

Software Development of Local Flower Recognition in Tomohon City based on Augmented Reality

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Abstract: Tomohon City is known as a flower city, with has various varieties of flower, and annually they have an event called Tomohon International Flower Festival. As for it, it will need a media that can be use as a reference and interactively introduced the local flowers that exist in Tomohon city. The research methods developed in this product are Research and Development (R & D) using Borg and Gall approach which includes research and data collection, planning, product design development, initial field trial, product revision, field test, field trial revision, field testing, final revision and dissemination and implementation. Development includes the production of a handbooks and android applications, with validation from media expert and material expert. Data collection instruments that used are including interview guidelines, product evaluation sheets, and response questionnaire sheets. The results of this study indicate that (1) the resulting augmented reality product is feasible and effectively used as a medium of introduction local flower in Tomohon. (2) The feasibility of this product is supported by the results of an assessment carried out by material experts and media experts on product quality. (3) the application has run well and can be used properly.

1 INTRODUCTION

Tourism is very important for an area that will get income from existing tourism objects. Tourism is also a commodity that is always needed by every individual, because the activity of travelling for an individual can eliminate work saturation, increase creative power, relaxation, shopping, business, knowing the history and culture of a particular ethnicity, also for health and tourism activities for spiritualism (Yovcheva et al., 2012; Kasinathan et al., 2016; Debandi et al., 2018; Ma et al., 2018). By utilizing free time on work or school days and supported by increased income, tourism activities will increase.

Tomohon City is a city known as the city of flowers, the city of flower Tomohon is one of the tourist attractions in North Sulawesi. The city of Tomohon has a very diverse flower collection. The fertile soil conditions and the cool air make this place suitable for growing all kinds of flowers.

The importance of promotion and publication began to be realized by every institution, both profit and non-profit institutions. Promotion and publicity are powerful tools to attract public attention,

including in linking visitors to visit tours in the Flower City of Tomohon. In supporting the promotion of tourism publicity in the city of Tomohon, an appropriate and useful solution is needed. The one of alternative in solving this problem is developing software based on augmented reality (AR) that can help provide information (Carmigniani et al., 2011; Nee et al., 2012; Yovcheva et al., 2012; Jung et al., 2015; Kasinathan et al., 2016; Chi et al., 2018; Irwansyah et al., 2018) about local flowers in the city of Tomohon. AR is needed as a solution for simulation to visualize objects from local flowers in Tomohon city. Simulation is basically a learning strategy that aims to provide a more concrete learning experience through the creation of imitations of forms of experience that approach the real atmosphere (Erik, 2009).

AR technology is one of the breakthroughs used recently in the field of interaction (Carmigniani et al., 2011; Chen et al., 2018; Chi et al., 2018). The use of this technology will be very helpful in conveying information to users (Debandi et al., 2018). AR is an interaction technology that combines the real world and cyberspace. AR is a

technology that combines two-dimensional or three-dimensional virtual objects into a real three-dimensional environment and then projects these objects in real time (Dinh et al., 2013). The existence of technology that is capable of displaying virtual objects in the real world is getting a high response from android users. This can be seen from one of the Android-based games that use augmented reality technology, Pokemon Go. Pokemon go is one of the games with daily active users approaching the popular Twitter service on the Android platform (similarweb.com, July 14, 2016).

The purpose of AR is to take the real world as a basis by combining several virtual technologies and adding contextual data so that human understanding as its use becomes clearer. This contextual data can be audio comments, location data, historical context, or in other forms. There are currently ARs that have been widely used in various fields such as medicine, military, manufacturing, entertainment, museums, educational games, education, and others (Carmigniani et al., 2011; Nee et al., 2012; Dinh et al., 2013; Chen et al., 2018; Chi et al., 2018). In AR technology there are three characteristics that become the basis of which are a combination of real and virtual worlds, interactions that run in real-time, and the last characteristic is the shape of objects in the form of 3 dimensions or 3D. The form of contextual data in this AR can be in the form of location data, audio, video or in the form of models and 3D animations.

This AR application was built using Unity where this application is one of the supporting software for creating AR and has supported the vuforia library (target image database) which has been integrated with various types of platforms (Fernando, 2013). The design process includes making markers on each object, creating 3D objects, animations, and adding sound features.

Based on that, the researcher developed local flower recognition software in the city of Tom based on AR which will help the user as one of the information centres. This AR-based software consists of module devices and extension applications of “*.apk” that can be installed on android devices. This AR-based software is a medium that is useful to guide users to understand independently about local flowers in the city of Tomohon. The media can be understood as everything that can convey and channel messages from sources in a planned manner so that a conducive learning environment can be created and the recipient can do the learning process efficiently and effectively (Munadi, 2013: 7-8).

The purpose of this study was to produce a local flower recognition software product in the AR-based tomohon which is suitable for use.

2 METHODS

The steps of research and development developed in this study are adapted by Borg and Gall (1983) approaches. The steps include 10 stages: research and information collecting, planning, developing preliminary forms of products, preliminary field testing, playing product revision, main field testing, operational product revision, operational field testing, final product revision, and dissemination and implementation. The product produced in this study is an AR-based local flower recognition software product in the form of an “*.apk” format.

The development carried out to make AR-based software begins with the first stage, namely pre-survey. The goal is to do research on material needs analysis what is the topic of discussion on the products being developed, and what facilities and infrastructure are available for product application.

The first stage is carried out with the Borg and Gall development model. The stage is research and data collection conducted to analyze the situation and conditions that exist in the field.

The second stage is the research planning stage which is making materials and designing local flower recognition software in the city of Tom based on AR.

The third stage was the development of the initial form of the product, namely the development of design and expert validation carried out by two media experts and two material experts.

The fourth stage was the initial field trial phase, which was conducted by selecting three communities randomly and then applying AR-based local flower recognition software as a media promotion support.

The fifth stage is to revise the product after the acquisition of data on the use of AR-based local flower recognition software products that have been carried out in the initial field trials.

The sixth stage is the main field trial phase where the revised product is re-tested.

The seventh stage is revising the results of field trials conducted in accordance with the acquisition of data and questionnaire responses. The data is analyzed and processed to get suggestions for product improvement.

The eighth phase is the stage of field trials conducted on the general public.

The ninth stage is the final product revision stage which is carried out by processing data obtained from the results of field trials. The final revision is fixing the media if there are still errors or input from the user. After the revision is complete, the product can be used real.

The last stage is the dissemination and implementation stage. The stage is to socialize the use of AR-based local flower recognition software products that have been tested for feasibility.

3 RESULTS AND DISCUSSION

This research and development aims to produce a local flower recognition software product in the city of Tomohon based on AR, where the object of research is carried out on the general public. The development of this product was generated through several stages based on Borg and Gall's (1983) development model which included the stages of research and information collecting, planning, developing preliminary forms of products, preliminary field testing, main product revision, main field testing, operational product revision, operational product testing, final product revision, and dissemination and implementation.

Then the product feasibility test is carried out. The feasibility test was carried out by two material experts and two media experts. The material expert evaluates learning material from the material aspects and aspects of learning. Media experts evaluate the aspects of appearance, media aspects and technical aspects. The results of the media evaluation and the material after revision were used to revise the product.

In the feasibility test, the results obtained by the media experts and the material experts can be seen in Table 1 and Table 2.

Table 1: Results of material experts assessment.

Material expert	Average	Category
1	3.40	Very feasible
2	3.40	Very feasible

The assessment results found that the average total value of the two material experts was 3.40 and based on the conversion table, this value was categorized as "very feasible". The results indicate that the products developed are suitable for use as multimedia learning for vocational students by making improvements to the parts according to the advice of media experts.

Table 2: Results of media expert assessment.

Media expert	Average	Category
1	2.80	Feasible
2	3.90	Very feasible

Table 2 shows that the value of validation by media experts on learning multimedia products was 3.37 and based on the conversion table, this value was categorized as "very feasible" so that it can be concluded that local flower recognition software products in Tomohon city are based This AR is suitable for use.

4 CONCLUSIONS

Local flower recognition software in Tomohon city is based on AR through ten stages, namely research and information collecting, planning, developing preliminary forms of products, preliminary field testing, playing product revision, playing field testing, operational product revision, operational product testing, final product revision and dissemination and implementation. The material on this software product is equipped with text, images, animation, sound, and video that are packaged in .apk file format and stored in compact disk (CD). This multimedia product has been evaluated by two material experts and two media experts. The results are categorized as "very feasible" with a total average of 3.40 in the results of assessment by material experts and 3.37 on the results of assessment by media experts so that it can be concluded that this software product is suitable even though there are some parts that need to be revised.

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