DISSENY D'EXPERIÈNCIES D'USUARI I INTERFICIES

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PAC4: Proposta d'interfície diegètica d'un joc VR

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Game introduction

Title

Once Upon a Meal

Genera

Cooking, Narrative, Management

Story and context

Once Upon a Meal, as its name indicates, is a game that combines fairytales and legends with cooking. Legend has it that due to the massive overtake of technology and materialism, culture and traditional practices and believes were getting more and more lost. As a consequence, spirits and folkloric figures of the world started to give up on humanity and stopped bringing magic into the world. The lack of magic and wonder had devastating effects on humanity, since these helped humans feel motivated, powerful, and meaningful. In consequence, humans took a refuge in materialism and consumerism, further accentuating the problem. This endless vicious circle was making the world more sad, grey, and desolated by the day.

In this context, the player takes the role of a spirit whisperer named Moshi. In the game, spirit whisperers represent figures dedicated to connecting the human and the spiritual world, but Moshi is about to get unemployed due to a reduction in the workforce: in a world where humans and spirits are breaking a part, his services would no longer be required. As a last resort, the spirit whisperer thinks of one last opportunity to bring motivation back to the spirits: by filling their bellies with human delicacies. Cooking is a masterful combination of tradition and innovation, and he believes it is the perfect occasion to show spirits how culture evolves, but humans still care about tradition. To do so, however, Moshi needs to carry out a difficult deed: travel the world to learn fairytales and legends, folklore, and traditional cuisine to prepare the perfect meal to please each spirit customer. Armed with a food cart, a basket to collect ingredients, and a magic portable garden to grow crops, Moshi will need to proof that, as it is often said for humans, the way through a spirit's heart is also his stomach.

Game world and game loop

In the game, the player can explore different parts of the world to learn the local traditional culture (legends, folklore and magical creatures), as well as the local cuisine. The player would access the different parts of the world through portals located in a magical place called The Intersection. This place would be a spherical mini-world with multiple portals to access different parts of the world. By crossing each portal, the player would be transported to the desired location.

Each location would have several cooking missions associated with the local culture. The missions can be completed by following a daily game loop. During the day, the player task would be to get familiarised with the local traditions, folklore, and cuisine by talking to the locals. This information would allow the player to adequate the recipes to the needs of the magical creatures from the land. Additionally, they would need to gather the necessary ingredients and tend to their magic portable garden. At night, when

the spirits and folkloric creatures of the region start wandering the earthly world, the player's job would be to prepare the recipes to please them.

Desired aesthetics

The game's desired aesthetics would be a combination of two main ideas. The general world aesthetics would be based on Ghibli Studios' hand-drawn cartoon style, particularly the style followed in Spirited Away movie (Figure 1). This style evokes a magical, friendly and cozy ambience, yet with a mysterious tone, which would be very fitting to the theme of the game. However, the style of each folkloric creature would try to emulate the style of each traditional culture (Figure 2).

Figure 1. Screenshots of the movie Spirited Away, by Ghibli Studios. Note the cozy, friendly, and mysterious tone.

Figure 2. Traditional drawings from different cultures that would be used as base to create the spirit customers from the game. From left to right and top to bottom: Barong, a dog-creature from Bali, Indonesia; traditional drawing of a dragon from China; Jörmungandr, the Midgard Serpent from the Nordic mythology; and Sachamama, the snake mother-of-the-forest from Peruvian folklore.

Interface design

Designing a diegetic main menu

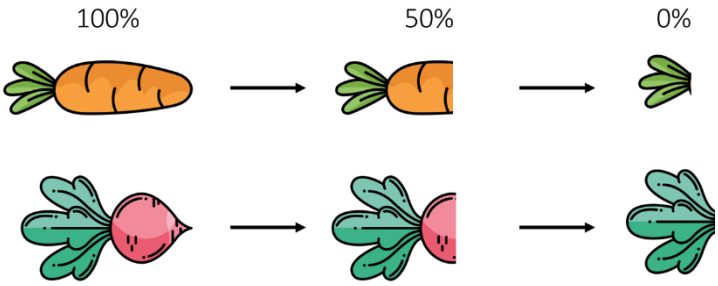
The diegetic Main Menu needs to fulfil two purposes. First, it needs to set the tone of the game: mystical and magic, but also cozy. And second, it needs to enable the player to perform certain actions: start the game, exit it, adjust settings, and try out these adjustments in a safe environment. Ideally, these actions should be performed in a diegetic and immersive manner, and adjusted to the theme of the game. This section aims to explain how the design of the Main Meny has been adapted to fulfil these purposes.

From the Main Menu scene, the player can start the game, exit it, change the settings, and try out grabbing and holding objects (the main interactions in the game). To display these options in a diegetic manner, they are represented through physical paths the player can follow (Figure A1, Annex). The location of each area is shown through wooden signs with words indicating the direction of each path (figure below). Moreover, since following the Start or Exit paths makes the player exit this scene (either to a new scene to start playing or to exit the game), a Japanese Torii door at the end of these paths is used to covey this meaning. Likewise, a glow effect in the doors aims to simulate a portal effect. This effect would need to be improved to properly convey their meaning, perhaps with a glass effect in the door aperture plane.

Since the game's theme is centred around cooking, the settings part intends to represent a catering or buffet, in which the player can "prepare the recipe" of their own settings (figure below). The elements to modify the settings are located in three restaurant bars: one for settings related to controllers, another one for settings related to the environment, and an extra one for additional settings. The buttons, sliders, wheels, and other elements to tune the settings have been adapted to represent cooking elements to enhance immersion and the feeling that the player is "cooking" their own settings. Moreover, to visualise the current settings, there is a large restaurant menu above these bars which shows the current status of each modifiable setting (figure below). Albeit its current intend is only to show the settings currently enabled, this restaurant menu has also been designed with an additional purpose. In a future version, the player should be able to choose between a diegetic and a non-diegetic option for the settings, and the restaurant menu could be used to modify the settings in a non-diegetic

manner. This is preferrable over an exclusively diegetic version, since some players may feel more comfortable using non-diegetic interfaces.

Moreover, to follow the game's theme, the degree of the settings in the restaurant menu is represented with vegetables, rather than using normal bars. The diagram below illustrates two examples of this: a carrot (which is used for the sound volume level) and a radish (which is used for the brightness level). The following section delves in more detail in how each setting is related to an element of the restaurant menu and a physical interactable element (button, slider, dial, lever...).



Finally, the Main Menu has a small area, called "Try out" (figure below). These area presents a safe environment for the player to experiment grabbing and releasing ingredients, and placing them in a basket.

Main menu usability and accessibility requirements

Hamilton (2018) and Heilemann et al. (2021) provided some guidelines on usability and accessibility issues arising in VR games. These author's analyses will be combined with the requirements of the game to assess the needs and opportunities to make *Once Upon a Meal* an accessible and usable VR game. Regarding the physical interface, the player would need to use some type of wireless VR controller similar to Quest 2 controllers or HTC Vive, in order to be able to perform in-game actions.

The player's actions when playing are mainly related to the two focus activities of the game loop: during the day, the player's job is to interact with people to learn their local legends and tales, acquire the recipes, and collect the necessary ingredients to prepare them. During the night, when the spirits arise, they need to prepare the delicacies to please them. This game loop entails a certain set of mechanics that the player needs to be able to perform: move, interact with people/spirits to engage in conversations, and collect and grab objects to move or interact with them (for instance, to place ingredients in a pot, stir them, or cut them in pieces). Understanding these mechanics allow to understand some of the options that the settings menu needs to offer.

Controls

To start, the settings need to enable the player with the possibility to adjust the **controls** to their desire and needs. Adjusting movement controls can be very helpful to prevent **simulation sickness**. Blur effects, as well as taking the control of the camera away from the player, can make these issues arise (Hamilton, 2018). Thus, the camera is fully at control of the player, and no blur effects are used. During the cooking at night, the displacement movement the player needs to perform is minimal, albeit turning is necessary. However, during the day, the player needs to attend their magical crops, look for ingredients and recipes, and engage in conversations with the locals. All these actions imply an exploration dynamic, which requires player movement and turning. To try to prevent simulation sickness arising from this, the settings menu enables the possibility to switch between smooth movement (continuous) and teleport (discrete), as well as between smooth turning or snapping. Moreover, the settings also offer the possibility to adjust the movement speed of smooth movement, as going too fast can occasionally cause sickness. The switch between these controls is done through the following interactable elements: pushing a burger (button for smooth/teleport move), moving chopsticks (leaver for smooth/snap turn), and turning a pan (wheel for the speed) (Figure 3). It is worth mentioning that there are **spatial elements**, in the form of yellow arrows, which assist the player in the input needed to modify each setting. Moreover, a word explaining how each cooking element relates to each setting is shown in blue letters behind each element. Finally, the current settings can be seen in the restaurant menu (Figure 3).

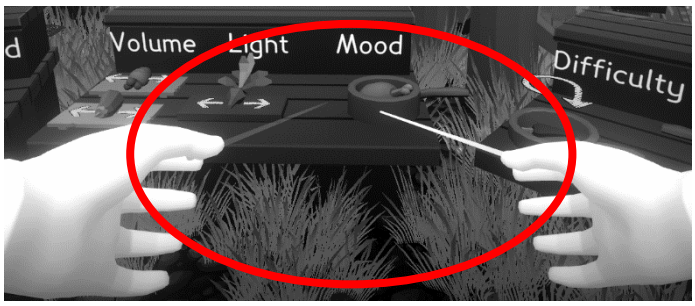
Figure 3. Comparison between changes in the Control settings. Note the changes between the two pictures in both the interactable elements (yellow square) and the restaurant menu (black circle).

There are some additional settings that should be implemented to allow extra fine tuning of controls. For instance, the player should be able to modify the input sensitivity or the turning speed, to choose between left-handed or right-handed, or to enable the possibility have a vignette view when moving fast in continuous movement. Likewise, another important issue to address in relation to the controllers in VR games is adaptation to **motion impaired** players. VR games offer a plethora of opportunities to adapt controllers for players with physical disabilities. To address these issues, some adjustments can be made. To start, everything should be accessible to any player, regardless of body type, size, mobility problems, or the use of a wheelchair. This could be addressed with a setting that allowed the player to adjust the range of maximum and minimum reachable high, adjusting the game elements accordingly. Similarly, a solution should be implemented to adjust arms width-range. In relation to this, it is also crucial to adapt games to people who do not have two functional hands and all fingers. One easy solution for this would be to enable settings to play the game with fewer buttons, to reduce the need to perform simultaneous inputs, and to enable a single-handed mode (Hamilton, 2018; Heilemann et al., 2021). These additional setting options would make *Once Upon a Meal* more accessible to different players with varying levels of accuracy in motion response.

Environment

Figure 4. Comparison between environment settings for sound and music volume, and brightness. Compare the modifications in the restaurant menu (black circle) between pictures, as well as the changes in the sliders in the menu bar (yellow square). Additionally, not the change in brightness between the two pictures.

Aside from the controls, there are settings related to the **environment** that can strongly affect a player's enjoyment of the virtual environment. For instance, players with **limited hearing** can have difficulties if the volume settings do not separate the volume of music, sounds and sound effects, and dialogues. Players with hearing loss may prefer to prioritize sound and sound effects over music volume, to facilitate hearing assistance. The prototype of the settings menu currently offers the possibility to separately modify music and sound volume. This is done through moving two modified physical sliders, which represent vegetables, a carrot and an aubergine, over a cutting board (Figure 4). These same vegetables are displayed over the restaurant menu, as UI sliders that fill in in response to the player moving the physical sliders (see Figure 4). Ideally, a future menu should enable the option to also modify the volume of voice dialogues. Likewise, it should implement a solution for unilateral hearing loss, such as playing both stereo sounds to both ears (Hamilton, 2018). Aside from limited hearing, some players may have some **visual impairment**. The game has contrasting bright colours, with shiny elements, such as bright particle effects. Unfortunately, this can cause problems to photosensitive players. In some extreme cases, it could potentially cause a photosensitive epileptic shock. To prevent issues arising from light sensitivity, the settings enable to modify the game brightness (Figure 4). This is convenient for several reasons: players who have low vision acuity can increase brightness to see better, while players who may be visually sensitive can decrease brightness. There is a final element that allows to adjust some settings for visually impaired players. The mood setting allows choose between three options that have different contrast and saturation (see Figure A2 Annex). The Default mode has medium contrast and high saturation of colours. The Pale mode has higher contrast but lower saturation. And finally, the Black & White mode has a very high contrast but no saturation. The combination of the mood settings and the brightness easily allows players with visual impairment, such as low visual acuity or colour blindness, to adjust the settings to their needs. The brightness can be modified by sliding a radish over a cutting board, while the mood can be changed by turning a sauce pan (Figure 4).



Moreover, colour is not used as the single element conferring meaning, which could present a barrier to players with some form of colour blindness. Rather, colour it is used as an extra element to convey information. An example of this is the interaction rays coming from the hands. While red indicates non-interactable and blue indicates interactable, ray pointing at non-interactable elements is half transparent, while rays pointing at interactable elements are rather opaque. This allows to appreciate the difference between rays even to colour-blind users, as illustrated in the figure above.

Extra settings

Another potential issue for visually impaired players or players with low visual acuity is the size of the texts. To address this issue, the current settings offer an **extra section**, called extra toppings. Among the options, it allows to choose the size of the text in the dialogues. Dialogue comes in the form of text in bubbles with high contrast (black over white), and it would also be accompanied by voice acting in the final version of the game. The player can change the size of the text by turning a pan located to the left, and a dialogue bubble over a frog is displayed right above for illustrative purposes (Figure 5). The dialogue bubbles are spatial elements rather than diegetic, but they are necessary to facilitate the

information to players who cannot hear. Additionally, the font used in all texts, including dialogues, is especially designed for dyslexic users. Moreover, to prevent sickness coming from Vergence Accommodation Conflict (Hoffman et al. 2008), all text elements are physically located in the world (dialogue bubbles, text from the Menu, text from the signs…).

Aside from dialogue text size, the extra settings offer two additional adjustments (Figure 5). The first one is difficulty. Player with **cognitive disability** may have trouble performing complex task requiring quick responses. Additionally, some players use games to have a relaxing experience, and may want to avoid frustration as much as possible. Others, however, may enjoy a challenge. To address these disparities, the settings menu offers the possibility to adjust the game difficulty. The interactable element representing the challenge is a pan with red chili peppers. Turning the pan makes one, two, or three chilis appear, indicating increasing difficulty level (Figure 5). In the restaurant menu, chili peppers also illustrate the difficulty chosen. The difficulty setting would have an influence over the number of clients who come to the food cart, the speed at which the recipes need to be prepared, and the assistance and guidance received. The second element from the extra settings menu is the number of particles. Shiny particles are an example of the aforementioned problematic elements for players with **photosensitive epilepsy**. Thus, this setting allows to have three options: high, medium (reduced to 50%), or none (remove them completely). The interactable element is a pot with particles inside, the number of which varies from high, medium or none as the player turns the pot (Figure 5). Likewise, the number of particles in the ambience updates accordingly.

Figure 5. Comparison between changes in the Extra settings menu referring to the difficulty, the particle number, and the dialogue text size. Note the changes between the two pictures in both the interactable elements (red square) and the restaurant menu (black square). Likewise, note the changes in the dialogue bubble coming from the frog, as well as on the number of particles in the environment and in the pot.

Finally, there are a few extra settings that would be desirable for an optimum usability and accessibility. To start, there should be a setting to enable the remapping of the controls, to allow the user adapting the input to their desire and needs. Moreover, the game should be localised and the player should be able to choose the language.

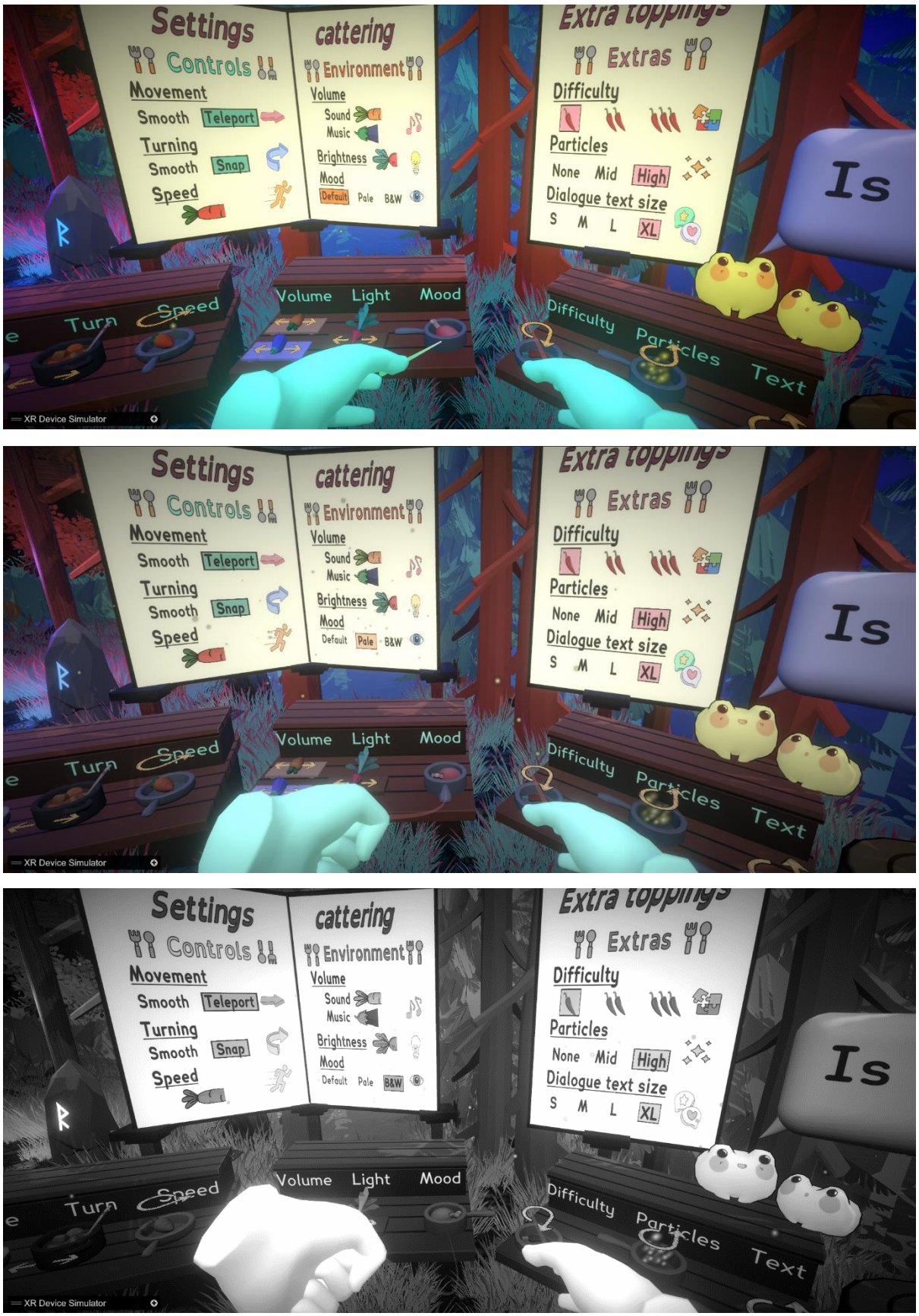
A final note. Albeit I have tried to adapt the design of the Main Menu to the theme of the game, the design was strongly limited by the availability of free assets. Thus, some improvements would need to be made to make the settings more intuitive. For instance, all interactable elements in the cooking pots

should visually convey what they are related to. This could already be achieved with the particles pot, in which the player can clearly see what this interactable is used for. Other elements, however, should be improved to become more intuitive in relation to their function. For the sliders related to volume, for instance, the size of a music note could be used. Similarly, for the size of the text, a 3D letter changing in size while the player turns the pot would clearly convey its meaning. For the brightness setting, the handle of the slider could be a firefly changing in brightness as the player moves the slider left or right, or a moon/sun. For the moving and turning speed, a speedometer with a fork/spoon as a pointer could be used. A combination of cooking elements with meaningful assets such as the ones mentioned would enable the player to understand their function without compromising the theme and aesthetics.

Annex – Supplementary figures

Figure A1. Screenshot of the Main Menu illustrating the paths to exit (up), start the game (up), change settings (middle), or try experimenting with interactable elements (bottom).

Figure A2. Screenshot of the Main Menu showing the difference in Mood settings in the game. From top to bottom, Default mood, Pale mood, and Black & White mood.



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