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DESIGN AND DEVELOPMENT OF SELF-PACED INTERACTIVE MULTIMEDIA PHOTOGRAPHY COURSEWARE FOR UNIVERSITY STUDENTS

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Abstract. *Multimedia can be presented mainly by five main elements, such as text, graphics, animation, audio and video in order to interact with the students more effectively. Due to the rapid development of current technologies, this project is to develop a better design of multimedia courseware in explaining the photography skills, tools and information to the students who are interested in photography field. The purpose of the proposed multimedia courseware is to gain their interest in photography through the proposed multimedia courseware. The multimedia courseware is developed based on ADDIE methodology and Adobe Director has been used as the main platform in development stage. It is delivered in English and comprised of five modules which are learning module, tutorial module, quiz module, game module and video module. All modules will be a learning tool that targeted to help students from university photography society to improve their photography knowledge and skills. The sample group consisted of 50 students who were studying in university. They were divided into two subgroups: male and female groups. User acceptance level and system functionalities level were evaluated by conducting survey among students. Based on the result it appeared to be favorable of the functionalities and capabilities of each module in the multimedia courseware. Hence, it helps students as well as fresh camera users to be more familiar with the photography information before they start to explore it in-depth. The content delivering is not only about the concept of photography but also an exercise of photography.*
Keywords: Multimedia courseware, User acceptance level, Multimedia, Photography

1. **Introduction.** With today's technologies, majority of the multimedia courseware are delivered in hardware and the cost is remained higher. According to Baker [1], researcher has found out that most of the failures are caused by educators, companies, organizations and governments. Therefore, multimedia courseware has to be improved in revolution. Studies believed that photography teaching tool should be evolution from paper-based to application-based in order to bring convenience to those who love to conduct photography session.

There are two ways of viewing the multimedia courseware quality, according to Kulik et al. [2], concerned on "why the product" and "how is the product". On the other hand, one looks multimedia courseware is only designed for a specific end user [3]. There are also two approaches which are "how the product work on end user" and "how the

product should work on the end user". User's needs are always considered in the process of courseware development.

The lure of computer is strong enough nowadays to attract adults using computer to search for information or learning through computer instead of referring to paper tools such as books or journals. Multimedia courseware can be enhanced in terms of learning ways with attention to the specific end user to satisfy their needs and wants by combining with the advances in software and hardware. Therefore, students do not have to sign up for any photography class for learning photography physically but they are able to learn through this multimedia courseware instead.

According to Berg and Watt [4], in order to deliver the information message to the students, many educators would prefer to use multimedia courseware as their supplement for teaching purpose [14]. Besides that, multimedia coursewares shows benefit compared to textbook or lecture slides due to the reduction of error rate [5]. According to Levin et al., those images or pictures implemented in the multimedia courseware are tools to help users understand the text of it and this shows the results effectively [6].

Most of the current existing multimedia coursewares are designed for theory purposes. Based on the research, there are mostly online based photography tutorials. None of the tutorial is designed in courseware based. The proposed multimedia courseware will be an offline courseware and will contain 5 modules which are learning module, tutorial module, quiz module, game module and video module. Each of the modules will be playing an important role in order to execute it with those multimedia elements such as text, graphic, audio, animation and video.

Due to the fact that the issues arise from the other subjects multimedia courseware, the user easily gives up to continue the guidelines before they start to play with the courseware. As learning module is the first module that users will be visiting to, it can be simplified as text passage attached with some beauty images or animation to attract the users to explore the courseware.

2. **Problem Statement.**

The proposed multimedia courseware is one of the coursewares which is integrated with animations, graphics and videos in order to help users more understandable on learning session instead of reading a lengthy paragraph whether from reference books or from website. The aim is to overcome the following issues and limitation on existing multimedia courseware.

2.1. **Lacking of knowledge in camera setting and functionalities.**

Nowadays digital camera becoming popular instead of using the point-and-shoot cameras. In order to take a better photograph, users have to understand how to utilize the settings and functions in the camera. This is due to the fact that the camera's user interface is more confusing for some users who are new to it. As camera manufacturer did fit many controls and button outside of the camera, and it only displays on the tiny LED screen of the camera with those selected optimal words and symbols, this may cause user bleed in all the settings so they choose to give up on learning it as well in the future.

2.2. **Limited learning materials and tools.**

Students build their skills conducted in class while they have more demand on some other e-learning materials and tools so that they can do more home exercise for extra knowledge instead of only learning what have taught in class with the limited skills. Due to the fact that photography skills are considered as broad knowledge for everyone, no matter how professional is the photographer, there is still a learning space for him or her. Photographer will find this courseware helpful to improve their skills and technique with a better outcome.

2.3. **Inappropriate multimedia courseware user interface design.** Student may need a better design of a multimedia courseware to assist them in improving their knowledge and skill in photography. All steps given as a guideline to the direction of success in the multimedia tools may produce an effective way of learning. Students do not want complicated design and it was hard for them to handle. They will prefer a simple design with ease of use while they are playing with the multimedia courseware. Interaction is important between users and the multimedia courseware, for example, users must satisfy with the design of result prompting out while he or she interacts with the courseware. Unsatisfied users may review it as a bad comment to other friends so it causes less people playing with the multimedia courseware in the future.

3. **Methodology.** The self-paced interactive multimedia courseware for photography is developed based on ADDIE model as shown in Figure 1. Nowadays learner-centered becomes the focus in learning purpose compared with the traditional teacher-centered [7]. By using ADDIE model, the proposed multimedia courseware can be developed and achieve the self-paced objective. ADDIE modelling is divided into five phases, such as analysis, design, develop, implement and evaluate. Each phase is playing the important task for developing the interactive multimedia courseware.

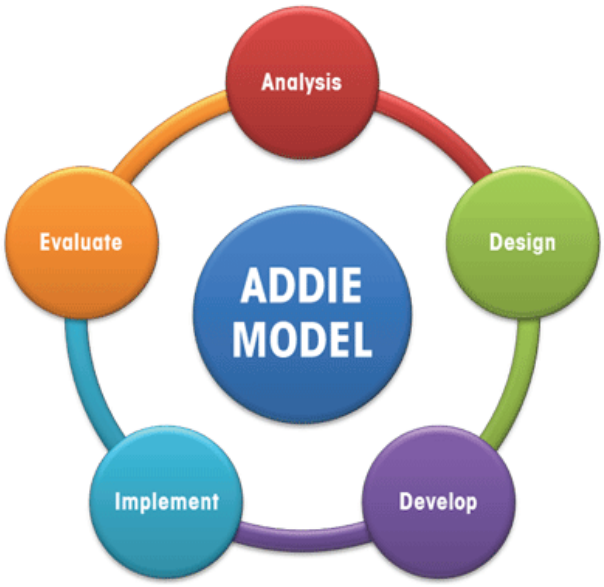

FIGURE 1. ADDIE model

3.1. **Analysis.** During analysis phase, the user's learning problem, goals, objectives and what users want such as the scope of knowledge or any other information needs will be identified. Information gathering from the users is required, for instance sending out the survey to users for understanding their learning problem and what their opinion towards the problem is. Several software or materials will be used for information gathering such as words, excel and voice recorder. After all of this, developer has to be thought of some possible solutions to cope with those learning problems. This phase may also include researched technique such as jobs, tasks and needs analysis in order to achieve the goals and objectives. All of the output from this phase will bring forward for the input of design phase.

3.2. **Design.** The design phase is important because it is the content outlines, templates, flow, and storyboards of the entire multimedia courseware. Teachers would like to show the well-designed multimedia courseware instead of the poor design of the courseware [12,15,16]. Therefore, design is playing the important role to attract users by gaining

attention, learning guide, assessing performance and providing information feedback. The content outlines should include elements such as text, graphics, animations, audios, and videos.

3.3. **Develop.** By gathering the information from both analysis phase and design phase, they are brought together into a software-based program to innovate it. There are many software programs that can be used to develop and present the multimedia courseware project such as Adobe Director and Adobe Flash. By developing interactive multimedia courseware for photography, import all the elements text, graphics, animations, audios and videos into the courseware to make the courseware more lively and attractive.

3.4. **Implement.** In this phase, the executable file (.exe) and shockwave file (.dcr) beta testing will be available for users to test for it and find out the bugs and errors of the program. It is referred as the actual delivery of the instruction no matter it is computer-based or classroom-based. The purpose of this phase is delivering the instruction design multimedia courseware in terms of efficiency and effectiveness. This phase is promoting the users about understanding of the courseware, achieve the objectives of the project and to be ensure that the knowledge has deliver to the users successfully.

3.5. **Evaluate.** Basically this phase is to evaluate the user acceptance level and system functionalities. The effectiveness refers to the achievement of the objectives and goals [17]. The purpose is to enhance the function and quality of the system. While the usability refers to the ease of use and ease of learning in the courseware developed. Therefore, information gathering from user has been conducted after the courseware has been developed. Based on the users' feedback from the users, developer improves the system by conducting some adjustments and maintenance on the developed courseware. There are three common ways in the evaluation process which are observation, questionnaire, and interviews. In this project, questionnaire survey has been selected. This can ensure that better multimedia courseware is developed for the users.

4. **Development and Implementation of Interactive Multimedia Courseware Modules.** In this section, graphic development will be discussed in Section 4.1. Overall modules development will be discussed in Section 4.2. This project consists of five modules, i.e., learning module, tutorial module, quiz module, game module and video module.

4.1. **Graphic development.** Adobe Photoshop as shown in Figure 2 is the basic industry standard image editor software which is able to use to create customized graphics, edit photographs, remove imperfect parts, enhance image properties and make flyers and images for printing purpose. The primary tool of Photoshop is toolbox, the most important interface and complex program to work with the graphics. This toolbox offers several tools such as select, paint, draw, sample, edit, move, annotate, and view images. Secondly, there is a menu bar at the top of the interface which provides a quick access setting with the application and the layer palette that is used for integrating several images.

Adobe Illustrator CS6 as shown in Figure 3 is one of the popular industry-standard and powerful vector-based image editing programs for printing, multimedia, and online graphics purpose. Vector graphics are defined by mathematical equations made up of points, lines, and curves so vector image can be scaled infinitely without any distortion and losing quality. Therefore, Illustrator offers user a professional quality result before using the image to another party of software [13]. Most of the graphics from the project are produced using Adobe Illustrator CS6.

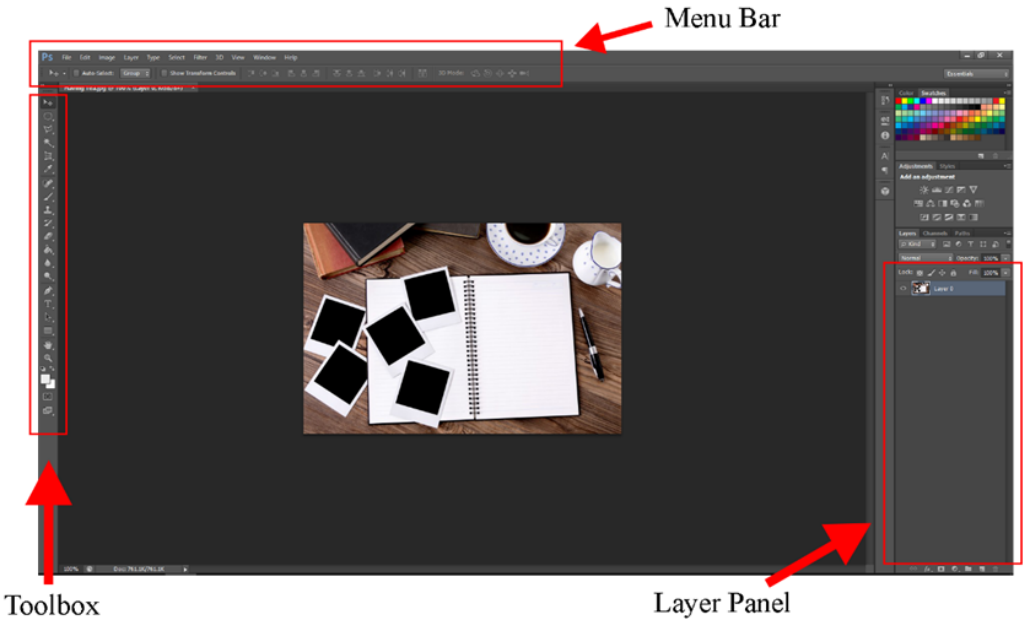

FIGURE 2. Adobe Photoshop CS6

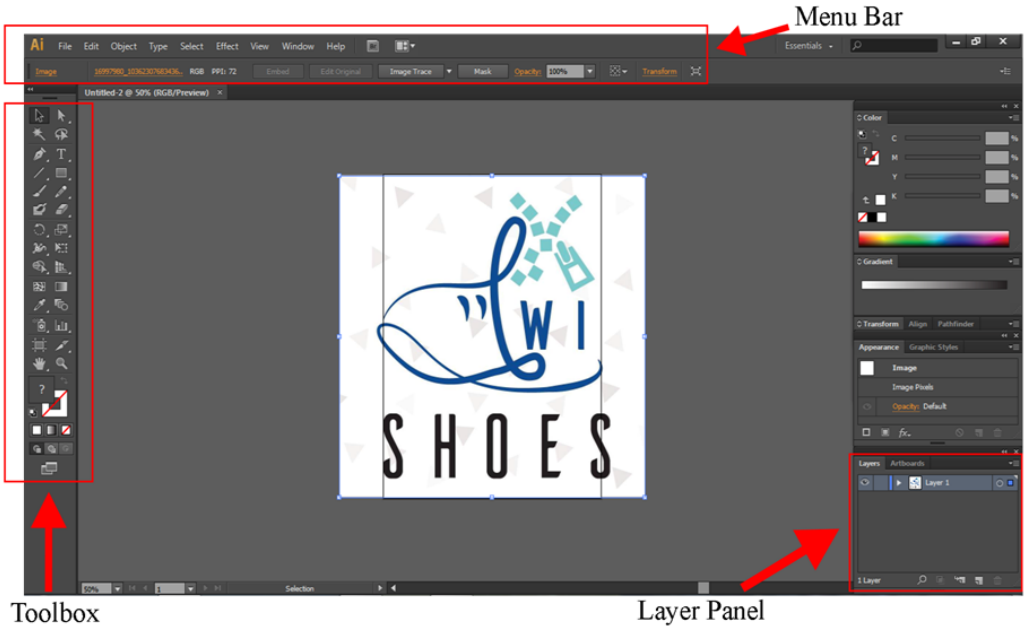

FIGURE 3. Adobe Illustrator CS6

4.2. **Module development.** The learning module page of the courseware is the most important module because it included all the learning materials of the courseware, and students may proceed to this page and start their learning journey. The narrator will start to teach the particular chapter once user has chosen it to begin. The tutorial module page provided the tutorial question which allowed users that have learned from the learning module apply their knowledge in this page. Question will be asked and diagram will be given, user may click on the answer and the narrator from the courseware will assist the user by speaking out whether the answer is correct or wrong. Basically, user may read and listen carefully from the narrator on how to take quiz test. User can start the game by following the instruction from the narrator. There will be a game that allowed user to find the camera equipment in different environment by dragging those of it and drop into the camera bag found from the user. Lastly will be the video module. It allowed user to

watch the video for learning purpose instead of just reading a bunch of words. When user moves the cursor over the video options, the narrator will brief the title of the particular video so that user will get to know the video content first before watching on it.

5. **Evaluation of Interactive Multimedia Courseware.** As discussed above, the modules were designed and implemented. A survey form was created, which contains short questions related to: i) user acceptance level [8] and ii) system functionalities level [9]. The main purpose is to enhance the function and quality of the system, user experience on the system itself and to improve user acceptance level [10]. The questions were answered based on Likert scale.

50 respondents have provided their comment on the user acceptance level of the interactive multimedia courseware. Figure 4 showed the total of 43 out of 50 or 86% respondents were satisfied with the developed multimedia courseware and only seven or 14% of them were neither satisfied nor dissatisfied with the developed multimedia courseware.

50 respondents have provided their comment on the system functionalities level of the interactive multimedia courseware. Figure 5 showed the total of 43 out of 50 or 86% respondents agreed that the system has all the functionalities and capabilities which they expected to have. Four respondents or 8% of them were neither agreed nor disagreed. There were three or 6% of the respondents disagreed and dissatisfied with the developed interactive multimedia courseware.

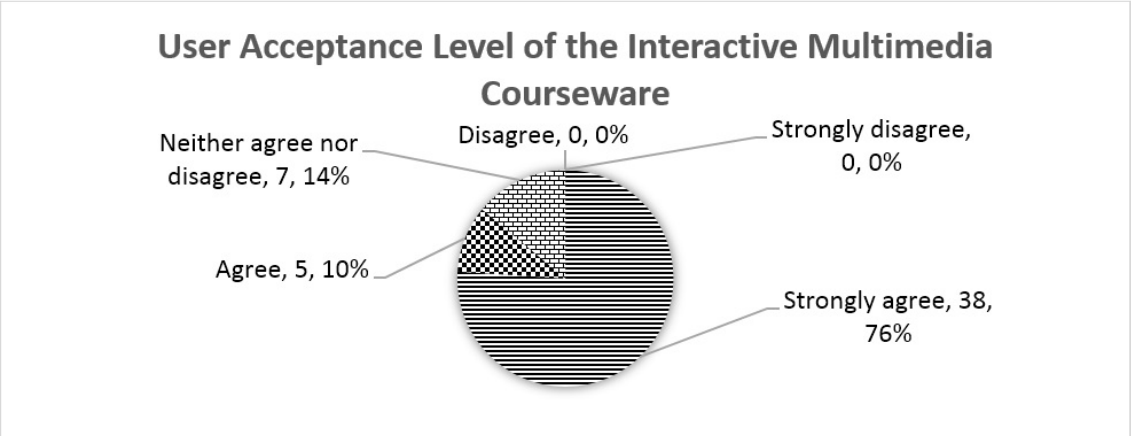

FIGURE 4. User acceptance level of the interactive multimedia courseware

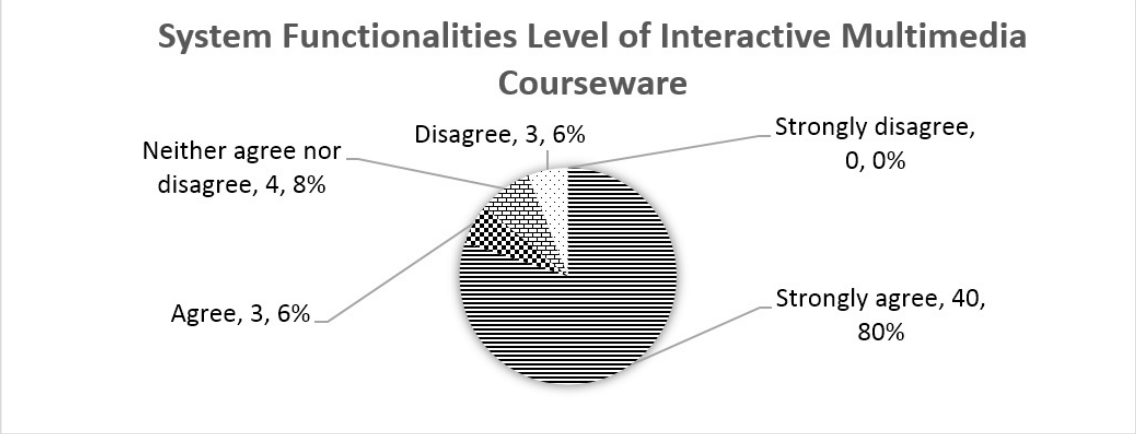

FIGURE 5. System functionalities level of interactive multimedia courseware

6. **Conclusions.** In conclusion, teenagers who are willing to spend time for outdoor activities such as photography are getting less nowadays. The purpose of interactive multimedia courseware for photography basically focuses on those who are lack of interest towards photography and who are interested in photography but lack of skills and knowledge. The proposed self-paced interactive multimedia courseware will be developed in order to gain users' attention. Meanwhile, it consists of appropriate multimedia elements such as text, graphics, animation, audio and video in order to present better courseware compared with other existing works [11].

Since the existing previous works of multimedia courseware usually do not provide a better video demonstration and game for user to release their stress, the proposed self-paced interactive multimedia courseware is included with both of these modules respectively for students in order to convey the information more accurately. Besides that, student can conduct the learning session in home during their free time by using the self-paced interactive multimedia courseware instead of attending the class on time in traditional way.

Furthermore, virtual photography studio can be included in the future in order to teach users snap photo in the courseware. Also, it includes the 360 degree rotation function in the virtual photography studio module as well.

Last but not least, the self-paced interactive multimedia courseware for photography is able to solve the mentioned problems as well as provide university students especially students from photography society, a platform that they can learn the photography skills based on their own pace.

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