HyDi

DELGADO, NAUI, SEVERINO

BACKGROUND OF THE STUDY

DISASTER READINESS AND RISK REDUCTION

GENERAL ACADEMIC STRAND (GAS)

- DRRR is offered as a specialized subject
- 15 core subjects

SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM) STRAND

- DRRR is a core subject
- Prerequisite is Earth Science
- 9 specialized subjects

HYDROMETEOROLOGICAL HAZARD

- Hydrometeorological hazards
  - Typhoon
  - Thunderstorm
  - Flash flood
  - Flood
  - Storm surge
  - El Niño
  - La Niña

LEARNING ENVIRONMENT

LEARNING ENVIRONMENT

Ms. Jenibel Paray **Mr. Mark Sanchez**

Disaster Readiness and Risk Reductions
instructors in De La Salle University

LEARNING ENVIRONMENT

- Taken by Grade 12 students
- Class lectures with powerpoint and audio/visual presentations
- Class sharing
- Seatworks and long exams

LEARNING ENVIRONMENT

- Typhoon & Thunderstorm
  - Concepts
  - Intensities
  - Effects
    - Flood
    - Flash Flood
    - Storm Surge

LEARNING ENVIRONMENT

- El Niño, La Niña and Climate Change
  - Concept
  - Cause and Effect
- Hazard Maps
- Risk Reduction and Preparedness
  - Safety measures
  - Safe and vulnerable

LEARNING ENVIRONMENT

- Video Clips
  - What happened in the disaster
  - How people responded
    - What were done right
    - What went wrong
- Role Plays

LEARNING PROBLEMS

1

Students are incapable of experiencing the scenarios where they can apply the safety measures because certain elements need to be present in a disaster

LEARNING PROBLEM

- Students do not get to simulate many decisions during a disaster during role plays/drills
    - They do not get to experience the negative effects of the safety measures they performed or choices they made

LEARNING PROBLEM

- Elements
  - Rain, thunder, flood, wind
  - Setting and condition of the environment

  - Time pressure
  - Possibility of different outcomes
  - Overlooked events or things

SIGNAL #2 TYPHOON, HOUSE SETTING
MISSING ELEMENTS

- Overlooked events/things:
  - Possibility of evacuation
  - Expiration date of food
  - Completeness of emergency kit

2

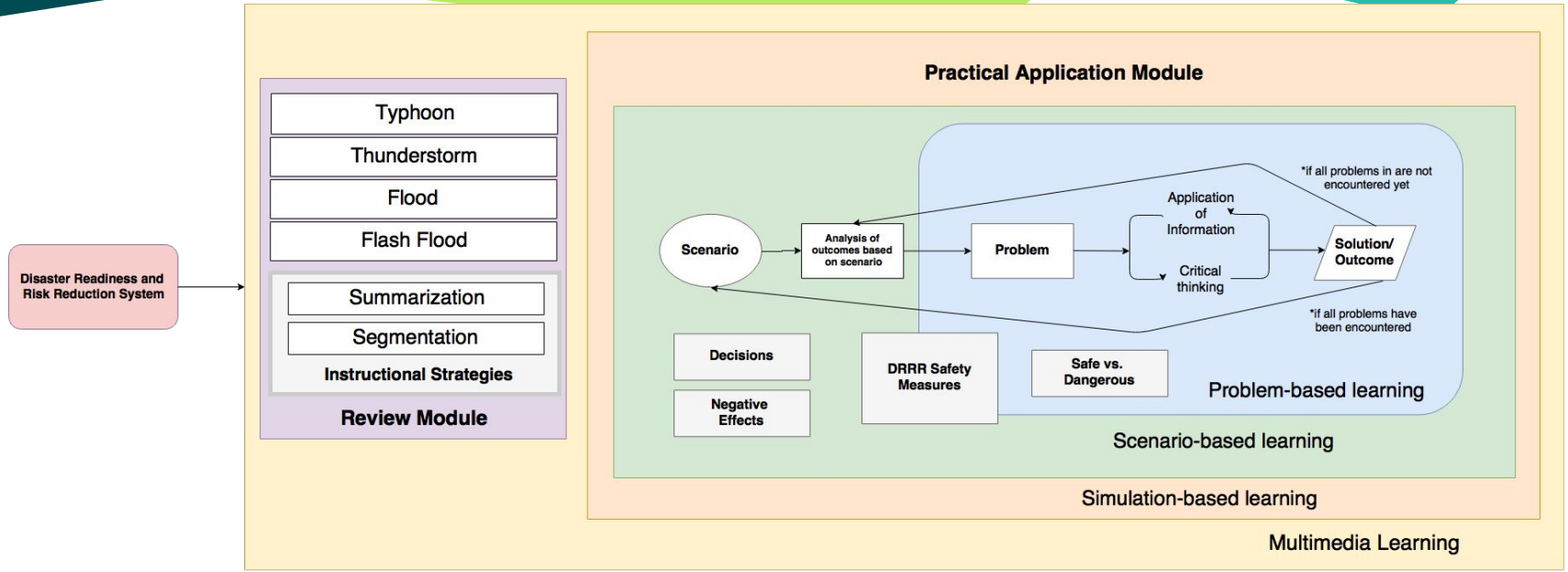
Students are unable to categorize which are considered safe or potentially dangerous in their environment because there are different factors that may come into play

LEARNING PROBLEM

- Factors
  - Actions that influence the learner’s decision
  - Corresponding effects of choices made

THEORETICAL FRAMEWORK

Theoretical framework



LEARNING THEORIES

Multimedia Learning

Different multimedia is implemented:

- Information displayed in text is accompanied by a narration of the information displayed
- Informative video or short animation showing the students important things to observe

Scenario-based Learning

- Students will be exposed to a simulated environment wherein they are tasked to solve ill-structured problems.
- It will allow students to have a deeper understanding of concepts because they are “experiencing” a scenario in its context.

Problem-based Learning

- The theory will be implemented through problem integration within the scenario.
- This will allow scenario-based learning to work hand in hand with this learning theory.

Simulation-based Learning

- Allows students/users to be immersed in a disaster scenario without exposing them to unnecessary harm
- Prevents ethical and practical dilemmas

SOLUTION

Solution

- A mobile virtual reality simulation
- Unity (Google VR)
- Users will select options with a reticle pointer and integrated clicker on Cardboard

GENERAL OBJECTIVE

To **gather the necessary information** in order to **create a courseware** for senior high students taking the **DRRR subject** to help them **apply the disaster preparedness knowledge** to solve real event problems.

SCOPE AND LIMITATION

Scope and Limitation

- A courseware that is designed to recreate disasters to be used by senior high students taking the DRRR subject
- Virtual reality simulation of hydrometeorological hazards in an urban setting

Scope and Limitation

- Hazards that will be simulated are typhoon, thunderstorm, flash flood, and flood.
- The proponents did not include El Niño, La Niña and Storm Surge

Scope and Limitation

- Scenarios will be based on collected final situational reports of previous typhoons from NDRRMC

SIGNIFICANCE OF THE STUDY

Significance of the Study

- The disaster preparedness education tool can be a tool to improve the current curriculum of the DRRR subject

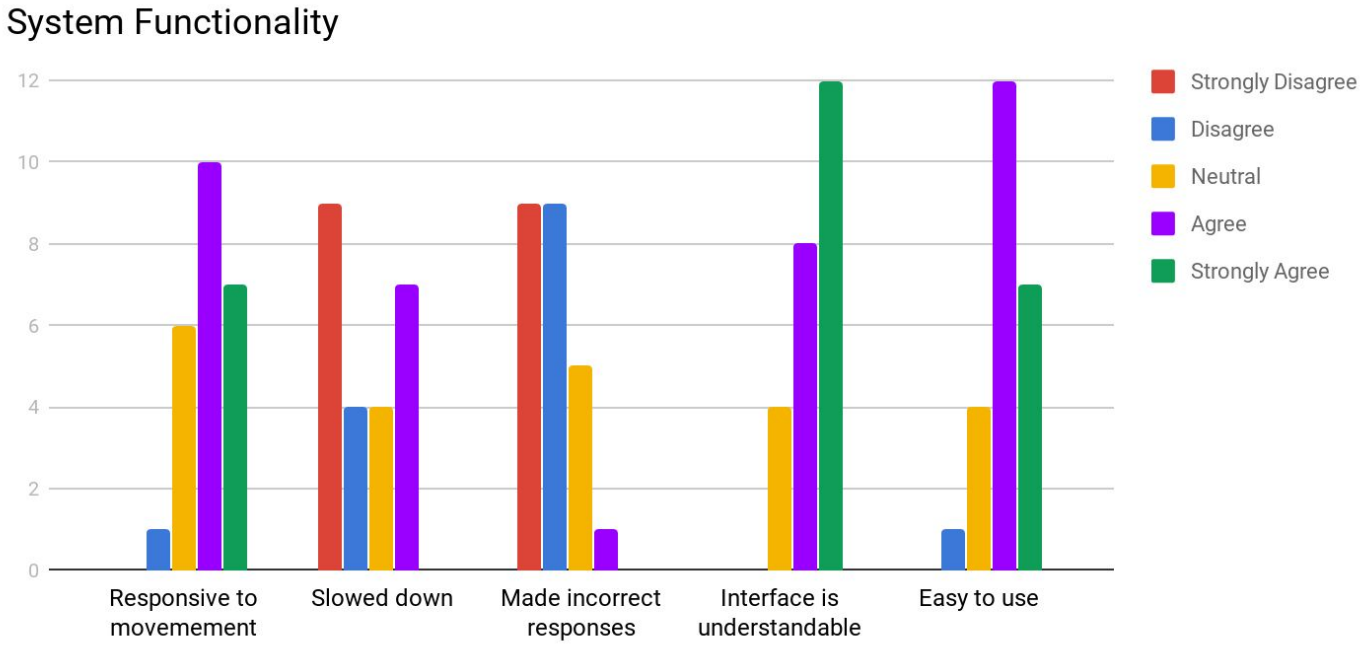
DEMO

METHODOLOGY & RESULTS

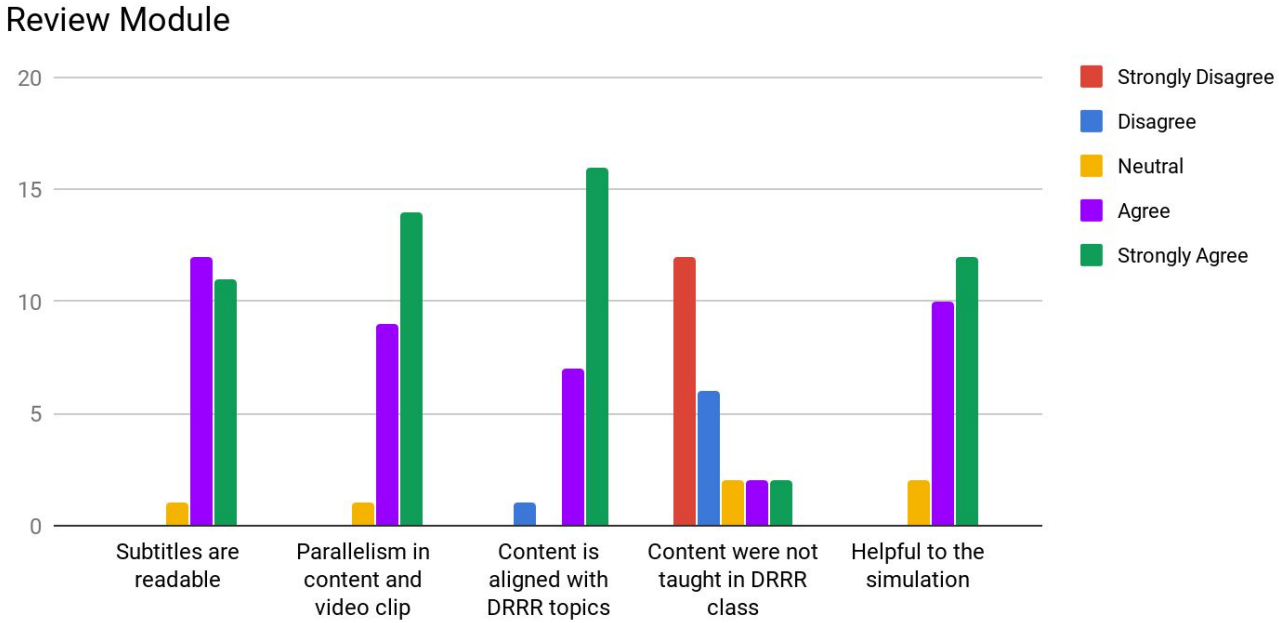
USER ACCEPTANCE TESTING

- Senior High School students used the system
- Tasked to go through one disaster simulation
- Tasked to answer assessment
- Tasked to answer an online / actual form to assess usability and effectivity of the system

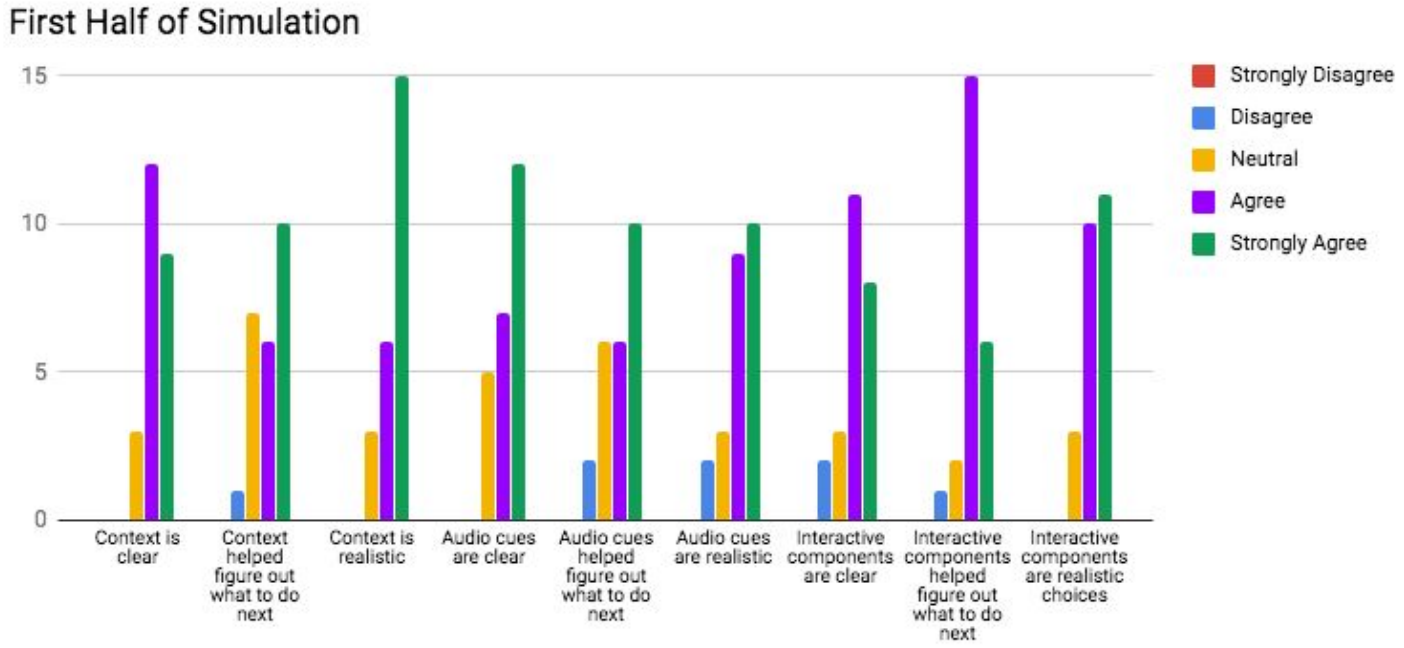
USER ACCEPTANCE TESTING



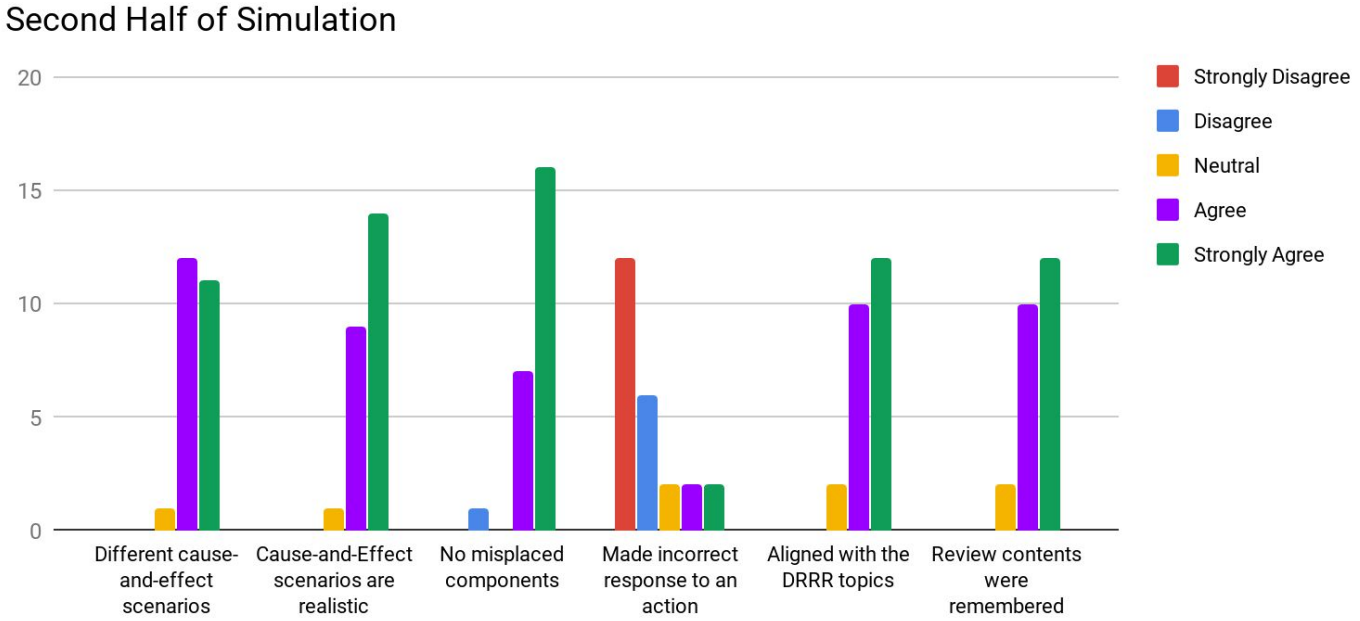
USER ACCEPTANCE TESTING



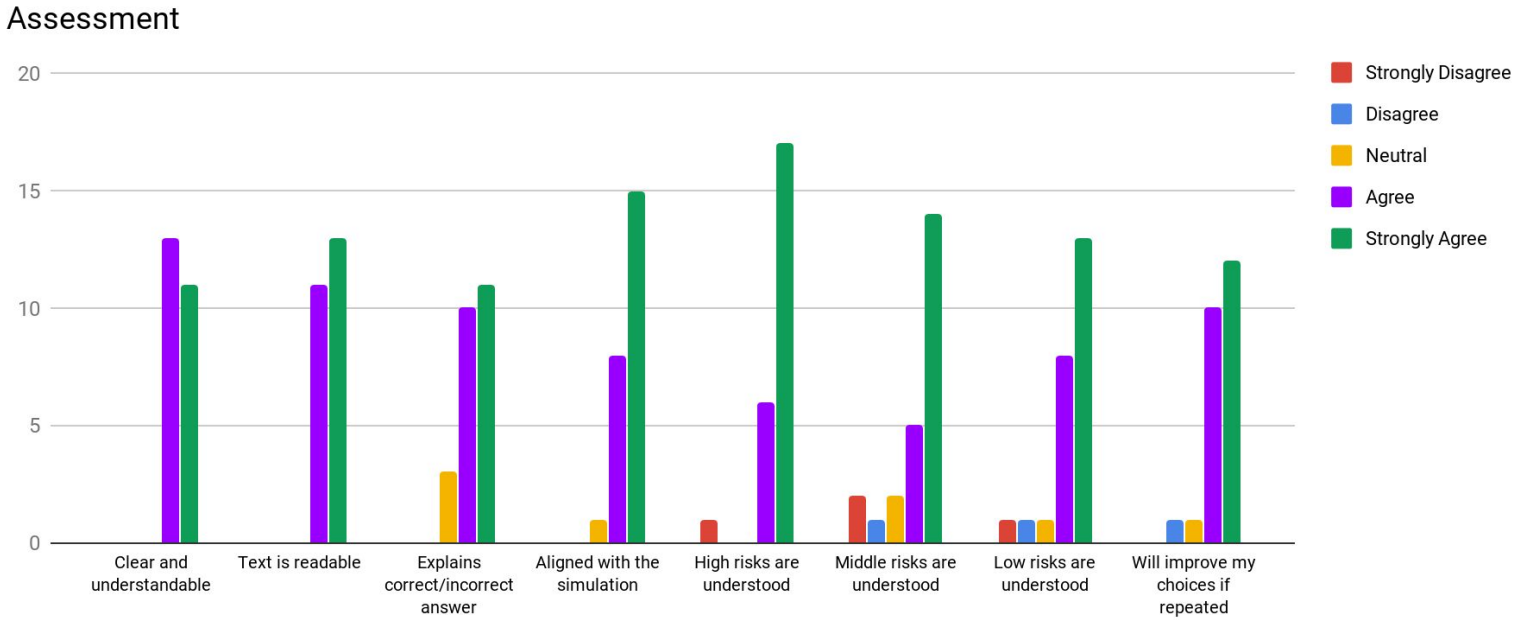
USER ACCEPTANCE TESTING



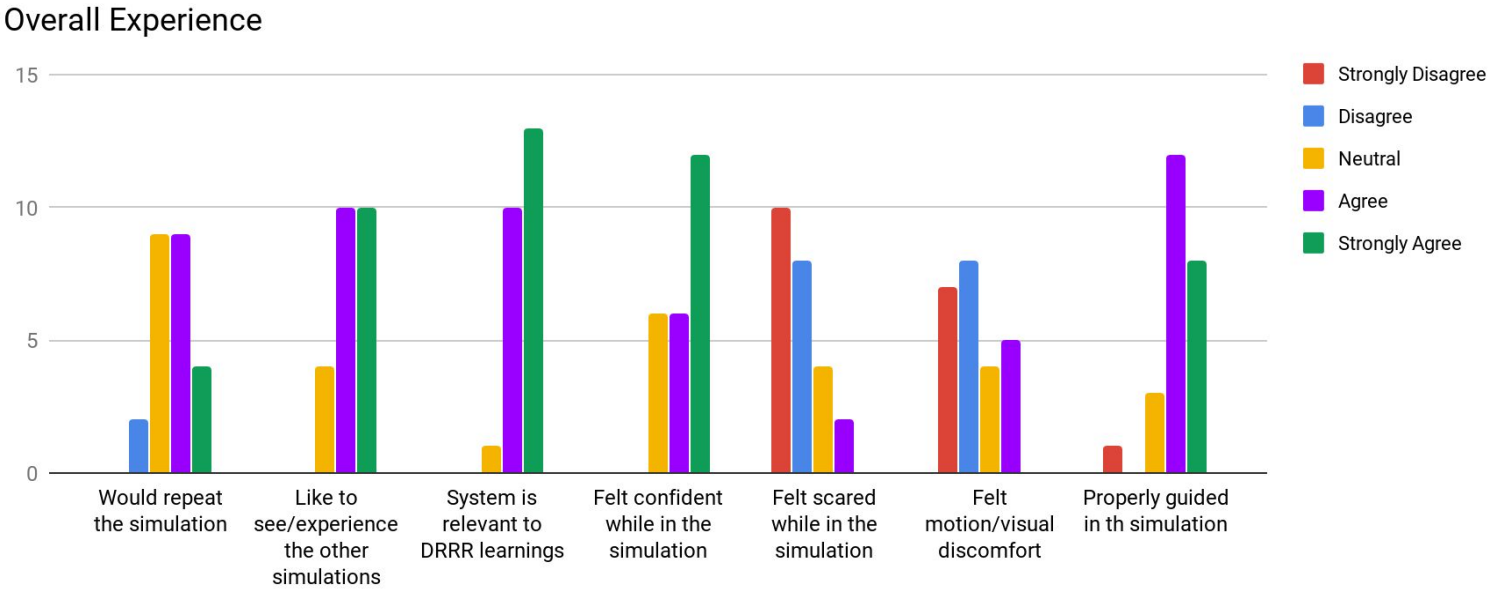
USER ACCEPTANCE TESTING



USER ACCEPTANCE TESTING



USER ACCEPTANCE TESTING



FINDINGS & REALIZATIONS

FINDINGS & REALIZATIONS

- The users believe that the scenarios simulated could happen in the real world, which is why they wanted to learn more.
- The users were very interested in how the project will progress, often asking about how the system will be distributed

FINDINGS & REALIZATIONS

- The researchers had difficulties during the development phase of the project.
  - Since virtual reality development kits are limited, with the exception of Google's Virtual Reality development libraries, certain functionalities had to be built from scratch.

FINDINGS & REALIZATIONS

- It would be best to divide the different scenarios into different application packages.
- This allows the device handling the system to require less storage space and memory.

FINDINGS & REALIZATIONS

- The classroom use case scenario was considered. During classes, the instructor may choose to include or exclude specific disaster scenario simulations included in the curriculum.

CONCLUSION

CONCLUSION

- The Hydrometeorological Disaster Preparedness Simulator is an effective virtual reality learning experience.
  - This sentiment was based from the user acceptance testing done with senior high school students

CONCLUSION

- The usability of the system has been validated with the UAT participants
- The objective of creating a courseware for the Disaster Readiness and Risk Reduction class has been achieved

RECOMMENDATIONS

RECOMMENDATIONS

- Students who are prone to/has a history with seizures are not allowed to use the system
- Students with any traumatic experiences regarding the disasters simulated in the system are not encouraged to partake in the UAT as it may trigger certain traumatic emotions.

RECOMMENDATIONS

- Future iterations of the learning experience have various disasters considered.
  - These disasters include, but are not limited to, are fires, earthquakes, terror attacks, and other disaster situations that users can experience without having to be in the actual disaster situation

RECOMMENDATIONS

- Consult psychologists and/or early childhood education specialists when designing virtual reality experiences for younger audiences

RECOMMENDATIONS

- Future iterations of the virtual reality learning experience must utilize updated source code, libraries, and APIs.
  - Due to the status of virtual reality as an “emerging technology,” a lot of the source code, libraries, and APIs available to the researchers were functional, but not optimized.