

# Interactive Android Application for *Pawikan* Hatchery Conservation

Asia Pacific Journal of  
Education, Arts and Sciences  
Vol. 5 No.3, 96-100  
July 2018  
P-ISSN 2362-8022  
E-ISSN 2362-8030  
www.apjeas.apjmr.com

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Date Received: October 9, 2017; Date Revised: July 5, 2018

**Abstract** - *The study focused in the development of an android application that disseminate information about Pawikan Hatchery Conservation. This includes a 2D animation about the importance of pawikan, pawikan life cycle and pawikan hatchery conservation. This application also includes a quiz and a puzzle game. The Local Government Unit of Naic through Municipal Environment and Natural Resources Office (MENRO), BS Fisheries students and the community in the coastal area of Naic are the main benefactors of this study. The developers followed the Fourth Generation Technique (4GT) as their software development process. The developers used Android Studio, XML, Java for coding, Adobe After Effects for animation, Adobe Photoshop for image editing, Audacity for audio recording. Forty respondents composed of personnel of MENRO, BSF students and IT experts rated the system as "Excellent". It signifies that the developed application is acceptable and it functions according to its preferred specifications.*

**Keywords** – 2D Animation, Information Technology, Mobile Application, Pawikan Conservation.

## INTRODUCTION

Golmack [1] said that the mobile app market is growing faster than a beanstalk. The industry is huge and growing daily, and there is no end in sight. Expectedly, the mobile developer population has boomed, and the number of mobile apps in the market has hit new heights. The revenue generated by the global mobile app industry has skyrocketed. Statista [2] discussed that the number of mobile phone users in the world is expected to pass the five billion mark by 2019. In 2016, an estimated 62.9 percent of the population worldwide already owned a mobile phone. The mobile phone penetration is forecasted to continue to grow,

rounding up to 67 percent by 2019.

However, people are no longer simply making calls and sending texts: mobile is fast becoming the Internet access medium of choice, fueled by the growth of smartphones, tablets, and laptop and dongle. According to recent research carried out by YouGov, over half (58%) the mobile phones in the UK are smartphones, allowing internet access; one in five (20%) adults now has a tablet computer; and one in ten (11%) has a dongle to access the Internet via a traditional PC2 [3]. In 2013, out of the 38,000 respondents in Metro Manila, 75 percent of the respondents surveyed used mobile phones to take photos or videos; 45 percent to browse the internet; 44 percent to access their social networking sites; and 37 percent to check their emails. The study was conducted from November 2012 to January 2013. Smartphone usage in the Philippine is at 53 percent compared to overall mobile phone usage of 89 percent according to the study conducted by the TNS, a global customized research company [4].

Due to the growing numbers of smart phone users in the Philippines, mobile application can become a use full instrument in promoting environment consciousness like sea turtle conservation. Mobile apps play an important role in the user's daily lives, Dute et.al [5] suggesting the potential of mobile apps to be used in promoting strategies. According to Andrew [6], Sea turtles conservatory learned that sea turtles are on the edge of extinction. The causes of decline are some predators such as snakes, birds and sharks eat the hatchlings, large-scale illegal harvest of eggs and collection for ornamental trade, coastal development, natural disaster, climate change and poaching. Without serious protection and conservation efforts on global scale, these reptiles might be lost and might not be seen by the next generation. A study by Davis [7] evaluates options for how smartphones and tablets can enhance existing sea turtle conservation efforts in North Carolina and Puerto Rico. Davis solution to the remote

area without wifi signal is to build a stand-alone app. Takoukam [8] said that a mobile app called SIREN-Turtles is developed by AMMCO (African Marine Mammal Conservation Organization) to be used around the world by sea turtle researchers for an easy and systematic collection of nesting beach monitoring, including data.

Because of the dwindling population of sea turtles in the country, different organization in the Philippines unite and produce *Pawikan* Conservation Project led by Protected Areas and Wildlife Bureau (PAWB) of Department of Environment and Natural Resources (DENR) as the necessary answer to save the said species. The role of this association is to develop and implement conservation and protection policies, management and propagate schemes and nationwide information and education programs to ensure the survival and growth of the sea turtles. Last February 06, 2015, the Local Government Unit of Naic through Municipal Environment and Natural Resources (MENRO) celebrated the 4<sup>th</sup> *Pawikan* Festival which aimed to serve specific needs, to provide entertainment, and to educate the local community about sea turtles' role in the environment.

As a result, the researchers came to develop an Interactive Android Application for *Pawikan* Hatchery Conservation to give another form of information technology to the local community and even, in android users.

## OBJECTIVES OF THE STUDY

The study aimed to develop an Interactive Android Application for *Pawikan* Hatchery Conservation.

Specifically, it aimed to design an Interactive Android Application for *Pawikan* Hatchery Conservation with the following features: (a) set of videos featuring the life cycle and importance of *pawikan*; (b) mini games composed of quiz game and puzzle game; (c) 2D animation to design characters within the videos ;(d) *Tagalog* narration and *Tagalog* subtitle on videos, and *Tagalog* set of questions on quiz game; create the application using the following software: (a) Android Studio for the whole graphical interface; (b) Adobe After Effects CS6 for animation; (c) Adobe Photoshop CS6 for editing the images; (d) Audacity for sound recording and editing; and test and evaluate the quality and performance of the mobile application.

## METHOD

This part presents the project design, project development, operation and testing, and evaluation of the study.

**Project Design.** In developing the system, the researchers used Fourth Generation Technique (4GT) Methodology. The researchers found that this technique is the most appropriate method to be used in the study. The approach of 4GT is suitable in the requirements of the system which include small range for easier construction and adjustment of the system. It is focused in quick responses to change and continuous development. It was a conceptual framework that promotes for seen interaction throughout the development cycle. 4GT process is preferred where rapid changes of requirements occur. At the beginning of each development scenario, system functionalities were recorded in the form of data gathering. The researchers derived the test situations from the specification. If the application needs revision during testing, the process will return to the corresponding process that needs further development [9].

**Requirements Gathering.** The researchers got their information from the books, from the internet, and from the documentaries done by some great journalists. Municipal Environment and Natural Resources Office (MENRO) was visited by the researchers for further knowledge about *pawikan*. The requirements needed in developing the application were listed by the researchers. Furthermore, the researchers gathered additional information from different school libraries and related studies. They also conducted interviews to the most reliable Local Government (LG) in Naic that handles project about *pawikan*.

**Design Strategy.** The second phase of the 4GT paradigm was the design strategy. In this phase, it is necessary to develop a design strategy for the system. The researchers analyzed the gathered data and used them for designing HIPO, storyboarding and in designing the android application. The coding phase started after designing. The detailed and specific documents were transformed into an actual system. The researchers used Java programming language in developing and creating the required source code for the android application. Hierarchical input process output (HIPO) and input process output (IPO) were used as a structural design to the android application. It shows all the module of the system.

The series of buttons under the first interface of the Interactive Android Application for *Pawikan* Hatchery Patroller was shown in Figure 1.

**Implementation using 4GL.** Implementation using 4GL was the third phase of 4GT paradigm and it was about the development of the application using 4GL. In developing the study, the researchers gathered information about *pawikan* hatchery from different references such as books, internet, documentary videos

and oral interviews. The researchers used Android Studio for the designing of the interface and Java programming language for developing the whole applications process, Adobe After Effects was used for creating 2d animations of *pawikan* life cycle, Adobe Photoshop CS6 for creating objects needed for the animation, and Audacity for audio editing needed for the sound effects and audio of the 2d animation.

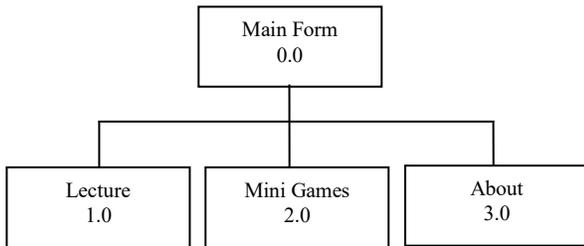


Figure 1. Hierarchical Input Process Output

**Testing.** After the designing strategy and implementation using 4GL, the researchers conducted testing and performed all the activities required in the study. The testing was implemented to find errors, determine the applications performance and determine if the application is effective and to make sure that the program runs successfully. The researchers focused on evaluating the system using the two types of testing, the beta test and the alpha test. In alpha test, the researchers conducted several testing on each component of the system to see if the system’s performance works properly and if errors might detect or occur. After the alpha test, beta test was done where the client tested the system. The criteria used in this phase were functionality, reliability, and usability. These were used to determine if the applications, reliable and user-friendly.

**Evaluation Procedure.** The researchers of the study select some criteria from the ISO 9126 standards in evaluating the system. From each category, these criteria were applied in evaluating the system performance for the users and technical experts: functionality, reliability, usability, efficiency, portability, adaptability and attractiveness.

The researchers followed the step by step procedure in order to conduct a proper evaluation upon their respondents:

- Step 1. Prepared the equipment and venue of the evaluation.
- Step 2. Invited the respondents to evaluate the system.
- Step 3. Presented and explained the system to the respondents.
- Step 4. Allowed the respondents to explore the system.

- Step 5. Distributed the evaluation form.
- Step 6. Explained the content of the evaluation form.
- Step 7. Let the respondents evaluate the system.
- Step 8. Collected the evaluation form

**Sources of Data.** Table 1 shows the breakdown of the respondents needed in the evaluation of the system. The respondents were composed of different personalities that represent each organization engaged in the project and served as the users of the system.

Table 1. Breakdown of participants

| Respondents           | Number    | Percentage  |
|-----------------------|-----------|-------------|
| IT experts            | 7         | 17.5%       |
| LG of Naic            | 4         | 10%         |
| BS FISHERIES Students | 29        | 72.5%       |
| <b>Total</b>          | <b>40</b> | <b>100%</b> |

**Data Gathering Procedure.** The researchers performed individual evaluation wherein the software demonstrated on individuals in specific offices. The initial step in system evaluation was the introduction of the title of the system and its specific objectives. Next, the system was presented and demonstrated to the respondents. Each respondent used and explored the system after the demonstration. After that, the researchers distributed the evaluation forms to the respondents to evaluate the system.

**Data Analysis.** Table 2 shows the rating scale used in evaluating the application. The corresponding interpretations were used in analyzing the result of the criteria.

Table 2. Rating scale

| Ratings     | Interpretation    |
|-------------|-------------------|
| 4.50 – 5.00 | Excellent         |
| 3.50 – 4.49 | Very Satisfactory |
| 2.50 – 3.49 | Satisfactory      |
| 1.50 – 2.49 | Fair              |
| 0.00 – 1.49 | Poor              |

**Statistical Treatment of Data.** Weighted Mean was used in computing for the result of the evaluation. The weighted mean is the average value of all the results from each criterion.

**Sampling Technique.** The researchers used purposive sampling method for the evaluation of the system. Purposive sampling is a sampling technique in which researcher relies on his or her own judgment when choosing members of population to participate in the study [10]. This method was used since the population of the study was difficult to locate. The respondents for the evaluation were random students of Bachelor of Science in Fisheries (BSF), IT instructors

in CvSU Naic, and Local Government of Naic employees which is the MENRO.

**Evaluation Instrument.** The system performance was based on ISO software standard with the criteria tackled and discussed in evaluation procedure. In analyzing and getting the result of the criteria, the numerical equivalent of each rating was used. The results were summarized and the total ratings of the evaluation were computed. The remarks, comments and the suggestions were also compiled.

## RESULTS AND DISCUSSION

The software developed by the researchers is an Interactive Multimedia Android Application for *Pawikan* Hatchery Conservation. The Local Government (LG) of Naic which is the Municipal Environment and Natural Resources (MENRO) was the main beneficiary of the system. It served as a strong tool for their advocacy in protecting and conserving *pawikan* and their newly-hatched eggs.

The system has the following capabilities:

1. The study focuses on developing an Interactive Users can watch 6 video presentation about *pawikan* life cycle anytime they want to watch them. The presentation is narrated in *Tagalog* and video presentations have *Tagalog* text on it.
2. In mini games button side, it is capable of giving entertainment to the users. It includes two game options: quiz game and puzzle game. In each game the help button is always present to guide the user on how to play each game.
3. The about button gives the information of the game including the credit.
4. Android Application for *Pawikan* Hatchery Conservation which provides video presentation about *pawikan* life cycle and its importance, and adds mini games – quiz game and puzzle game, which contains personal reviews and knowledge. Figure 2-4 shows the screenshot of the user interface of the developed android application.

## Evaluation Results

The system had undergone series of testing. The developers first conducted an alpha test to determine the behavior of the system. After the alpha test, the developers conducted beta test. For the second time, the system was tested by the clients and users. After this, the evaluators tested the system.

Functionality of the system got a mean of 4.69 which means excellent. It showed that the system was suitable and accurate to the user's needs. The functions of the system were appropriate and correct to satisfy the user's requirements.

Table 3. Overall evaluation results

| Criteria      | Mean        | Interpretation   |
|---------------|-------------|------------------|
| Functionality | 4.69        | Excellent        |
| Usability     | 4.69        | Excellent        |
| Reliability   | 4.56        | Excellent        |
| Efficiency    | 4.64        | Excellent        |
| Maintenance   | 4.58        | Excellent        |
| Portability   | 4.85        | Excellent        |
| <b>TOTAL</b>  | <b>4.67</b> | <b>Excellent</b> |

Usability got a mean of 4.69 which means excellent. It confirmed that the system interface and functions was easily understood by the different types of users. The users were able to use the system efficiently.

Reliability got a mean of 4.56 which is interpreted as excellent. The system was able to maintain its level performance under a certain condition. It was a consistent source of information about *pawikan* life cycle for the users.

The efficiency got a mean of 4.64 which means excellent. This verified that the system was able to response and process playing video's and games immediately.

Maintenance got a mean of 4.58 which means excellent. This showed that the system was convenient for verifying changes done to the system and it can withstand errors.

Lastly, Portability got an overall mean of 4.85 which means excellent. It revealed that the system was portable.

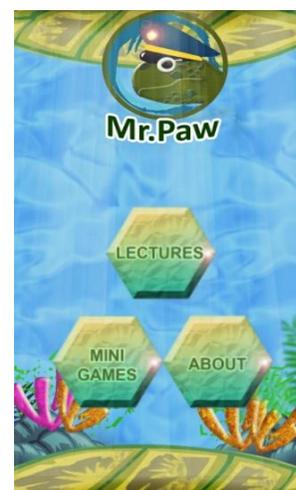


Figure 2. Main form

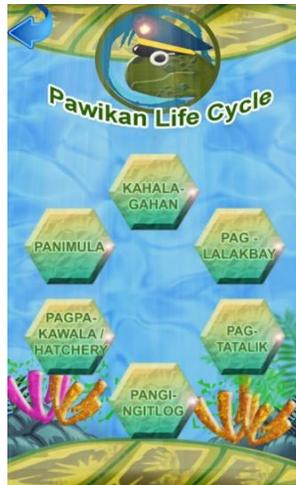


Figure 3. Lecture form



Figure 4. Mini games form

## CONCLUSION

After the system went through series of test and evaluation, the developers were able to conclude that the objectives were met.

The study proved that the use of Interactive Android Application for *Pawikan* Hatchery Conservation was a reliable tool for providing a good sense of learning's and ideas with a touch of entertainment on it. It was found to be helpful instrument in conserving *pawikan* and for the protection of their eggs.

The developed system was achieved by using the software applications such as Android Studio, Adobe Photoshop CS6, Adobe After Effects CS6 and Audacity.

It is concluded that the performance of the system had passed based on the selected criteria on ISO 9126

standard, as tested and evaluated by the participants. Thus, the system is functional, reliable, usable and efficient.

## RECOMMENDATION

The following recommendations are suggested for the future researchers who aim to enhance the system: (1) Questions in the quiz game must not be repeated; (2) Must include an external website for more details about *pawikan*; (3) Learning outcomes for different *pawikan* chapter; (4) Add video presentations for the parts of *pawikan*; (5) Develop an application that applicable in other platforms; and (6) Assess the effectiveness of this mobile application

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