Developing a Mobile Multimedia-Based Learning Resource on Living of Komodo Dragons

Meike Paat
Universitas Negeri Manado
Jalan Tondano, Koya
Tondano 95618, Indonesia
meikepaat@gmail.com

Hadi Sutopo
Kalbis Institute
Jl. Pulomas Selatan Kav. 22
Jakarta 13210, Indonesia
hadi.sutopo@kalbis.ac.id

Nurliani Siregar
Universitas HKBP Nommensen
Jl. Sutomo No.4A, Perintis
Medan 20235, Indonesia
nurlianisiregar@yahoo.com

ABSTRACT

The study aimed developing a mobile multimedia-based learning resource model on living komodo dragons. The model is a supplementary resource for teaching materials of learning process and lecturer's guide in a university. The research conducted using research and development method from January 2018 to January 2019. Outcome of this study was a set of information about living of Komodo dragons that can be accessed using smartphone, complemented with the set of teaching tools; i.e. teaching materials, student worksheets, and lecturer's guide. Results of the testing in development phase indicated that the product was proper to be implemented in learning after some revision had been conducted, so the product could be used as a learning model using mobile device.

CCS Concepts

• **Applied computing → Education → Computer-assisted instruction.**

Keywords

Instruction; developing; multimedia; learning; biological tourism; mobile device.

1. INTRODUCTION

The educational innovation is the effort in increasing the professionalism of learning systems in education. This research was based on the educational innovation in studying Komodo dragons, the ancient animal that live in Komodo island Indonesia. Students have to complete their knowledge, soft skills and hard skills in order working in the global area. Komodo dragons are the largest living lizards in the world. They are identified by their massive size, flat heads, bowed legs and long, thick tails. The name comes from rumors that a dragon-like creature lived on the Indonesian island of Komodo. No Western scientists had seen a Komodo dragon until 1912, according to the San Diego Zoo. Local people call them "ora," or "land crocodile." [1].

Formal education or higher education is divided into four stages

beginning with diploma, bachelor, master, and doctorate [2]. While informal education has many varieties of education as training, workshop, seminar, and course that can be taken in a short period time [2]. Informal Education is a general term for education that can occur outside of a structured curriculum. Informal Education encompasses student interests within a curriculum in a regular classroom, but is not limited to that setting. It works through conversation, and the exploration and enlargement of experience. Sometimes there is a clear objective link to some broader plan, but not always.

History course in university that major in tourism consists of several topics and are conducted in 16 session. One of the session is discussion about Indonesian history and heritage. It cannot be discussed in one session completely, because so many culture, geographic location, plant, animal and others that are very interesting should be understand by students. Fast multimedia and mobile technology development gain many advantages for education, especially accessing huge interesting information by students anywhere and anytime to enhance their learning.[3]

People hope that theories of learning and their implications leads them to consider important questions: How do they think students learn mathematics? Or history? When a textbook seems particularly helpful or harmful, to what extent is the problem located in underlying assumptions about how teachers ought to teach and how students learn best? When teachers encounter a new curriculum, what are its theoretical underpinnings, and how do they align with the previous experience and with other theoretical and empirical scholarship? It is only through the theories produced by new generations of education scholars that can make progress on that lifelong journey of becoming accomplished practitioners. [4]

The point of the research is to develop a mobile multimedia-based Living of Komodo Dragons learning model at a university in Manado, Indonesia. The model is a supplementary resource for teaching materials of learning process and lecturer's guide. Using the learning model, it expected that students can enhance their learning.

1.1 Komodo Dragon

Komodos are very rare and are found in the wild only on five islands: the Lesser Sunda Islands of Komodo, Rinca, Gili Montang and Gili Dasami - all within Komodo National Park - and the island of Flores, where the Komodo roams freely. According to the San Diego Zoo, the habitat of the lizard can be anything from a tropical dry forest to a savanna to a deciduous monsoon forest. Komodo lives in the extreme heat around 95 degrees Fahrenheit with 70 percent humidity on the islands of Indonesia. [1]

According to National Geographic, as carnivores, Komodo dragons eat meat while hunting, such as large buffaloes, deer, carcasses, pigs, and even humans. They have unique ways to kill prey. First, they appear and kill their prey with their large legs. Then they used their sharp and jagged teeth - like sharks - to tear their prey to death. If the prey escapes, it will die within 24 hours of blood poisoning because Komodo's saliva contains 50 strains of bacteria.

The great inhabitant of Komodo National Park is the Komodo Lizard, Varanus komodoensis. The giant lizards, existing no-where else in the world, are of great scientific interest, especially for their evolutionary implications. They are commonly known as 'Komodo Dragons', due to the appearance and aggressive behavior, the Komodo Lizard, is the largest living species of lizard, growing to an average length of 2 to 3 meters. The species is the last representative of a relic population of large lizards that once lived across Indonesia and Australia. The location of living of Komodo dragons, the Park provides a refuge for many other notable terrestrial species such as the orange-footed scrub fowl, an endemic rat, and the Timor deer. Komodo dragon is one of the world heritage that was legacy from the past, and live today, and should live in the future generations. The cultural and natural heritage are both irreplaceable sources of life and inspiration. [5]

The special species that lives now as Komodo dragon is worth to be known by people in the world. Hence, the home of gigantic lizard in Komodo Island is one of the most popular place to be visited by domestic and international tourists. Elliott [6] stated that tourism can be defined in more than one way, depending upon the basis of the study, such as geography, sociology, psychology, or economics. It can be defined as an industry or a series of industrial sectors such as hotels, restaurants, and transport which provide services for tourists. It can also be defined as an experience from the tourist's point of view, an experience of relaxation and pleasure. It can also be viewed as pleasurable and profitable, or as a troublesome nuisance. United Nations Statistical Commission, following the advice of the World Tourism Organizations (WTO) stated that the term 'tourism', 'visitor', and 'tourist' generally used in tourism statistics [7].

1.2 Multimedia
Multimedia is used in education, which is the integration of text, audio, video, graphics and animation into a single medium. Instructional multimedia integrate many kinds of media in the instructional process [8]. Integration of different media multiplies the impact of a message. The focus is on instruction and learning. According to the research reports by Mayer and McCarthy 'multimedia has many benefits derived from its use. The focus of Instructional multimedia focuses on the expectation of the learner in doing upon the instruction component including multimedia object such as audio and video [9].

Mobile technologies support educators and students having the opportunity to view a natural environment and getting some information anywhere and anytime. Mobile devices are widely used in schools, searching some information and learning resources [10]. Media has become an integral part of education. There are three major forms of multimedia-based instructional application computer-based application, broadcast application, and web-based application [11].

1.3 Mobile Device
Mobile device is a general term for any handheld computer or smartphone. The term is interchangeable with 'handheld,'

'handheld device,' and 'handheld computer.' Tablets, e-readers, smartphones, PDAs and portable music players with smart capabilities are all mobile devices [12]. Smartphones are advanced versions of old version of cell phones, have the ability to make and receive phone calls, sending and receiving text messages and voicemail. They can also be used to browse the internet, send and receive email, as well as accessing social media and omline shopping.

2. RESEARCH DESIGN
2.1 Developing Mobile Multimedia
Designing the instruction is required to meet a good product, hence the learning becomes more effective and efficient. Some instructional designs including ADDIE, Dick and Carey, Hannifen and Peck, Knirk and Gustafson, Jerrold Kemp, and Gerlach & Ely have developed. All the instructional design models contain five generic phases. These are analysis, design, development, implementation, and evaluation [13]. ADDIE model can be seen in Figure 1 as follows: (1) Analysis. The objective of this paper is defined, for drugs impact information, content of information, audience and infrastructure; (2) Design. The interface design and algorithm that will be used in the tutorial are developed. Storyboard and navigation structure can be used to describe the project; (3) Development. During this phase, developing a mobile multimedia-based learning resource; (4) Implementation. During this step, reproducing the application and delivering to students and lecturers for their use on their mobile devices. The distributed application file should be run on mobile devices; and (5) Evaluation. The application must be evaluated, whether it can increase student's knowledge.
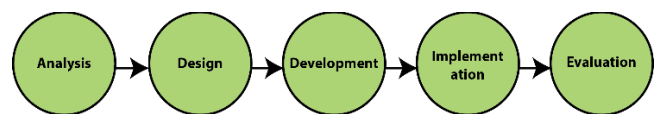

Figure 1. ADDIE model of learning development.

2.2 Respondents and Location
The research is conducted in Tourism program at a university with respondents of students who study History from January 2018 to January 2019. The object of research is mobile multimedia-based application that can access the information of Living of Komodo Dragons.

2.3 Data Analysis
This research begin by exploring the basic ideas of research and choosing alternative research titles. The field research is conducted by observing, analyzing documents, and in-depth interviews with planning and implementing of learning development.

Using qualitative approach, data are collected from observations, interviews, image, document, notes, and other unstructured data. All qualitative data are analyzed by enriching information, looking for relationships, comparing, and finding patterns base on the original data. The results of data analysis are in the form of exposure of the situation under study, and presented as narrative descriptions. [14]

3. DISCUSSION
Discussion consists of describing analysis, design, and development. The implementation and evaluation phases were not conducted in this research

3.1 Analysis

The objectives of this phase was getting the information that was needed by educators and students in developing the mobile application, production equipment and human resources to develop the product. Mobile application should meet the needs of learning that would be used by students. Data was collected in the preliminary research from questionnaires filled by students and lecturers, that can be seen in Table 1.

Table 1. Research findings after data processing

1. Most of the respondents used internet and social media more interesting than using printed media.
2. Most respondents preferred learning in class, many respondents favored to learn using smartphone by themselves.
3. Most of respondents used smartphone for everyday activities, getting information, entertainment and shopping.
4. Almost all respondents agreed that the History would be difficult to understand, without provided images and video
5. Many respondents were fond of the stories about travelling, finding historical sites and interesting beautiful scenes

Based on the answers of questionnaires, it was proper to develop an application that using mobile phone to access information, because mobile phones are widely used by young people and would increasing in 2019. An estimated 62.9 percent of the population worldwide already owned a mobile phone in 2016. The number of mobile phone users in the world is expected to pass the five billion people by 2019. The mobile phone penetration is forecasted to continue to grow, rounding up to 67 percent by 2019 [15].

In order to develop mobile application "Living of Komodo Dragons", the first phase was Analysis that focusing on objectives of the development, audiences, content and infrastructure. Equipment that was used to produce mobile 'Living of Komodo Dragons' was already available, that was a desktop computer with 4 GB of RAM, 250 GB hard drive and a mobile phone with Android operating system. The system software was Windows 7 Professional with a visual object-oriented programming tool Adobe Flash Professional CC for developing interactive multimedia application [16].

3.2 Design

The next phase was developing a navigation structure and visual design of the mobile application as a guidance for producing the learning application. Scene 1 was title page that continued with the Scene 2 containing table of content. The Scene 3 until Scene 7 contained Overview, Population, Habitat, Diet, and Travel to Komodo Island. Figure 2 shows the navigation structure of the application.
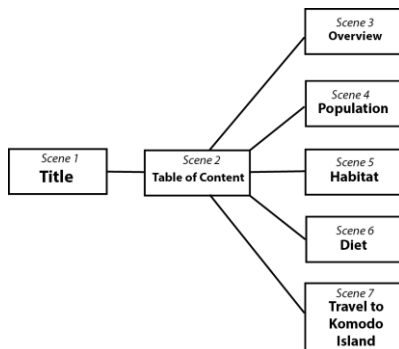

Figure 2. Navigation structure of mobile application.

Designing the instruction was required, so that the learning process became more effective and efficient. There were several topics about living of Komodo dragons. There were 5 topics: (1) Overview; (2) Population (3) Habitat; (4) Diet; (5) Travel to Komodo Island; Every topic was provided with images that could be interested and made clear information.

Figure 3 shows the display of Scene 1 of the mobile application with presenting title and image. The first display should be interesting, because it was the view which people should be interested in. Scene 2 was Table of Content which can be seen what the topics of learning about are.
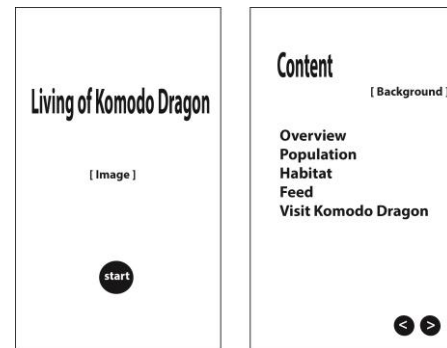

Figure 3. Visual design Scene 1 (left) and Scene 2 (right).
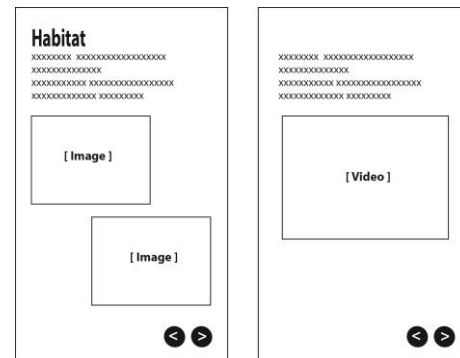

Figure 4. Visual design text and image (left) and text and video (right).

The other scenes were prepared the whole text provided with some images or video, as can be seen in Figure 4. By watching the video students could understand the habitat of Komodo dragons. The most uniqueness was that Komodo dragons live in environment surrounding people.

3.3 Development

Development phase was the phase where the entire multimedia object was created, and making application based on the visual design and the navigation structure. Because the mobile game had a lot of interactivity and complexity, it was necessary to use ActionScript 3 programming which was the part of the Adobe Flash authoring [16]. Adobe Flash has become a popular method for making interactive multimedia. It is used to create animation, advertisements, and various web page, and integrate video into application [17]. Figure 5 shows stage design of Flash document shows the several displays the application on smartphone, while Figure 6 and Figure 7 present the views of implemented application that was running.
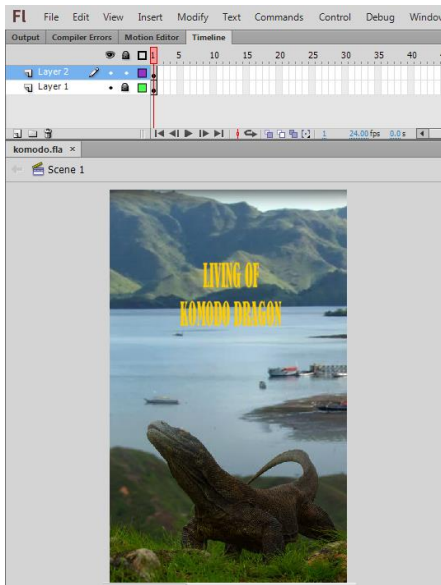
Figure 5. Stage design in Flash document.

To create a mobile application using Adobe Flash, several activities must be carried out: (1) Create animated titles and some graphs with color effects, (2) Create buttons with ActionScript that will direct to the certain view (3) Create some stages consist of information about living of Komodo dragons using text, images and videos. Figure 5 shows one of the stage design in a Flash document, while Figure 6 and Figure 7 show the visual design of scenes.

Figure 6. Visual Design Scene 1 and 2.

Figure 7. Visual Design Scene 3 and 4.

The mobile application run and checked it to confirm the objectives of the research. In application this was like filtering where the application or its parts were viewed and approved by the user. The next Flash movie shows how the multimedia worked. The first test was carried out on a mobile phone with a resolution of 800 x 480 pixels, and the screen was compatible with the mobile device. The second test used some other mobile devices with some images displayed on the screen, as can be seen in Figure 8. The application could not fit the resolution of several mobile devices, and it displayed a part of the content only.

Figure 8. Testing using several resolution of mobile device.

Blue_Chi [18] stated that developing multimedia for mobile application was not easy, because it needed Flash Player that supported in running the application. Although it was hard to do, but the application could be played on a PC without using any emulators because the file could be played on the Flash Player. The application could run on mobile device using Adobe Air that supported in running Flash application on mobile device. Adobe AIR (Adobe Integrated Runtime) is a cross-platform runtime system developed by Adobe Systems for building desktop applications and mobile applications. The runtime supports installable applications on Windows, OS X and mobile operating systems including Android, iOS and BlackBerry Tablet OS. The Adobe AIR runtime enables developers to package the same code into native apps for Windows and Mac OS desktops as well as mobile devices, reaching the mobile app stores for over 500 million devices [19].

Table 2. Item suggested by students and lecturers

1. Information about the transportation to get Komodo Island from Jakarta was not been described. It was important for domestic and international tourists.
2. Most respondents stated that the video could not be accessed easily, it might be caused by the bandwidth of the audience's location or the type of smartphone.
3. Button next and back were not clear, because they were without labels. They would be better if using symbol that user could identify easily.
4. The application had not uploaded to Google Play and App Store, hence user could find the application anytime and anywhere.
5. The color of application was not attractive. It should be changed to be interesting. Mobile application should be attractive.
6. There was no sound used on the application, unless the sound of video.

Based on the feedback, criticism and validation by students and lecturers in university, the product should be revised in order to be implemented for learning. Table 2 shows the suggestion that students and lecturer did. Results of the answers to the respondents then analyzed to determine whether the questions that created by researchers was worth to the standards. Research findings show that the application was interested for students and it motivated them to study the living of Komodo dragons by themselves as their local culture. They were proud of their unique, hot and friendly culture they have ever had. Komodo island had been stated by United Nations as one of the uniqueness in the world.

4. CONCLUSION

According through this paper, the results of the discussion of the mobile multimedia-based Living of Komodo Dragons learning model development can be conclude:

1) The mobile multimedia-based resource learning on living of komodo dragons can be used to improve learning process. The application can be used independently in learning about living of komodo dragons as one of the world heritage.

2) Living of Komodo Dragons learning model had developed based on ADDIE model including analysis, design, development with several revisions and produced the model that can be learned by student individually. The revision will be conducted for using in the next phase called implementation.

4) Some details about Flash technology used in the interactive experiments have been described. The mobile multimedia in its interactive has been well tested by the university students who major in tourism. Adobe Flash, a great authoring tool with ActionScript scripting can be used to develop mobile multimedia application.

For future work, the mobile multimedia needs to be developed as an application that can run on mobile device and can be downloaded from Google Play and App Store. The mobile multimedia should be able run on every platform, product and resolution of mobile device.

5. ACKNOWLEDGMENTS

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