

Development of 3 Dimension Video Simulation Hardware and Software in Education

Azita Ali^{1*}, Fatini Auni Saharudin¹

¹Faculty of Technical and Vocational Education,
Universiti Tun Hussein Onn Malaysia, Batu Pahat, 86400, MALAYSIA

*Corresponding Author Designation

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Abstract: The project aims to design and develop a 3D simulation video using hardware and software in Education. The development of this 3D simulation Video can help teachers and students learn more about tools and software that they can use for the teaching and learning process. The model used in the development of this product is ADDIE model which has five main phases which are Analysis, Design, Develop, Implement, and Evaluation. The analysis phase was conducted by discussing and finding out the problem. In the design phase of the product, the developer creates a storyboard and gets feedback from the interface and design specialist. In the development and implementation phase, the developer creates a prototype using selected hardware and software. The last phase is the evaluation carried out by five (5) experts in the Multimedia Creative field from the Faculty of Technical and Vocational Education (FPTV), while one (1) content specialist is a teacher from Collage Vocational Datuk Seri Mohd Zin. The instrument of study used is the expert checklist form. Data is analysed using the frequency and percentage method. The finding of the study found that five experts gave a positive response to this product development. The result obtained by this product can help teachers and students use software and hardware in Education.

Keywords: ICT, Simulation Video, 3D, Education

1. Introduction

Technology is a tool that influences and composes in every aspect of life today, especially in the education sector. This is because the use of technology in education can help in improving the performance of educators and students compared to the traditional techniques Wan Idros Wan Sulaiman *et al.*, (2017). The use of software and hardware can also help in improving the efficiency of educators in the production of effective teaching and learning methods.

According to Cheng & Townsend (2000) changes in teaching and learning are inevitable with the introduction of multimedia technology in education. Information in digital, and the educational curriculum has evolved to use multimedia and interactive elements to create a more engaging learning and learning experience for students and teachers. According to Syed Muhammad Dawilah Al Idrus

*Corresponding author: azita@uthm.edu.my

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& Mohd Lutfi Solehan (2009) educators acknowledge that computers are very important in improving the quality of life and should be learned by everyone. However, this awareness is not accompanied by training programs for teachers or instructors. The delivery methods and information should be encouraged because today's society prefers the use of information technology rather than reading books.

This product developing with three main objectives:

1. Designing the development of 3D video simulation software and hardware in Education
2. Develop a 3D video simulation of software and hardware in Education
3. Evaluate the functionality of 3D video simulation software and hardware in Education

2. Methodology

According to Jamaludin (2000), in the process of delivering information, the field of education now advanced with the development of various media. The use of multimedia software is said to be a catalyst in various fields such as education because multimedia can be seen as an effective medium to convey information.

Development of 3D video simulation of software and hardware in education, ADDIE (1996) design model was selected as the study design model. There are five main phases in this model which consist the analysis phase, the design phase and development phase, the implementation phase, and the evaluation phase.

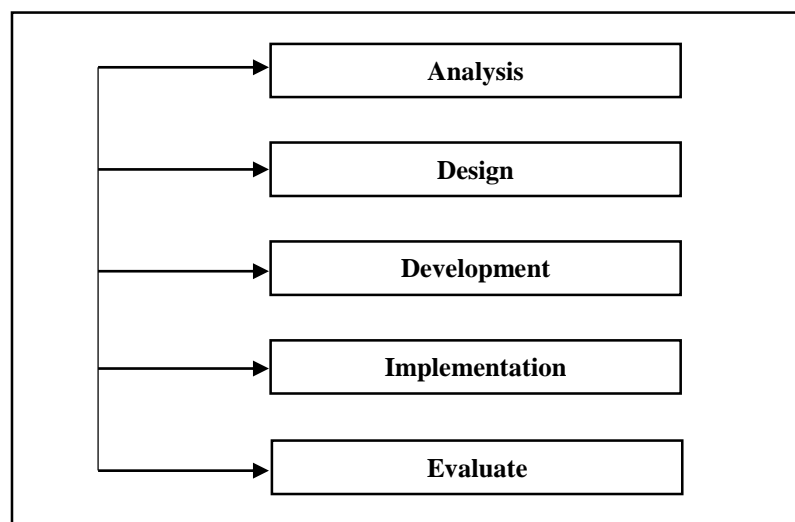




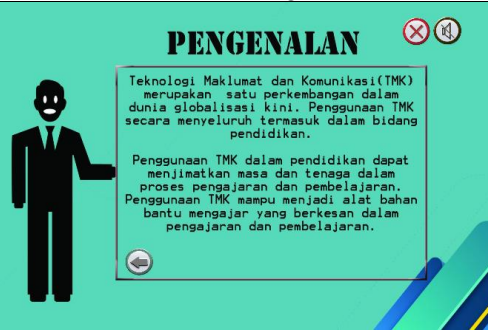
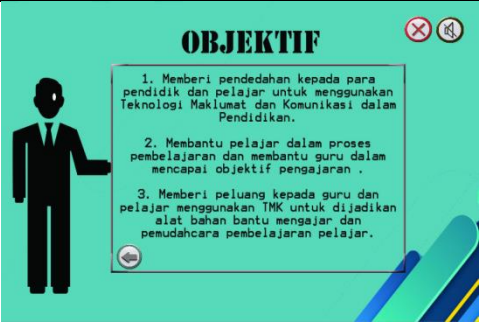

Figure 1: Addie Model


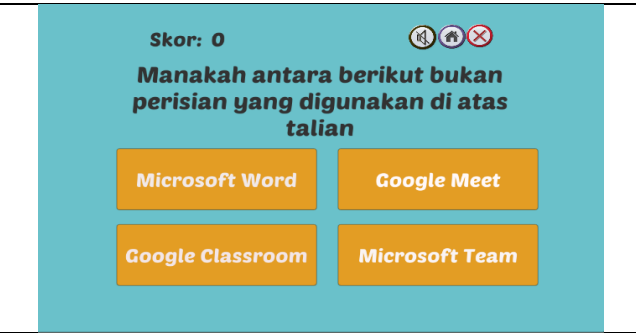

In this study, the developer will make a test with experts consisting of lecturers from University Tun Hussein Onn Malaysia by giving the questionnaire through google form for the evaluation.

2.1 Interface Design

Interface Design Interface design is the whole set of content, multimedia, and interactive elements available. This design will show the initial sketch of the product development. In this study, developers use storyboards to focus on multimedia elements and content in the development of animated videos. Through storyboards, developers will organize product development content such as the main page, note interface, the video tutorial home page interface, the video tutorial subtopics display interface, and the exit page.

Table 1: Page Interface

Page Interface	Description
 <p style="text-align: center;">Start Page</p>	<p>The start page interface shows the use of text and graphic</p> <p>Graphic- the design of the background page</p> <p>Text- Title and button name</p>
 <p style="text-align: center;">Home Page</p>	<p>The homepage interface shows the use of text and graphic</p> <p>Graphic- the design of the background page</p> <p>Text- Title and button name</p>
 <p style="text-align: center;">Introduction Page</p>	<p>The introduction page interface shows the use of text and graphic</p> <p>Graphic - The design of the background page</p> <p>Text – Page title and notes.</p>
 <p style="text-align: center;">Objective Page</p>	<p>The objective page interface shows the use of text and graphic</p> <p>Graphic - The design of the background page</p> <p>Text – Page title and notes.</p>
 <p style="text-align: center;">Page button video</p>	<p>Main page for video interface button</p> <p>Graphic - The design of the background page</p> <p>Text – Page title and notes.</p>

 <p style="text-align: center;">Video Page</p>	<p>The video tutorial page shows the use of audio, animation, text, and graphics. Graphic- graphic 3D button Text- Title and button name Animation- Computer, class Audio- audio of subtitle</p>
	<p>The quiz page shows the question and the multiple choice answer. Graphic- graphic 3D button Text- Title and button name</p>
	<p>The exit page interface, shows the use of text and graphic Graphic - The design of the background page Text – Title and button name.</p>

3. Findings and Discussion

On the testing and evaluation instruments, two questionnaires have been prepared, namely the interface expert evaluation form and the content expert evaluation form. For the interface experts, a total of 3 experts were made evaluators, two of them were lecturers at the Faculty of Technical and Vocational Education while a teacher from Datuk Seri Mohd Zin Vocational College was made the evaluator. For the content evaluator, 2 lecturers from the Faculty of Technical and Vocational Education UTHM were selected.

The questionnaire for the expert content analysis section is section A found in the expert evaluation form. It contains general and background information such as gender, educational level, the field of specialization, work experience, sector, and position. This interface evaluation form is given to two experts consisting of lecturers from the Faculty of Technical and Vocational Education, UTHM who have been selected, and a lecturer from the Vocational College Datuk Seri Mohd Zin. While the expert design has been selected are lecturers from the Faculty of Technical and Vocational Education, UTHM.

The items in the interface design and content expert review form were divided into several sections namely text, graphics, animation, audio, video, and interaction design. all experts mostly chose to agree with the items stated however there were also items that the experts disagreed with. The analyzed data be presented in the form of frequency and percentage values.

Table 2 shows findings of expert confirmation of content design. As the result of the findings, all expert agrees on all the item described in the expert checklist form. The use of navigation in the application gets support and agreement from all experts, they agree that navigation and navigation options work well, so the user can achieve any information in a particular order. Then all the experts also agree that the inserted audio and video can be played well. Overall, the element of interactivity applied by developers in 3D video simulation can help users freely choose the video they want. This is because according to Ovalle, F., Schofield, D., & O'Hara-Lesie, E. (2017), interactively help user to be more active and control media travel when using multimedia software.

Table 2: Finding of expert confirmation of interface design

Item	Content	Frequency		Percentage
		YES	NO	
Teks				
1.	The type of text used is easy to read	3	0	100%
2.	The use of text colour is appropriate	3	0	100%
3.	The type of text used is appropriate	3	0	100%
4.	The text size used is appropriate	3	0	100%
5.	The type of text used is consistent	3	0	100%
Graphics				
6.	The 3D graphics used are interesting	1	2	33.3%
7.	The resolution of the graph used is clear	2	1	67.3%
8.	The 3D graphics used are appropriate	3	0	100%
9.	Use of appropriate graphic colours	3	0	100%
10.	The 3D graphics used are easy to understand	3	0	100%
Video				
11.	Users can control the video	3	0	100%
12.	The quality of 3D simulation video is good	3	1	67%
13.	3D simulation video is generated with clear	3	0	100%
14.	The 3D simulation video is easy for users to understand	3	0	100%
15.	The video length used is appropriate	3	0	100%
Animation				
16.	Animation 3D corresponds to the content	3	0	100%
17.	The resulting 3D animation is interesting	1	2	33.3%
18.	The movement of 3D animation is clear	3	0	100%

Interaction Design

19.	The interaction button works well	3	0	100%
20.	The interaction button uses the appropriate icon	3	0	100%
21.	The interaction button use appropriate text	3	0	100%
22.	The design of the interaction buttons is user friendly	2	1	67%
23.	The position of the interaction buttons used is consistent	0	3	0

Audio

24.	The audio used can be heard clearly	1	2	33.3
25.	The audio used is appropriate to the title of the product developer	3	0	100%
26.	The audio used does not disturb the user	2	1	67%
27.	The audio used corresponds to the content	3	0	100%
28.	The background music used is appropriate	3	0	100%
29.	Audio is parallel to the movement of the animation	2	1	67%

Based on the finding of the evaluation, all the experts agree that interface design can meet the target meet of the user (Table 2). This can be proven when mostly all items on the form of the expert checklist of the interface section received the answer “yes” from the expert. However, (9) items got “No” in the item of text and graphic. The expert gives a suggestion and views in relation to interface design which is to improve the color of graphics, and buttons and change the layout.

Table 3: Findings of expert confirmations of content design

Item	Content	Frequency		Percentage
		YES	NO	
1.	Video simulations of the of software and hardware are in line with the objectives	2	0	100%
2.	The software and hardware usage video is easy to understand	1	1	50%
3.	The content on the use of software and hardware in education is explained as appropriate	2	0	100%
4.	Descriptions of the use of software and hardware are appropriate	2	0	100%
5.	The developed 3D simulation video is well produced	1	1	50%
6.	Malay language used in the video is easy to understand	2	0	100%

7.	Malay language used is clear	2	0	100%
8.	The 3D simulation video of software and hardware has a good effect on the user	2	0	100%
9.	Malay language used is easy to follow	2	0	100%
10.	The use of I software and hardware in 3D simulation videos is realistic	1	1	50%

Developers have made confirmation of five experts for the evaluation 3D simulation video software and hardware used in education. As a result of the evaluation, it was analysed using the method in frequency and percentage of acceptance. Table 3 shows the findings of the expert confirmations of content design. As the result of the findings (10) items have been submitted and there are (7) got the “Yes” but the other (3) items got “No”. There are suggestions and views from an expert in relation to the content design in items (7) and (9). The expert gives the suggestion to the developer to consistent the audio used in every video. Suhaimi (2012) states that software with a user-friendly element can be seen when instructions and orders are clear and orderly on each screen. Overall, all experts have given positive feedback on the design of the 3D simulation video software and hardware used in education as a guide to teachers and students in using ICT for education.

4. Conclusion

Overall, the developer managed to produce a 3D simulation video of the use of information and communication technology in this education well according to the objectives of the study that have been set. A total of five experts who consists of four lecturers from the Faculty of Technical and Vocational Education UTHM and a lecturer from Datuk Seri Mohd Zin Vocational College. Developers used a questionnaire as a research instrument and result in study findings in the form of frequency and percentage. The results show experts give positive feedback.

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