Virtual OR Lab Design Documentation

(prototype)

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Target Devices:

IOS, Android

Application Goal:

The Goal of this application is to provide medical service personnel in training with a virtual environment in which they can study tools and procedures that they will find in the Operating room.

Player/Room Overlay:

- The player room overlay contains all of the game objects that are interactable within the virtual world. This would include objects such as a:
    - Surgical tray
    - Scalpel
    - Ventilator
    - Cadaver
    - Medications
    - IVs
- What items are spawned in the overlay:
    - The player would be able to individually spawn different items in the overlay 1 at a time if desired. This could be done if there were certain problem areas that this student was struggling with.
    - Players could choose from a set of scenarios from which they could practice care.
    - Ex:
        - A patient comes in with minor laceration, the player is presented with the tools to suture the wound on a virtual surgical tray next to the virtual patient. The player would be scored on correct procedure and accuracy of the sutures.

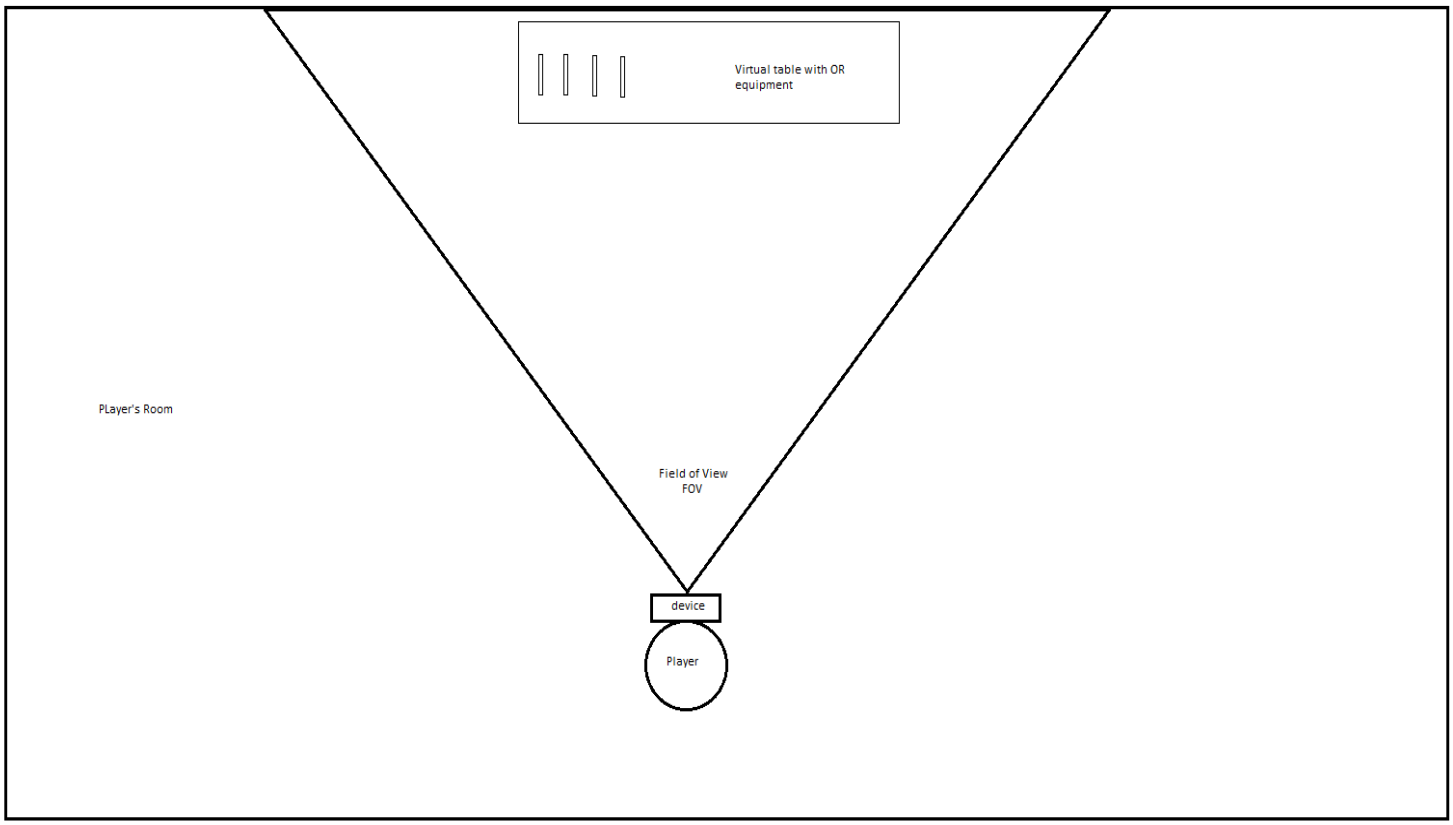

Figure 1.1 (above)
Player / room overlay (top down).

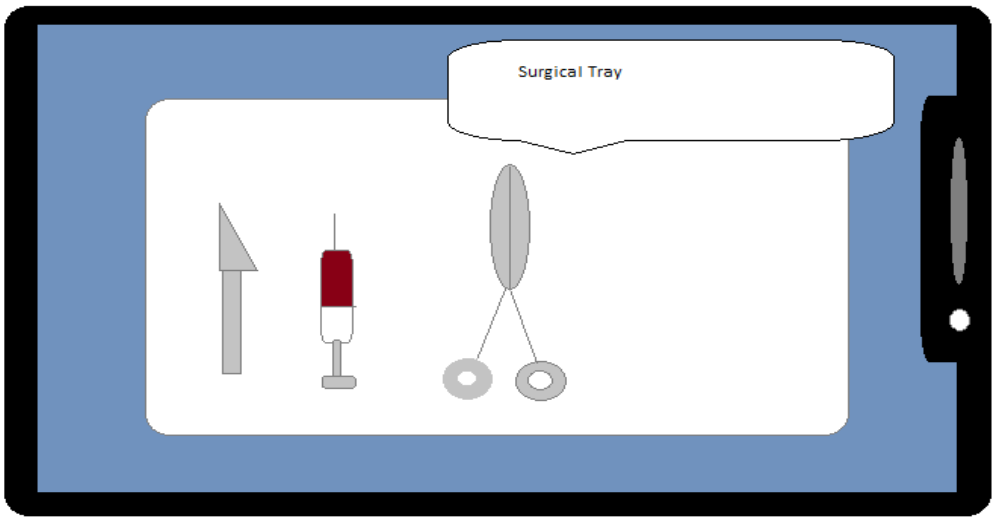

Figure 1.2 (above)
Player perspective of surgical tray from target device.

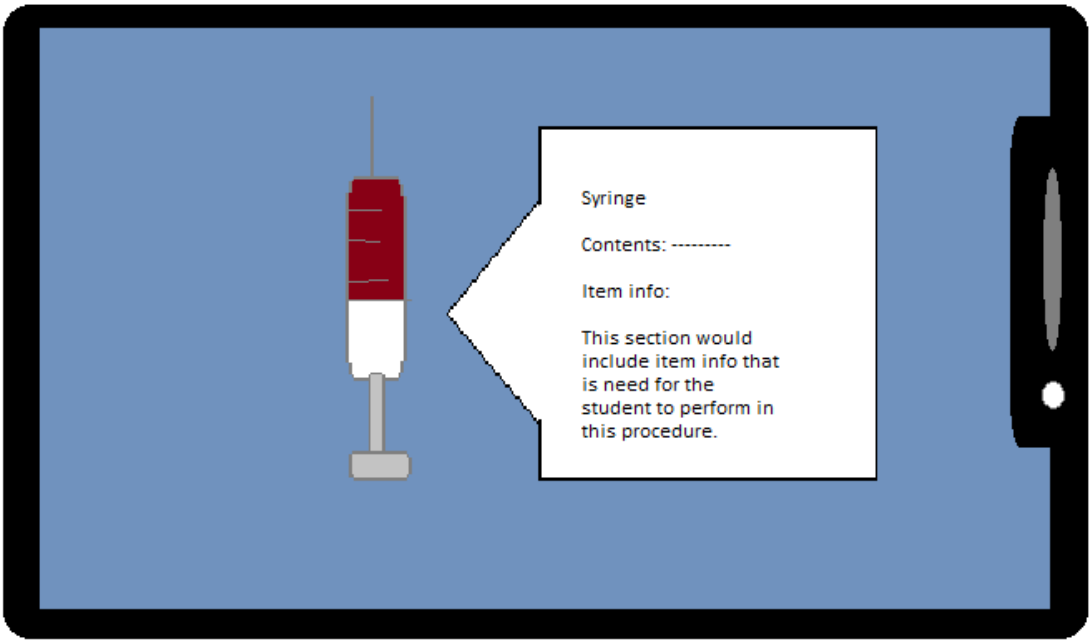

Figure 1.3 (above)
Item inspection view.

Item Inspection View:

- Item inspection view feature of the training platform would allow the player to select items in the overlay and receive additional information about them.
- The view would only present information about the item that is critical to the successful execution of the targeted procedure. This info could include:
    - Medication name
    - Gauge of needle
    - Type of scalpel
    - Name of item
- Information that would be excluded from the item inspection view:
    - Side effects of the medication
    - Recommended needle gauge for procedure
    - Recommended scalpel for the procedure
- The admission of this information would provide an environment in which the player would be forced to know about each item to succeed in the scenarios.
- Full info mode would be enabled during free play so that the player could study before entering scenarios.

Scenarios:

- The scenarios would be developed with help from domain experts to ensure that the procedures were being modeled correctly.
- Additionally the domain experts would be used to decide which procedure would be the best fit for the scenario mode.
- Lastly the domain experts would help the developers create heuristics for the scenarios. Each player would receive a score at the end of a playthrough that accurately reflects their ability to execute that procedure in real life safely/effectively.

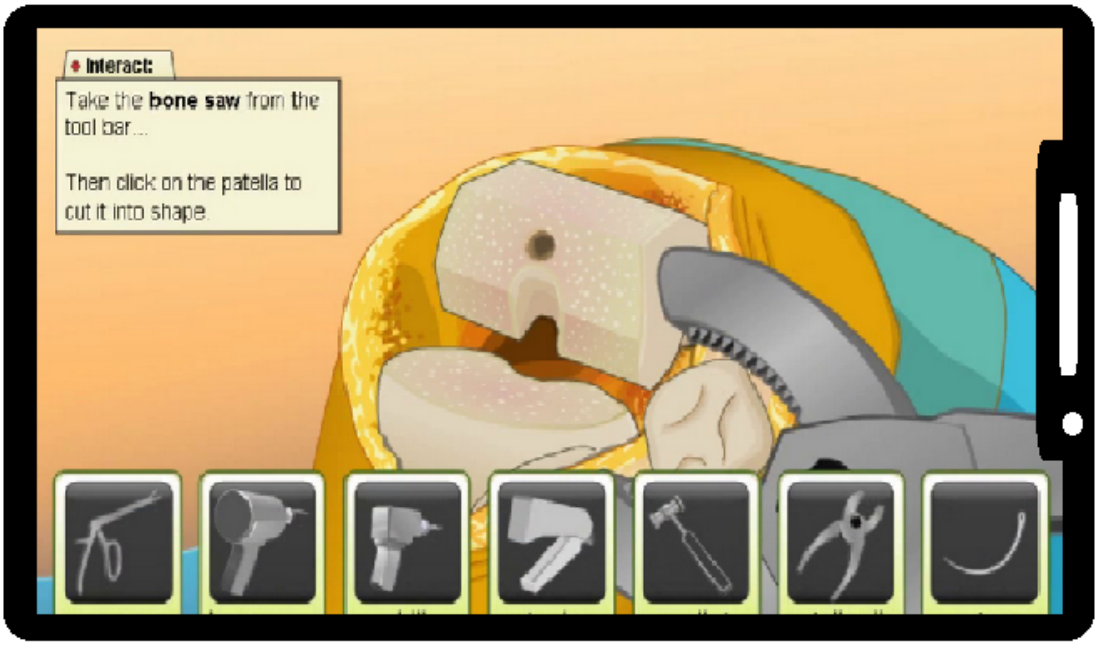

Figure 1.4 (above)
Scenario mode mock-up

Freeplay/Exploration mode:

- Freeplay/exploration mode would be a playground that the player would interface with so that they could study for scenarios.
- The player would have a menu on their screen from which they could spawn in objects.
- In this mode all available information about each item is presented to the player.

Player Outcomes:

The outcome for the players of this application is increased preparedness for the stresses of performing procedures as medical students / residents. Ideally after receiving passing scores in the application each player would be able to perform studied procedures with a higher degree of efficiency than if they had been used standard studying procedures alone. The use of AR in the application allows students to receive visual feedback in a way that had been previously reserved for in-person experiences only.