Development of interactive learning media based on *Lectora Inspire* on the basics of building construction and soil measurement techniques

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Abstract

This research was based on a preliminary study at SMK Negeri 1 Mandrehe Barat, it was found that students were passive and monotonous in learning process activities and had not used interactive learning media which means the learning process was not optimal. The solution to this problem is to use interactive learning media based on *Lectora Inspire* in the learning process. The purpose of this research is to develop valid, practical and effective interactive learning media based on *Lectora Inspire*.This type of research is *Research and Development* (R&D) development research using the ADDIE model (*Analize, Design, Developtment, Implementation, Evaluation*). The instruments used in this study were validation questionnaires for feasibility tests, student and teacher response questionnaires for practicality tests, and essay question tests for testing the effectiveness of learning outcomes.The types of data used in this study are qualitative data and quantitative data. Qualitative data in the form of comments, and suggestions given by validators to the learning media developed. While quantitative data is in the form of questionnaire results from validators, student and teacher response questionnaires and learning outcome tests. Based on the results of the study, the interactive learning media based on *Lectora Inspire* developed has been tested and declared valid both in terms of material validity 95%, language validity 94%, and design validity 92. Furthermore, interactive learning media is also very practical to use by students based on the percentage of individual tests of 93%, field trials of 94%, and teacher responses of 93% practicality of 95.47% and the percentage of practicality results from teachers of 93.81%. Interactive learning media is also effective in increasing students' learning ability with an average score of 89% and is in the high category. So it can be concluded that the interactive learning media developed has met the expectations or research objectives.

Keywords: *Lectora Inspire* Interactive Learning Media, ADDIE Model

Introduction

Education is the main aspect in human self development and as a bridge to increase knowledge. Education plays an important role in every line of human life. Therefore, it is necessary to direct and develop good education for individuals, starting from an early age until they reach the adult phase. The aim is none other than to produce high quality and highly competitive people. This is also in line with the definition of education according to Law Number 20 of 2003 which states that:

> Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have spiritual, religious strength, self-control, personality, intelligence, noble morals, and the skills needed by themselves, society and the country.

In line with the definition above, (Rahmat, 2018) states that education is a process or conscious effort carried out by adults deliberately which has an influence in increasing students' maturity, so that students can develop their potential as a provision in society. Education is a process to develop potential within an individual so as to bring about changes in oneself that are better and of better quality and are useful for oneself, society and the country. In this case, the process of delivering lessons requires good communication between educators and students. Good communication in the learning process can improve the quality of students' learning and create a conducive learning atmosphere. Delivering education requires choosing the right model, strategy, approach, learning resources and media. This also aims to ensure that students are able to receive and understand the learning material presented by educators.

According to (Suyitno, 2020) Vocational education is education that provides specific training that can be used in the world of work. Vocational High School (SMK) is a formal education institution that aims to prepare students to master certain knowledge and skills to enter the workforce while providing provisions to continue their education to tertiary institutions. Vocational Schools are educational institutions that have several expertise programs and students are trained in their skills to become professionals in their field of expertise. Very influential on the skills of Class X DPIB students at SMK N 1 Mandrehe Barat for the 2023/2024 academic year.One of the subjects that must be studied in the Class

Based on the results of observations carried out by researchers at SMK Negeri 1 Mandrehe Barat, based on the process of teaching and learning activities, teachers still tend to use textbooks or modules, whiteboards and other references from the internet, low mastery of the material, lack of motivation among students. These students only listen and listen and are passive in the process of learning activities or are monotonous. Educators' role should not only be in conveying knowledge to students or simply giving assignments. Educators as facilitators and have creativity in providing learning materials.

Based on the problems stated above, there is a need for learning media that supports students in understanding learning material (K3LH). The word media comes from the Latin medius which literally means 'middle', 'intermediary', or 'introduction'. In Arabic, media is an intermediary or messenger of messages from the sender to the recipient of the message. In line with the previous interpretation of the word media, (Tafonao, 2018) stated that "learning media is anything that can be used to channel the sender's message to the recipient, so that it can stimulate students' thoughts, feelings, attention and interest in learning." Overall, learning media is a tool or material used in the teaching and learning process which has the function of carrying information from learning sources to recipients. The media used is adjusted to the school conditions and learning objectives. The purpose of using media in the learning process is to make the process of conveying information more effective to students.

In the current era of science and technology development, there are many types of media that can be used, including multimedia learning media which involves several types of media and equipment that are integrated in a learning process or activity. One media that can be used to support the learning process is the Lectora Inspire application. According to (Astuti et al, 2019) "by using the Lectora Inspire program the learning materials are packaged practically and interestingly, because they contain material, example questions and discussions, animations, learning videos and interactive evaluation questions." Lectora is an electronic learning development tool developed by Trivians Corporation. This software can display

images, music and various unique templates. Lectora Inspire also presents evaluation variations in the form of simple tests including multiple choice, true false and matching questions. The final product of this interactive learning media based on Lectora Inspire is in the form of a Single File Executable with the file extension .exe which makes it easier to use without having to install the Lectora Inspire software. (Muttaqin et al, 2020) stated "the advantage of Lectora Inspire compared to other learning media development software is that this software is created with leading flash content, screen capture, recording, strong authorization tools making it possible to create videos and flash content quickly." *Lectora Inspire* has various templates that can make it easier for teachers to integrate material and evaluation in learning. The development of interactive learning media based on Lectora Inspire can make good use of school facilities and attract students' attention, the learning environment becomes more conducive, relaxed and fun so that it can help students understand the material and can involve students in the learning process.

METHODS

This research is a type of development research or Research and Development (R&D). According to (Sugiyono, 2019) said that "R&D research methods are research methods used to produce certain products, and test the effectiveness of these products." According to (Ritonga et al, 2022) defines "R&D research is activities to develop a product or in other words perfect an existing product into a product that can be accounted for." So, research and development is a process or steps to develop a new product or improve an existing product to make it better.

The development of interactive learning media using Lectora Inspire in this research uses the ADDIE (Analyze, Design, Development, Implementation, Evaluation) development model. This model is one of the systematic learning model designs developed by Dick & Carey in 1996. (Tegeh et al, 2014) stated "that at the level of learning material design and development, systematicity as a procedural aspect of the systems approach has been realized in many practices methodology for the design and development of texts, audio-visual materials and computer-based learning materials".

Analysis Stage (Analyze)

At this stage, an analysis of student needs will be carried out by conducting observations in class X DPIB (Building Installation Modeling Design) at SMK Negeri 1 Mandrehe Barat. This stage was carried out to obtain information and the need for learning media needed to overcome students' learning difficulties and boredom, especially in the subjects Basics of Building Construction and Land Measurement Techniques, material on understanding procedures (K3LH) in building work. It is hoped that this learning media will be able to provide solutions for teachers and students to overcome this problem. Apart from that, it is hoped that this learning media can increase the variety of learning media that will be used by teachers.

Design Stage (Design)
a. Learning Media Design Concept Design
At this stage, researchers will begin designing product designs that are appropriate to the research subject and materials that will be used in interactive learning media based on Lectora Inspire. The product design is prepared as a whole (storyboard) so that every part of the product can be seen.
b. Preparation of Material, quizzes and Answer Keys
At this stage, the basis for selecting material, preparing questions and answers that will be published in learning media is determined. Material and quizzes in this media

Development Stage (Development)
a. Creation of Interactive Learning Media Products Based on Lectora Inspire
Based on the product design that has been designed, researchers will manufacture the product. This interactive learning media was created using Lectora Inspire software. The storyboard that has been designed is put together to form a complete product unit.

b. Validation

At this stage the initial product that has been created will be validated by material experts, language experts and experts Media. The purpose of this validation is to obtain suggestions, comments and input to be used for the first product revision.

c. Revision I

At this stage the product will be revised based on suggestions, comments and input from Material experts, Language experts and Media experts.

d. Validation II

Products that have been revised are validated again a second time to find out whether the learning media that has been created is suitable or not.

e. Revision II

At this stage the product will be revised secondly based on validator suggestions and comments.

f. Practitioner Validation

At this stage the initial printed product will be validated by learning practitioners (teachers). The purpose of this validation is to obtain suggestions, comments and input to be used to revise the product before field trials are carried out.

Implementation Stage (Implementation)

(Rayanto & Sugianti, 2020) said that the research products that have been produced are not compiled products, but must be tested through several scientific stages. So that validity, reliability and usability can be measured and tested. At this stage the media has been improved according to the advice of Material, Language, Media and Practitioner experts, before being tested on students. There are two testing stages:

a. Individual Trial

This individual trial will be carried out by 3 students in class X DPIB. This trial was carried out to determine the practicality of the media developed based on student responses regarding interactive learning media based on Lectora Inspire. In this individual trial, researchers gave media practicality assessment questionnaires to students.

This questionnaire consists of 15 indicators and uses a Likert scale with 5 alternative answers, namely very good, good, fair, not good and very bad. Students filled out questionnaires after using interactive learning media based on Lectora Inspire developed by researchers. The results of the individual tests are as follows:

1) Revise individual trial results

At this stage, product revisions will be carried out based on input from 3 class X DPIB students.

b. Field Trials

At this stage the product will be tested on students in class X DPIB SMK Negeri 1 Mandrehe Barat with 10 subjects. In this stage, a questionnaire will be given to assess interactive learning media products based on Lectora Inspire. Researchers monitor the progress of activities while learning media is used by students. Next, at this stage, after completing the learning process, the researcher directs students to take a learning outcomes test after using learning media with the aim of finding out the effectiveness of the learning media that has been created.

Evaluation Stage (Evaluation)

At this stage, researchers carried out an evaluation to measure the success of the objectives of developing interactive learning media products based on Lectora Inspire, namely analyzing the results of the feasibility of the final product that had been carried out at the implementation stage and making improvements to learning.

Data Collection Instrument

The instrument used to collect data in this research was a questionnaire. Research instruments are measuring tools such as tests, questionnaires, interview guides and guidelines that researchers use to collect data in a study (Sugiyono, 2019).

RESULTS AND DISCUSSION

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The results of this research are interactive learning content with the help of using the Lectora Inspire application on the material of understanding Occupational Safety and Health and Environmental (K3LH) Procedures in Building Work, Class X DPIB Vocational School students. The procedure for developing content/learning media is carried out using the ADDIE development model which consists of five stages, namely (1) Analyze, (2) Design, (3) Development, Implementation and Evaluation (Evaluation). The following is a description of each stage carried out.

4.1.1. Analysis Stage (analyze)

At the analysis stage, researchers conducted observations and interviews in class X DPIB, SMK Negeri 1 Mandrehe Barat. Observations were carried out on May 17 2023. The number of students present was 13 people. Based on interviews with teachers in the Basics of Building Construction and Land Measurement Techniques subjects, regarding the importance of using learning media, so far teachers have only used simple media, textbooks, modules and other references from the internet. Learning activities that tend to be monotonous result in students getting bored. This is indicated by the number of students sitting in the back benches who do not pay attention to the teacher's explanation and are busy chatting with their classmates. They seemed less enthusiastic about participating in the learning process. Facilities should be utilized as maximally as possible, for example using LCDs and projectors to support the delivery of material. However, in the learning process the use of facilities was not optimal.

Design Stage (design)

The stage of developing the ADDIE model is the design stage. At this stage the researcher collects information that supports the development of the learning media created. The results of this information are:

    a. Learning Media Design Concept Design (Storyboard)

      *Storyboarding*contains an overview of the entire interactive learning media that will be loaded into interactive learning media based on Lectora Inspire.

      In general, the parts of interactive learning media based on Lectora Inspire can be described as follows:

    1) Material section

    This section contains learning material to understand occupational safety and health procedures and the K3LH environment in building work.

    2) Quiz section

    This section contains a quiz that students will answer after they have finished studying the material that has been presented previously, with the hope that students will be able to find out the extent of the knowledge they have achieved.

    b. Preparation of material, questions and answer keys.

At this stage, material will be prepared regarding basic competencies regarding understanding occupational safety and health and environmental (K3LH) procedures in building work. The basis for selecting this material is because there are difficulties in understanding the material experienced by students.

Making learning outcomes tests to determine the effectiveness of learning media in the form of questions and answer keys based on material on understanding procedures (K3LH) in building work. The material is grouped into sub-materials to make it easier for students to study the material. K3LH sub-materials include:

1) Understanding occupational safety and health.
2) The main goal of occupational health.
3) The influence of K3 on personal/work environment.
4) Occupational health function.
5) K3LH benefits for workers.
6) Factors that cause work accidents.
7) Personal protective equipment for construction work.
8) Things you need to pay attention to regarding PPE.
9) Personal protective equipment is divided into several types.

c. Selection of background, characters and images

*Backgrounds*and the characters used in this media are combined with images downloaded from several sources. Creating and combining backgrounds and characters using the PicsArt application. The background and character format in this media is portable network graphics (png).

d. Creation of Interactive Learning Media Products Based on Lectora Inspire.

Developing interactive learning media, all components such as background design, images, characters, navigation buttons, materials and quizzes are prepared using Lectora Inspire software in accordance with the storyboard design that was created in the previous stage. After all the components are created in the Lectora Inspire software, they are saved in awt format. The awt file format can still be edited if there are revisions. The final product of developing this learning media is an offline and online file which is published in a single executable file in EXE format so that it can be used on smartphones, computers and laptops without having to install Lectora Inspire first.

4.1.2. Development Stage (development)
a. Validation

The media product that has been created is then validated. This validation aims to obtain recognition of the feasibility and input for improvements regarding the media that has been developed by researchers. This validation stage was carried out by three expert validators. Comments and suggestions from the three expert validators were used as a basis for media revision before testing was carried out so that the media developed could be better.

The results of material expert validation from three aspects from revision I to revision II can be seen in the following graph:
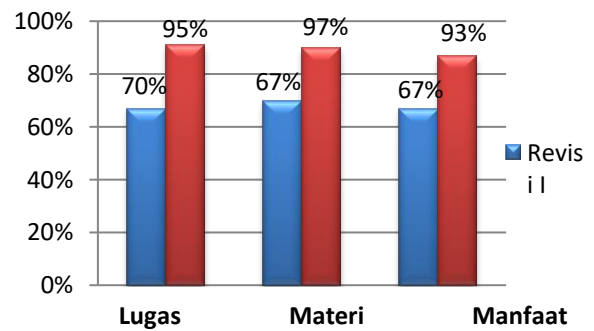
Product Validation Results for Each Aspect
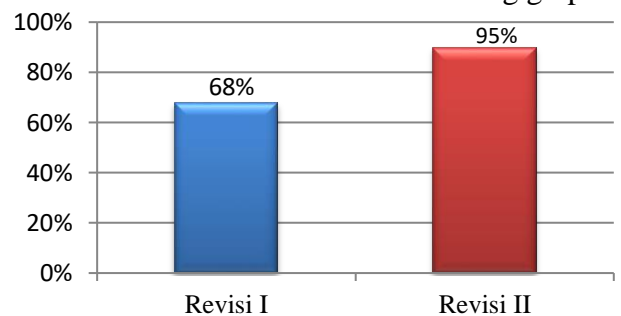
By Materials Expert

Information :

Straightforward : Revision I 70% and Revision II 95%

Material : Revision I 67% and Revision II 97%

Benefit : Revision I 67% and Revision II 93%

The following are the average results of material expert validation in revision I and revision II which were carried out twice with a percentage achievement of 81.5%, which can be seen in the following graph:

Average results of Revision I and Revision II by Material Experts

Information :

Revision I : 68%

Revision II : 95%

Complete validation results based on suggestions and comments from material expert validators can be seen in attachment 4.
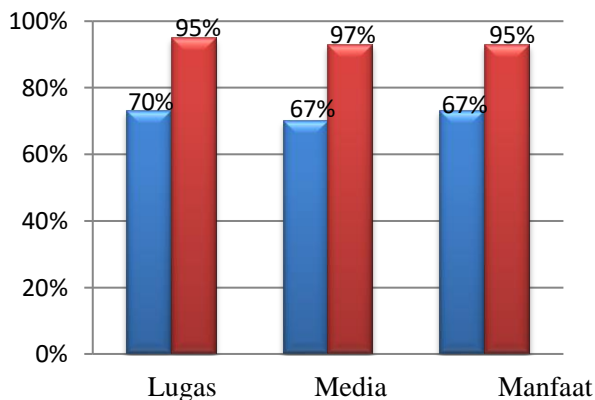
1) Linguist Validation

The language expert's assessment was obtained based on the results of the validation questionnaire as well as

suggestions and comments from the validator. Language validation was carried out in two revisions.

Based on the table above, the results of the linguist's validation of the product in the form of interactive learning media based on Lectora Inspire in revision I, after calculations, obtained an achievement percentage of 72% from 3 aspects, namely the Straightforward aspect 73% from 11 indicators, the Media aspect 70% from 6 indicators, Benefit aspect 73% of 6 indicators. Meanwhile, in revision II, after calculating, the achievement percentage was 94% from 3 aspects, namely the Straightforward aspect 95% from 11 indicators, the Media aspect 93% from 6 indicators, and the Benefit aspect 93% from 6 indicators.
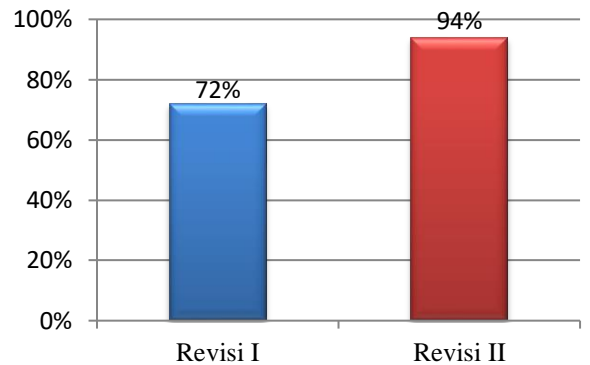
The results of the validation by language experts from three aspects can be seen in the following graph:

Product Validation Results for Each Aspect of Revisions I and II by Linguists

Information :
Straightforward : Revision I 73% and Revision II 95%
Media   : Revision I 70% and Revision II 93%
Benefit   : Revision I 73% and Revision II 93%

The following are the average validation results of language experts in revision I and revision II which were carried out twice with an achievement percentage of 82%, which can be seen in the following graph:

Average Results of Revision I and Revision II By Linguists

Information :
Revision I   : 72%
Revision II   : 94%

Complete validation results based on suggestions and comments from language expert validators can be seen in Appendix 5.
2) Media Expert Validation
The design expert's assessment was obtained based on the results of the validation questionnaire as well as suggestions and comments from the validator. Media validation was carried out twice. The results of media validation for interactive learning media products based on Lectora Inspire can be seen in the table below:

The results of media expert validation of the product in the form of interactive learning media based on Lectora Inspire obtained a percentage in revision I, namely 68% from 3 aspects, namely the Slide aspect 67% from 11 indicators, the design aspect 70% from 6 indicators, the Benefits aspect 67% from 6

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indicators, Meanwhile, revision II, after being calculated, obtained a percentage of 92% from 3 aspects, namely the Slide aspect 93% from 11 indicators, the design aspect 90% from 6 indicators, the Benefits aspect 93% from 6 indicators.

The results of media expert validation from three aspects from revision I to revision II can be seen in the following graph:
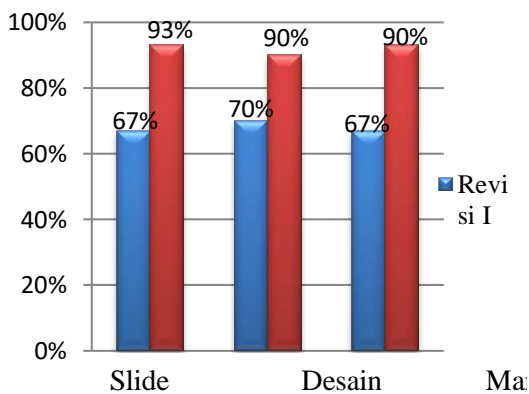
Average Product Results for Each Aspect By Media Expert

The average results of media experts on learning media products with an achievement of 80% can be seen in the following graph:

Average Results of Revision I and Revision II By Media Expert

Complete validation results based on suggestions and comments from media expert validators can be seen in Appendix 6.
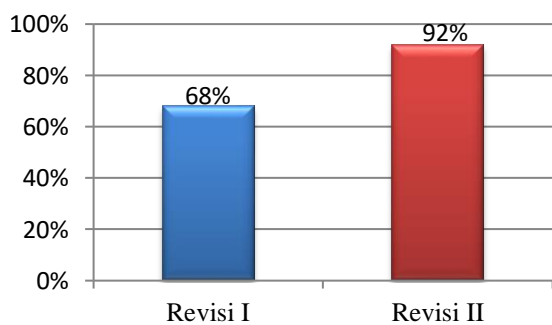
4.1.3. Implementation Stage (Implementation)

At the test implementation stage, try the product that will be implemented at SMK Negeri 1

Mandrehe Barat which is divided into two stages, namely individual trials and field trials, as well as knowing the teacher's response to the media used by distributing questionnaires to subject teachers. The aim is to find out the practicality and effectiveness of interactive learning media based on Lectora Inspire which has been previously validated.

a. Individual Trial

At the individual trial stage, the researcher selected 3 students from class After the three students studied the learning media that had been developed, the researcher distributed response questionnaires to the three students as a response to the learning media that had been studied. The following are the results of individual trial student response questionnaires.

RESULTS OF INDIVIDUAL TRIAL STUDENT RESPONSE QUESTIONNAIRE

No.	Student	Total Score	Percentage	Criteria
1.	Student 1	68	91%	Very Practical
2.	Student 2	71	95%	Very Practical
3.	Student 3	70	93%	Very Practical
Total score		209		
Average Percentage Yield		93%		
Criteria		Very Practical		

b. Field Trials

The final stage in developing this learning media is the field testing stage. After the learning media is declared very valid and practical, the next stage is that the learning media is tested in one class. The class chosen by the researchers was class X DPIB to serve as test subjects. Research activities were carried out face-to-face at SMK Negeri 1 Mandrehe Barat, totaling 10 people. At this stage, researchers also looked at the level of effectiveness of the learning media that had been developed. The effectiveness of learning media is measured from the assessment of learning outcomes given

to students after participating in learning process activities using the learning media developed. The learning outcomes tests given to students are learning outcomes tests that have been declared valid and have been validated by material experts. Furthermore, researchers also gave student response questionnaires to determine the level of practicality of learning media in field tests. The following are the results of the field test student response questionnaire, which can be seen in the table below:

FIELD TRIAL STUDENT RESPONSE QUESTIONNAIRE RESULTS

No.	Student	Score	Percentage	Practicality Criteria
1.	Student 1	70	93%	Very Practical
2.	Student 2	68	91%	Very Practical
3.	Student 3	71	95%	Very Practical
4.	Student 4	69	92%	Very Practical
5.	Student 5	73	97%	Very Practical
6.	Student 6	72	96%	Very Practical
7.	Student 7	69	92%	Very Practical
8.	Student 8	72	96%	Very Practical
9.	Student 9	71	95%	Very Practical
10.	Student 10	70	93%	Very Practical
Total score			**705**	
Percentage			**94%**	
Practicality Criteria			**Very Practical**	

c. Teacher Response

The following is the assessment from the teacher of the basics of building construction and land measurement techniques, which can be seen in the table below:

PRACTICAL RESPONSE QUESTIONNAIRE BY TEACHERS

No.	Rated aspect	Score
1	Teachers do not find it difficult to carry out learning using media.	5
2	The teacher fluently operates the media.	4
3	Media can be used repeatedly by teachers and students.	5
4	Suitability of time available for learning with ease of media operation.	4
5	Media helps students understand information in the learning process.	5
6	Media in triggering student creativity.	4
7	The ability of media to activate students in building their own knowledge.	5
8	The suitability of the media to the world of the students being taught.	5
9	Students fluently operate Lectora Inspire-based media	4
10	The learning process uses media in accordance with student activities	5
11	Media is appropriate to the content of K3LH learning material	5
12	The atmosphere of the learning process is conducive and enjoyable.	5
13	Students understand material more quickly with media.	4
14	Media makes it easier for teachers to teach.	5
15	Students complete individual and group assignments more quickly with media learning resources	5
Total Score		**70**
Percentage		**93%**
Practicality		**Very Practical**

d. Product trial results

The practicality of developing interactive learning media based on Lectora Inspire in the subjects Basics of Building Construction and Land Surveying Techniques, material on understanding occupational safety and health procedures and the environment (K3LH) in building work based on student and teacher response questionnaires in individual tests and field tests .

1) Student and Teacher Responses

Product trials carried out at SMK Negeri 1 Mandrehe Barat, especially class X DPIB were divided into two stages, namely individual trials and field trials. Individual trials used 3 students as respondents and field trials used 10 students as respondents. The aim of this trial is to determine students' responses to the learning media developed through assessment questionnaires.

Trial results can be obtained by assessing students' response questionnaires. The student questionnaire assessment can be seen in the following table:

MEDIA PRACTICAL ASSESSMENT

N o.	Product Trial	Many Samples	Total Score Earned	Maximum Total Score	Achievement Level	Category
1.	Individual Trial	3 Person	209	225	93%	Very Practical
2.	Field Trials	10 People	705	750	94%	Very Practical
3.	Teacher Response	1 Person	70	75	93%	Very Practical

Source: Researcher 2023

Product testing has been carried out in individual trials and field trials as well as teacher responses. In the individual trial the achievement level was 93% in the very practical category, then the researchers conducted a field trial with an achievement level of 94% in the very practical category, and the teacher's response was with an achievement percentage of 93%.

After conducting two trials of interactive learning media products based on Lectora Inspire, including individual trials, field trials and teacher responses, achievement results were obtained with each being categorized as "Very Practical". The results of product trials that have been tested on students can be seen from the following graph:
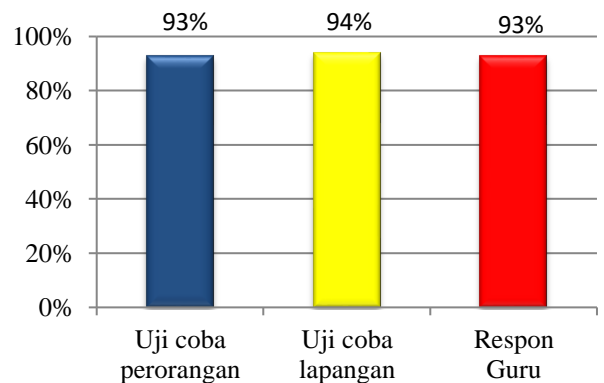
Graph 4.7 Average Individual Trials, Field Trials, and Teacher Responses

Information :
Individual Trial   :   93%

Field Trials   : 94%
Teacher Response   : 93%

4.1.4. Evaluation Stage (Evaluation)

The evaluation stage (evaluation) activities carried out at this stage is by evaluating responses to test questions on the media given to students at the end of the material, as well as filling out student response questionnaires and answering the test questions given. In this evaluation, all students completed a total of 10 people. These scores were obtained from the test given at the end of the lesson, namely the competency test.

Discussion

Analysis of Media Development Procedures

The research and development procedures in this study were adapted from a summary of Instructional Design with the ADDIE approach by Dick & Carey 1996. According to (Tegeh et al, 2014) ADDIE consists of five stages, namely 1) Analysis, 2) Design, 3) Development, 4) Implementation and 5) Evaluation.

a. Analysis Stage (Analysis)

At this stage, an analysis of students' problems and needs is carried out. Problem analysis to find out related problems in the learning process. Analysis of student needs is carried out to determine student characteristics and student needs in the learning process so that the media developed can suit needs. The results of the analysis show that there is a problem, namely that teachers are still monotonous in the learning process. Teachers only often use textbooks, modules and other references from the internet. This makes students less enthusiastic about participating in the learning process, as indicated by some students having fun chatting with their classmates when the teacher explains the material in front of the class. Students feel bored with the learning process. This boredom arises because the learning media used by teachers is not yet varied.

Based on the results of this analysis, researchers have the idea to develop Interactive Learning Media Based on Lectora Inspire.

b. Design Stage (Design)

Researchers designed media which included creating learning media design concepts (storyboards), preparing material, questions and answers, and creating backgrounds, images and characters. The concept of Lectora Inspire-Based Interactive Learning Media is in the form of material, example questions and discussions and evaluation questions that are in accordance with the Basic Competency (KD) Understanding Occupational Health and Safety Procedures and the Environment (K3LH) in Building Work.

c. Development Stage (Development)

Development of interactive learning media, semi-components such as background design, images, characters, navigation buttons, materials and questions prepared using Lectora Inspire V.18 software in accordance with storyboard design. The final product of developing this learning media is an offline/online file which is published in .exe format so that it can be used on the user's computer or laptop without having to install Lectora Inspire first. Lectora Inspire Based Interactive Learning Media was then validated by Material Experts, Language Experts and Media Experts from FKIP lecturers, Nias University. The researcher received advice from the supervisor to choose the lecturer as an expert because he had competence in his field. The researcher then carried out revision I based on input from material experts, language experts and media experts. The Learning Media is then validated II by the validator.

d. Implementation Stage (Implementation)

This stage carried out individual trials on 3 class X DPIB students at SMK Negeri 1 Mandrehe Barat. The results of the small group trial did not reveal any revisions that had to be carried out by the researcher, so the Field Trial continued. Field trials were carried out on 10 students of class X DPIB X DPIB SMK Negeri 1 Mandrehe Barat. Researchers provide laptops that include interactive learning media files based on Lectora Inspire. Students look enthusiastic in participating in learning using Lectora Inspire-based Interactive Learning Media. Learning using interactive learning media provides motivation and new experiences in learning in a more relaxed and enjoyable way. At the end of the lesson, students were asked to provide responses to the interactive learning media developed by researchers

by filling out a questionnaire.

e. Evaluation Stage (Evaluation)

At this stage the researcher carried out an evaluation by comparing the results of all trial stages and recapitulating the results of the assessment of the feasibility of the learning media by material experts, language experts, and learning media experts (practitioners) and students.

4.2.1. Data Analysis of Validity Results

The validity of Lectora Inspire-based interactive learning media is based on three aspects, namely material, language and design validation. The following is an analysis of these three aspects based on the results of the validation that has been carried out.

a. Material Expert Validation

Based on assessments from material experts. Learning media on the material of understanding occupational safety and health procedures and the environment (K3LH) in building work with the help of the Lectora Inspire application. The material expert validator revised the learning media developed by the researcher twice, in terms of the straightforward, media and benefit aspects. The explanation of the aspects assessed is as follows.

The validator results in the Straightforward aspect obtained a validation score in revision I of 70% from 8 indicators. The validation score results were obtained from the total score obtained of 28, then divided by the maximum score for each aspect, namely 40, multiplied by 100%. Meanwhile, in revision II, the Straightforward aspect received a validation score of 95% from 8 indicators. The validation score results were obtained from the total score obtained of 38, then divided by the maximum score for each aspect, namely 40, multiplied by 100%. The results obtained in the score increased in revision II with a difference of 25%.

The validator results in the Media aspect obtained a validation score in revision I of 67% from 6 indicators. The validation score results are obtained from the total score obtained of 20, then divided by the maximum score for each aspect, namely 40, multiplied by 100%. Meanwhile, in revision II, the Media aspect received a validation score of 97% from 6 indicators. The validation score results were obtained from the total score obtained of 29 then divided by the maximum score for each aspect, namely 40, multiplied by 100%. The results obtained in the score increased in revision II with a difference of 30%.

The validator results in the Benefits aspect obtained a validation score in revision I of 67% from 6 indicators. The validation score results are obtained from the total score obtained of 20, then divided by the maximum score for each aspect, namely 40, multiplied by 100%. Meanwhile, in revision II, the Benefits aspect received a validation score of 93% from 6 indicators. The validation score results were obtained from the total score obtained of 28, then divided by the maximum score for each aspect, namely 40, multiplied by 100%. The results obtained in the score increased in revision II with a difference of 25%. The three aspect assessment results obtained an overall average percentage in revision I of 68% and revision II of 95% in the "Very Valid" category. In line with research (Imani, 2021), validation results obtained by material experts obtained a validity level of 96%, meaning it is very suitable for use.

Based on qualitative data obtained from suggestions and comments from material experts, several things need to be improved, namely providing information on the images so that it is easy to know the name of each image,It is necessary to add a brief and clear explanation of the function of the image so that students can easily understand, finally, add a description of the function to the image of protective clothing.

b. Linguist Validation

Based on assessments from language experts. Learning media on the material of understanding occupational safety and health procedures and the environment (K3LH) in building work with the help of the Lectora Inspire application. The language expert validator revised the learning media developed by the researcher twice, in terms of the straightforward, media and benefit aspects. The explanation of the aspects assessed is as follows.

The validator results in the Straightforward aspect obtained a validation score in revision I of 73% from 11 indicators. The validation score results were obtained from the total score obtained of 40, then divided by the maximum score for each aspect, namely 55, multiplied by 100%. Meanwhile, in revision II, the Straightforward aspect received a validation score of 95% from 11 indicators. The validation score results were obtained from the total score obtained of 52, then divided by the maximum score for each aspect, namely 55, multiplied by 100%.

The validator results in the Media aspect obtained a validation score in revision I of 70% from 6 indicators. The validation score results were obtained from the total score obtained as 21, then divided by the maximum score for each aspect, namely 30, multiplied by 100%. Meanwhile, in revision II, the Media aspect received a validation score of 93% from 6 indicators. The validation score results were obtained from the total score obtained of 28, then divided by the maximum score for each aspect, namely 30, multiplied by 100%.

The validator results in the Benefits aspect obtained a validation score in revision I of 73% from 6 indicators. The validation score results were obtained from the total score obtained of 22, then divided by the maximum score for each aspect, namely 40, multiplied by 100%.

Meanwhile, in revision II, the Benefits aspect received a validation score of 93% from 6 indicators. The validation score results were obtained from the total score obtained of 28 then divided by the maximum score for each aspect, namely 40, multiplied by 100%. The three aspect assessment results obtained an overall average percentage in revision I of 72% and revision II of 94% in the "Very Valid" category. These results are in line with research (Mahmudah, 2019) with validation results obtained by linguists obtaining a validity level of 90%, meaning it is very suitable for use.

Based on qualitative data obtained from suggestions and comments from linguist experts, improvements need to be made regarding several things, namelychanging the word 'tau' to 'know' on page nine, giving space to the word 'inside' on page ten, correcting the word 'tak' to 'not' on page eighteen, finally correcting the word 'chemistry' to 'chemistry ' on page twenty-three.

c. Media Expert Validation

Based on assessments from media experts. Learning media on the material of understanding occupational safety and health procedures and the environment (K3LH) in building work with the help of the Lectora Inspire application. The media expert validator revised the learning media developed by the researcher twice, in terms of the aspects of Slides, Design and Benefits. The explanation of the aspects assessed is as follows.

The validator results for the Slide aspect obtained a validation score in revision I of 67% from 11 indicators. The validation score results were obtained from the total score obtained of 37, then divided by the maximum score for each aspect, namely 55, multiplied by 100%. Meanwhile, in revision II, the Slide aspect received a validation score of 93% from 11 indicators. The validation score results were obtained

from the total score obtained of 51, then divided by the maximum score for each aspect, namely 55, multiplied by 100%.

The validator results in the Design aspect obtained a validation score in revision I of 70% from 6 indicators. The validation score results were obtained from the total score obtained as 21, then divided by the maximum score for each aspect, namely 30, multiplied by 100%. Meanwhile, in revision II, the Design aspect received a validation score of 90% from 6 indicators. The validation score results were obtained from the total score obtained as 27, then divided by the maximum score for each aspect, namely 30, multiplied by 100%.

The validator results in the Benefits aspect obtained a validation score in revision I of 67% from 6 indicators. The validation score results are obtained from the total score obtained of 20, then divided by the maximum score for each aspect, namely 40, multiplied by 100%. Meanwhile, in revision II, the Benefits aspect received a validation score of 93% from 6 indicators. The validation score results were obtained from the total score obtained of 28, then divided by the maximum score for each aspect, namely 40, multiplied by 100%. The three aspect assessment results obtained an overall average percentage in revision I of 72% and revision II of 94% in the "Very Valid" category. Based on these results, it is in line with research from (Mualifah, 2020) with media expert validation results obtaining a validity level of 94%, meaning it is very suitable for use.

Based on qualitative data obtained from suggestions and comments from design experts, improvements need to be made regarding several things, namelyfixed the start navigation button on page oneto make it look attractive and easy to use, the last thing is to design the appearance on page two by adding images and removing the 'back' navigation button.

Practical Results Data Analysis

The learning media developed is assessed for the level of practicality based on the results of the response questionnaire that has been given to students and teachers. Student response data was obtained from the results of student response questionnaires at the individual test and field test stages. Teacher response data was also obtained from the results of teacher response questionnaires when they had finished carrying out the field trial phase.

a. Individual Test

Student responses in individual trials were carried out at the West Mandrehe 1 Vocational School, in class X by taking a sample of 3 respondents covering the Straightforward aspect, Media aspect and Benefits aspect. The results of individual trials show that the media can be used in learning, based on the results of the questionnaire responses, students got a total score of 209 out of a maximum total score of 225 with a percentage level of 93%, in the "Very Practical" category. Based on these results, it is in line with research results from (Mahmudah, 2019) with a practicality level of 93% included in the Very Practical category

The following is a description of the percentage results of each respondent's score with a maximum score of 75, namely respondent 1 with a score of 68, with a percentage of 91%, respondent 2 with a score of 71, a percentage of 95%, respondent 3 with a score of 70, a percentage of 93%.

b. Teacher (Practitioner) Response

Based on the assessment of learning practitioners in understanding material (K3LH) in building work, it reached a percentage level of 93%, with the "Very Practical" category. So the media doesn't need to revise it again. The validation score results are obtained from the total score obtained of 70 then divided by the maximum score, namely 75, multiplied by 100%. Based on these findings, it is similar to the research results from

(Petrus Desniatman Zega, Envilwan Berkat Harefa, Aprianus Telaumbanua, Arisman Telaumbanua)

(Imani, 2021) with a practicality level of 91% included in the Very Practical category.

So it can be concluded that the media is practical and suitable for use in learning the materialunderstand occupational safety and health and environmental (K3LH) procedures in building work.

c. Field Test

Field trial student responses at West Mandrehe 1 Vocational School in class The results of the field trials show that learning media can be used in learning, the results of the student response questionnaire obtained a total score of 705 out of a maximum total score of 750 with a percentage level of 94% in the Very Practical category. Based on these results, it is in line with research results from (Muallifah, 2020) with a practicality level of 94% included in the Very Practical category

Based on the two trials above, it shows that there is an increase in results in each practical test. Based on the practicality scale assessment range, the percentage of 81-100% is included in the very practical category. So the achievement at the field test stage with a percentage level of 94% is very practical for use in the learning process.

Data Analysis of Effectiveness Results

The effectiveness of developing learning media is obtained from learning outcomes tests given to students after studying learning media. Learning media was given to 10 class X DPIB students. After students study the learning material with the title understanding occupational safety and health and the environment (K3LH) in building work which is published in interactive learning media based on Lectora Inspire,The researcher distributed learning result test questions to students with a total of 5 questionsessays.From these results, the percentage of students' learning completeness is obtained, which can be seen in the table below:

TEST RESULTS LEARNING RESULTS

No.	Student	KKM	Score	Mark	Information
1	Student 1	70	18	82	Complete
2	Student 2	70	19	86	Complete
3	Student 3	70	20	91	Complete
4	Student 4	70	18	82	Complete
5	Student 5	70	18	82	Complete
6	Student 6	70	20	91	Complete
7	Student 7	70	19	86	Complete
8	Student 8	70	17	77	Complete
9	Student 9	70	19	86	Complete
10	Student 10	70	18	82	Complete

Source: Researcher 2023

Based on the table above, the completeness of the student learning test results in class Researchers evaluate the material that has been taught to students, the product is said to be effective if the student's grades meet the predetermined KKM completeness. 10 students had scores above the KKM and were declared complete, from the data obtained the average student score was 85% according to the criteria (Effective).Based on these results, it is strengthened by research from (Mahmudah, 2019) with an effectiveness level of 85.5% included in the Very Effective category and the media is suitable for use as a tool in the learning process.

Conclusion

Based on the results of research and development of interactive learning media based on Lectora Inspire on the basics of building construction and land measurement techniques, the researchers drew conclusions namely:

1. Lectora Inspire-based interactive learning media on the material of understanding occupational safety and health procedures and the environment (K3LH) in building work. The results from material experts obtained 95% with very feasible criteria, from language experts obtained 94% with very feasible criteria, and design experts obtained 92% with very feasible criteria.

2. Lectora Inspire-based interactive learning media on the material of understanding occupational safety and health procedures and the environment (K3LH) in building work. In individual trials, 95% were obtained with very practical criteria, in field trials 93% were very practical criteria and teacher responses were 93% with very practical criteria.

3. Lectora Inspire-based interactive learning media on the material of understanding occupational safety and health procedures and the environment (K3LH) in building work reached effective criteria with an average student score of 85%.

So it can be concluded that the development of interactive learning media is based on *Lectora Inspire* In the Basics of Building Construction and Land Measurement Techniques, material on understanding Occupational Safety and Health and the Environment (K3LH) in building work carried out in class in the learning process at school.

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