Study of the Elements Design Interactive of Student in Solar System Physics lessons through the Interactive Compact Disk (CD) of Solar System Physics Lab

A T Cahyadi*

Departemen Desain Komunikasi Visual, Universitas Komputer Indonesia, Indonesia

Email : *arif3cahyadi@email.unikom.ac.id

Abstract. Multimedia can combine elements of text, sound, images, animation, and video via a computer or digitally manipulated elements that are conveyed or controlled interactively. Interactive multimedia in this learning can be a learning solution in the digital era to stimulate the thinking power of students. The purpose of this study was to determine the interactive multimedia element theory test used in the Interactive CD of Solar System Physics Lab as an electronic learning medium. This research method was carried out using a descriptive qualitative approach regarding the results of the study of the interactive multimedia design structure on the Interactive CD of Solar System Physics Lab, with case studies of researchers investigating carefully a program, event, activity, process, or group of individuals. Data processing techniques through literature study, group discussions, and interviews. The results of this study will determine the elements of interactive multimedia on the interactive CD of Solar System Physics Lab, which can be used as an example for e-learning media, the Solar System Physics Lab has used the Multimedia development process flow according to the procedure.

1. Introduction

Indonesia has almost eight months entered the Covid-19 epidemic [1], life changes have been very drastic in economic stability to education, which is currently the use of information technology using internet networks. Information technology has become a universal technology that can be used in various fields of human life, both in the needs of individuals, companies, businesses, especially in the field of education today. The use of information technology in education has now progressed rapidly, information technology used for learning has various types of methods that are varied and effective to improve the quality of learning. [2] Information technology in education is currently supported by e-learning-based information technology.

The use of information technology in education has a lot of controversy and raises a lot of questions whether the e-learning learning method is the right method or not in the process of teaching and learning activities. As stated by Primadi [3] that all theories of the learning process, teaching, training, curriculum, etc. borrowed from developed (western) countries. However, from past experience and to date this loan is not suitable for Indonesia. [3] In this case, e-learning based learning

media, its use and development is still being studied until now. Information technology used in e-learning based learning is very diverse, one of which is in the form of interactive multimedia.

Different from the opinion of Suyanto [4] that multimedia is currently important because it is used as a means of competition between companies. In its use, multimedia is one of the basic skills that are equally important in reading skills in the 21st century. The learning process that is dynamic by providing new experiences in each learning activity, this is one solution for teachers or teachers to be able to take advantage of the interactive multimedia-based e-learning system. And interactive multimedia makes it easy to learn the material [5]. Also, the opinion of Sutarno [6], that the mastery of concepts and skills and critical thinking of students is higher with learning using interactive multimedia than students who take conventional learning.

In its development, there have been many developers, both small industry, large industry, or even researchers who have created and developed interactive multimedia for learning. In general, interactive multimedia is present as a supporting medium for students as a practical class for learning. This requires an evaluation of interactive multimedia that is made, to be considered in the future development of interactive multimedia as an effort to build a theoretical framework for the structure of interactive multimedia design that is used optimally. [7]

The process of making interactive multimedia requires an effective interactive multimedia design guide or arrangement to make it easier for developers to create interactive multimedia design applications [12]. So that developers make it easier for developers to design interactive multimedia media and understand the initial process to the completion stage in making interactive multimedia design media. and also, the structure of the Interactive CD or interactive multimedia can be used by students and can be used as a reference for teachers as teaching materials [13].

With the complexity contained in the interactive multimedia on the Interactive CD of the Solar System Physics Lab from the Interactive Intellect product, the researchers chose the product to be studied in relation to the interactive multimedia design structure that has been produced which will later become a reference as an interactive multimedia developer.

In conducting research, the researcher uses the descriptive qualitative method, the researcher focuses on the educational environment in the city of Bandung by collecting data in the form of theory in the form of books, journals, research related to the object of research. As well as conducting field studies to obtain more in-depth information such as conducting interviews with informants with responsible sources to find out direct responses to the object of research.

2. Method

This study used a qualitative methods with research procedure descriptive data. In general, this study conducted an interactive multimedia design study by producing a design structure from the Interactive CD of Solar System Physics Lab The research carried out described systematically. Researchers will collect information using various data collection procedures that have been determined. As stated by Stake (1995), a case study is a research in which researchers carefully investigate a program, event, activity, process, or group of individuals (Creswell, 2013). [8]

In this qualitative research, the researcher will test a specific theory, then collect data to support or refute these hypotheses. From the aspect of the research area, the research was carried out with a case study of the Interactive CD of Solar System Physics Lab from the Interactive Intellect product, as well as choosing a study located in Bandung in an educational environment.

3. Results and Discussion

According to Vaughan (2004), in his article the first part explains multimedia is a combination of text, art, sound, images, animation, and video that is conveyed by computer or manipulated digitally and can be delivered or controlled interactively. The structural analysis of the design on the Interactive CD of Solar System Physics Lab refers to several aspects consisting of text, video, audio, interactive, animation, and graphics [9]. One interactive multimedia that can be the right solution where interactive multimedia can contain photos, videos, and music so that learning is more interactive [10].

In the research object being studied, the researcher will examine the sections on the Interactive CD of Solar System Physics Lab on 7 page sections, including intro, main, material, material maps, exams, games, and profile pages, in the follow in table 2.

Table 2. Structure Analysis Chart of the Design of Interactive CD of Solar System Physics Lab
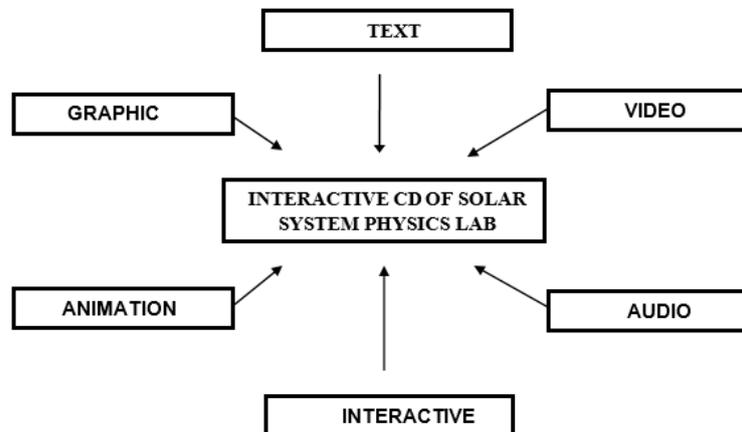
4. Bumper Page Analysis

The bumper page or it can be called the opening page before entering the main page of the Interactive CD of Solar System Physics Lab product. This page presents a Video Bumper or commonly referred to as an animated video in the form of a logo from Interactive Sense. This bumper page consists of 1 (one) page. as in the figure 1.

Figure 1. Bumper Page [11]

5. Intro Page Analysis

The Intro page of the Interactive CD of Solar System Physics Lab product presents a greeting about the Physics Lab before entering the main page, users will be greeted by this product as an opening and ensure that users will learn about this Interactive CD before entering the main page, as in the figure 2.

Figure 2. Intro Page [11]

6. Main Page Analysis

The main page of the Interactive CD of Solar System Physics Lab presents the facilities available on this Interactive CD, including facilities on the material menus, material maps, exams, games, profiles, and exit menus. Here's the Main Page on this Interactive CD, as in the figure 3.

Figure 3. Main Page [11]

7. Main Material Page Analysis

The material page on the Interactive CD of Solar System Physics Lab consists of 8 (eight) main materials, namely material about the Solar System Material, the Sun, Planets, Comet, Asteroid, Meteor & Mateorid, Earth as Planet, and the Moon as Earth Satellite. These eight materials are the main material in this Interactive CD of Solar System Physics Lab, which is in accordance with the curriculum devoted to junior high school class IX (Nine), with a total of 87 pages divided into 8 main materials. With 67 pages of descriptions of general material explanations, 4 pages of material simulation, 8 pages of material summaries and 8 pages of task. Each material presented in the Interactive CD of Solar System Physics Lab has several facilities, namely, the delivery of material in general, simulations, summaries, and practice questions of each material presented.

8. Material Map Page Analysis

This material map page contains links to the material contained in Interactive CD of Solar System Physics Lab, the facilities provided on this material map page present menus such as Table of

Contents, Simulation, Summary, Exercise Questions and Material Info. Its function is to make it easier for users if there are things they want to search freely without having to enter the material page, as in the figure 4.

Figure 4. Material Map Page [11]

9. Exam Page Analysis

This exam page contains questions to test the user's ability after the user learns from the material pages contained in the Interactive CD of Solar System Physics Lab. Before working on this exam question, users are encouraged to practice the questions on the material page according to the sub material the user is using.

In the facilities provided on this exam page, there are 10 (ten) exam questions about the Solar System, with a time limit for processing them, besides that after the user completes the exam questions, the user immediately gets the results of the questions that have been worked on. Users can do the test questions again for self-testers with different questions on this exam page. as in the figure 5.
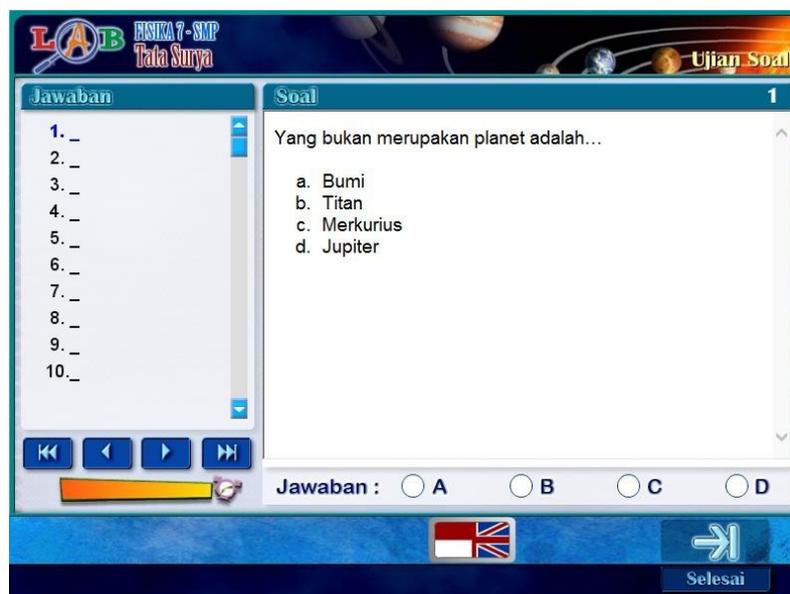
Figure 5. Exam Page [11]

10. Games Page Analysis

The Games page is a learning support facility contained in the Interactive CD of Solar System Physics Lab. The function and purpose are so that users can learn accompanied by games. Of course this can help users understand the material that users have gotten on the previous material page.

In the Games on this Interactive CD, there are 2 (two) games, namely the Hangman Games for Physics and the Physics Maze. Hangman Physics users can guess words or sentences contained in games about Solar System material and Physics Maze users can explore the maze by answering questions in games about the Solar System as a condition so that they can open the exit and complete the games, as in the figure 6.

Figure 6. Games Page [11]

11. Profile Page Analysis

This Intellect Profile page is an information page related to Interactive Intellect profiles and products, on this page there is also information on the Team that produces Interactive Intellect products. as in the figure 7.
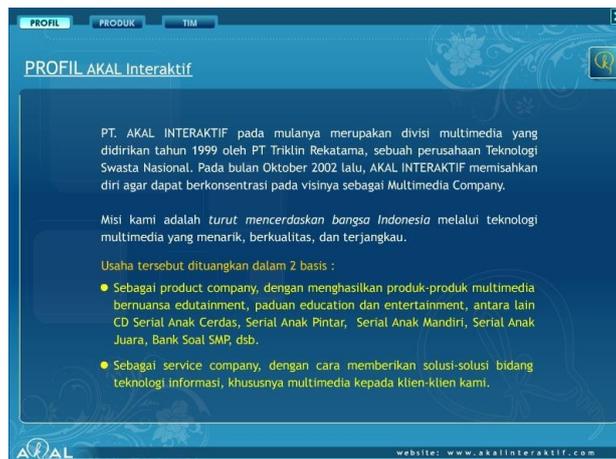

Figure 7. Profile Page [11]

Based on the analysis of the structure of interactive multimedia designs and the value of aesthetic elements in multimedia designs that have been done, in Multimedia are detailed in table 11.

Table 11. Structure Analysis of the Interactive Multimedia Design of Games Pages

No	Pages	Struktur Desain Multimedia Interaktif					
		Teks	Audio	Video	Interactive	Animation	Graphic
1	Bumper Pages	✓	✓	x	x	✓	✓
2	Intro Pages	✓	✓	x	✓	✓	✓
3	Main Pages	✓	✓	x	✓	✓	✓
	Material Pages						
4	Solar System	✓	✓	x	✓	✓	✓
5	Sun	✓	✓	x	✓	✓	✓
6	Planet	✓	✓	x	✓	✓	✓
7	Comet	✓	✓	x	✓	✓	✓
8	Asteroids	✓	✓	x	✓	✓	✓
9	Meteors dan Meteorites	✓	✓	x	✓	✓	✓
10	Earth as a Planet	✓	✓	x	✓	✓	✓
11	Moon as earth satelite	✓	✓	x	✓	✓	✓
12	Material Map page	✓	✓	x	✓	x	✓
13	Exam Pages	✓	✓	x	✓	✓	✓
14	Games Page	✓	✓	x	✓	✓	✓
15	Profile Pages	✓	✓	x	✓	x	✓

12. Conclusion

Interactive Multimedia on Interactive CD of Solar System Physics Lab has a complex design structure. However, in the Interactive CD of Solar System Physics Lab, there is no video multimedia component in it, researchers assume that in the absence of a Video component on each page of the Interactive CD of Solar System Physics Lab because the material presented is in the form of the Solar System, where it is difficult to take pictures of the Solar System, to reach, in this case it is possible not to use Video in real terms, but replaces Video with animations depicting the Solar System, both in depicting Earth, Planets, and other types of solar systems. The multimedia development process is indispensable for the path or rules for the stages of multimedia development. This is to reduce the risk of system errors in the application or Interactive Multimedia that it develops. In the process of developing Interactive CD of Solar System Physics Lab, the Solar System Physics Lab has used the Multimedia development process flow according to the procedure and there is a need for further development.

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