HiStorya: a Game Based Mobile Learning Application

Zeus Gean Paul R. Miguel[1]**, Ritzmann C. Salvador**[2]**, Christian Jade D. Guillen**[3]**, Saturnina F. Nisperos**[4]

[1]Instructor, Mariano Marcos State University, Philippines. zgpm24@gmail.com
[2]Mariano Marcos State University, Philippines, itmann_02@yahoo.com
[3]Mariano Marcos State University, Philippines, christianjadeguillen@rocketmail.com
[4]Assistant Professor, Mariano Marcos State University, Philippines, nina_nisperos@yahoo.com

Abstract

In mobile learning approach, game-based learning techniques have been popular to engage learning while still enjoying. This study sought to design and develop a mobile game application for Araling Panlipunan (AP) that could be used as a supplementary tool in learning the subject by Grade 8 students under the K-12 Curriculum of the Department of Education (DepEd) in the Philippines. The researchers identified the topics, teaching methods and evaluation techniques used by the AP teachers and the game preferences of the AP students by conducting interviews and surveys. HiStorya, an interactive mobile game, was developed using the Android platform and the Digital Game-based Learning-Instructional Design Model. An evaluation survey of the application was also accomplished by the AP teachers and students.

HiStorya is relevant to the current state of technology today where smart devices are very popular. It is beneficial to the Grade 8 students taking up AP, the teachers of AP and the current education system of the Philippines. The students who used the application played and learned AP during or outside of school hours. The immersive, challenge and reward aspects of the game motivated the students to study and learn more about AP. The application was also utilized by AP teachers as a supplementary tool in teaching the subject. With the game statistics report generated by the system, HiStorya demonstrated it could help the teacher evaluate the subject proficiency level of his students. Moreover, HiStorya emphasized the significance of using games for student learning and introduced itself as another tool for teaching AP in the Philippines.

Keywords: HiStorya, game-based mobile learning, Araling Panlipunan

Introduction

With the rapid development of smart devices and technology today, there is a shift from desktop PC's to smart devices for mobility. According to the International Data Corporation (IDC, 2013), the rapid growth of the market for smart devices is driven by massive global consumer interest in tablets and smartphones. New smart devices which are capable of running customized applications are continuously growing. Tablet shipments in the world experienced the latest largest growth in 2012 with 78% over 2011, while smartphone grew by 60% (Reith, 2013). With this development comes the opportunity to use smart devices for learning because of their portability and widespread use.

There are already mobile systems that integrate gaming and learning which is called game-based mobile learning. In this approach, real world applications are embedded in virtual game contents without losing the motivation benefits of games (Yen, Wang, & Chen, 2011). Schwabe and Goth (2005) found in their evaluation of the effects of game-based mobile learning that gaming provides motivational learning experiences. In another study conducted by Huizenga, Admiraal, Akkerman and Dam (2009), it was found that pupils who played the game about medieval Amsterdam got

more engaged and gained significantly more knowledge about the topic than those pupils who received regular project-based lesson series. Harnessing these innovations in the education system of the Philippines brings a digital and high technology learning opportunities for students.

As to the education system of the country, the Philippines recently adopted the K to 12 curriculum which is regarded as the international education standard. Social Studies or "Araling Panlipunan" (AP) is among the subjects offered to the students. Based on the K-12 curriculum (DepEd, 2012), AP for Grade 8 focused on developing skills and giving importance to the essential qualities of geography, history, culture, society, government and economy which identify and make the Philippines part of Asia. It was found in the interviews with some AP teachers that some students easily get bored with the subject because it required a lot of memorization. Having a game as a tool aided the AP teachers in motivating the students to learn AP. Hence, the researchers aimed to develop a game-based mobile learning application for AP particularly for Grade 8 students.

Objectives

This study aimed to design and develop a game-based mobile learning system for the Araling Panlipunan (AP) subject would be used as a supplementary tool for Grade 8 students.
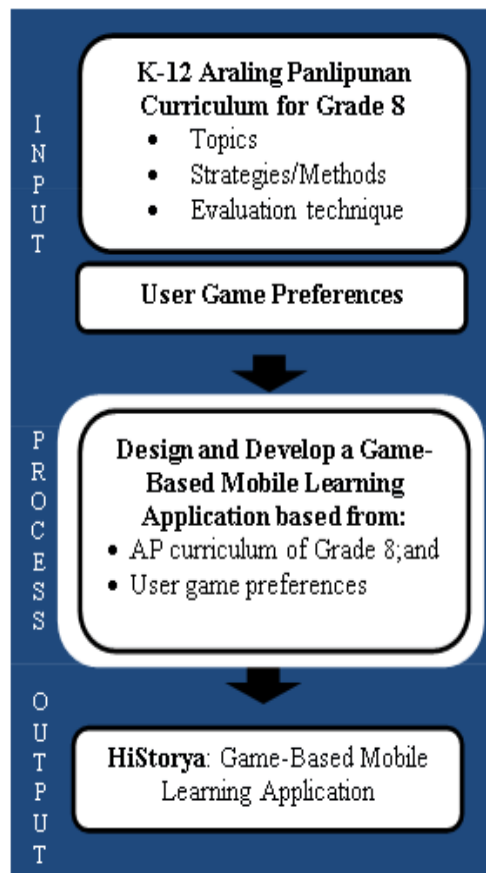
Specifically, it sought to:

1. Gather relevant information and knowledge about AP under the curriculum in AP, particularly in terms of a) topics discussed, b) teaching strategies/methods used, and c) evaluation techniques used by the teachers;
2. Determine the game preferences of the students;
3. Design and develop an interactive learning application based from the a) AP curriculum of Grade 8; and b) game preferences of the students.

Conceptual Framework

Figure 1 illustrates the conceptual framework of the study using the input-process-output model. The inputs of the study include a) K-12 AP Curriculum for Grade 8; and b) User Game Preferences. For the K-12 AP Curriculum input, the topics included in the different modules of the grade 8 curriculum were identified. The strategies and methods used by AP teachers were also considered in order to have knowledge about the practices of the teachers in teaching the subject. Considering these inputs, an interactive mobile learning system was designed and developed. As a result, HiStorya, a game-based mobile learning application was created which can be used by Grade 8 students enrolled in AP.

Zeus Gean Paul R. Miguel, Ritzmann C. Salvador, Christian Jade D. Guillen, and Saturnina F. Nisperos

Figure 1. Conceptual Framework

Methodology

A. Determine the relevant information and knowledge about the curriculum in AP

Information about the K-12 curriculum in AP was gathered with the use of unstructured interviews. The researchers obtained the information from the personnel of the Department of Education and the AP teachers at MMSU Laboratory High School in Laoag City. Artifacts such as modules, AP curriculum, and assessment guidelines were also collected in order to have more knowledge about the techniques and methods used in teaching by the AP teachers.

B. Determine the gaming preferences of the students

A survey was administered to Grade 8 students of MMSU Laboratory High School in Laoag City to determine the game preferences of the students.

C. Design, develop, and test an interactive learning application

This study adapted the Digital Game Based Learning-Instructional Design Model (DGBL-ID) for the design and development of HiStorya. DGBL-ID originated from the Universiti of Kebangsaan Malaysia and it was developed by Nor Azan Mat Zin, Azizah Jaafar and Wong Seng Yue (Zin, Jaafar, & Yue, 2009). The DGBL-ID model consists of five phases: the analysis phase, design phase, development phase, quality assurance phase, implementation and evaluation phase.

The data gathered about the AP curriculum and game preferences were considered in the analysis and design phase. Based from these inputs, the content, game types/categories, difficulty levels, and game assessment method were identified. The Android platform was used in the development of the application.

Results and Discussions

A. K-12 AP Curriculum

The researchers conducted an interview to validate what has been commonly known about the current education system of the Philippines in relation to the AP subject for grade 8. AP teachers were also interviewed regarding their teaching techniques and how they assess students in AP.

Araling Panlipunan Curriculum for Grade 8

The Araling Panlipunan grade level standard for Grade 8 showcases Asian geography, history, culture, society, government, and economy. It is being taught 3 hours a week. The AP topics are grouped into four units, including a) Heograpiya ng Asya, b) Sinaunang Kabihasnan sa Asya, c) Ang Timog at Kanlurang Asya sa Transisyonal at Makabagong Panahon and d) Ang Silangan at Timog-Silangang Asya sa Transisyonal at Makabagong Panahon. These four units are taught sequentially in the four grading periods (Unit 1 in 1st grading, Unit 2 in 2nd grading and so on) of the academic year.

Levels of Assessment

DepEd Order No. 73, s. 2012 (DepEd, 2012) contains the guide on the assessment and rating of learning outcomes under the K-12 Basic Education Curriculum. The levels of assessment listed are: a) Knowledge, b) Process or skills, c) Understanding and d) Products/Performances.

As defined in the DepEd Order, knowledge is the substantive content of the curriculum, the facts and information that the student acquires. To determine the student's' knowledge of specific facts and information, this level may be assessed using multiple choice, true or false, or matching type of tests.

Process is the skills or cognitive operations that the student performs on facts and information for the purpose of constructing meanings and understandings. It is evidenced by the student's ability to process and make sense of information.

Understanding focuses on the meanings or understandings that the students themselves make or develop. The assessment in this level should be able to draw from the students the meanings they have, which may be expressed using any of the facets of understanding which include interpretation. Students understand if they can interpret by making sense of data, text, and experience through images, analogies, stories, and models.

The highest level of assessment is focused on the products or performances. It is reflective of what is wanted from students for them to be able to do with their learning.

Zeus Gean Paul R. Miguel, Ritzmann C. Salvador, Christian Jade D. Guillen, and Saturnina F. Nisperos

Levels of proficiency

The performance of students is described based on the following levels of proficiency: a) Beginning (B), b) Developing (D), c) Approaching Proficiency (AP), d) Proficient (P) and e) Advanced (A). Table 1 shows the numerical value associated with the levels of proficiency.

Table 1. Level of Proficiency

Level	Equivalent Numerical Value
Beginning	74% and below
Developing	75 – 79%
Approaching Proficiency	80 – 84%
Proficient	85 – 89%
Advanced	90% and above

B. Game preferences of the students

The survey was conducted to determine the students' game preferences and their familiarity with the mobile technology especially the android platform.

Ninety percent of the respondents said they had a smart device, 63% were using Android operating system, 93% played games using their own or others' mobile device, and 89% played one to two hours per day. The top games played by the respondents included 4 Pics 1 Word, Logo Quiz, IQ Test, Flow Free, and Text Twist. Also, the top mobile game types preferred by the respondents include analogy, quiz, and memory games.

C. HiStorya: a game-based learning system

Based on the gathered information about the AP Curriculum for Grade 8 and game preferences of the students, the HiStorya application was developed.

Figure 2 shows the main menu of the android application. The menu items included Play Game, Instructions, Sync, Update, Quit, Music Control, Stats, and About. The Play Game menu displays the game categories. Stats show the game statistics of the player. The Sync feature allows the player to upload his or her stats to the online database which can be viewed by the teacher for assessment purposes. It also has an update feature wherein the player can download new questions from the online database.

Figure 2. Main Menu
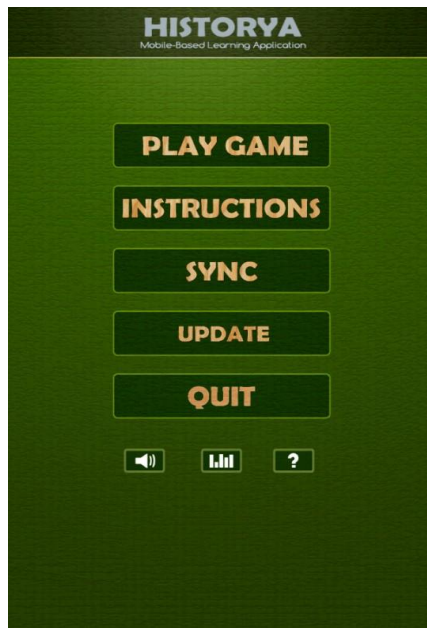
A player needed to register to be able to sync his scores to the online database. Figure 3 shows the registration form of the application which allows the player to input necessary information needed in assessing his progress. Users who are not registered may still use the application but their scores will not be synced to the online database.

Figure 3. Registration

Figure 4 shows the three categories in the game. The game preferences of the students and levels of assessment in the K-12 curriculum were considered in identifying the game categories. The analogy game represents the understanding level, the quiz game for the knowledge level and the memory game for the process or skills level.

Zeus Gean Paul R. Miguel, Ritzmann C. Salvador, Christian Jade D. Guillen, and Saturnina F. Nisperos

Figure 4. Game Category

Figure 5 shows the four levels in every game category. The four levels represented the four units in the AP curriculum. The player needed to unlock the next level to be able to play it. To unlock a level, the player had to answer the required number of questions correctly. This feature intended to make learners feel immersive and absorbed when playing the game and to motivate them to continue the game play and overcome the difficulties of each game level.

Each level had sub-levels which represented the different parts of a Unit in the AP curriculum. The sub-levels were used to organize topics and future updates on the content.

Figure 5. Game Level
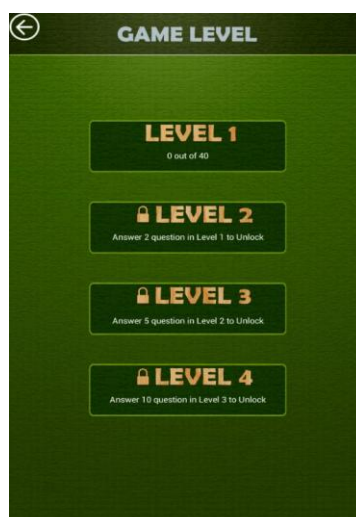
Figure 6 presents the stats of the student. It illustrates the progress of the students in answering the questions per category and level. When synched, the stats would be uploaded to the online database, where the teacher could view and evaluate the performance of the player through the web-based module.

Game samples are shown in Figures 7 – 10. The questions were formulated from the selected modules of Araling Panlipunan under the Grade 8 curriculum.

The Quiz game was a multiple choice question and a Trivia associated to the answer is displayed when the player answers the question correctly. Analogy Game lets the player analyze how the images are related and determine the word that best describes the four images. The Memory Game category aims to determine how students could recognize significant images related to Asia. An image was displayed and the player identified what was being depicted in it.

Figure 6. Game Statistics

Zeus Gean Paul R. Miguel, Ritzmann C. Salvador, Christian Jade D. Guillen, and Saturnina F. Nisperos
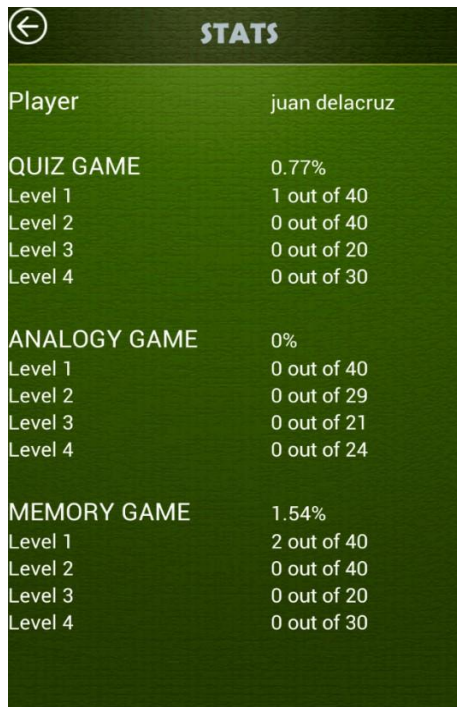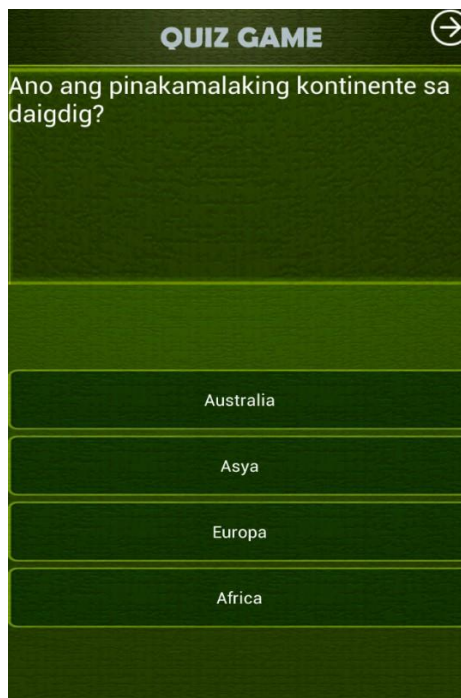
Figure 7. Quiz Game

Figure 8. Trivia for Quiz Game
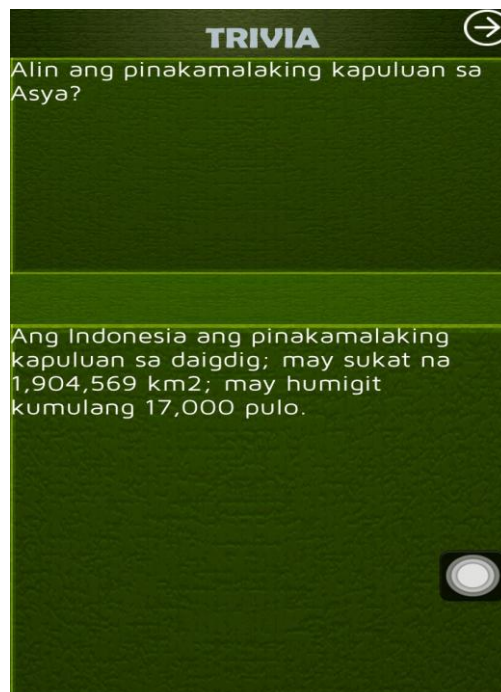
Figure 9. Analogy Game

Figure 10. Memory Game

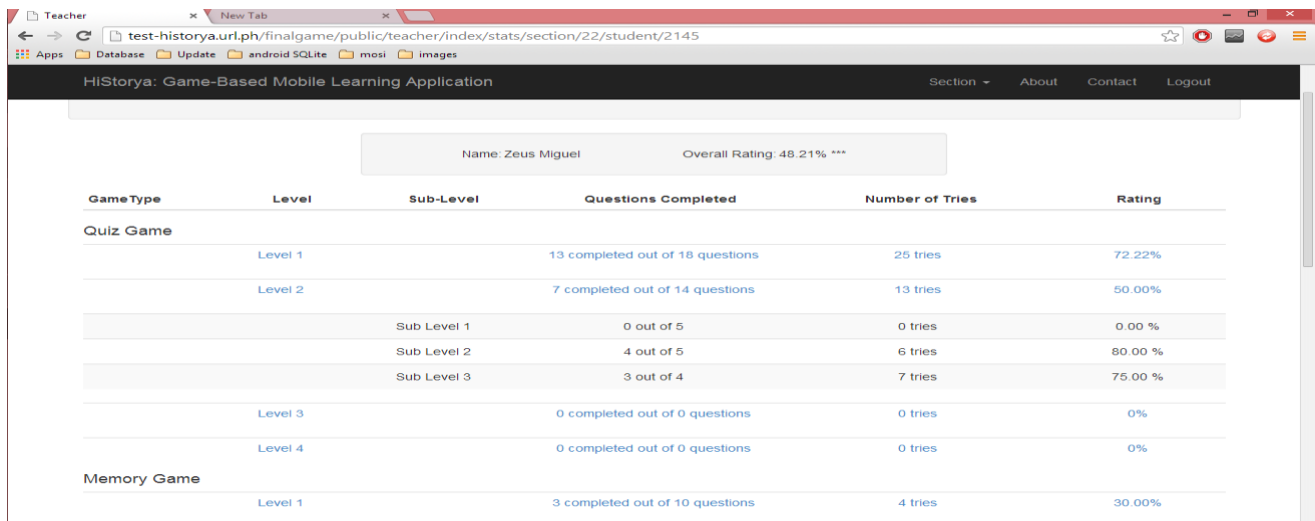Zeus Gean Paul R. Miguel, Ritzmann C. Salvador, Christian Jade D. Guillen, and Saturnina F. Nisperos
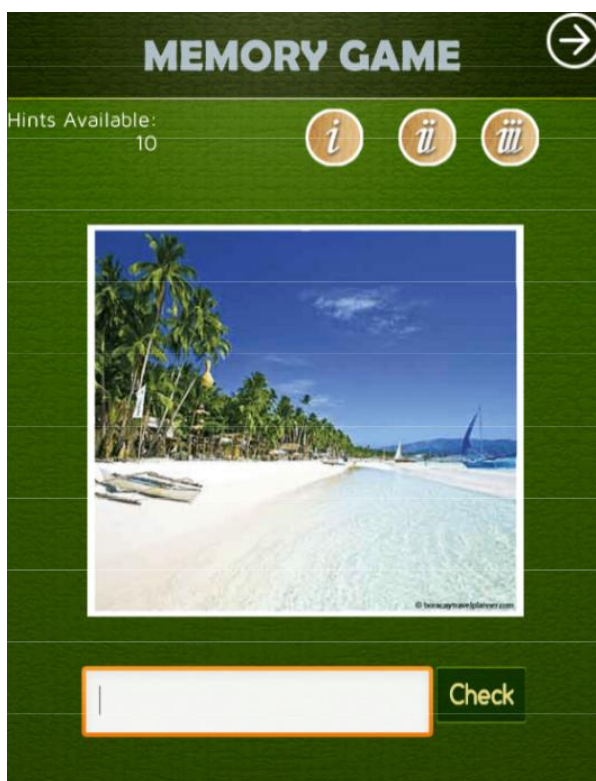
Apart from the mobile game, a web-based module which could be accessed by the teacher and administrator was developed. This module was created to aid the AP teacher in his assessment task.

The teacher module allowed the AP teacher to manage his AP class and view the students' progress while they were playing the game. Figure 11 shows the game statistics of students. The sys- tem analyses the proficiency level of the students using the levels of proficiency matrix of the K-12 curriculum. The number of tries a student answered a question was also tracked in order to determine the questions that the students had difficulty answering.

With the statistics report, the AP teacher would be able to determine the specific questions and topics that the students had difficulty with. Given this information, the AP teacher would be able to determine if there is a need for remedial class on a particular topic. The administrator module allowed the administrator to manage questions for the game using the online database.
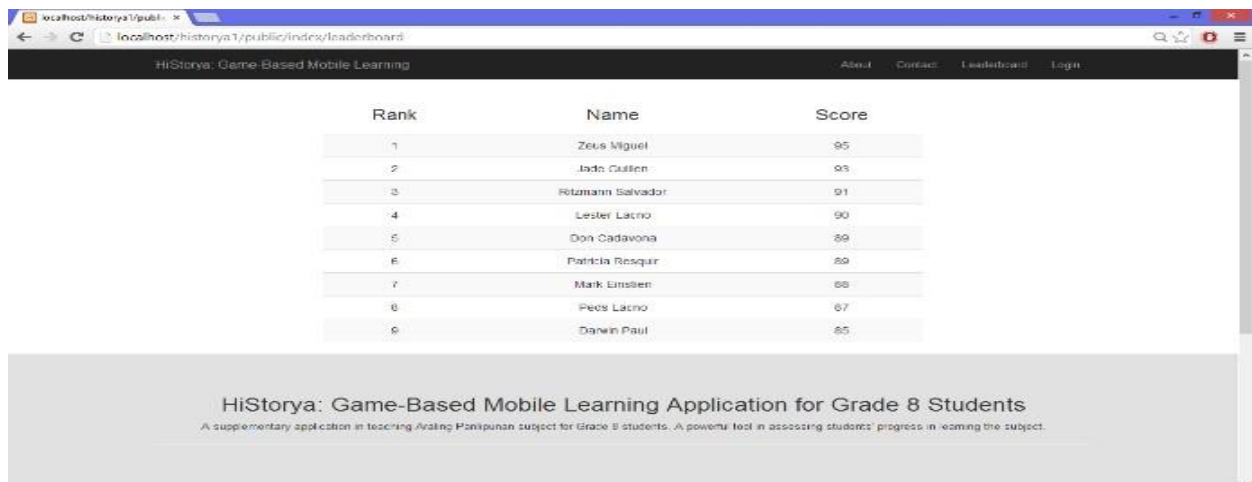
Figure 11. Game statistics of students

The add question feature of the administrator module allowed the administrator to add new questions and indicate their categories, level, sublevel, choices, and answer. To integrate challenge or competition, a leaderboard shown in Figure 12 was added as a feature. It allows players and visitors to see the top scorers in the game.

Figure 12. Leaderboard

Conclusions and Recommendations

With the growing consumer interest in smartphones, these devices are now being used for learning because of their portability. To motivate students to learn Araling Panlipunan and facilitate learning for them even if they are on-the-go or outside the school, HiStorya, a game-based mobile learning application was designed, developed, and tested in this study. The units and topics in the subject curriculum served as the basis for the game levels and content. The game categories and evaluation criteria were derived from the levels of assessment and proficiency level matrix indicated in the K-12 curriculum of the Philippines. The game preferences served as basis for the game types used in the application. With the immersive, reward, and challenge features of the game, HiStorya will help teachers to engage their students in a fun way of learning through the utilization of technology.

It is recommended to further study the effectiveness of HiStorya by assessing the performance of the students who used the traditional approach compared to the students who integrated HiStorya as a learning tool in their AP subject.

Zeus Gean Paul R. Miguel, Ritzmann C. Salvador, Christian Jade D. Guillen, and Saturnina F. Nisperos

References

DepEd. (2012). *General Guidelines for the Assessment and Rating of Learning Outcomes.*

DepEd. (2012). *K-12 Araling Panlipunan Learning Standards* (Grade 8).

Huizenga, J. (2009). Mobile game-based learning in secondary education: engagement, motivation and learning in a mobile city game. *Journal of Computer Assisted Learning,* 332–344.

IDC. (2013). *IDC Predictions 2013: Competing on the 3rd Platform.* Retrieved from http://www.idc.com/research/Predictions13/downloadable/238044.pdf

Reith, R. (2013). *Mobility Reigns as the Smart Connected Device Market Rises 29.1% in 2012 Driven by Tablet and Smartphone Growth.* Retrieved from IDC: http://www.idc.com/getdoc.jsp?containerId=prUS23958513

Schwabe, G., & Göth, C. (2005). Mobile learning with a mobile game: design and motivational effects. *Journal of Computer Assisted Learning,* 204–216.

Yen, J.-C., Wang, J.-Y., & Chen, I.-J. (2011). *Gender Differences in Mobile Game-based Learning to Promote Intrinsic Motivation.* (pp. 279-284). WSEAS E-Library.

Zin, N., Jaafar, A., & Yue, W. (2009). *Digital Game-based Learning (DGBL) Model and Development Methodology for teaching history.* (pp. 322-333). WSEAS E-Library.