USABILITY DOCUMENT

INTERACTIVE HUMAN DIGESTIVE SYSTEM VR TOUR

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USABILITY

Usability is an important aspect in any user's interaction and experience with the product/application and is all about the efficiency, effectiveness and the satisfaction of the user. As a developer, it is important to design the product/application with a good usability and to achieve that, we followed *Shneiderman's Eight Golden Rules* to design a productive and frustration-free user interface for our VR application in which user's usability is of great concern as the user-interface itself must prove and immersive experience for the user.

SHNEIDERMAN'S 8 GOLDEN RULES

1. Strive For Consistency

"Consistent sequences of actions should be required in similar situations"

-> Consistency is achieved in our VR application with similar interface animations for every action (Interaction with UI buttons produces similar prompts/pop-ups in the interface with consistent terminology and fonts)

-> With similar color layout, consistency is achieved in the UI. Each UI interactable button is similar in color which have a similar action

-> The movement in 3D space is also consistent for each 3D action/interaction For eg. Rotation, Position, Movement and user's immersive-ness is ensured to provide a flawless experience.

2. Design For Universal Usability

"Recognize the needs of diverse users & design, facilitating the transformation of content"

-> Our VR application is designed mainly for primary school kids and to ensure an easy experience, a separate help screen with controls is shown at the beginning. Also a help button is provided which is accessible at any time.

-> Certain Helping Animations are embedded in the application to help the user navigate through the simulation. Cursor' on any interactable button produces a helping pop-up which explains the function of the button.

-> A minimalistic UI with no branching sequence of actions to ensure an easy to learn and enjoy-able experience.

-> For experienced users, certain advanced settings are provided for the 3D simulation related to 3D models and animation which can be set according to preference otherwise set to default.

3. Offer Informative Feedback

"For every action, there should be appropriate, human-readable feedback within a reasonable amount of time"

-> Every interactable button produces a pop-up/prompt/action almost immediately which can be directly observed in the UI or the 3D model itself.

-> For certain actions (like 3D model loading) which requires some time for loading, the progress of loading is shown as a progress bar.

-> Interaction with organs produces information as text for the particular organ in a pop-up.

-> The 3D movements are directly observed in the 3D space according to the given input through the VR hand-held device or headset.

4. Design Dialogues To Yield Closure

"Informative feedback at the completion of a group of actions gives users the satisfaction of accomplishment, a sense of relief, a signal to drop contingency plans from their minds, & an indicator to prepare for the next group of actions"

-> The VR application is embedded with progress bars wherever there is a loading function so as to alert the user about the progress and status of that particular action/interaction.

-> A "completion/complete" dialogue and a "please wait" dialogue box for the users which shows the status of the particular interaction .

-> In simulation mode, for each organ simulation, the progress is displayed which makes it easier for the user to keep track of the digestion simulation.

5. Offer Error Prevention & Simple Error Handling

"As much as possible, design the system such that users cannot make serious errors"

-> Error pop-ups are generated in case any wrong input is used and according to the function, a suggestion is provided which the user can use to get the desired output.

-> For certain 3D options, such as scaling, a limited input range is provided to prevent the unwanted input values which the application is not designed to handle.

-> A try-again pop-up is generated in case of any wrong input is provided by the user which takes the user back to the same program screen to input again.

6. Permit Easy Reversal Of Actions

"As much as possible, actions should be reversible"

-> For certain actions which require loading, a cancel option is provided in case the loading takes longer than expected due to some error in application or the environment in which the application is running.

-> For the 3D space, an extra button in the UI is provided which resets the user's POV to default (centre of the 3D space) in case the 3d space is modified too much with wrong input or any bug in the external VR devices.

-> For every pop-up/prompt, a close button is provided which closes that particular pop-up and prompt and for user-friendly interaction, a fair time limit is set which automatically closes the dialogue boxes since they can be opened any time.

-> Action Sequences are stored and common shortcuts as undo/redo also works.

7. Keep Users In Control

"Experienced operators strongly desire the sense that they are in charge of the interface and that the interface responds to their actions"

-> The VR application is mainly dependent on the user's input which can modify the 3D space according to their will at all times. Rotation, Movement, and Position changes occur only when the user gives an input by the external VR devices or interacting with the UI button.

-> For certain interactions, a permission dialogue is displayed to prevent unwanted actions and confirmation dialogues are also displayed to confirm actions excluding the interactions with 3D model for a non-interrupted flow of the simulation.

8. **Reduce Short-Term Memory Load**

"The limitation of human information processing in short-term memory (the rule of thumb is that humans can remember <u>seven plus or minus two chunks</u> of information) requires that displays be kept simple"

-> The VR Application consists of a minimalistic UI with 3D model at the centre which is interactable and the number of intractable buttons are limited on the main screen to reduce the short-term load on memory.

-> The Text Pop-Ups generated are ensured to fit within the device's screen for proper readability and are ensured not to clash with multiple text pop-ups.