

## **1. Desired Needs**

- a. Multiplier functionality requires the player to verbally request help from teammates by name before collaboration is permitted
- b. The device should be too difficult for an individual to complete, but easy enough for a team to complete
- c. Free to access, no installation required

## **2. Constraints**

- a. Cost: Limited budget restricts physical hardware and paid APIs. No cost associated with the current device.
- b. Interaction Medium: Computer-based limits interaction types
- c. Safety/Regulatory affairs: Must protect user data
- d. Global Impact: Internet access and language differences may affect accessibility and usability
- e. Marketability: Must demonstrate realistic training value for hospital adoption, and not constrain the device to strictly surgical applications

## **3. Engineering Standards**

- a. IEC 62304 - Medical Device Software Life Cycle Processes
- b. IEC 62366-1 - Usability Engineering for Medical Device
- c. ISO 9241-210 - Human-Centered Design for Interactive Systems
- d. ISO 14971 - Risk Management for Medical Devices

## **4. Ethical, Environmental, Societal Concerns**

- a. Ethical: Audio volume causing auditory damage, Device overheating from processing
- b. Environmental: High energy consumption of AI-based TTS and STT models
- c. Societal: Interpersonal conflict from perceived individual performance, Competitive dynamics undermining the cooperative goal

## **5. Active Teamwork & Leadership**

- a. Interview various stakeholders, including flight school students, hospital CIOs, surgeons, and ER technicians, to better understand the need.
- b. Delegated work between partners to meet deadlines and frequently tested/improved each other's work to ensure product quality
- c. Working in a group of 2, both partners were held accountable for their contributions to the project: Andrew, contributing more direct coding skills, and I, contributing more direct clinical experiences, adding unique perspectives in planning and developing our device.
- d. During presentations, we struggled to present our project in a visual way, as most of the device was code-based. Our final poster includes additional images to aid viewers' understanding of the background and our testing results.

## **6. Motivating Factors**

- a. Through my experiences working in direct patient care and engineering medical devices to help care for patients, I always keep the patient at the center of my work. Knowing there is currently no training for medical residents to help combat cognitive overload puts patients at risk during surgeries. This project's work has the potential to reduce surgical complications and improve patient outcomes, and that is the motivation that pushed me throughout the past year.