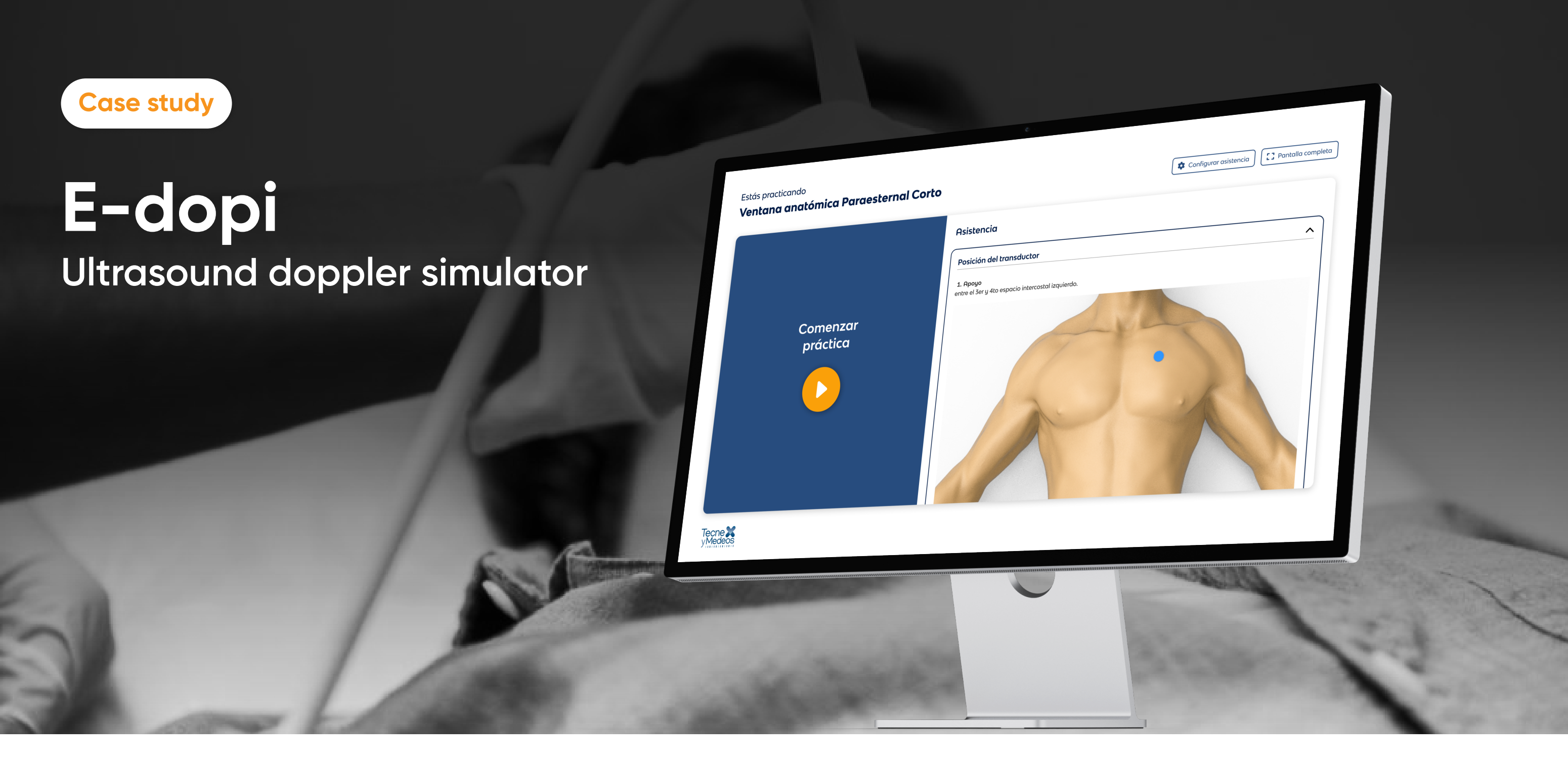
Case study

E-dopi

Ultrasound doppler simulator


Estás practicando

Ventana anatómica Paraesternal Corto

Comenzar práctica

Asistencia

Posición del transductor

Software for a simulation system used by health professionals in emergency practice.

About the project.

Techne&Medeos is a critical care academy where more than 700 healthcare professionals have learned practical skills from theory.

Florencia Arguiló has collaborated with the academy during her graduation thesis in Bioengineering, creating a simulator for doppler ultrasound.

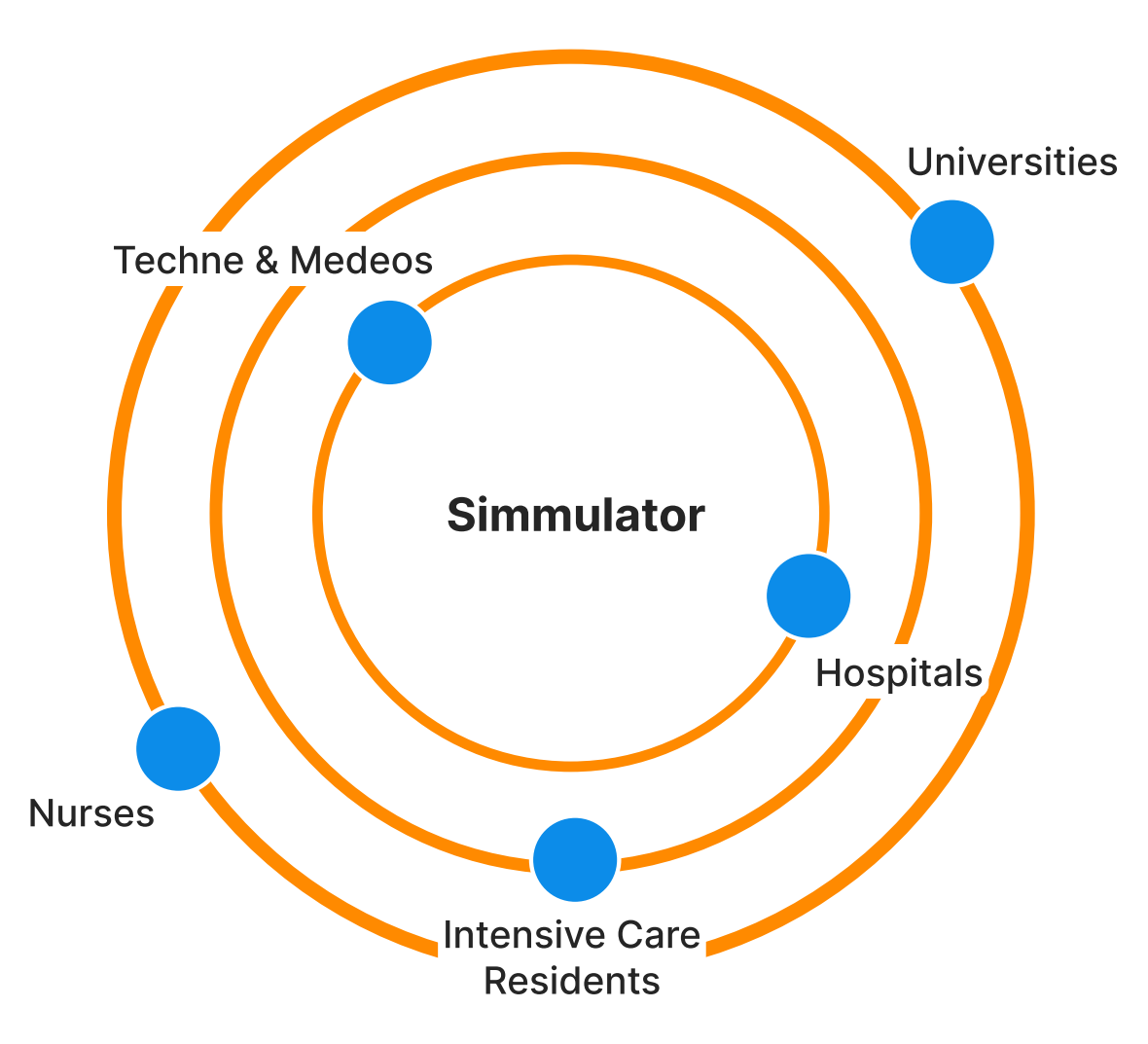
The main objective of the project is to provide a tool to prevent critical situations during emergencies.

My role

I worked as Product Designer with a partner, following the process from start to finish. We did the research process and the design. I was in charge of the Design System to be implemented in the high fidelity prototypes.

Stakeholders

All these **people, companies** and **institutions** are interested in using and practicing with the system. Some will see a greater impact on their jobs than others.



Goals

1.

Create an MVP.

Improve functionality, and the most important features for this stage.

2.

Increase usability.

Design interactions taking into account the use of the transducer.

3.

Do it in a short time.

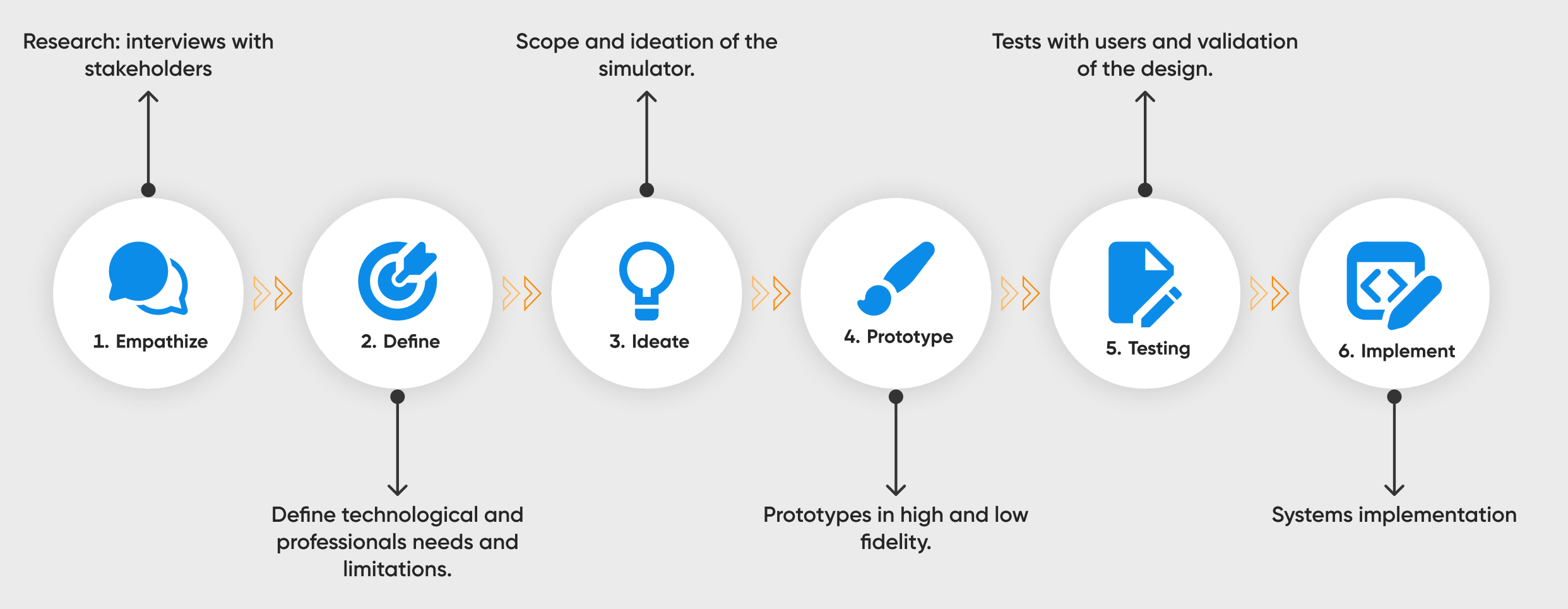
It had to be created in two months, so decision making was important.

4.

Educate.

The content had to be organized and structured to facilitate learning.

The process


1. Empathize: Research: interviews with stakeholders

2. Define: Define technological and professionals needs and limitations.

3. Ideate: Scope and ideation of the simulator.

4. Prototype: Prototypes in high and low fidelity.

5. Testing: Tests with users and validation of the design.

6. Implement: Systems implementation

1 Empathize

Remote interviews

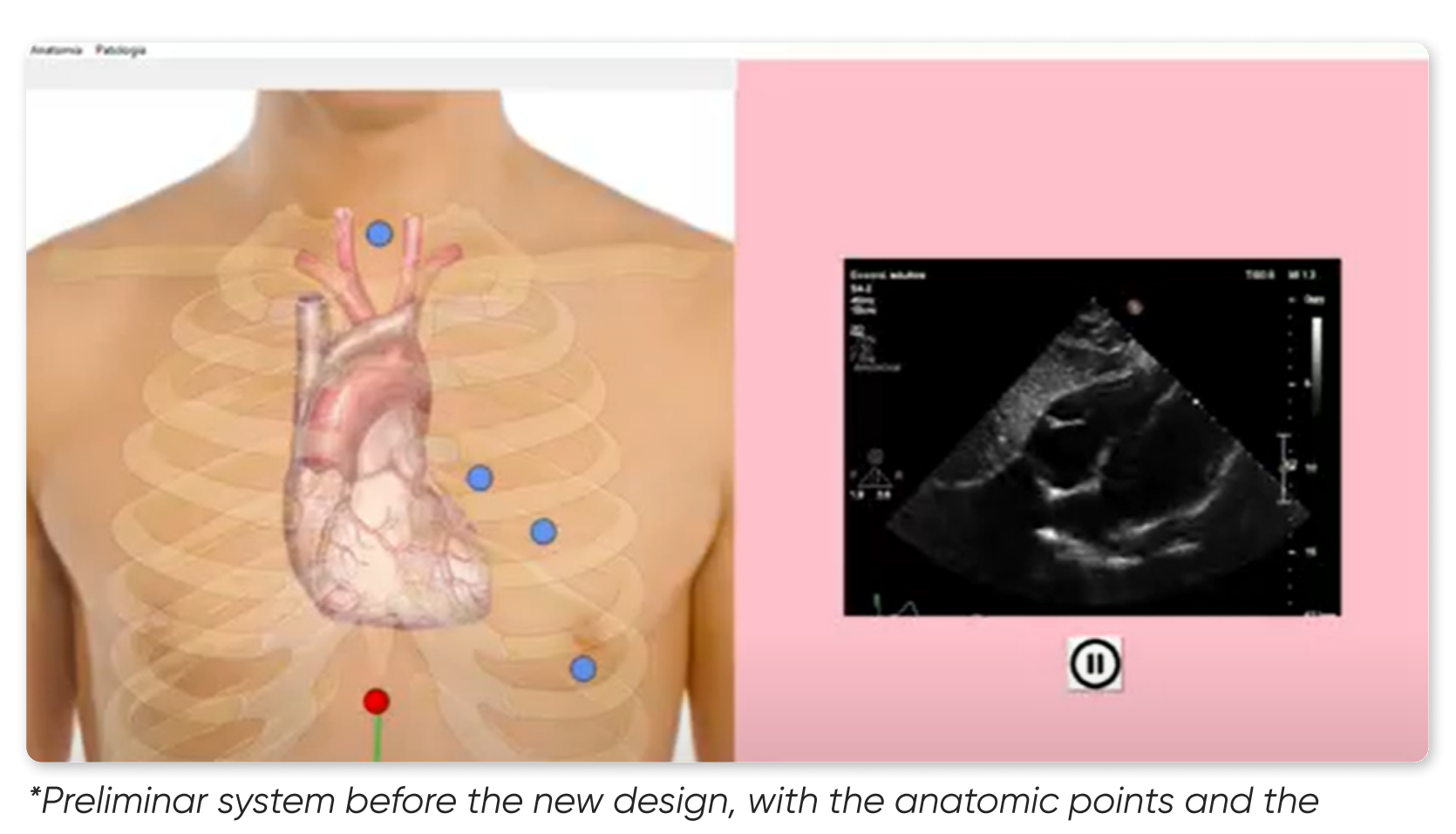
With the team of bioengineers and doctors to know the system function and the business goals.

With healthcare professionals to know their needs on emergency practices

How does the system works?

Two components.
The simulator has a transducer to obtain the anatomical images, and a software system where users will view them.

The sensor.
Once the user finds the location of an anatomical point, the transducer will identify the sensor and, at that moment, the Doppler image will appear on the screen as a video automatically.


*Preliminar system before the new design, with the anatomic points and the doppler video at the right.

What our users said

"En una situación de emergencia tenés apenas cinco minutos para tomar una decisión. Saber usar el eco doppler puede salvar a alguien."

"In an emergency situation you have just five minutes to make a decision. Knowing how to use the ultrasound can save someone."

"Yo todavía soy residente, lo que sé del uso del eco doppler es por observar a alguien usándolo. Sería genial poder aprender de a poco."

"I'm still a resident, what I know about the use of ultrasound is from observing someone using it. It would be great to learn a little at a time."

"Hay pocas prácticas con eco doppler, y generalmente se aprender desde un libro. Sería bueno tener la teoría junto con la práctica."

"There is few practice with ultrasound, and it is usually learned from a book. It would be nice to have the theory along with the practice."

2 Define

What does users need?

To learn.
Users would like to learn by theory and practicing.

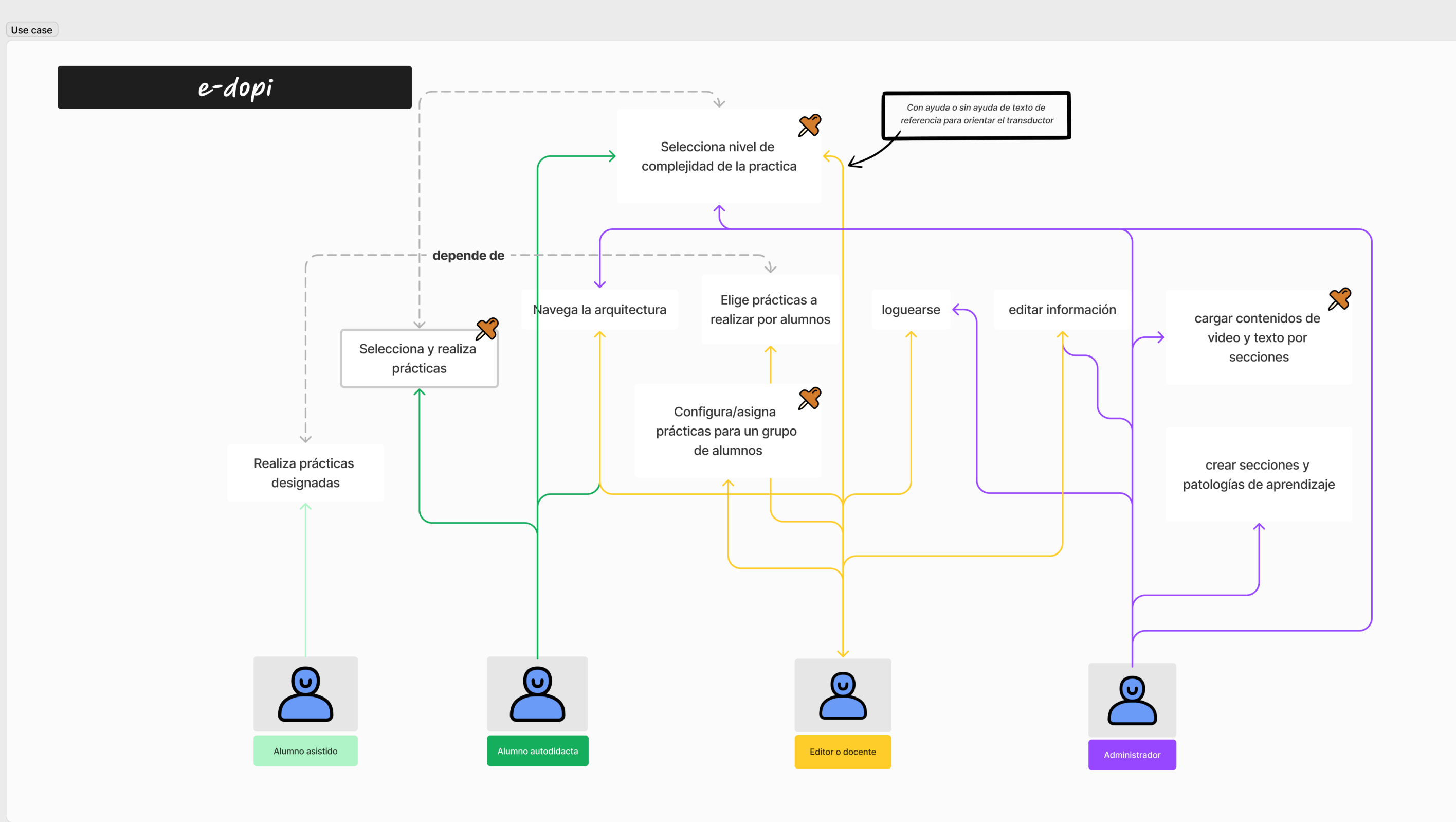
To customize.
Users will practice increasing learning over time. It is important to offer a customizable experience with different levels and complexities.

To simulate.
It is important to provide an experience similar to an emergency situation, so that they can easily apply what they have learned.

Use cases

This is how main actors interact with an eco doppler system during a lesson.

Use case

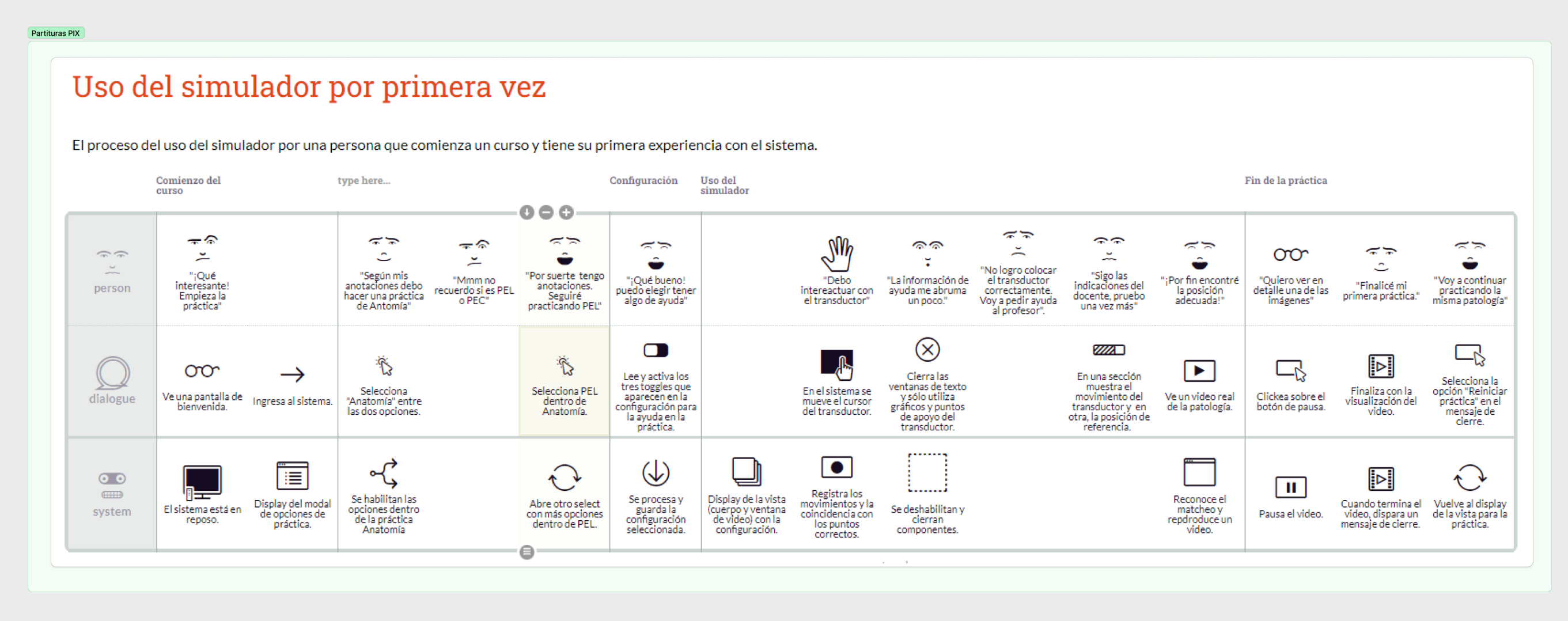

e-dopi
depende de
Selecciona nivel de complejidad de la practica
Con ayuda o sin ayuda de texto de referencia para orientar el transductor
Navega la arquitectura
Elige prácticas a realizar por alumnos
loguearse
editar información
cargar contenidos de video y texto por secciones
Selecciona y realiza prácticas
Configura/asigna prácticas para un grupo de alumnos
crear secciones y patologías de aprendizaje
Realiza prácticas designadas
Alumno asistido
Alumno autodidacta
Editor o docente
Administrador

Benchmarking

We did a comparative analysis of similar products to review features and funcionalities.

PIX

We use PIX to shoe how all the activity works when using a system, going from people's feelings, to the functioning of the hardware.


Partituras PIX

Uso del simulador por primera vez

El proceso del uso del simulador por una persona que comienza un curso y tiene su primera experiencia con el sistema.

Comienzo del curso | type here... | Configuración | Uso del simulador | Fin de la práctica

person: "¡Qué interesante! Empieza la práctica" | "Según mis anotaciones debo hacer una práctica de Antomía" | "Mmm no recuerdo si es PEL o PEC" | "Por suerte tengo anotaciones. Seguiré practicando PEL" | "¡Qué bueno! puedo elegir tener algo de ayuda" | "Debo intereactuar con el transductor" | "La información de ayuda me abruma un poco." | "No logro colocar el transductor correctamente. Voy a pedir ayuda al profesor". | "Sigo las indicaciones del docente, pruebo una vez más" | "¡Por fin encontré la posición adecuada!" | "Quiero ver en detalle una de las imágenes" | "Finalicé mi primera práctica." | "Voy a continuar practicando la misma patología"

dialogue: Ve una pantalla de bienvenida. | Ingresa al sistema. | Selecciona "Anatomía" entre las dos opciones. | Selecciona PEL dentro de Anatomía. | Lee y activa los tres toggles que aparecen en la configuración para la ayuda en la práctica. | En el sistema se mueve el cursor del transductor. | Cierra las ventanas de texto y sólo utiliza gráficos y puntos de apoyo del transductor. | En una sección muestra el movimiento del transductor y en otra, la posición de referencia. | Ve un video real de la patología. | Clickea sobre el botón de pausa. | Finaliza con la visualización del video. | Selecciona la opción "Reiniciar práctica" en el mensaje de cierre.

system: El sistema está en reposo. | Display del modal de opciones de práctica. | Se habilitan las opciones dentro de la práctica Anatomía | Abre otro select con más opciones dentro de PEL. | Se procesa y guarda la configuración seleccionada. | Display de la vista (cuerpo y ventana de video) con la configuración. | Registra los movimientos y la coincidencia con los puntos correctos. | Se deshabilitan y cierran componentes. | Reconoce el matcheo y repdroduce un video. | Pausa el video. | Cuando termina el video, dispara un mensaje de cierre. | Vuelve al display de la vista para la práctica.

3 | Ideate

Desktop system.

We devised a simple and easy-to-use desktop system in a complex context where users would be performing multiple tasks at the same time.

Challenges.

To create a simple look and feel.
Users will be aware of what is happening with the simulator body as well as what is happening on the screen. A clear and simple design that does not generate distractions is key.

To understand the technical processes.
There are many technical wording and processes. So we had the challenge of learning about it to improve usability.

To enable it to grow.
We work on an MVP, so we must think of a solution that can grow by adding functionalities and new technologies.

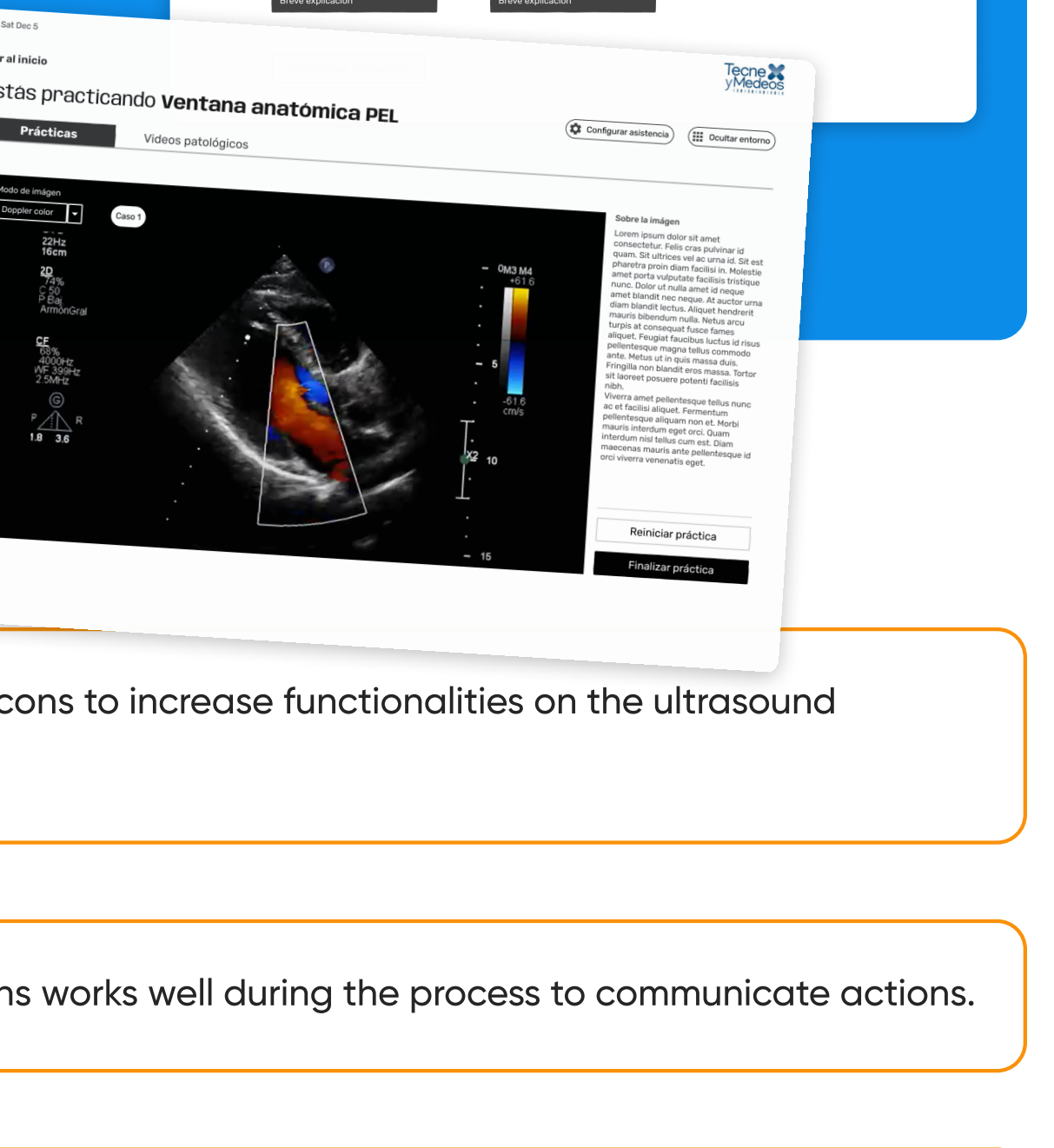
4/5 | Prototyping and testing

Tests on a prototype in low fidelity

4 resident students | 2 emergency doctors

You are a medical resident and have been assigned to an emergency practice. A colleague tells you that the hospital has a Doppler ultrasound simulator, and you take some time off work to practice. You approach the machine and take the transducer and start using it.

1. *How would you perform a PEL practice with assistance?*
2. *What other modes of view do you find in the image?*
3. *How would you refresh the content of the practice and restart it?*


Te damos la bienvenida ¿Qué práctica vas a realizar hoy?

Realiza una búsqueda

Las practicas que vas a realizar son sobre pacientes sin rasgos de obesidad, ni implantes en la zona toraxica

PEL Breve explicación

PEC Breve explicación

Apical Breve explicación

Subcostal Breve explicación

SET Breve explicación

Estas practicando **Ventana anatómica PEL**

Prácticas | Videos patológicos

Configurar asistencia | Ocultar entorno

Sobre la imagen

Reiniciar práctica

Finalizar práctica

WE NOTED THAT...

✓ People understood the home and its architecture.

✗ We should adjust the icons to increase functionalities on the ultrasound visualization.

✗ The full view is not an intuitive feature.

✓ Syncronized animations works well during the process to communicate actions.

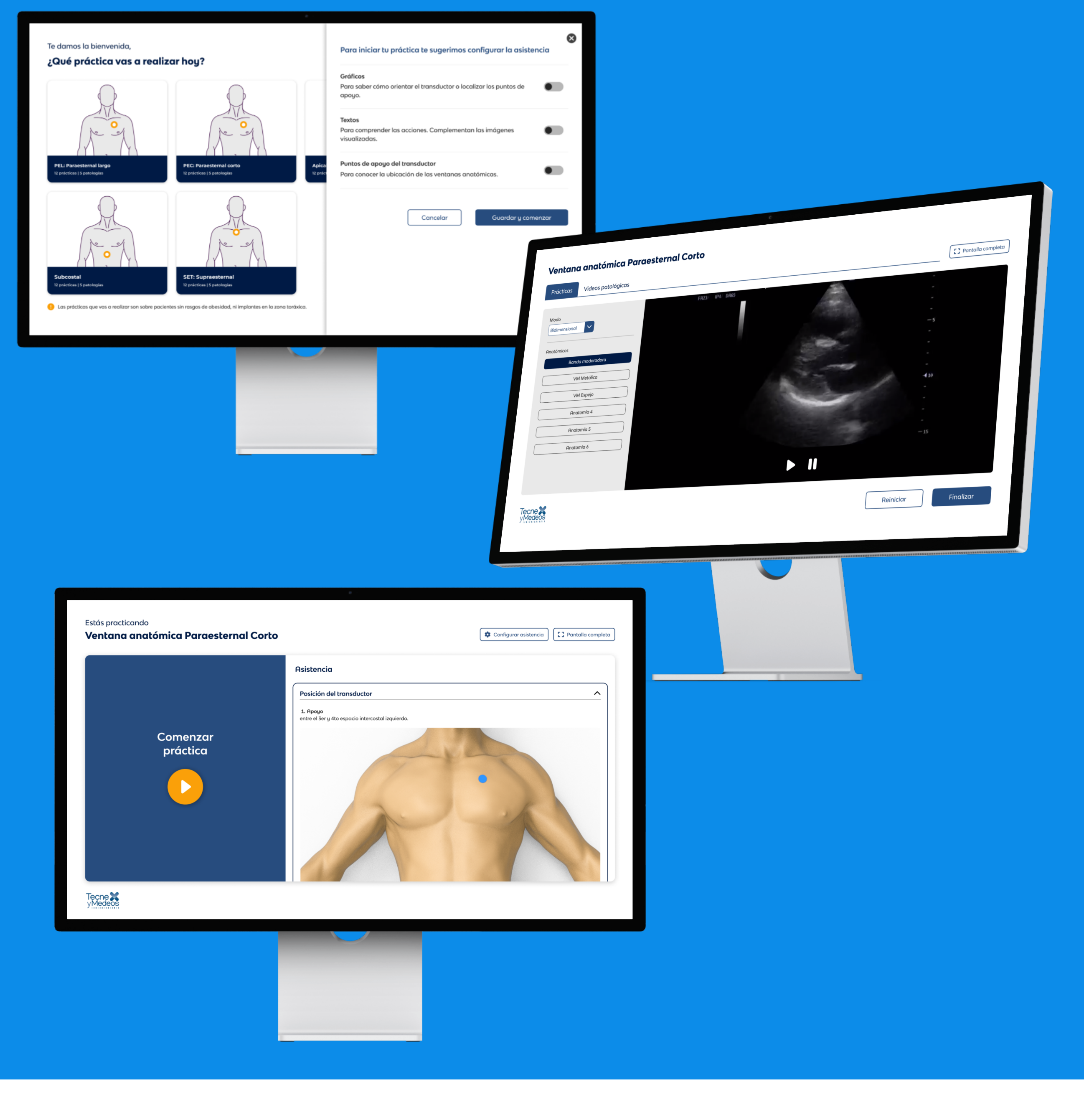
✓ For users, assitance customization adds value and increase learnings.

✗ We note that a better structure on the screen could help to improve visualization.

WE DID AN ITERATION

We continued working to define the interactions and have a high fidelity prototype for the MVP implementation

- We decided to redesign the structure, so that now users could find the actions easily,
- We defined the library to select more usable icons.
- We created 3D models to explain transductor movements and techniques.
- We redesigned the full view interaction.


Te damos la bienvenida,
¿Qué práctica vas a realizar hoy?

PEL: Paraesternal largo — 12 prácticas | 5 patologías

PEC: Paraesternal corto — 12 prácticas | 5 patologías

Subcostal — 12 prácticas | 5 patologías

SET: Supraesternal — 12 prácticas | 5 patologías

Las prácticas que vas a realizar son sobre pacientes sin rasgos de obesidad, ni implantes en la zona torácica.

Para iniciar tu práctica te sugerimos configurar la asistencia

Gráficos — Para saber cómo orientar el transductor o localizar los puntos de apoyo.

Textos — Para comprender las acciones. Complementan las imágenes visualizadas.

Puntos de apoyo del transductor — Para conocer la ubicación de las ventanas anatómicas.

Cancelar | Guardar y comenzar

Ventana anatómica Paraesternal Corto

Pantalla completa

Prácticas | Videos patológicos

Modo: Bidimensional

Anatómicos: Banda moderadora | VM Metálica | VM Espejo | Anatomía 4 | Anatomía 5 | Anatomía 6

Reiniciar | Finalizar

Estás practicando
Ventana anatómica Paraesternal Corto

Configurar asistencia | Pantalla completa

Comenzar práctica

Asistencia

Posición del transductor

1. Apoyo
entre el 3er y 4to espacio intercostal izquierdo.

Simulation for the use of an ultrasound prevent important risks. Through research and the design of a good experience, we are providing a tool to save the lives of many people.