INTERACTIVE PHYSIC LEARNING MEDIA DESIGN USING LECTORA INSPIRE

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ABSTRACT

The learning process in the digital era cannot be separated from information technology. Various kinds of applications are offered, ranging from paid to free. This study aims to describe the design of interactive learning media by utilizing a free application, namely Lectora Inspire. This application serves to make it easier for users to create interactive learning media designs. In addition, the Lectora Inspire application can assist teachers in the learning process with attractive and interactive media designs. Appropriate interactive learning media design can produce effectiveness in the learning process. In this case, this research is motivated by the use of learning media used in schools that are not fully interactive and are not in accordance with making good learning designs. For this reason, this study aims to design good interactive learning media by following the proper learning media design rules. The research method used in this research is research and development (R&D) with the ADDIE model namely analysis, design, development, implementation, and evaluation. Research on the development of the ADDIE model is limited to the early stages, namely Analysis and Design. From the results of the design of interactive learning media using the lectora inspire application developed by researchers, it is hoped that it will be useful for students and teachers at school so that students can master learning independently and have fun.

I. INTRODUCTION

The 21st century is marked by the rapid development of information technology. Current technological developments bring major changes in the development of the world of education. The world of education always follows technological developments, especially the adaptation to the use of information technology, to improve the quality of education. This is in line with Permendikbud No 22 of 2016 concerning Active Participation in learning physics in high schools that is interactive, inspiring, fun and active. skills, interests, and student development. Therefore, information technology can be developed to support learning in such a way as to encourage innovation in the use of technology results in the teaching and learning process [1]. Teachers also need to develop skills in creating a learning environment so that learning is more optimal.

Learning media is one of the intermediaries or introductory sources of messages with message recipients so as to arouse the thoughts, attention, and willingness of students to be more motivated in the learning process and participate actively [2]. The learning process will run effectively and efficiently if it is supported by learning media [3]. The use of media in the learning process will provide a meaningful experience for students. the learning process through the media is expected to be able to convey messages clearly and effectively [4]. A good category of educational media is media that is fun and easy to digest and interactive for students. interactive learning media can generate new desires and interests as well as generate motivation student learning [5]. Interactive media is a tool for creating versatile learning where teachers can use technology to convey educational material or information to students more easily [6]. Therefore, students can solve problems related to learning physics with the help of an interactive learning environment.

In learning physics, students must have basic skills that are useful for solving everyday problems. It is

known that all these natural phenomena can be explained in physics, so that problems that often occur in the surrounding environment are not far from physics concepts. The teacher's role in learning physics is to guide students to master the concepts, knowledge and principles of physics as well as scientific process skills. In this case the physics material is not only applied through teacher explanations which are too monotonous, but reinforced through experiments so that students understand the concepts being taught. In addition, the use of interactive media needed in the teaching and learning process to support students' knowledge and solve problems caused by limited time and other opportunities.

Based on the conditions in the field, the use of interactive learning media in high schools in Padang City is relatively low. One of the factors is the use of media which is less interactive and the limited use of media in schools. Teachers usually use power points or videos so that students get bored. The use of power point media only shows important points or contains writing so that students do not understand and monotonous. In addition, the material of straight motion and parabolic motion is difficult for students to understand if the teacher only explains it through the lecture method. From the observational data obtained, this material is usually explained using the lecture method and the lack of use of interactive media makes it difficult for students to understand the material. In addition, the material is Straight Motion and Parabolic Motion is one of the physics materials that requires complex solving skills, meaning that students not only need to remember formulas, but students must be able to develop them graphically, graphically and mathematically. Students have difficulty solving physics questions about straight motion and parabolic motion, if they cannot represent the material concept. Therefore, interactive learning media is needed to support the learning process.

The criteria that must be considered in choosing media in the learning process are as follows: accuracy with learning objectives, support for learning material content, ease of obtaining media, skills possessed by teachers and their application to students so they can think. well. Therefore the researcher chose Lectora Inspire to make good interactive learning media. Lectora inspire is learning software that is relatively implementable because it does not require understanding of advanced programming languages [7]. In addition, learning media using the Lectora Inspire application can be said to be an effective teaching tool to support student learning. the use of inspirational lectors can improve student learning outcomes. In Lectora Inspire there are several features to make it easier for teachers to use such as recording videos, combining images or animations, and capturing screens [8]. Lectora inspire is used to make assessments, and presentations. Content developed with the Lectora software can be published to various outputs such as HTML, Single File Executable, and CD-ROM [9].

The use of interactive learning media used by teachers there are several things that must be considered so that the media becomes effective [10]. One of them is designing good interactive learning media. Media design is a learning design that is useful for finding qualities (effective, efficient and practical processes, activities or forms of learning) to achieve the expected learning objectives. Therefore planning or designing learning is very necessary in the learning process [11]. the introduction in making designs on media is the suitability of planning to core competencies, basic competencies, learning objectives, and materials. Generally, preliminary research is more focused on what material is appropriate in the curriculum [12]. There are several important components in designing interactive learning media, namely text, images, audio, video and animation. This is in accordance with Mayer's research that learning media includes instructions in the form of words (such as spoken or printed text) and graphics (such as illustrations, diagrams, photos, animations or videos) to encourage learning [13].

several criteria in designing an interactive learning environment according to Thorn, including: ease of navigation, cognitive content, presentation of information, media integration, artistic and aesthetic functions, and general functions. interactive learning media combines text, graphics, sound and interaction [14]. Thus, the use of interactive learning media can improve student learning outcomes. In addition, it increases learning motivation and independence in achieving the level of mastery of physics material. Previous research on the use of learning media used the Powtoon application, while researchers used the Lectora Inspire application. This study aims to describe the design of interactive learning media using a free application, namely Lectora Inspire properly, especially in the material of straight motion and parabolic motion.

II. METHOD

This research is part of the Research and Development Using the ADDIE Model (R&D). This research is in the design stage. This research design interactive learning media using the Lectora Inspire application. The result of this media development is a good interactive learning media design that can be used in physics learning. the stages of this research are shown in Figure 1.
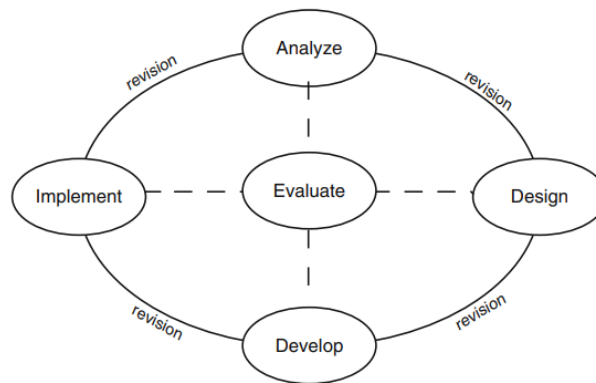
Fig.1. Addie Model [15]

This research is in the design stage. At this stage the researcher begins to design interactive learning media products that will be produced. The design stage carried out by the researcher is to develop a design according to the previous analysis. This research is in the design stage. At this stage the researcher begins to design interactive learning media products that will be produced. The design stage carried out by the researcher is to develop a design according to the previous analysis.

1) Application selection
   The application used is in the form of interactive learning media using the Lectora Inspire application with the aim of making it easier for students to understand concepts during the learning process

2) Collection of materials
   This stage is carried out by designing the appearance of interactive learning media and designing learning content in developing the interactive learning media designs that are developed.

3) Compilation of product drafts
   The initial design that was carried out was first made in word before being entered into the Lectora Inspire application.
   a. Cover, contains the front page of the learning media entitled Interactive Learning Media
   b. Introduction, contains preface and instructions for using the media
   c. Competencies, contains core competencies, basic competencies, and indicators used in accordance with the material presented
   d. Summary of material, contains material that is presented briefly, and is equipped with supporting features such as audio, video, animation, and so on
   e. Example questions, contains questions accompanied by discussion
   f. Evaluation, contains practice questions that contain questions from LOTS, MOTS and HOTS
   g. References used in making a product

III. RESULTS AND DISCUSSION

1. Analysis

The analysis phase is the initial stage in the design of instructional media carried out by researchers before conducting research. This stage is to analyze the need for interactive learning media design. The analysis stage includes needs analysis, curriculum analysis, and characteristics analysis.

   a. Needs Analysis

At the needs analysis stage, researchers analyzed the state of the interactive media used in the learning process in class. This analysis is based on real conditions in the field by distributing questionnaires and conducting interviews with physics teachers throughout the city of Padang. Based on the results of interviews with physics teachers, in the process of learning physics, teaching materials in the form of textbooks from schools are already

available. However, teaching materials in the form of printed books are less practical in terms of their use, because some students are lazy to read printed books because there are too many theories that cause boredom.

In addition, the application of learning media used is only monotonous and does not vary. The teacher only uses media in the form of video and ppt so that students are less enthusiastic when learning takes place. The limited use of interactive learning media to support the learning process is because teachers are not familiar with interactive learning media software. This interactive learning media can help and facilitate the learning process in class.

b. Curriculum Analysis

The curriculum analysis phase is carried out by taking into account the applicable device curriculum. The analysis stage aims to formulate indicators and competency-based learning objectives. Competencies for straight motion and parabolic motion are guided by Permendikbud No. 37 of 2018 concerning Core Competencies and Basic Competencies in the current curriculum. Straight motion competence is analyzing physical quantities in straight motion with fixed (fixed) speed and straight (fixed) motion along with its application in everyday life while parabolic motion content is related to analyzing parabolic motion using vectors, the following is the physical meaning and its application in life daily.

c. Student Analysis

In this stage it is carried out by distributing questionnaires to students. The questionnaires distributed were used to see the interests, attitudes, learning motivation, learning styles, and students' thinking abilities towards the learning media used in the learning process. This is done with the aim that product design is made according to the character of students. The learning styles in question are audio, visual, and audio-visual. While learning motivation can be seen through the learning media used, whether learning media can influence student motivation or even vice versa.

2. Design stage

At this stage, researchers begin to design interactive learning media products that will be produced. The design stage carried out by the researcher is to develop a design according to the previous analysis

1) Main menu display (cover)

The cover is the first page of the interactive learning media. The cover consists of the material title and navigation buttons that directly lead to the material in straight motion and parabolic motion. The navigation structure shows the flow in the learning media application which describes the menu order. This menu sequence has been arranged in such a way that students can use it. These navigation buttons should be kept as simple as possible when developing an interactive learning environment [16]

Fig. 2. Cover display on interactive learning media design

If the cursor is directed to straight motion material, there is a cover for straight motion material. This cover contains menus that have been arranged according to a good layout. Layout is the arrangement of design elements. The purpose of the layout is to display image and text elements in such a way as to make it easier for students to read or accept the information presented [17]. the researcher arranges the layout on the cover, which consists of instructions. The goal is for users to understand the instructions or guidelines for using an interactive learning environment before using learning media. After that competencies, indicators, learning objectives, materials, assessment questions, translators and references. These menus are in the form of active buttons, if students choose the wrong button they will be directed to the desired page.

Fig. 3. Cover view of Straight Motion material

The same thing with the cover on the straight motion material. When the cursor is on the parabolic motion material, then the parabolic motion material has a cover. This cover consists of a layout that is arranged to make it easier for students to use interactive learning media. This button consists of instructions, competencies, indicators, learning objectives, materials, assessment and discussion, references, and identity are the components of the product to be constructed. These menus are active buttons which can be bound to specific buttons. On the cover there is a picture of phenomena in direct and parabolic motion. The goal is that students can understand the material and encourage students to be more interested in learning. In addition, the existence of physical phenomena in the images presented can develop students' thoughts that are more realistic [18].

Fig. 4. Cover display on Parabolic Motion material

2) Hint

This guide section contains information about the navigation buttons available on each page. Instructions contain information about the use of interactive learning media. This navigation button has three active navigation buttons namely menu button, back button and next button. Then there is typography or lettering. Typography sets the type so that the user can read as fully as possible. When choosing fonts/fonts for interactive learning media, research must pay attention to the product being made. The letters on this media use Arial size 12. This typeface is used because it has the advantage of being very easy to read [17]. The text color is black, chosen based on the background color of the media. The media shows the Dijon background color and the black writing is legible when using student interactive learning media.

In addition, color is an important element in designing interactive learning media. Color selection is an important thing that also determines the feasibility of a medium [19]. The researcher uses Dijon color on the background and brown color on the top view of the media. This color belongs to the contrast category according to Eko Nugroho (2008), so students will focus on interactive learning media. In the opinion of Heinich, et.al. spectrum and the use of the right color composition can increase the enthusiasm of students [20].
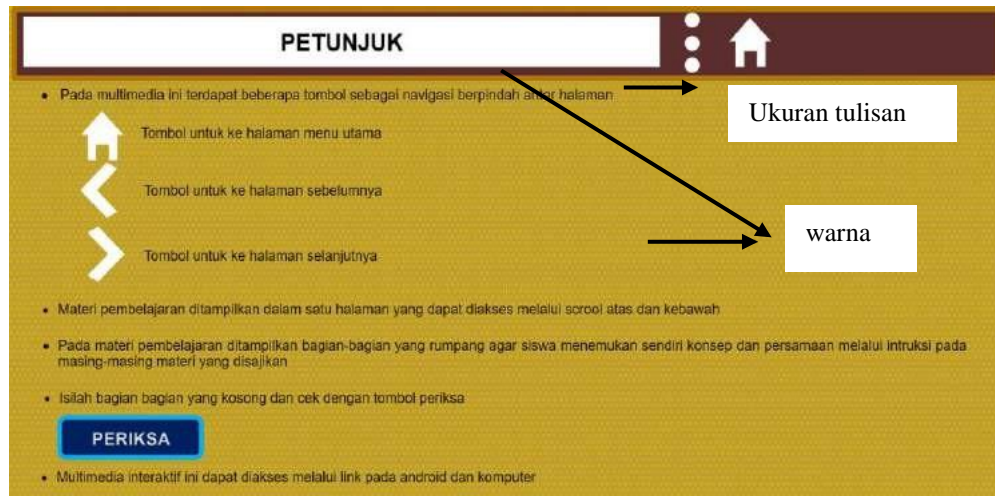
Fig. 5. Display of Instructions for Interactive Learning Media

3) Competencies

Competence is knowledge, skills, abilities or characteristics related to the level of ability to work in problem solving, critical thinking or leadership [21]. core competencies are the main competencies which consist of four interrelated groups, namely with regard to religious attitudes, social attitudes, knowledge, and application of knowledge. Meanwhile basic competencies is a competency derived from core competencies [22]. basic competencies is the minimum ability that must be achieved by students, namely in the form of knowledge, skills, and attitudes that show that students have mastered the competencies that have been determined [23]. Display of core competencies and basic competencies on interactive learning media displays information about competencies. There is a home button that functions to return to the menu.
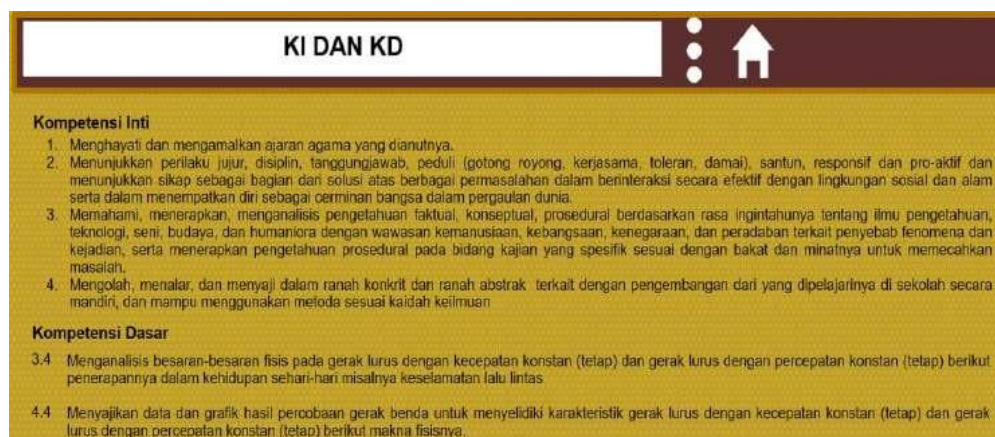

Fig. 6. Competency Display on Straight Motion Material

Fig. 7. Competency Display on Parabolic Motion Material

4) Indicators

Indicators are markers for achieving specific competencies that can be used as a measure to determine the achievement of learning objectives [24]. So that competency achievement indicators are used as a reference in evaluating learning [23]. The display of the indicator page contains a description of the basic competencies that have been developed. Indicators are developed to improve students' thinking skills.

INDIKATOR GERAK LURUS

3.4.1 Mendeskripsikan fenomena-fenomena beserta konsep gerak lurus dalam kehidupan sehari-hari

3.4.2 Menganalisis besaran-besaran pada gerak lurus dengan kecepatan konstan dan gerak lurus dengan percepatan konstan

3.4.3 Menjelaskan fenomena yang berkaitan dengan gerak lurus beraturan

3.4.4 Menganalisis fenomena yang berkaitan dengan gerak lurus berubah beraturan

4.4.1 Menyajikan data dari gerak suatu benda untuk menentukan hubungan jarak dan waktu dari hasil percobaan gerak lurus dengan kecepatan tetap

Fig. 8. Indicator Display on Parabolic Motion Material

INDIKATOR GERAK PARABOLA

3.5.1 Menjelaskan fenomena-fenomena beserta konsep gerak parabola dalam kehidupan sehari-hari

3.5.2 Menjelaskan hubungan GLBB pada gerak parabola

3.5.3 Menganalisis besaran-besaran pada gerak parabola

3.5.4 Menentukan persamaan titik tertinggi dan jarak terjauh dari suatu benda yang bergerak dengan lintasan parabola

4.5.1 Menyajikan data dari percobaan gerak parabola untuk menentukan hubungan variasi sudut terhadap jarak tempuh benda

Fig. 9. Indicator Display on Parabolic Motion Material

5) Learning Objectives

The learning objectives are an illustration of the competency driving indicators. In learning objectives. In this case, the numbering format is adapted to the indicators. This is intended so that users better understand the objectives according to the indicators and what is achieved in the presentation of the material.

TUJUAN PEMBELAJARAN

Tujuan Pembelajaran pada Gerak Lurus

3.4.1.1 Melalui pemaparan fenomena, peserta didik mampu mendeskripsikan contoh-contoh fenomena mengenai penerapan gerak lurus dalam kehidupan sehari-hari dengan tepat

3.4.1.2 Melalui pemaparan fenomena, peserta didik diharapkan mampu untuk menjelaskan konsep gerak lurus dengan tepat.

3.4.2.1 Melalui pemberian animasi, peserta didik dapat menganalisis perbedaan konsep jarak dan perpindahan dengan benar.

3.4.2.2 Melalui pemberian animasi, peserta didik dapat menganalisis perbedaan konsep kecepatan dan kelajuan dengan benar.

3.4.2.3 Melalui pemberian animasi, peserta didik dapat menganalisis konsep percepatan dengan benar.

3.4.3.1 Melalui pemberian animasi, peserta didik mampu menjelaskan konsep gerak lurus beraturan dengan tepat.

3.4.3.2 Melalui pemberian animasi, peserta didik mampu menyimpulkan ciri-ciri yang terdapat pada gerak lurus beraturan dengan tepat.

3.4.4.1 Melalui pemberian contoh soal, peserta didik mampu menjelaskan konsep gerak lurus berubah beraturan dengan baik.

3.4.4.2 Melalui pemberian animasi, peserta didik mampu menyimpulkan ciri-ciri gerak lurus berubah beraturan dengan baik.

3.4.4.3 Melalui penjelasan yang diberikan guru, peserta didik dapat menguraikan turunan persamaan gerak lurus berubah beraturan dengan baik

3.4.4.4 Melalui pemberian animasi, peserta didik mampu menganalisis konsep gerak vertikal dan gerak jatuh bebas dengan baik

3.4.4.5 Melalui pemberian animasi, Peserta didik mampu merumuskan persamaan gerak vertikal dan gerak jatuh bebas dengan benar

4.4.1.1 Melalui penyajian data, peserta didik mampu menentukan hubungan jarak dan waktu dari percobaan gerak lurus dengan kecepatan tetap dengan tepat

Fig. 10. Display of Learning Objectives in Straight Motion material

TUJUAN PEMBELAJARAN

Tujuan Pembelajaran pada Gerak Parabola

3.5.1.1 Melalui pemaparan fenomena, peserta didik mampu menemukan contoh-contoh fenomena mengenai penerapan gerak parabola dalam kehidupan sehari-hari dengan tepat

3.5.1.2 Melalui pemaparan fenomena, peserta didik mampu untuk menyimpulkan karakteristik gerak parabola dengan tepat.

3.5.2.1 Melalui pemberian animasi, peserta didik dapat menjelaskan hubungan gerak lurus berubah beraturan (GLBB) pada gerak parabola dengan benar.

3.5.3.1 Melalui pemberian animasi, peserta didik mampu menganalisis besar perpindahan, kecepatan dan percepatan benda dengan tepat

3.5.4.1 Melalui pemberian animasi, peserta didik mampu mampu menentukan persamaan titik tertinggi, jarak terjauh serta waktu yang diperlukan pada gerak parabola dengan tepat.

4.5.1.1 Melalui penyajian data, peserta didik dapat menentukan hubungan variasi sudut elevasi terhadap jarak tempuh benda dengan tepat

Fig. 11. Display of Learning Objectives on Parabolic Motion material

6) Material Summary

The material summary display contains material on straight motion and parabolic motion in a nutshell. Straight motion material is the basic material for the next physics material. The summary of the material consists of sub-chapters, namely straight motion, uniform rectilinear motion, and uniformly altered rectilinear motion. There are pictures, animations along with various examples of questions so as to increase students' interest in learning.

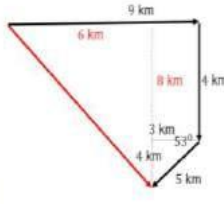**Fig. 12.** Display of Parabolic Motion Material Summary

7) Example Questions

The examples of questions contained in straight and parabolic motion material are very diverse, so that students give an interesting impression and are not monotonous in understanding the material. In addition, this aims to train students' thinking skills.

Fig. 13. Display of an example of a straight motion problem

The examples of questions given are very diverse, namely in the form of matching questions, puzzles, and filling in blank boxes as well as drag and drop. Examples of these various questions can be used by students so that there is interaction between users and the media.

Fig. 14. Display of an example of a parabolic motion problem

8) Evaluation

Evaluation is an assessment activity that aims to measure the success of the learning process [25]. Evaluation cannot be separated from learning because every learning activity must always be followed by an assessment activity. Evaluation is used to determine the ability of learning outcomes and the constraints encountered during

the learning process [26]. There are evaluation questions on straight motion and parabolic motion material using interactive learning media. The evaluation questions consist of 15 questions, where 10 questions are multiple choice questions and 5 questions are statement questions. On this evaluation page students will answer all questions and at the end of the page there is a check button which will go to the discussion page of the questions along with the grades obtained by students.

Fig. 15. Display of evaluation questions

Based on the learning design stages, it is known that interactive media usually consists of a combination of sound, images and text that allows users to interact with learning media [27] so that interactive media design can run well and can be utilized in learning at school and can be accessed via the internet. This success is because the media produced is interactive, easy and interesting so that it can be used by beginners [28]. Design of interactive learning media as a learning tool for students and educators in high schools, especially in straight and parabolic motion material. the design of interactive learning media using the lectora inspire application is very effective in supporting student learning, so that it can increase motivation and the level of mastery of student material. if learning motivation increases, then the learning process can be carried out properly [29] and helps students to achieve the expected competencies [30]

IV. CONCLUSION

Straight and parabolic motion material is very difficult for students to understand and master based on the results of curriculum analysis. In addition, because the straight and parabolic motion material is abstract and the use of media is limited, the learning process seems monotonous. For this reason, researchers designed learning media using the Lectora Inspire application. First, the researcher conducted a design framework with the help of Microsoft Word, and then designed learning using the Lectora Inspire application. The results of the research that has been carried out, it can be concluded that 4C-based interactive learning media using the lectora inspire application on straight and parabolic motion material can increase students' interest in learning and are motivated to learn, because the media is interactive.

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