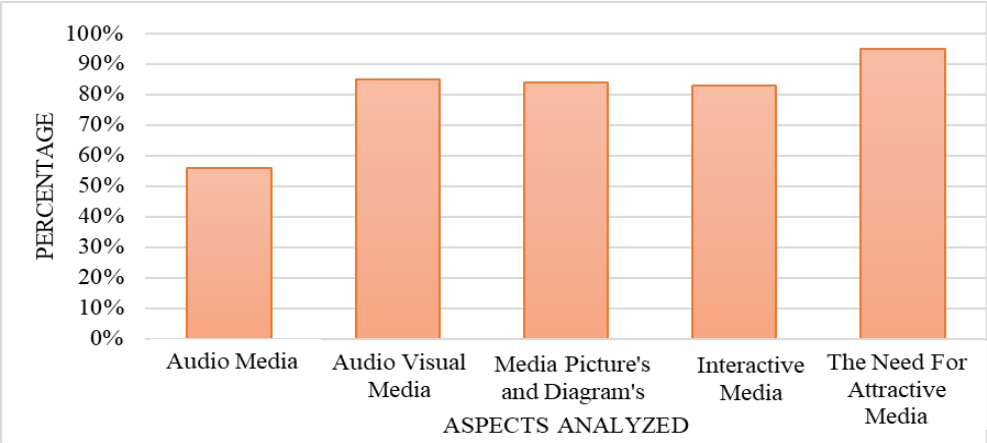

Figure 1 Results of needs analysis

The data analysis results shown in Figure 1 illustrate that each student has varied learning media needs due to their different learning styles. This learning method is important and must be adopted by every student (Rahmi, 2020). The variety of student needs demonstrates the need for media accommodating various learning styles and materials. Since interactive learning media includes graphics or diagrams, voice, and audio-visual, it is ideal for meeting these media needs. This type of audio-visual media can depict more realistic physical phenomena (Manurung, 2020). This can make learning more meaningful.

Based on the above explanation, the researchers are interested in developing interactive learning media using the *Lectora Inspire* application, particularly in straight and parabolic motion material. This interactive learning video incorporated critical and creative thinking skills indicators. This research aimed to create interactive learning media that were combined with critical and creative thinking skills using a legitimate *Lectora Inspire* application on straight and parabolic motion content.

METHOD

This form of research is known as Research Development or R&D, and it employs the ADDIE development model introduced by Dick & Carry (1996). Figure 2 depicts the steps of this research.

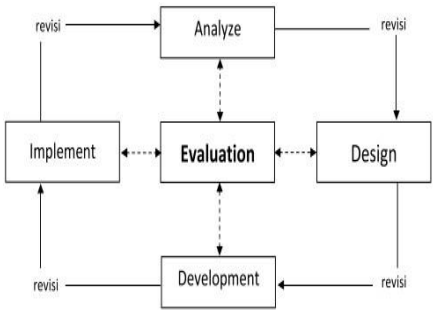

Figure 2 ADDIE model (Irawan, 2014)

This research is still in its early stages. The research was conducted from July to December 2022. At this point, interactive physics learning media on straight motion and parabolic motion content were created using the *Lectora Inspire* software, which incorporated critical and creative thinking skills.

Three validators who were lecturers in the physics department at Padang State University performed a validity test at this stage. The validation procedure is

carried out by specialists or professionals in the field of research who use valid validation tools.

The validation instrument is used to test the validity of interactive learning media. This instrument is in the form of an expert validation assessment sheet. This instrument is in the form of an expert validation assessment sheet. The assessment of this instrument has several aspects, including assessment of the material substance, media display, learning design, software utilization, critical thinking skills, and creative thinking skills, which are modifications of the validity component proposed by (Suryani et al., 2020)

Assessing the materials' substance includes numerous indicators: correctness, material coverage, presentability, and readability. Furthermore, the media display assessment comprises numerous indications such as navigation, menu presentation, text composition, typefaces, media illustrations (sound, graphics, animation), narration, color, layout, and audio effects. Meanwhile, the learning design assessment includes titles, Competency Standards and Basic Competency, indicators and learning objectives, materials, sample questions, evaluation/simulation, and compilers.

The next validation component is the use of the software. Assessment of this component includes interactivity (feedback from the system to the user), supporting software, and originality. In this case, the researcher refers to a modified source from the Ministry of Education and Culture (2010). Furthermore, examining critical thinking skills includes various indicators, including interpretation, analysis, evaluation, inference, explanation, and self-regulation, as amended by Facione (Fithriyah, 2016). Additionally, numerous indicators are used to assess creative thinking skills, including fluent thinking, flexible thinking, original thinking, and detailed thinking (Saufi, 2017).

The validity data obtained was examined using Aiken's validity index. The validity test results data were examined using Aiken's validity index (V). The category of the index value can be assigned after getting the rater agreement index. It is shown in Table 1 based on the results of Aiken's V index.

Table 1 Decision-based on Aiken's index

Intervals	Category
$\leq 0{,}4$	Invalid
$0{,}4 < V \leq 0{,}8$	Valid
$0{,}8 < V$	Very Valid

Source: Retnawati (2015)

The findings of this research are considered good if they have a wide range of values in valid and very valid categories. If the product remains in the invalid category, it gets amended again based on the validator's suggestions.

RESULTS AND DISCUSSION

This research is in the develop stage. Learning media designed generally include cover menus, material, and evaluations. There are various elements in the cover display. The title of the material appears at the top of the cover, and eight components appear below it, including instructions, Core Competencies and Basic Competencies, indicators, objectives, materials, evaluation questions, compilers, and references. The cover also includes images of events in a straight motion, such as the speed of a train, a sailing ship, coconuts that fall, rockets that slide, and people riding bicycles. This graphic provides an overview of rectilinear motion examples in everyday life.

The next component of the developed media is a summary of material on straight and parabolic motion and an evaluation section. Interactive questions complemented the evaluation section of this media. The collected evaluation

includes components such as question instructions, questions, and answer keys, which were visible once students filled in the answers they believed were correct. The questions supplied include various types, including both objective and essay problems. This question has interactivity, allowing students to submit responses and immediately exit the problem discussion.

The development stage seeks to provide interactive learning media that is combined with critical thinking and creative thinking skills, as well as valid straight motion and parabolic motion material. The researchers conducted product validity tests at this stage. Three validators who are physics lecturers at Padang State University evaluated the generated media's validity. This validity test employs an instrument that has previously been verified.

The validation instrument is used to test the validity of interactive learning media. This instrument was in the form of an expert validation assessment sheet. A validity test was performed to determine the feasibility of a new interactive media product. The validity instrument's lattice was directed at critical and creative skills, namely in the substance of the material, media display, learning design, software utilization, and assessment of critical and creative thinking. The instrument validation findings suggested that it was already in the valid category, with a value of 0.76.

Furthermore, at the product validation stage, the validator made suggestions or provided input on the flaws of the developed media. Researchers used these suggestions and contributions to improve learning material. Revisions included enhancing the use of less effective language in the media and presenting evaluation questions that did not indicate critical and creative thinking skills. The validator then re-validated the changed media. The validator filled out the product validation sheet once the product had been amended based on ideas and input, and the validator thoroughly checked the outcomes of the revised media generated.

The validation results of interactive learning media demonstrate legitimate values, indicating that this media can be used to achieve high-level thinking skills in students, particularly critical and creative thinking skills. This is in line with the statement of Sugiyono (2015), which states that once a measuring instrument is certified genuine, the measuring instrument can measure what should be measured.

The validator validated six aspects: material substance, audio and visual communication display, learning design, software utilization, critical thinking skills evaluation, and creative thinking skills assessment. The material substance component included indicators for determining correctness, currentness, and readability. Figure 3 depicts the validation results of the material substance components.

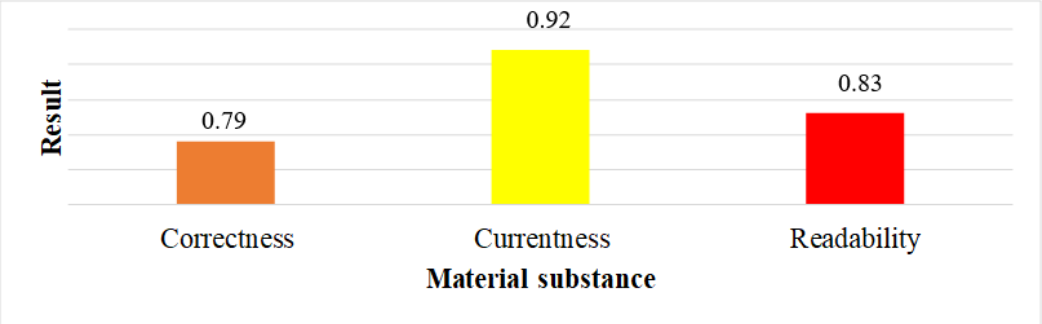

Figure 3 Material substance validation results

Figure 3 illustrates that the currentness aspect had the highest assessment result. Students can construct their knowledge autonomously in the current evaluation element, which is relevant to the evolution of science. This demonstrated that the occurrences shown in the media were consistent with the most recent scientific findings. The learning media employed can also help students build their knowledge. Meanwhile, the correctness aspect had the lowest assessment result. This component concerned the appropriateness of the material given with scientific knowledge; the truth of concepts, equations, and symbols of physical quantities presented in the media; and the applicability of facts and principles in physics. The correctness aspect was already valid, but a few things need to be fixed, specifically, the truth and facts offered in the material in interactive learning media. Furthermore, the readability aspect was adequate, with the validation value between the correctness and currentness aspects. This was connected to the efficacy and efficiency of language use in the media.

The following validation results concern auditory and visual communication components. This validation considers four aspects: navigation, typography, media elements, and layout. Figure 4 depicts the validation findings for this component.

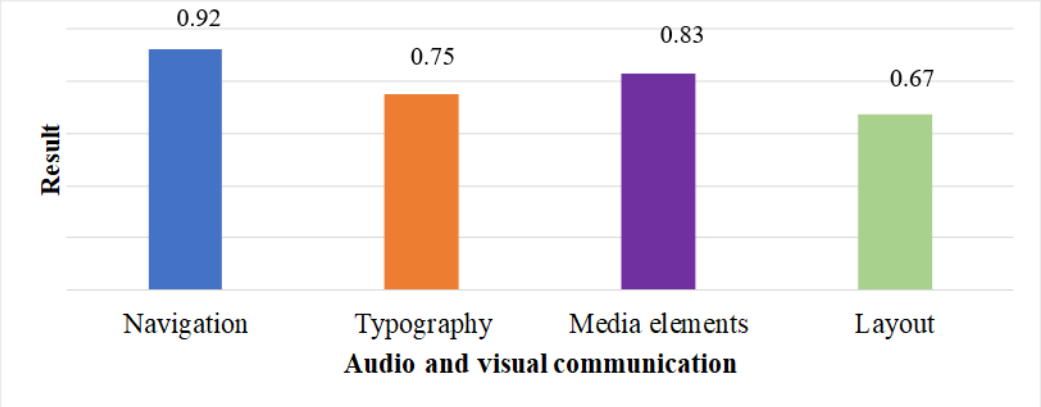

Figure 4 Audio and visual communication display validation results

Figure 4 shows that the navigation aspect received the highest rating, while the media layout received the lowest. This demonstrated that navigation on learning media could perform well and made learning media more accessible. However, the media design had to be updated to look more appealing and proportionate.

The media and typography aspects were also fairly strong, indicating that the validation value was between navigation and layout. The typography aspect refers to employing letter type, size, and color combinations in the learning medium. Color is one factor that can influence a medium's viability (Purnama, 2010). As a result, the valid value in this aspect indicates that using letter type and size in interactive learning media is appropriate, and the color combination is appealing. Not only that, but the usage of animation, graphics, sounds, and physical symbols in developing media components can also aid learning. This media's usage of symbols, visuals, voice, and animation can pique students' interest.

The next critical validation component in this media is learning design validation. Titles, Core Competencies and Basic Competencies, Competency Achievement Indicators and Learning Objectives, materials, sample questions, evaluation, and compiler identity are all included in this

validation assessment. Figure 5 depicts the results of this validation on the components of this learning design.

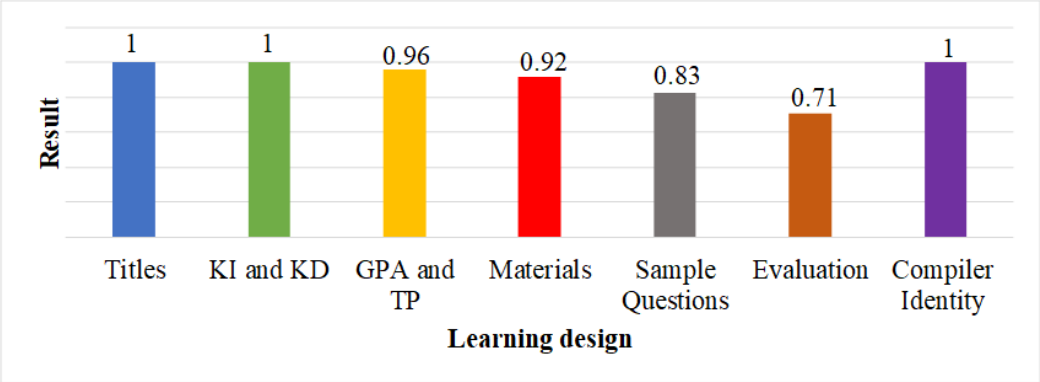

Figure 5 Learning design validation results

According to Figure 5, the highest assessment elements are titles, Core Competencies and Basic Competencies, and compiler aspects. The title component of evaluation comprised the title's appropriateness with the substance. This demonstrated that the title displayed in the interactive learning media corresponds to the material. Furthermore, the media indicators were consistent with Basic Competencies, and the learning objectives were consistent with the indicators. Furthermore, there was the identity of the researchers in the compiler aspect to find out the researchers' biodata.

The evaluation aspect receives the lowest rating on the learning design component. The evaluation portion for this media consists of material-appropriate questions. The feature of evaluation is already in the valid category. However, one aspect that has to be improved is the compatibility of the evaluation questions with the subject offered in interactive learning media.

Meanwhile, Competency Achievement Indicators, Learning Objectives, and sample questions offered were fairly decent in terms of material. This number showed that the learning material followed Core Competencies and Basic Competencies and that sample questions were provided in each sub-material. Furthermore, validation was performed on the components of software consumption. This validation examination considered interactivity, supporting software, and the material's originality. Figure 6 depicts the validation findings of the software utilization components.

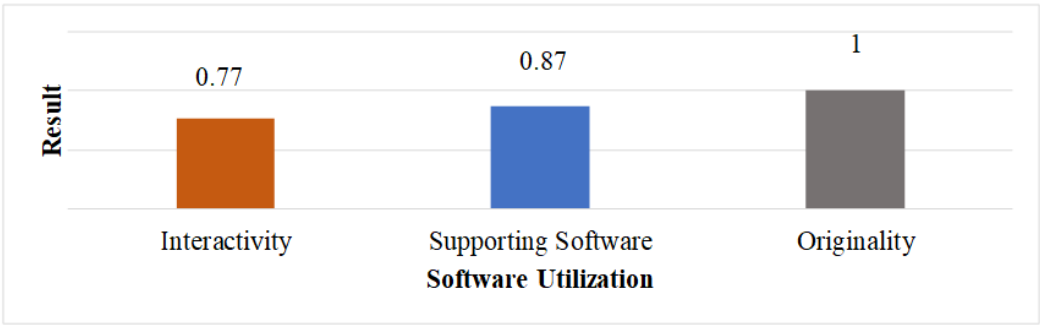

Figure 6 Software utilization validation results

Figure 6 demonstrates that the originality aspect received the highest rating. This demonstrated that the media developed was the researchers' unique work, ensuring the originality of this interactive learning media. Meanwhile, the interactivity aspect received the lowest rating. Nonetheless, this component was already in the correct category. This interactivity aspect demonstrated whether the media utilized can reconstruct information, provide user feedback, and produce learning incentives. This element was modified by improving the display of media interaction so that students can reconstruct their knowledge and receive feedback from media use.

Furthermore, the supporting software aspect was adequate, with the validation value balancing originality and interactivity. The assessment of supporting software aspect related to whether interactive learning media might be accessed directly via a smartphone or laptop and operated properly.

Furthermore, interpretation, analysis, evaluation, inference, explanation, and self-regulation skills are aspects of the validity assessment associated with critical thinking skills. Figure 7 depicts the results of validating the components of critical thinking skills.

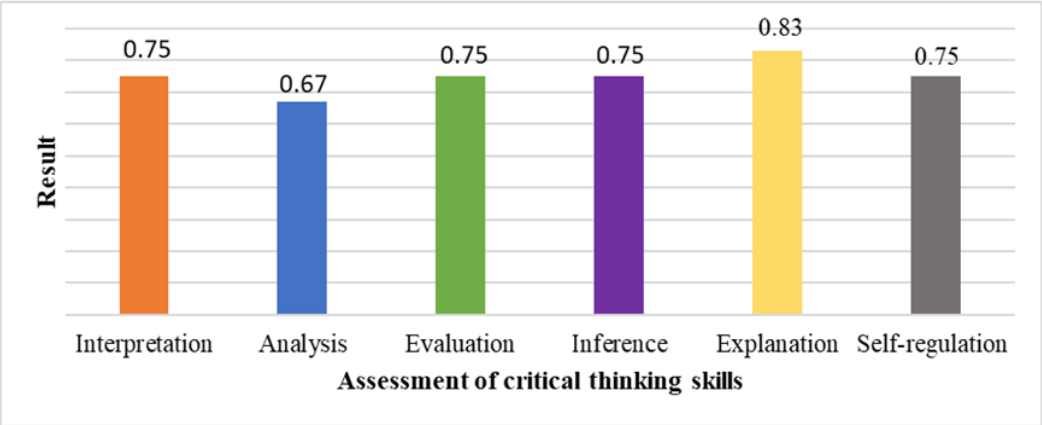

Figure 7 Substance validation results of interactive learning media on critical thinking skills

It is seen in Figure 7 that the explanation aspect had the highest assessment result. Meanwhile, the results of the lowest assessment were in the analysis aspect. The validity value in the analysis aspect was already in the valid category. However, the media had to be revised to aid students in writing down the relationship between the concepts used in answering the questions and the steps. Furthermore, the aspects of interpretation, assessment, inference, and self-regulation were quite good, indicating that the validation value was between explanation and analysis. The interpretation aspect in the media was related to the ability of students to write down the meaning of the problem clearly and to answer questions correctly. This value indicates that learning media stimulate and direct students so that they can write down the meaning of the problem clearly and precisely.

Furthermore, the validity results on the inference aspect suggested that learning media provide opportunities for students to solve difficulties. In addition, the developed media could facilitate students to review answers on self-regulation aspects. The results of the validation assessment of six indicators of critical thinking skills in the media demonstrated that the interactive

learning media compiled had aspects of critical thinking skills following the opinions of Facione (2016) and Fithriyah (2016).

Figure 8 also shows the validity of the components of the assessment of creative thinking skills.

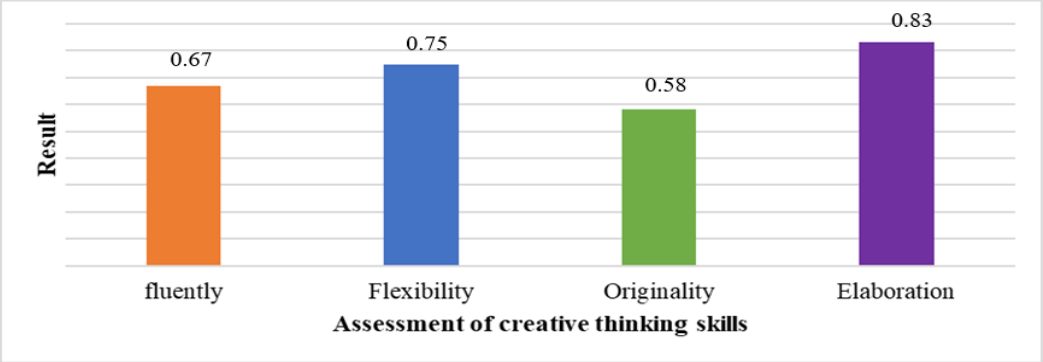

Figure 8 Substance validation results of interactive learning media on the assessment of creative thinking skills

According to Saufi (2017), creative thinking skills include several indicators, including students' fluent thinking skills (*fluently*), students' flexible thinking skills (*flexibility*), students' original thinking skills (*originality*), and students' thinking skills that detail (*elaboration*). Figure 8 depicts the presentation of creative thinking skills in the media, with the *elaboration* indicator receiving the highest score. This demonstrated how interactive learning media can help students express diverse opinions (Hufri & Triani, 2022) to provide many ideas in the learning process regarding the subject and the evaluation presented.

Meanwhile, the lowest rating result lied in the *originality* aspect. This component was related to student's ability to provide exposure to new and unusual material in the media. Furthermore, the validity value was already in the good category in terms of *fluency* and *flexibility* aspects. The *fluency* aspect demonstrated that interactive learning media allows students to discover various ideas. This was expected to provide students with a productive and engaging learning environment (Abas, 2015). Furthermore, the validity value for the *flexibility* aspect demonstrated that using interactive learning media assists students in solving problems in various ways.

Based on the findings of the analysis of each validity component, it was possible to conclude the average value of the validity of the generated interactive learning media. Table 2 shows the average value of this media validation.

Table 2 The average value of interactive learning media validation

Assessment Component	Score
Material Substance	0,88
Audio and Visual Communication Display	0,81
Learning Design	0,90
Software Utilization	0,85
Critical Thinking Skills Assessment	0,72
Creative Thinking Skills Assessment	0,75
Average	0,816

The results of learning media validation based on each component assessed on the instrument can be seen in Table 2. Table 2 shows that the components in the learning design have the highest validation value. According to Mahyuddin et al. (2017), the design appearance of interactive learning media can make the media more accessible to students. Meanwhile, the consequences of inadequate learning media validation can be found in critical and creative thinking. This value, however, remains within the permitted category range. Critical thinking skills are the lowest of the two.

The develop stage that had been completed led to the conclusion that the developed medium was usable. Product feasibility results were very valid criteria, according to Retnawati (2015). The development of interactive learning media is predicted to boost students' learning interest and, thus, their learning achievement (Sunaryo et al., 2022).

Based on this, it could be seen that interactive learning media is integrated with critical and creative thinking skills using the *Lectora Inspire* application, which was developed linearly with previous research (Tambunan & Purba, 2017); namely, the presence of interactive learning media is capable of increasing student learning outcomes. The research findings proved that learning media was valid, practical, and successful. Furthermore, using the *Lectora Inspire* application might make it easier for teachers to create and apply to students (Putri et al., 2016). This application has several advantages, including the fact that it does not require a specific programming language that it may mix photographs record videos, contain animations or merely the teacher’s voice, and that it includes interactive evaluation questions. Learning materials can be made more entertaining by using the *Lectora Inspire* program (Dahlia et al., 2022).

CONCLUSION

Based on the develop stages completed, it is possible to determine that interactive learning media combined with critical and creative thinking abilities aided by the *Lectora Inspire* application has a very valid category. This validity component demonstrates the product's viability regarding material substance, audio-visual communication presentation, instructional design, software utilization, critical thinking skills assessment, and creative thinking skills assessment. Furthermore, because this learning medium is primarily intended for validity testing, the researcher advises that other researchers undertake trials of all class X students to obtain practicality and effectiveness values.

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