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FCP Helicopter Paramedic - Game Design Document

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Analysis

Topic

FC-P Certified Flight Paramedics

Case Problem

How can a digital product improve the preparedness and skill level of FP-C Certified Flight Paramedics for emergency rescue situations?

Target Audiences

1. FP-C Flight Paramedics actively working as medical emergency response personnel
2. Patients undergoing treatment and rescue by FC-P Flight Paramedics
3. Emergency Services Providers that actively employ FC-P Flight Paramedics
4. Paramedics Seeking to Obtain FP-C Certification

Research

To research the topic of flight paramedics and what kinds of relevant skills and knowledge the prototype will need to include in order to be of sufficient value to the target audience, I have researched the topic of flight paramedics and the training that is required to become one. To become a flight paramedic a person must already be qualified and skilled as a paramedic and potentially skilled at piloting aircraft. I found the “Certified Flight Paramedic Candidate Handbook” that is used to prepare candidates for their FC-P Certification exam and discovered that it contains a wealth of information regarding all of the specific skills and knowledge that are covered in the examination and as a result are required knowledge and practicable skills in order to operate as a licensed flight paramedic.

Knowing this, it will become easy to identify scenarios and situations that can be adapted into a digital prototype in order to create the final product. Additionally, I sought out video evidence of everyday life and operations for flight paramedics, and they showed that it is common to use on-site medical equipment to perform training exercises and prepare for emergency rescue situations. The medical equipment used for training purposes was combined with digital equipment that displayed the health condition of the patient along with other key information and allowed the paramedics to perform their duties with efficiency and skill. Combining this kind of training into a digital product that is immersive and interactive could also allow for these skills to be practiced and improved upon.

Questions

Based on my initial research, I have concluded that there are several types of learning that a person undergoes when becoming a flight paramedic, and those are cognitive, behavioral, and experimental learning. I have concluded that it is cognitive because of an understanding of medical knowledge and aircraft flight systems. It is behavioural and psychomotor learning because of the practical skills related to the application of emergency medical services as well as preparation and usage of medical aircraft. Finally, it is experimental because of the incredible amount of new experiences and knowledge that a person must undergo in order to complete their training as a flight paramedic and be fully certified. As a result of this, I have deduced three questions that should be addressed when creating this prototype.

1. What skills and knowledge are required in order to become a FP-C Certified Flight Paramedic?
2. How can a digital prototype teach these skills in an effective manner?
3. In what ways can a digital prototype improve upon existing learning materials?

Design

Learning Goals

1. The player will need to recognize medical flight procedures in order to implement effective medical flight operations.
2. The player will need to define medical treatments for patients in order to demonstrate efficient emergency medical practices. (circumstance of being in a helicopter)
3. The player will need to carry out emergency medical practices on patients in order to demonstrate sufficient performance and knowledge in emergency medical procedures.

Design Requirements

1. The product should require the player to respond to emergency flight procedures in a safe and effective manner.

   Examples:
   Respond to in-flight emergencies such as:
   1. Fire
   2. Emergency egress
   3. Emergent landing
   4. Adverse weather conditions
   5. De-pressurization

2. The product should task players with applying specific medical procedures on patients in an emergency medical rescue situation.

   Example:
   Identify the indications for basic and advanced airway management
   Perform patient triage (including MCI and WMD incidents)
   Conduct differential diagnosis of coma patients
   Perform a detailed cardiovascular assessment

3. The product should require the player to communicate medical knowledge and flight information to others in a clear and concise manner.

4. The product should challenge the player with answering factual knowledge-based questions in an emergency medical rescue situation.

Example:
Your patient has a closed head injury confirmed by CT scan. Initial assessment in the Neuro Trauma ICU, you find the following: ICP=24, BP= 110/58, CVP=8, HR=104, RR=20. What is your patient's CPP?
A.86 mmHG
B.51 mmHG
C.72 mmHG
D.134 mmHG
B is the correct answer: Multiply the diastolic blood pressure by 2. Add the systolic blood pressure to the total Divide the total by 3. This is the mean arterial pressure (MAP). Subtract the higher value (ICP or CVP) from the MAP to get CPP.

5. The product should task the player with demonstrating an understanding and practical capability to use medical flight equipment.

Concept Solution

A concept for the digital product could be a virtual reality game that tasks the player with several emergency rescue scenarios where they must complete challenges and objectives from preparation of medical and flight equipment to flight operation and successful emergency rescue and transportation of a patient. A simpler iteration of this same prototype could be a series of image based 2D or real-time 3D scenes with interactable objects and prompts that allow the player to complete these challenges and objectives in a similar but less immersive manner.

Development

Prototype

- The prototype could be a series of 3D scenes (Unity/ Unreal Engine) or 2D still images (Unity/ Unreal Engine) of scenarios and encounters of emergency rescue situations that FP-C Certified Flight Paramedics will need to be able to respond to.
- There should be objects and equipment the target audience will need to identify as based on exam prep guidebook.
- The prototype could involve answering multiple choice questions that relate to exam knowledge and skills.
- In the future, the prototype could be expanded to a full VR experience that allows for immersive encounters and realistic depictions of emergency medical response situations for training purposes.
- It would be efficient to use Adobe XD for the initial prototype and then expand to Unity 3D or Unreal Engine for full scale virtual reality development.

The final prototype incorporates two different scenarios that reflect separate fields of knowledge for the target audience.

Evaluation

Testing

To test my prototype, I created a testing plan that is in this document at the end of the appendix, in it I determine the key mechanics and conditions that will be tested in the prototype. I also determine what I aim to gain from it, the logistics of carrying out digital testing during Covid-19 lockdown restrictions, as well as any potential risks and issues that could be present while testing the prototype. Unfortunately, as I do not have the ability to currently conduct testing with my target audience, I resorted to conducting several tests with my peers and friends. Through their feedback I have refined the prototype over time as well as improved its visuals and usability. Several mistakes such as spelling errors and a confusing user interface were originally present in the prototype, however through reiterating upon the original design and utilizing a flowchart to outline each specific interaction it became clear how to improve the prototype to a more professional level.

Iterations

The prototype went through several iterations throughout its early development. Originally, I intended on creating a Unity 3D game in order to utilize virtual reality from the very beginning, and I created a scene with the fundamental objects required for the prototype. I soon realized that creating a fully functional virtual reality experience up to the level that would be required for a successful prototype in the time remaining was an unobtainable goal, I decided to change direction to a prototype in the Adobe XD software that allows for less immersive gameplay and interactions but more rapid experimentation and change. For the redesign of my prototype I focused mainly on the successful implementation of the learning goals that I had set out, as well as taking into consideration its application as testing material for the flight paramedic examination for several of the case problems target audiences.

Solution

Design Solution

The solution for this case problem based on my research findings, prototyping, and testing indicate that a virtual reality experience that aims to be as immersive and responsive as possible while ensuring authenticity towards both flight and medical knowledge with specific application towards emergency rescue situations would be the most proficient way to accomplish the learning goals of the case problem as well as the wants of the target audience. By creating a fully immersive virtual reality scenario for a large multitude of emergency response scenarios as well as medical operations and hazardous situations I believe that target audience of FP-C Flight Paramedics actively working as medical emergency response personnel will be able to practice their skills and knowledge in a new and immersive environment that could lead to increases in job safety or efficiency.

Future Improvements

In the future there are several improvements that would be implemented such as the full transition to virtual reality for every single scenario that can be derived from the outlined skills, knowledge, and practices in the “Certified Flight Paramedic Candidate Handbook”. The addition of helpful hints and information that expand upon the knowledge required to solve these scenarios in both completion and failure would also be implemented in order to further inform the target audience in the related knowledge and empower them to further improve their skills in the future. The current prototype was able to achieve the first two learning goals of recognizing medical flight procedures in order to implement effective medical flight operations and defining medical treatments for patients in order to demonstrate efficient emergency medical practices. However, it does not allow the user to carry out emergency medical practices on patients in order to demonstrate sufficient performance and knowledge in emergency medical procedures. In the future it would be very useful to focus on the ability for the user to perform those skills on a patient, and by not allowing this kind of practice to take place a key pillar of the learning system for flight paramedics would be lost.

Appendix

User Persona

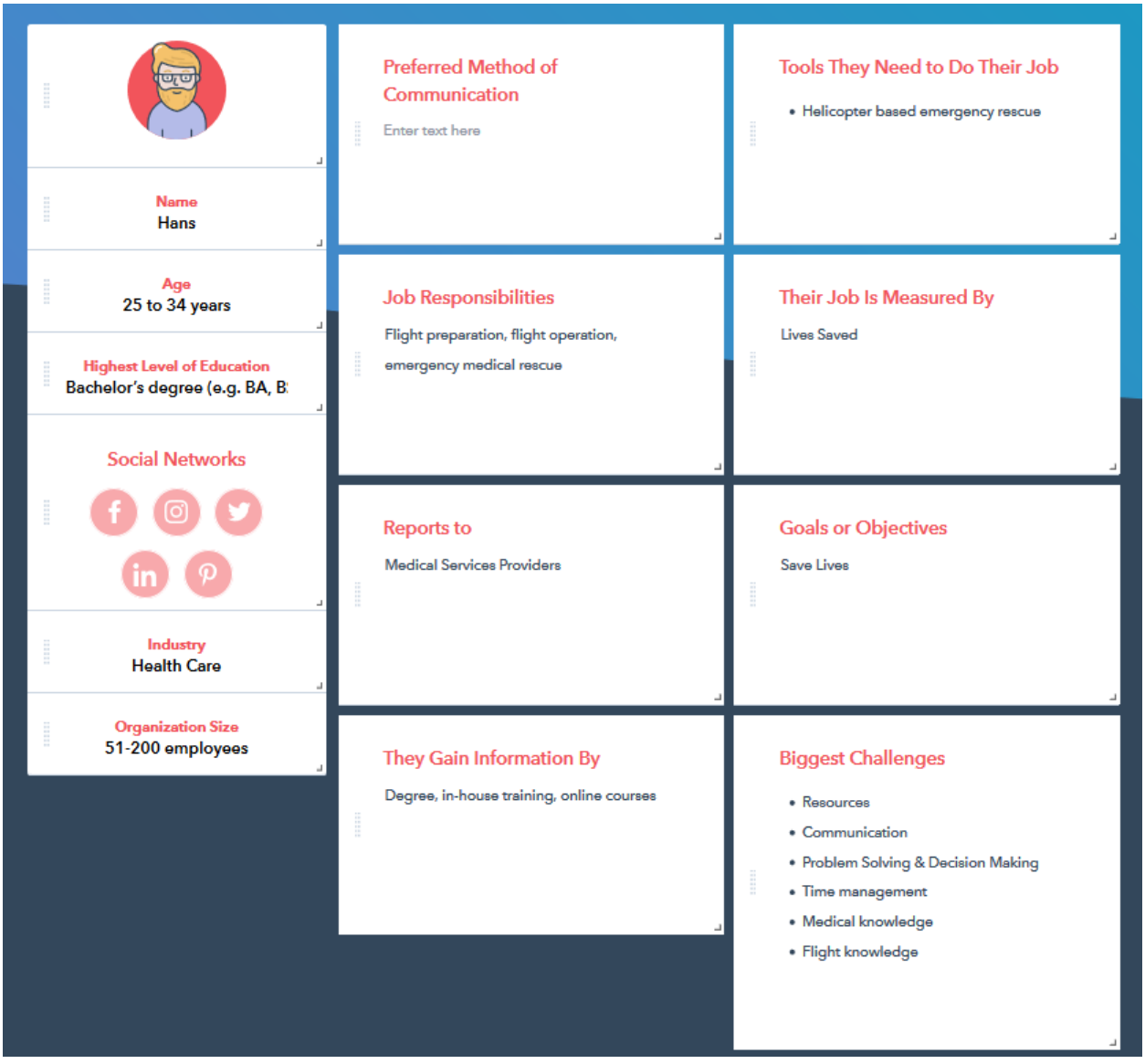

Figure 1 – Persona

Empathy Map

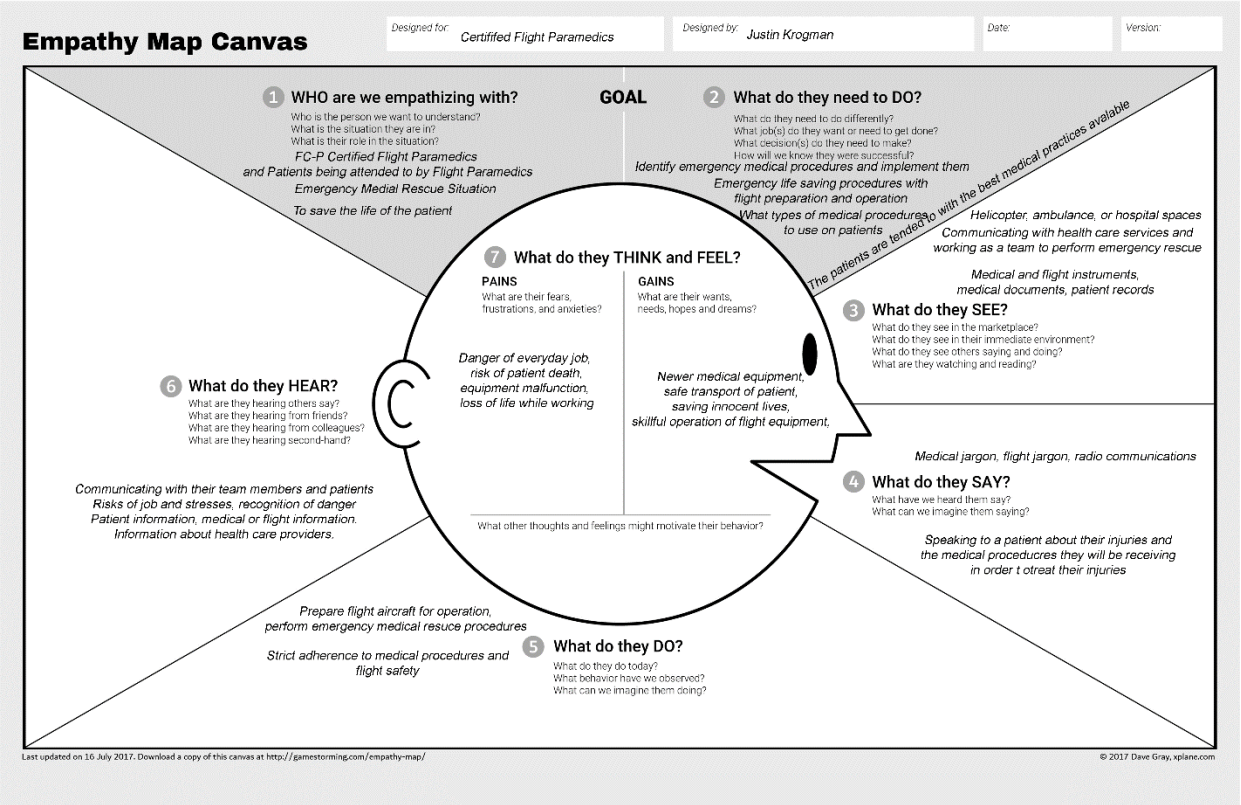

Figure 2 - Empathy Map

Prototype Flow Chart

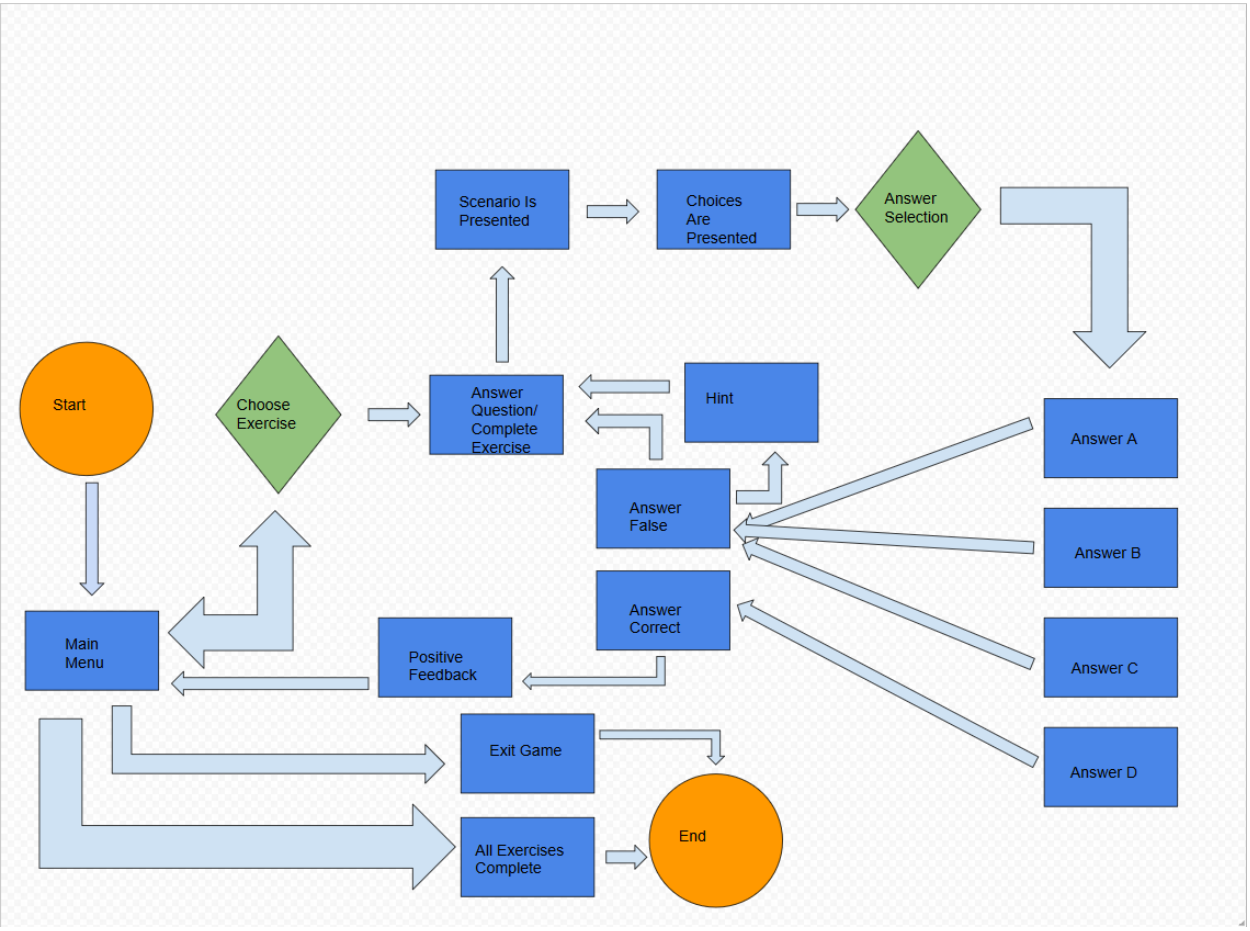

Figure 3 - Flow Chart

Concept Feedback

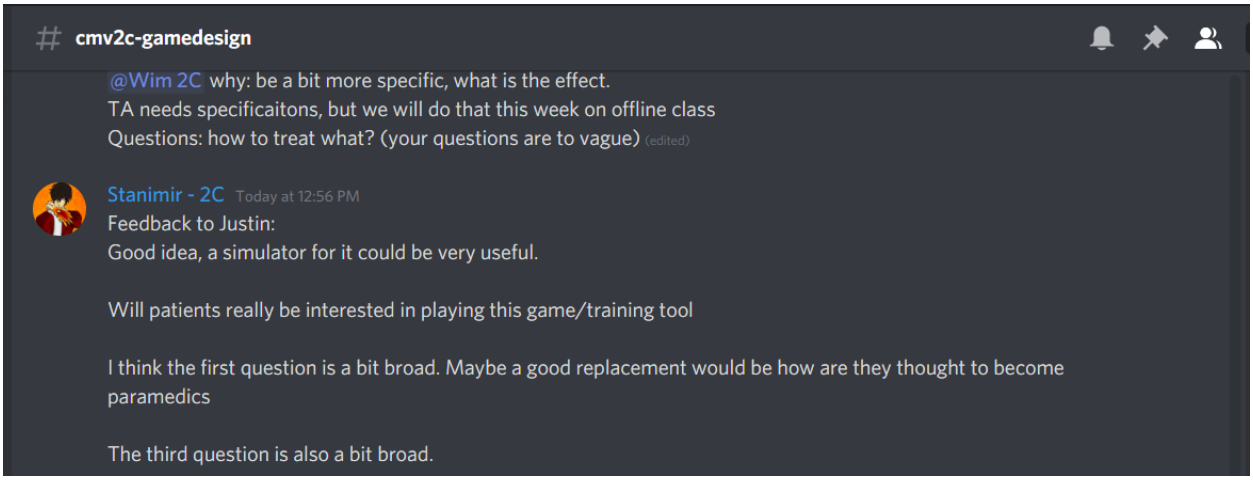

Figure 4 - Feedback 1

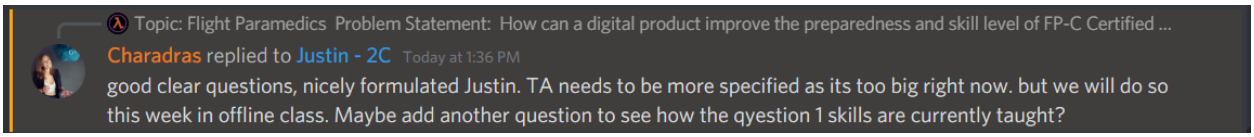

Figure 5 - Feedback 2

Testing Plan

Game Features to be tested:

- Menu
- Starting scenarios
- Playing through scenarios
- Win and fail conditions
- Completing scenarios
- Closing the prototype

Goal of the Test:

- Complete two scenarios (Identify flight emergencies, answer factual medical questions)

  Criteria:
  Flight Emergencies:
  Respond to in-flight emergencies such as:
  1. Fire
  2. Emergency egress
  3. De-pressurization

  Medical Knowledge:
  Your patient has a closed head injury confirmed by CT scan. Initial assessment in the Neuro Trauma ICU, you find the following: ICP=24, BP= 110/58, CVP=8, HR=104, RR=20. What is your patient's CPP?
  A.86 mmHG
  B.51 mmHG
  C.72 mmHG
  D.134 mmHG
  B is the correct answer: Multiply the diastolic blood pressure by 2. Add the systolic blood pressure to the total Divide the total by 3. This is the mean arterial pressure (MAP). Subtract the higher value (ICP or CVP) from the MAP to get CPP.

- Be able to interact with all base features of the prototype.

  Criteria:

-Player can open the menu, begin a scenario, play through a scenario, either win or fail at that scenario, and then end the game.

- Determine if the usability of the prototype is at a sufficient level.

  Criteria:
  The player is able to open the prototype and complete the above testing goal without outside aid or influences, without asking for help, or without displaying signs of uncertainty in regards to utilizing the base features of the prototype.

What do I want to test?

I want to test the basic interaction of the prototype and its overall usability, while also testing two different scenarios that would be fully developed in a final product. This will allow for the overall usability of the prototype to be tested while also challenging the player with solving scenarios that directly relate to the product's overall goals.

What do I want to gain from the test?

I would like to gain some insight towards the usability of the prototype as well as the overall game and product loops. I will not be able to test the prototype with my target audiences however I would still like to gain input regarding the knowledge and skills towards flight paramedics that will be tested.

Risks and Issues:

The medical knowledge being tested is too specific and the user is unable to comprehend it or answer the question/ scenario. Solution: One of the scenarios represents identifying general flight hazards that are more common rather than specific knowledge.

The usability of the prototype is not at a sufficient level and the user is unable to begin or complete a scenario without guidance. Solution: Have a set of hints or guides in place to help the user if this problem occurs, take notes on potential solutions as a direct result of the players interactions with the prototype.

The user is not comfortable with interacting with digital products and is unable to use the prototype at a level sufficient for testing purposes. Solution: Find users that are more comfortable with interacting with digital products, explain this as a requirement in the testing consent form.

Logistics:

Who: Any person ages 18 and above that is comfortable with interacting with digital products and is willing to both give feedback and have their feedback recorded for testing purposes.

When: Between the 4th and the 10th of January 2021.

Where: Digitally over Discord or WhatsApp Messenger, the prototype through Adobe XD and the testing plan through Microsoft Word.

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