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Development of Interactive Learning Media in Information and Communication Technology (ICT) Class X IPA

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Abstract

This research was about the media where the lack of availability of learning facilities caused students to not be able to master the subject matter so that students' low skills affect their learning outcomes. The purpose of this study was to produce interactive learning media on the subject of Information and Communication Technology (ICT) in class X MAN which was valid, practice and effective so that it can assist teachers in delivering material more creatively and innovatively, and help students master the subject matter. This type of research was research and development (R &D). The development model used was a 4-D model which consisted of the stages of defining, designing, developing and disseminating. The define stage was carried out by curriculum analysis, material analysis, and student analysis. The design stage was carried out by designing the learning media. In the development stage, the validity test was carried out through the learning media validation sheet, the practicality test through the media implementation observation sheet, the teacher and student response questionnaires, the effectiveness test was obtained from the knowledge competency assessment. The dessiminate stage was carried out by deploying the devices. The data analysis used was the Cohen Kappa formula. Based on the analysis, it showed that the validity test in terms of media and interactive learning materials in the Information and Communication Technology subject had been tested and declared very valid, namely 0.90; the practicality test of the teacher's response were 0.79 in the practical category and 0.81 student's response was in the very practical category; The effectiveness of the experimental class on average learning outcomes was 84.52 while the control class averages 75.16 learning outcomes with this value interactive multimedia was categorized as a valid, practiced and effective and media used as a learning medium.

Keywords: *Interactive Learning Media, Information and Communication Technology*

INTRODUCTION

The educational process involves many aspects in an education system, from teachers, students, curriculum, methods, strategies, media, facilities and infrastructure and others. All these aspects must be integrated and mutually support each other to achieve the aspired educational goals [1]. As stated in Law Number 20 of 2003 concerning the national education system, national education aims to develop the potential of students to become human beings who believe, fear God Almighty, have noble character, are healthy, knowledgeable, competent, creative, independent , and become democratic and responsible citizens. From this, it can be seen that there are many goals that are expected with the ongoing educational process that can be realized through the learning process carried out in schools.

An explanation of the implementation of learning in accordance with Law no. 20 of 2003 is contained in Government Regulation no. 19 of 2005 concerning national education standards, which was later revised into Government Regulation no. 32 of 2013, which describes the scope of national education standards consisting of 8 standards, namely content standards, process standards, graduation standards, standards for educators and educational staff, standards for facilities and infrastructure,

management standards, financing standards and assessment standards. The implementation of the learning process carried out in the classroom should be in accordance with the process standards, which are described in Permendikbud No. 65 of 2013 concerning the standard process of primary and secondary education [2].

Every learning process carried out in schools has certain objectives, as stated in the 2013 Curriculum guidelines that the goal of secondary education is to increase intelligence, knowledge, personality, noble character, and skills to live independently and follow further education [3]. To achieve learning objectives according to the 2013 curriculum, the role of ICT is very important for teachers in finding, processing, storing, presenting, distributing data and information in order to support the smooth learning process [4]. ICT subjects are here to provide students with skills to process information with technology, ranging from secondary to tertiary education.

In implementing the 2013 Curriculum (K-13), teachers must be able to follow the development of science and technology (IT) to be more innovative in providing lessons to students. Teachers are required to deliver more varied IT-based teaching materials so that they are easily accepted by students. The 2013 curriculum emphasizes more on the modern pedagogical dimension of learning more to the scientific approach, which includes observing, asking, reasoning, trying, forming networks [5].

Utilizing Information and Communication Technology (ICT) in schools is an effort to improve the quality of education in Indonesia. The role of technology which helps in improving the quality of education for the learning process which can make the learning process more enjoyable [6]. Information and communication technology offers a lot of convenience in student learning that allows a shift in the orientation of learning from the process of presenting various knowledge to a process of guidance in conducting individual exploration of science [7]. The teaching technique performed by a teacher using information technology media is a teaching system that utilizes computer hardware and software in a given learning system [8]. ICT is one of the driving forces in creating high quality education. Tik can improve the quality of teaching, learning and management in schools and thus raise standards [9].

Based on preliminary observations made by researchers at MAN 2 Padang which has implemented the 2013 curriculum, the media used by ICT teachers generally uses power points, videos, and blackboards but is not yet interactive. The media designed by the teacher is only one way, where the teacher explains the media he has designed so that student involvement in the learning process is only minimal. Besides, the instructional media provided by the teacher is not given to students, so students only learn the media at school. With the use of this media students can only pay attention to the activities of the teacher when explaining the subject matter, for students who are slow to grasp their material will be missed, because the media cannot be repeated.

The inaccuracy of the selection of instructional media by the teacher is also influenced by the ability of the teacher to design instructional media. ICT teachers find it difficult to use and create a learning media that is more innovative according to ICT subjects. Therefore we need a media that can help teachers to implement ICT learning in accordance with the characteristics of the ICT subject matter itself. There are still many teachers who admit that they have difficulty using the media in learning [10]. These difficulties, for example, such as designing learning media that are appropriate to the subject matter, operating IT-based learning media and others. Researchers also see that many teachers use text media as teaching media, because teachers find it difficult to determine learning media, especially those with technology (leptop and LCD projectors).

The limited learning media developed to support teaching and learning activities causes learning to be less than optimal, so that understanding of ICT material eventually becomes limited. When students are given media that can develop equipment or actual conditions and functions, enthusiasm and challenges will arise in students so as to increase motivation in learning [11].

The use of instructional media in the teaching and learning process can generate new desires and interests, generate motivation and stimulation of learning activities and have a psychological influence on students [12]. The use of educational media can make the learning process more interesting which will have an impact on improving the quality of learning [13]. In accordance with the function of the development media, interactive media learning models can provide a positive response and increase student interest in learning which is shown in the results of very high learning evaluation and excellent learning activities [14].

The interactive multimedia developed in this study is offline interactive multimedia. Offline intractive multimedia is interactive media that is not conveyed through a line / wire / channel / network. Examples of android, interactive CD, company profile [15]. One of the software that can be used to create interactive multimedia learning media offline is adobe flash from Adobe Systems Incorparaterd. Adobe flash is a leading and popular multimedia software for adding animation and interactive websites, but flash is not only used for web applications, flash can also be developed to build desktop applications because flash applications are compiled into "*swf*" form, but flash can also be compiled into the format. "*Exe*" [16].

Interactive multimedia has advantages, including being flexible (can choose material and when to access it according to their wishes), *content-rich* (providing sufficient information according to the material presented) and interactive (two-way communication between media and users). Interactive multimedia makes it easier for students to study independently, anytime and anywhere, and students can choose material according to their individual wishes. So that interactive multimedia-based learning media is one of the media that is economical, effective and efficient.

In accordance with the role and function of media in learning, which is to help clarify an abstract concept to be more concrete / clear. With this media, it is hoped that teachers can use it to help students understand the subject matter and make learning more creative, innovative and fun and increase student learning motivation.

METHOD This

type of research is research and development using the *4-D Model* with the following stages: *Define, Design, Develop, and Disseminate.* At thestage, *define* it includes three main steps, namely preliminary analysis, student analysis, and material analysis. The second stage is thestage *Design*. At this stage, interactive learning media design is carried out. At this design stage, two stages were carried out, namely the design of the instruments needed in this study and the design interactive learning media.

The next stage is *Develop,* at this stage the validity, practicality and effectiveness test will be carried out. To test the validity of interactive learning media, it will be assessed by a validator consisting of 2 Postgraduate Lecturers at Padang State University, and two practitioners from the MAN N 1 Padang teacher. The practicality test is carried out by asking for teacher responses and students' responses after using interactive learning media in the learning process. The practicality of interactive learning media is also determined from the observations of the implementation of the learning process. Observations were made by 1 observer, namely the physics teacher at SMA N 10 Jambi. Test the effectiveness of interactive learning media seen from the increase in student learning outcomes. The test subjects were interactive learning media that would be developed, while the respondents in this study were teachers and students of MAN N 1 Padang.

RESULTS AND DISCUSSION

A. RESEARCH RESULTS

1. Results of the Defining

Stage The defining stage produces an analysis of the curriculum, concepts and students. The defining stage is the basis for developing interactive learning media. The

component analysis is as follows. The following will explain further about the definition stage.

Observations

The results of observations made in MAN 2 Padang, so far, that the procurement of learning media is still limited so that teachers have not found the right way to present material that cannot be presented with the lecture and note-taking method, so that students only focus on receiving lessons given by the teacher. The use of existing learning media does not yet support teaching materials,media is *power point* used by teachers in the learning process as additional media in classroom learning and student independent learning.

Curriculum

Analysis This curriculum analysis refers to the syllabus of Information and Communication Technology (ICT) subjects. In this development, interactive learning media for Information and Communication Technology (ICT) subjects were developed. In this research, the analysis is core competencies, namely competence of knowledge, understanding, applying, analyzing factual knowledge, conceptual procedural knowledge based on their curiosity about science, technology, arts, culture and humanities with national humanity insight, and basic competences using the Number Processing Program to process and produce information learned by class X IPA MAN.

B. RESEARCH RESULTS

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Student Analysis

The test subjects in this study were class X students of the Department of Science, MAN 2 Padang, whose ages ranged from 16-18 years. According to Lorin (2001), each category in therevision *Bloom Taxonomy*, students at that age lie in thecategory *Create* where students are able to design, build, plan, plan, find, update, refine, strengthen, beautify and change.

2. The resultsDrafting

of the analysis definition phase*(define)*is used for the next stage of the design stage*(Design).*The details of the design stage are as follows:

a. Media Selection Media

selection is carried out to identify the appropriate learning media to present the material presented. In this study, interactive learning media were selected which are designed using theapplication program *Lectora Inspire* which is integrated with *Macromedia Flash* for making animations on the interactive learning media. *Lectora Inspire* was chosen because this program is a program developed specifically for the manufacture of learning media, and *Macromedia Flash was* chosen for animation creation because this software is very supportive for animation creation, button creation and can integrate text, images, animation, sound.

b. Designing the *Prototype*

The design of the *prototype* or the initial design of this interactive learning media is a design that must be made prior to validation and field research. At this stage, the arrangement of a framework in interactive learning media is carried out in the form of a media display design which includes the opening page, thepage *home* which is the main menu of the media, the material page, the evaluation page which contains questions to test the students' ability to the material presented in the media. The result of the display design is an interactive instructional media interface design. The results of the interactive instructional media display design consist of:

a. Opening page which is the initial display when the media is first opened. On the start page there is music and text animation of the name of the interactive learning media. On this home page there is also a button that will take the user to the SK / KD menu page.
b. The SK / KD menu page is the initial media page consisting of SK / KD layout and text,button *home* and several menu buttons, including: material, evaluation, profile, instructions, and intro. The function of each navigation button on the main menu page is to take the user to the respective menu page.
c. The material menu page is a page that contains the material to be studied which consists of material 1, material 2, material 3, material 4, which in each material consists of several sub-materials.
d. Evaluation page, contains questions that want to test students' ability to the material presented in the learning media. On this evaluation page there are two kinds of evaluations, where students with an odd number will get different questions from students with an even number.
e. Profile menu page, contains the author's profile and contains animated text and there is one navigation button, namely the home button which will take the user back to the main menu page.
f. The instruction page consists of animated text and layout instructions for using the media, as well as an explanation of the use of the buttons contained in the learning media. On this page of the instructions there is one navigation button, namely the home button which will take the user back to the main menu page.

3) Media

Making The making of interactive learning media is based on the initial design or *prototype* that has been designed previously. This interactive learning media contains material on Information and Communication Technology (ICT) subjects, especially Basic Competencies using processing programs and producing information that is included with animations about the material in this interactive learning media. The media displayed are in the form of pictures, text, sound and learning animation. This learning media was developed using theprogram *Lectora Inspire* which is integrated with *Macromedia Flash* as a program in making learning animations.

3. Results of the Development Stage The

purpose of this stage is to produce interactive learning media that are valid, practical and effective so that they are suitable for use in the learning process. The results of the validator's assessment of the validation sheet, which consisted of three UNP postgraduate lecturers and two physics practitioners / teachers at MAN 1 Padang.

The results of device validation can be seen in Table 1.1.

Table 1. Validation Results for Interactive Multimedia Design

No.	Assessment Aspects	Kappa is		Average	Category
		V1	V2		
1	Material expert	0.83	0.86	0.85	Very valid
2	Media expert	0.94	0.94	0.94	Very valid
Average				**0.90**	**Very valid**

Based on Table 1, the validation of interactive learning media with an average value of 0.90% can be concluded that the device is in the interval 0.81-1.00 with a very valid category.

Practicality data obtained from the results of the assessment of interactive learning media observations, teacher response questionnaires and student response questionnaires in class X MAN 1 Padang to interactive learning media. Results practicalities of interactive learning media can be seen in Table 2.

Table 2. Results of the practicalities of Instructional Media Interactive

Datapracticalities	Kappa Values	Category
Questionnaire ResponseTeacher	0.79	High
Questionnaire ResponsesStudent	0.81	Very steeper

in Table 2, the average values obtained practicalities of media interactive learning developed were 0.79 and 0.81. So it can be concluded that the practicality of interactive learning media is high and very practical.

Student learning outcomes data are taken aiming to see the extent to which student learning success in learning that does not use interactive media with those that use interactive learning media. To see the comparison of the results of the scores can be seen in table 3.

Table 3. Results of the Post Test

No.	Rating Results	Average
1.	Experimental class (X IPA 1)	84.52
2.	Control class (X IPA 2)	75.16

Based on the results of the t test, the t value is 6,643 and the t table is 1,995. From the results of theassessment, *post-test* it can be concluded that there is a difference between the results of the assessment, there are differences in ICT learning outcomes given treatment usinglearning media in *interactive* the experimental class and control class using conventional methods. So it can be concluded that this interactive learning media is effective.

Based on the description above, it can be concluded that interactive learning media can improve student learning outcomes.

4. Results of the Dissemination Stage

At this stage the distribution was carried out on a small scale, namely to different classes and different teachers.

DISCUSSION

The development of interactive learning media on ICT eyes based on the needs of class X students of MAN 2 Padang. One of the basic competencies that must be mastered by students of XMAN 2 Padang class in learning ICT subjects is to use processing programs and produce information. According to Dimiyati and Mudjiono (2006; 157) "Learning is a process organized by the teacher to teach students how to learn how to acquire and process knowledge, skills and attitudes". Thus, it can be said that ICT learning is a process carried out by teachers in teaching students to acquire knowledge, skills and attitudes so that students can think critically and can understand learning in accordance with the learning objectives.

The development of interactive learning media is designed according to the needs and problems in research, at this stage the researcher compiles a detailed program that includes all components of interactive learning media, namely creating animations related to ICT subjects. The design of the interactive learning media display screen is to use theprogram *Lectora Inspire*, and the design of the learning animation is made using *Macromedia Flash.* All the material that has been analyzed is put together into the animations that have been made, the animations are integrated into the interactive learning media so that they can be displayed with the material that has been analyzed.

This interactive learning media is equipped with animated images, *sounds,* text to make it more attractive. This interactive learning media is designed in accordance with ICT learning materials, especially on basic competencies using processing programs and producing information. This interactive learning media is also equipped with instructions for use and is equipped with evaluation questions. Each material in this interactive learning media is equipped with animation so that the material is easily understood by students with animation that can help understanding the material, so there is an interesting interactive learning media.

The interactive learning media developed is based on the 4-D development model *(Define, Design, Develop, Disseminate)*, the description is as follows:

1. Defining Stage (*Define*)

This research begins with data collection before making learning media, namely the definition stage. Thisstage *Define* aims to raise and determine the basic problems faced in learning, with this analysis a picture of facts, an overview and alternatives to solving basic problems will be obtained. The defining stage is the initial stage of media development. This stage is carried out as a basis for developing interactive learning media on ICT subjects so that they can be used to facilitate students independently.

This stage is a needs analysis where at this stage three activities are carried out, namely observation, curriculum analysis and student analysis. Where the results of the three analyzes will be used as guidelines for researchers in developing interactive learning media on ICT subjects, especially in basic competencies using processing programs and producing this information.

2. Stage Design*(Design*Phase)

After conducting a needs analysis, and continued to develop the initial product or a *prototype* of this interactive learning media later this interactive learning media making based on the initial product or *prototype* has been created. This research produces a product in the form of Interactive Learning Media (MPI) using *Lectora Inspire* which is integrated with *Macromedia Flash* on competency standards using a processing program and produces information in class X MAN which is suitable for use as learning media.

3. Development Stage (*Develop*)

The development stage aims to produce interactive learning media that are valid, practical, and effective. The development stage in question includes:

a. Validation Stage of Interactive Learning Media

The purpose of validation by experts is to obtain input, criticism, and suggestions for improvements to the perfection of the developed media. Validation test data is obtained through validation instruments filled in by several validators who are experts in learning media. The validator consists of 4 people, namely two people for the media validator and two people for the material validator. Media expert validation is focused on the appearance or presentation seen from the point of view of the media. Validation by media experts aims to make-based interactive learning media products *Lectora Inspire* developed into quality products in terms of programming and appearance aspects.

The data from the validators were obtained from a questionnaire that had been given an assessment by two media validators and 2 material validators.The average validity of the media and material was 0.90 which was in the very valid category. Based on the suggestions and assessments of the validator both in terms of content and design, revisions were made to this interactive learning media, so that the interactive learning media developed is feasible to be tested.

b. Practicality of interactive learning media

The practicality of interactive learning media data was taken through tests carried out in class X IPA 1 MAN 2 Padang which aims to see the implementation of learning using this interactive learning media. To see practicality, interactive learning media that have been validly used in the learning process by the teacher. At the end of the lesson, the teacher and students were asked to fill out a practical questionnaire from the interactive learning media that had been used.

An assessment of the practicality of this interactive learning media was obtained from a questionnaire filled out by the teacher / practitioner and the results of the assessment obtained from the teacher's response questionnaire to the practicality of this interactive learning media were 0.79 with the high practicality category. In addition to the assessment from the teacher / practitioner, the practicality of this interactive learning media is also assessed based on student responses and the results are known in the student response questionnaire, which is a value of 0.81, so it can be concluded that the interactive learning media developed is practical with very high practicality categories**.**

c. The Effectiveness of Interactive Learning Media The

effectiveness of interactive learning media in this study is seen to be used to make it easier for students to understand the learning material, as well as the effectiveness of the interactive learning media used can be seen from the students' cognitive learning outcomes. Learning outcomes are abilities that students have after they go through the learning experience process. Learning outcomes were obtained from *posttest* to students of class X IPA.1 as many

as 34 students who were given interactive learning media and class 2 students who were given conventional treatment as many as 36 students who were given in the form of objective tests as many as 27 items. Based on the data obtained from the test results of this interactive learning media, the researcher can explain that there are significant differences in the learning outcomes of the two classes.

4. Deployment Phase(Disseminate)

Phase dissemination or dissemination is done by the application of interactive learning media is in the process of learning and teaching on the subjects of ICT in particular on the basis of competence using processing program and produce the information disseminated in other classes, namely class X IPA.1 in MAN 2 Padang . Spread can also be done through a process of transmission to related learning practitioners in a particular forum.

CONCLUSION

The development result of this research is a product in the form of interactive learning media on Information and Communication Technology (ICT) subjects in Basic Competencies using processing programs and producing information. The process of developing interactive learning media refers to the 4-D model of development that *Define* (definition),*Design* (Design),*Develop (Development),* and *Dessiminate* (Deployment). At the defining stage, an analysis of learning needs and student analysis was carried out. The subjects of this interactive media development trial were students of class X IPA.1 MAN 2 Padang. After the development stage is complete and the interactive learning media being developed have been declared valid, the interactive learning media is ready to be distributed. This learning media is distributed to students of class X IPA.1 MAN 2 Padang.

In this development research produces an interactive learning media that is very valid, practical and effective, in the subject of Information and Communication Technology (ICT) class X MAN 2 Padang, this is proven because this interactive learning media has experienced validity, practicality and effectiveness trials. conducted on validators, teachers and students. The interactive learning media developed is based on competency standards and basic competencies of the Information and Communication Technology (ICT) subject. Learning devices for optical tools using themodel *discovery learning* can also be applied to learning materials for optical tools at the junior secondary level. with characters that are adapted to the characteristics of the subject and carried out for a long time and there are comprehensive classes so that learning outcomes increase, and student character becomes habitual and permanent, in order to obtain outstanding and character student products.

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