Handum: Developing a Learning Mobile Game on Health for Philippine Schools

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Abstract: Project Handum was a project by the University of the Philippines and funded by the Department of Science and Technology Philippine Council for Industry, Energy, and Emerging Technology Research and Development (DOST-PCIEERD). There are two primary outputs of this project—an Android mobile phone application called Outbreak Vanguard, which discusses topics in the Department of Education Health curriculum for grade school and high school children through an adventure game, and its accompanying Teacher Portal, a website where teachers can monitor the performance of their students playing the game. This paper describes the theoretical background, software, and content of Project Handum. The Outbreak Vanguard mobile game is available for free on the Google Play store starting August 2022.

Keywords: Games in Education, Health

1. Introduction

Project Handum was a research project created by a team from the University of the Philippines and funded by DOST-PCIEERD. Its two main outputs are the Outbreak Vanguard mobile game and the Outbreak Vanguard Teacher Portal.

In the Outbreak Vanguard mobile game, players explore a world where germs have become clearly visible to everyone. As they explore the world and complete objectives, they learn all about the Prevention and Control of Diseases and Disorders, following the standard curriculum set by the Department of Education of the Philippines.

Teachers may even choose to have the game as part of their Health classes by setting up a class on the Outbreak Vanguard Teacher Portal for their students to join in. As the students play the game, their performance in in-game assessments is sent to the teacher to evaluate how well the students are achieving the learning objectives.

Outbreak Vanguard can be easily integrated into Philippine schools as it follows the official curriculum, in contrast to other learning apps. The team is currently in talks with the Quezon City and Pasig City Local Government Units for the formal adaptation of the Outbreak Vanguard system within the city school system.

The Outbreak Vanguard mobile game is available for free on the Google Play store beginning August 2022. The Outbreak Vanguard Teacher Portal can be accessed at https://www.outbreakvanguard.com.

2. Theoretical Basis

The work of Plass, Homer, and Kinzer (2015) provide four arguments for game-based learning. These are motivation, player engagement, adaptability, and graceful failure.

★ Motivation is the choice to engage in a task with persistence and intense effort (Garris et al., 2017). Games can be designed to motivate users to keep on playing.
★ Emotional engagement can occur through a compelling story. A socially engaged player plays the game because their friends play too.
★ A game can be designed to adapt to the level of the user's cognitive ability, with game levels slowly increasing in difficulty. This allows the learner to quickly go past content they already know and reach learning materials more appropriate to their level.
★ Finally, games allow for graceful failure as sometimes, failure is necessary for the learning process. Players may be motivated to study more about the topic to pass that game level. Given these design principles, here is an overview of the Outbreak Vanguard system.
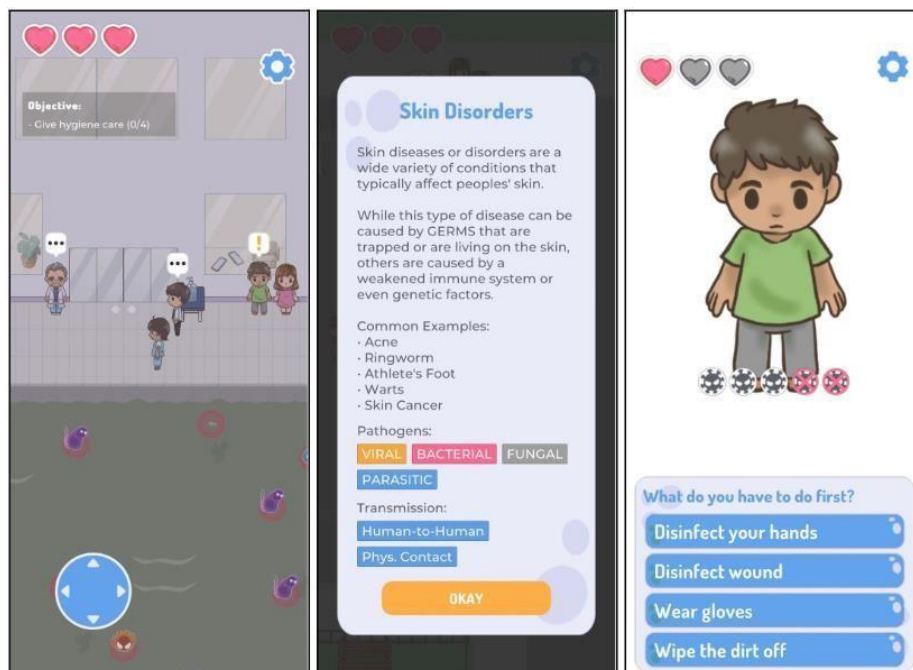
3. Outbreak Vanguard Mobile Game and Teacher Portal

Figure 1. Outbreak Vanguard Game Screens and Battle System

In Outbreak Vanguard, the player enters a world where germs have become visible to the naked eye. The player volunteers to help their local community by joining a crisis management task force called Vanguard. See Figure 1 for in-game screens.

The game follows the Prevention of Diseases and Disorders Domain lessons (Department of Education, 2016) for Grade 4 and Grade 8 students, implemented by having the player choose either the Junior or Senior Hygieneer track. They may try the other track once their main track is finished.

The two storylines are divided into eight levels each. Each level has a plot patterned on their respective Grade Level Learning Competencies as set out in the health curriculum. The Handum team chose to adapt the official curriculum to make it easier for the game to be adapted for use in Philippine schools. For example, in Level 6 of the Senior Hygieneer Storyline, the Player helps secure a marketplace where animal-borne diseases are reported to be spreading. This follows the Department of Education Learning Objective H8DD-IIId-e-20 where the student should learn about emerging and reemerging diseases.

Emotional engagement is promoted through day-to-day scenarios for each level. Players can relate to the game environment and quickly grasp how their real lives are affected by invisible germs.

To fulfill the level objectives, the player must navigate the environment to talk to different non-player characters (NPCs) while simultaneously avoiding germs wandering around the level. The lesson is delivered through interaction with the NPCs. Stage and character design were developed to appeal to the target age group of the application to motivate them to play the game.

Assessments involve the game's battle system. In a battle, the player interacts with an NPC or object to reduce the number of germs around while simultaneously maintaining their health, represented by hearts. In each stage, the player chooses one of four choices. Good choices will decrease the number

of germs and/or increase the player's health. Wrong choices do the opposite. If the player's health reaches zero, they must redo the entire battle again.

At the end of the stage, the student will be given a short assessment by a Vanguard team member based on the lessons they learned. They must pass this assessment before being able to move on to the next stage.

Graceful failure is present in both the battle system and the end-of-game assessment. If they cannot get the answers correctly, they may quickly redo the encounter again. They may also go after other objectives or talk to other NPCs to review the lesson before trying again.

A teacher using Outbreak Vanguard as part of their lessons can sign up with the Outbreak Vanguard Teacher Portal (https://outbreakvanguard.com). There, the teacher can set up a class. Students can join a class by entering the unique class code ID when they start the game. The teacher can then monitor student performance through the different screens of this website.

Players can have a social engagement with the game when the teacher provides incentives to students who perform well. Collaboration with their classmates in competition with other classes can also promote social engagement. The Teacher Portal also provides study guides to help the teacher discuss the actual lessons of the health curriculum in line with the game.

4. Effectiveness Testing

To test the effectiveness of Outbreak Vanguard in a classroom setting, the team worked with the University of the Philippines Integrated School. A pre-test was given before the students learned their health lessons in the usual way. The experimental group, however, had access to the game. At the end of the lesson, a post-test was given to see if the experimental group learned the lesson better.

Data analysis is still being performed at the time of this paper writing. The results of this testing will be published in a different paper at the 58th Psychological Association of the Philippines Convention to be held in late September 2022.

5. Conclusion

This paper provided a summary of the output of Project Handum. The Outbreak Vanguard mobile game is available for free on the Google Play store starting August 2022. Teachers may sign up on the Teacher Portal website (https://outbreakvanguard.com) or email the Handum team (hello@projecthandum.fyi).

Acknowledgements

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