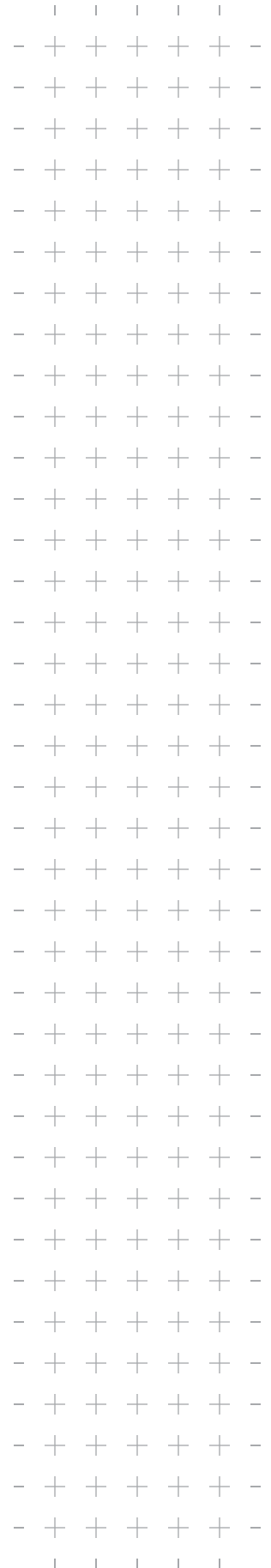


GLENROSE GROCERY GAME

Project Plan & Design Guide

2016-04-04



PROJECT PLANNING SESSION:

DEC 7, 2015

INTRODUCTION

The Glenrose Hospital has a mandate to advance the boundaries of rehab medicine by experimenting with new technology and treatment methods. Specifically the treatment team working with geriatric patients has identified using video games as a potential treatment for patients with cognitive impairments. Some earlier attempts at developing video games have not achieved the desired results. They have either been too complicated to be adopted by treatment teams or not fun enough for patients to sustain their interest. The project team developed and tested a prototype game in 2015 that received positive feedback from patients. Building on this success, the project team will complete development of the game in 2016.

THE PROJECT WILL:

- » Make something fun that patients will want to play and that helps their rehabilitation.
- » Provide a better patient experience by making a game that is easy for patients and treatment teams to use.
- » Create activities to help seniors with cognitive impairments develop abilities associated with independent activities of daily living skills.

IN ADDITION, THIS PROJECT HAS AN OPPORTUNITY TO:

- » Fulfill the Glenrose Hospital's mandate to be idea generators that advance the boundaries of rehab medicine.
- » Capitalize on current investments in rehabilitation technology as well as funds put aside for new projects.
- » Use this investment to give the treatment team another option for functional-based assessment.

ALIGNMENT WITH INSTITUTIONAL VISION

This project aligns with the Glenrose Hospital's vision outlined in *Our Vision: Building Abilities for Life*.

The project aims to create innovative care practices to enable patients to participate in life to the fullest.

The project develops leadership ability of Glenrose staff and enables them to learn new skills.

The project will be a collaboration between the hospital and external developers to leverage leading-edge technology at the Courage Centre to create a new way to measure and to improve patient performance.

PROJECT END STATE:

The project team will build a fun and easy-to-use video game containing the features approved by the project team on budget by Q4 of 2016.

The purpose of the game is to help the treatment team assess the skills of geriatric patients with cognitive impairments.

ASSUMPTIONS & EXCLUSIONS

TO ACHIEVE THIS GOAL, THE PROJECT TEAM ASSUMES THE FOLLOWING ABOUT THE PROJECT:

- » The game is fun for geriatric players with mild to moderate cognitive impairments
- » The game needs to be easy to use and quick to set up for the treatment team
- » The game provides an opportunity for future research
- » Project team has time, ability, and budget to deliver on goal
- » Project team can find developers able to build the game
- » Working with a studio is preferred to an ad hoc team of contractors
- » Involvement of advisory group will build broad support for project
- » Project team will consult others for legal and technical advice
- » The basic concept of the game was established by the prototype

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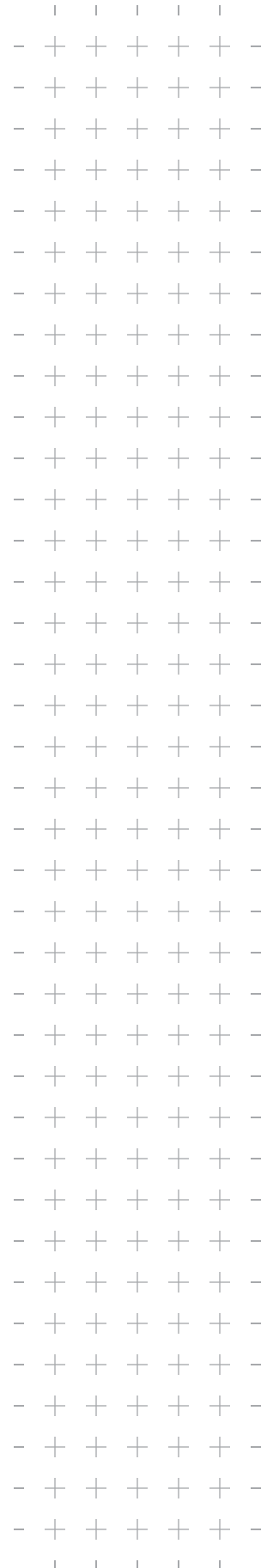
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- » Positive media story illustrating Glenrose's investment in innovative medical technology
- » A visually appealing showcase piece

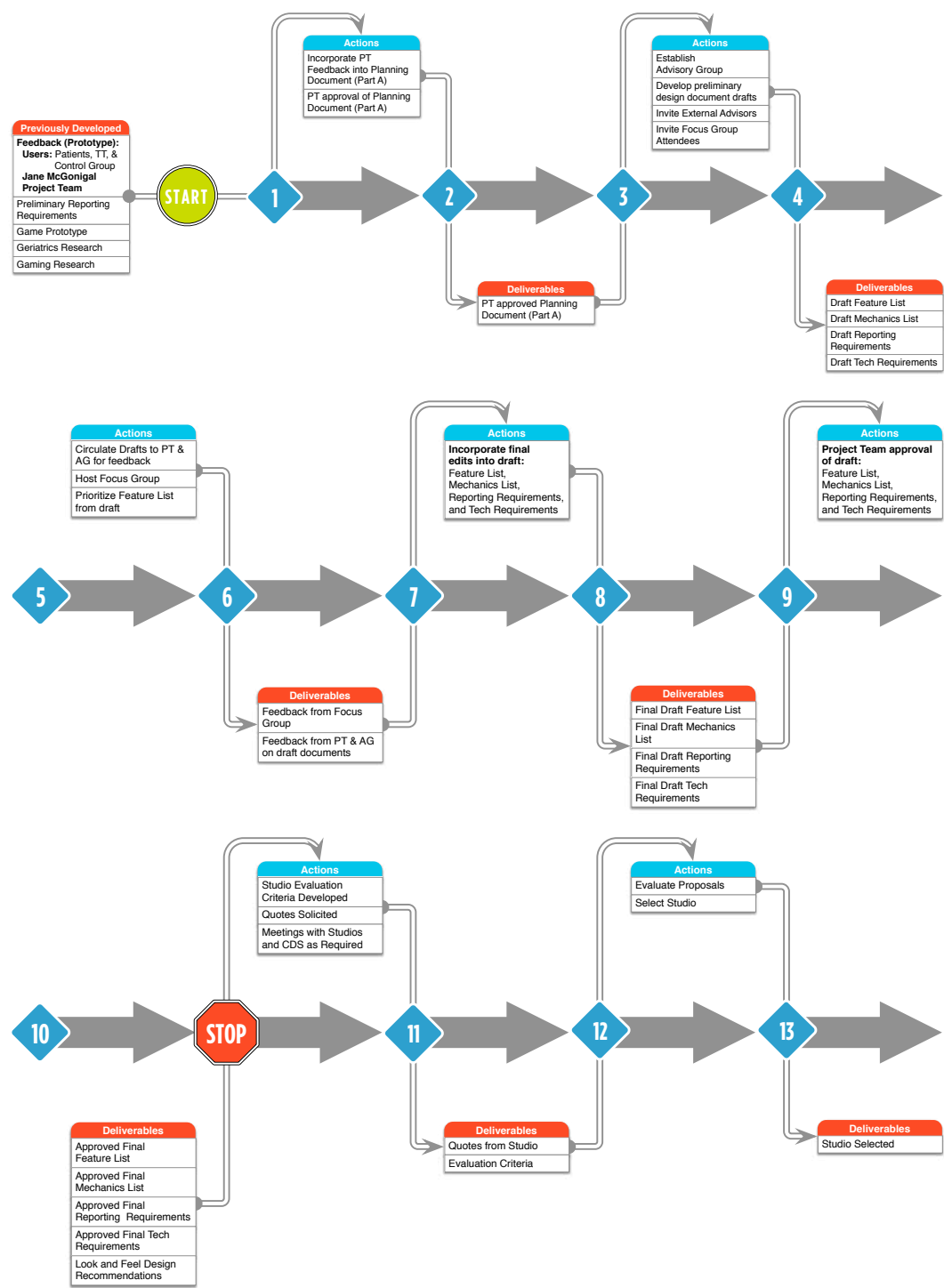
Previous video game projects didn't meet the expectations of the Glenrose staff. Throughout the planning process, the project team reiterated the need to focus on making a game that is fun to play and easy to use to ensure this video game meets those expectations.

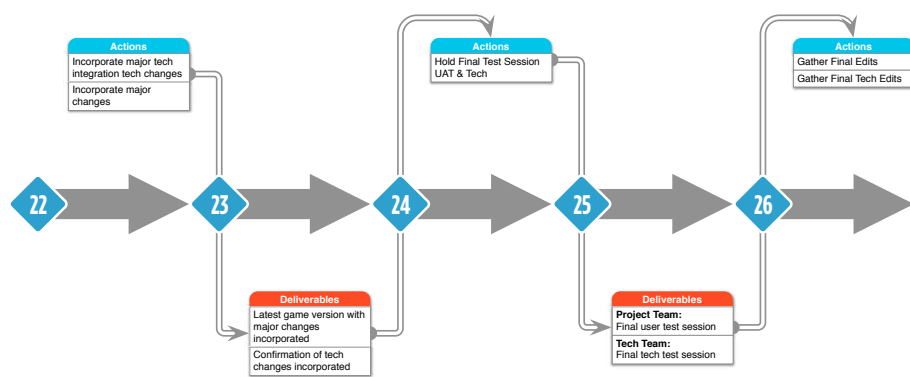
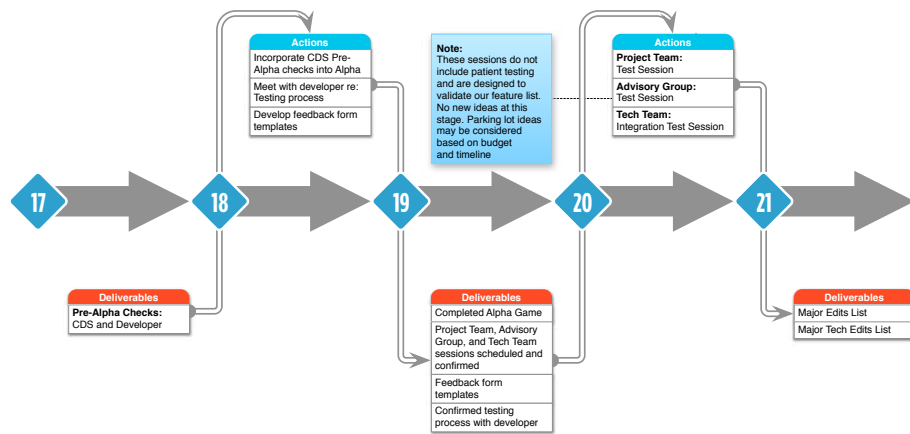
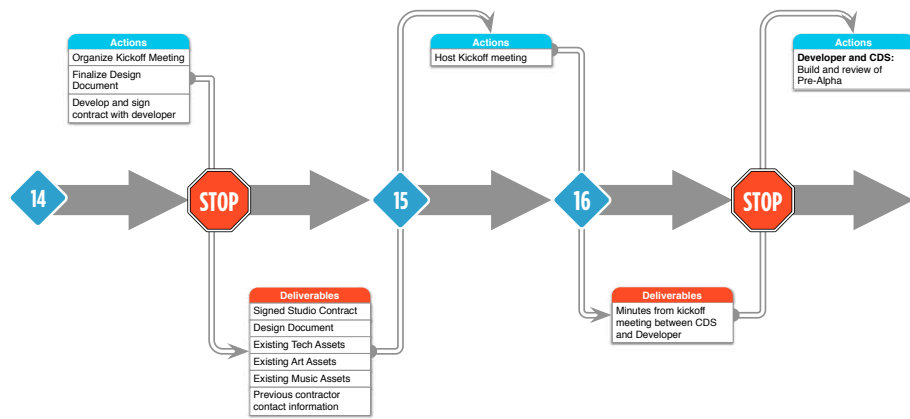
In addition, the project team identified some items for future consideration while developing this plan. Even if the project achieves its goals, access to hardware and proving the efficacy of the tool are barriers that could prevent other treatment teams from using the game. The project team recommends the following next steps as the Glenrose rolls out the game to its staff in the next phase of this project:

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PROJECT TIMELINE





DESIGN GUIDE

OVERVIEW

The Glenrose Grocery Game tasks players with making the favourite recipe of a surprise celebrity dinner guest. Players have to rush to buy ingredients from the grocery store to make it home in time to make the meal. Getting the right ingredients in time and on budget helps score points with the celebrity dinner guests and opens the door to have more famous people stop in for a meal.

The game was designed specifically to help older adults with mild to moderate cognitive impairments to develop the daily living skills needed to live independently, and to help health practitioners assess a patient’s skills.

DESCRIPTION OF GAMEPLAY

The majority of gameplay involves using a touchscreen to move between sections within a grocery store and select food items from grocery shelves to add to the player’s cart. They have to scour the shelves and hunt for specific ingredients from their recipe within a set time, while also using their memory to compare the food in their cart against the ingredients in the recipe.

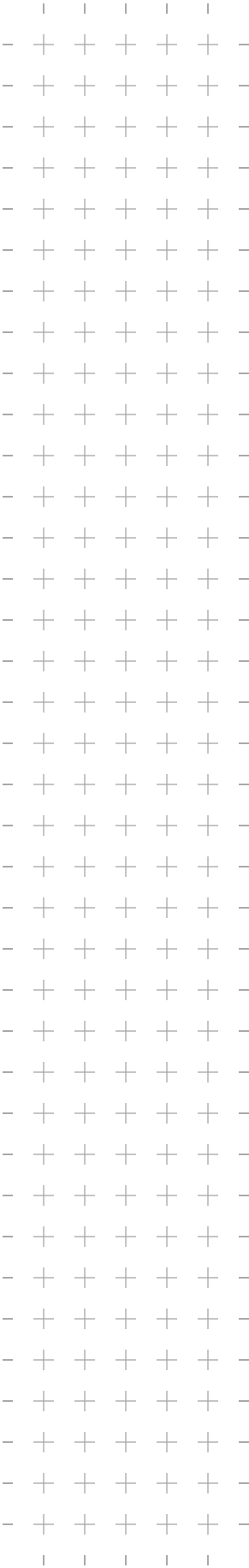
Before heading to the grocery store, players select a celebrity to make a meal for. The recipe determines the difficulty of the level and the reward for finishing that level. Early recipes have fewer ingredients and restrictions, whereas more advanced levels add more ingredients, require several servings, add budget requirements, and other challenges.

Once players have collected all of the ingredients needed for the recipe, they head to the checkout till. Their groceries are tallied, and the results are scored based on beating the goal time for the level and getting the right ingredients for the recipe.

If the player scores high enough, then the celebrity guest will be pleased and tell their friends about the player’s cooking, opening up more celebrities to host and unlocking new recipes.

Like similar touch-based games, players continue to open new levels, as they progress. Players can replay previous levels to improve their score.

Players play the game on the ReTouch table, a large touchscreen



on an adjustable stand designed to be used in hospitals.

SUMMARY

- » Uses large touchscreen called ReTouch table
- » Touch-based interactions
- » Players search grocery shelves to find ingredients to complete a recipe
- » First-person view of grocery store shelves
- » Scored on time needed to complete and number of correct ingredients
- » Getting a good score earns the celebrity guest's approval and unlocks new levels

DESCRIPTION OF CHALLENGES

This game is about remembering a list of items and finding them among other items within a short time limit. Success comes from getting the right ingredients under the goal time. For some adults with moderate cognitive impairments, this task by itself can provide an interesting challenge, if presented properly with interesting feedback in-game and meaningful rewards for completing challenges.

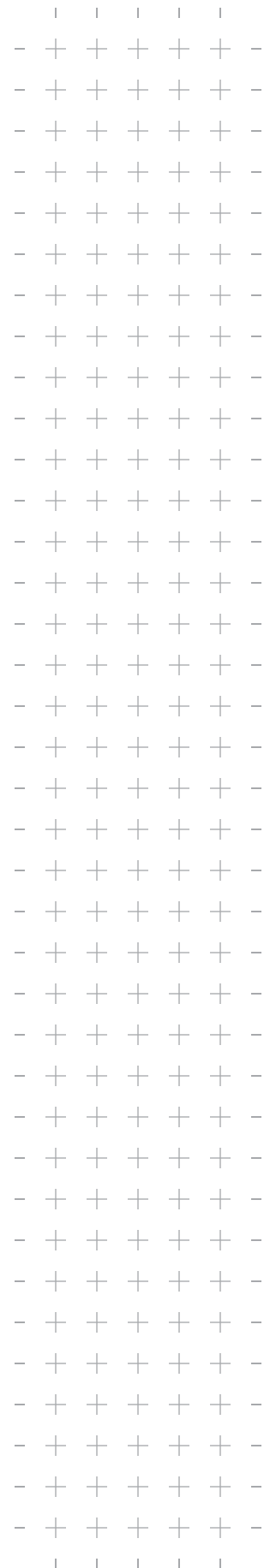
Beyond this basic concept, the game difficulty increases by challenging the player in four key themes: memory, attention, planning, and problem solving.

By overcoming these challenges, players practice key cognitive skills necessary to live independently: simple math skills, problem solving, planning, delayed-recall, and scanning for useful data.

The difficulty of the game can also be adjusted by the occupational therapist to ensure that players have a baseline equal to their current skills level and can progress from there. Each of these four main themes can be adjusted independently, so therapists have flexibility in defining the game's difficulty to align the game to client-centred goals for rehabilitating skills.

SUMMARY

- » Main challenge is remembering and finding correct ingredients within a set time
- » Increasing difficulty built around four themes: memory, attention, planning, and problem solving
- » Difficulty can be adjusted to match player's current skill level



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PROTOTYPE SCREEN SHOTS



Start Screen



Character Selection

PROTOTYPE SCREEN SHOTS



Map Screen



Shopping - Deli

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PROTOTYPE SCREEN SHOTS



Checkout Animation



Completion Screen

FEATURES DESCRIPTION

INTERFACE

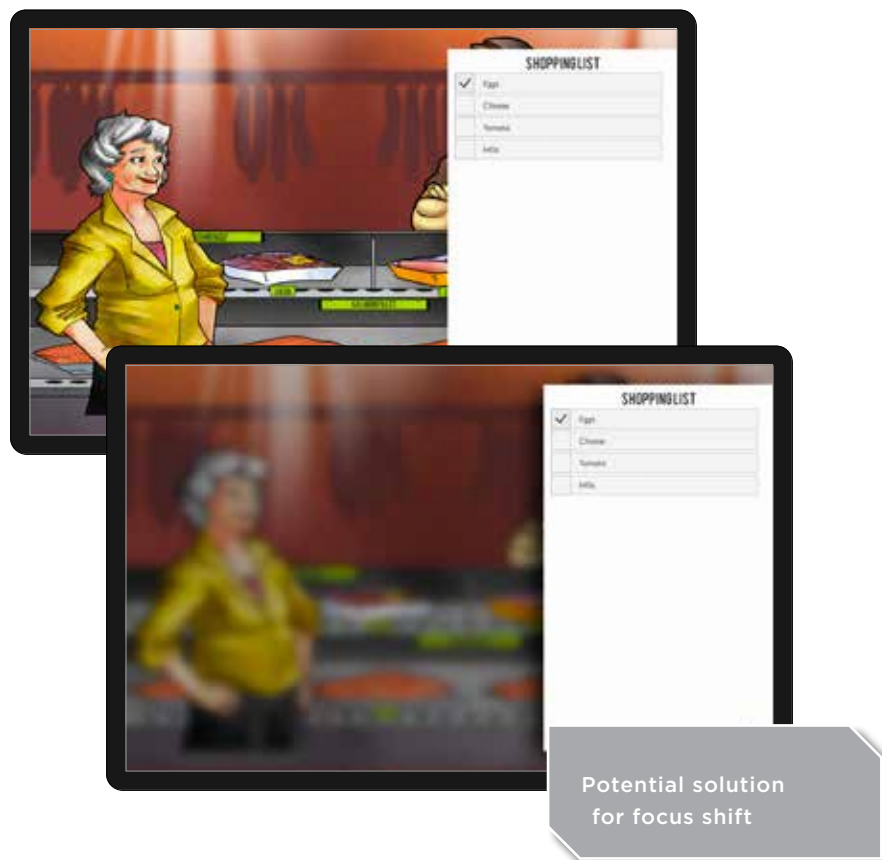
GENERAL

Accessibility and simplicity are key considerations in the design of the game. Both patients and occupational therapists have abandoned other games designed by the Glenrose Hospital because the interface was too complex, intimidating or difficult to navigate. The project team recommends using big, simple text and contrasting colours to assist players with visual impairments. Players should only need to select a player character and a recipe to beginning playing. However, occupation therapists (OTs) can open additional options as required to customize the difficulty to match a player's skill.

The ReTouch table is a very large interface. Typically, Players sit directly in front of the screen. Their centre of focus is at the centre-bottom of the screen. The corners of the screen are far on their periphery. As a result, the information in the corners of the screen goes unnoticed and is forgotten by players. Similarly, touch areas in the top corners of the screen are difficult to reach, causing many players to forget about interactions placed in these areas of the screen. The project team recommends that the most important interaction points be located in the centre-bottom of the screen.



Also, the large screen size means that players sometimes do not notice when something changes in the game. This issue led to confusion for play testers and uncertainty about players' abilities. To maintain single focus, the design of the game will need to actively direct the players' focus by using animations and fading out background information to ensure it's clear where their focus should lie. Animations are also important to create delight for players and reinforce that a player's actions have an effect within the game.



The players are unfamiliar with some of the basic concepts of interacting with digital products. Many play testers had a difficult time remembering that interacting with certain parts of the game would bring up additional information. This situation was especially apparent for the shopping cart and map, as these features were on the periphery of the player's vision. The project team suggests limiting the number of menus used in gameplay and consolidating items like the list and budget. Further, skeuomorphic design would help the player understand how the game works (i.e. a paper list, recipe cards).

In play testing, the project team noticed that overlapping interaction points confused the players and led to missed taps. The arrows used to navigate the shelves were particularly difficult to pick out among the food items and lead to several mistakes for the players. As a result, any touch points outside of the ingredients on the shelf should be discrete items located at the bottom of the screen.

Every interaction in the game should be a tap. Physically, the players have difficulty holding their finger down on the screen, making the use of swipe movements undesirable for the interface. For instance, in the prototype, the project team implemented a pop-up box to confirm selection of an ingredient rather than having the player drag the ingredient to the cart. Similarly, the touch areas need to be large and distinct to prevent players from unintentionally touching an item that they don't want. These types of mistake quickly dishearten the players, who tend to blame themselves, which demotivates them from continuing.

SUMMARY

- » Simplicity and accessibility essential
- » Interactions should be touch based.
- » Every interactions should be a tap
- » Touch areas need to be large and distinct to prevent unintentional taps
- » Interface is large and top corners of the screen are difficult for players to reach
- » Player focus centred on the middle and bottom of the screen
- » Actively direct players focus using animations
- » Skeuomorphic design approach assumed

SELECTION INTERFACE

The first time that a player starts the game, they will be asked to select an avatar. In play testing, the project team found that players had a little trouble cycling through the options using the arrows. Instead, the player selection screen should show the players all their options, possibly using portraits of the characters for the menu.

Players will have to select a level to play before beginning. A similar menu to the player select screen could be used for the recipes, as cycling through recipes caused some players trouble. The player testers also had difficulty distinguishing between recipes. Using larger type and icons of the finished meal might help them select a level quicker.

SUMMARY

- » Players will select an avatar at the beginning of a new session
- » Players will select level each time to start playing that level
- » Prefer to show all options on a single screen rather than using arrows to cycle options

PLAYER INTERFACE

The primary interface for gameplay is a first person view of a grocery store shelf including a timer showing approximately how much time the player has left to complete the recipe. The players can tap on items on the shelf to select qualities and view the price and simple nutrition information. They can then confirm or cancel the selection.

Players also have the option to select their list, cart or map. These selections bring up menus that show information about what they need to buy, what they've already selected and how much money they have to spend. The game also has a store map that lets the player move between locations in the store.

When players select the map option, a pop-up window opens showing an abstracted map of the grocery store. Visual cues such as matching colors or icons should connect sections on the map to the sections in the store. The play testers, found the current map somewhat confusing and the project team suggests abstracting the map further to make it more clear that the players need to tap on a section to navigate to that area of the store.

During game play, the player will interact with other characters, particularly at check out and when the celebrity guest arrives to eat. The player's avatar should be visible during these interactions with other characters to provide the players a sense that their character is a part of the game's world.

SUMMARY

- » Gameplay uses first-person view of grocery shelves
- » Every interaction should be a tap
- » Include indication of approximate time remaining (i.e. hour glass)
- » Players can select items on store shelves, their recipe, their cart and other store sections
- » Players use map to navigate from section to section
- » Player avatars appear during transition animations or interactions

OPTIONS INTERFACE

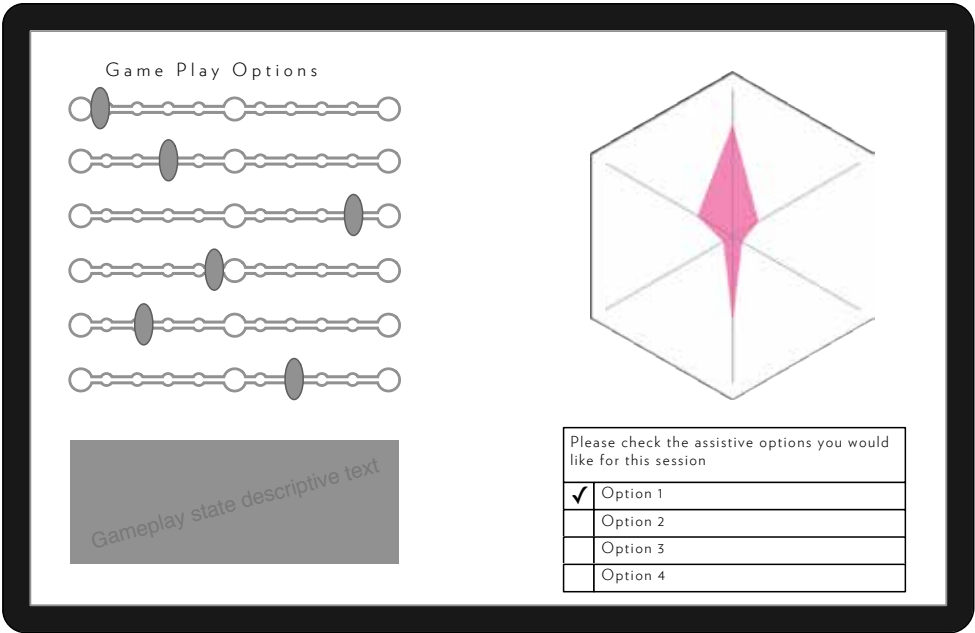
The Options menu should be accessible from the start screen. The options interface will be used by OTs to adjust the difficulty of the game. In addition to selecting the level that the game begins on, the OTs should be able to fine tune the difficulty using sliders to adjust the four main skills being practiced in the game: memory, attention, planning and problem solving. A description field should explain exactly which challenges are turned on based on the settings that the OT has selected. (See Level Difficulty for more details)

In addition to the difficulty setting, the OTs should also be able to toggle on/off assistive features to make the game playable for patients with moderate cognitive impairment (i.e. keeping the ingredient list open at all times for those with poor memories).

Other typical options like music and sound effects can be available under options as well.

SUMMARY

- » Simple interface for OTs to adjust difficulty
- » Difficulty options include adjusting for memory, attention, planning and problem solving skills
- » Toggle options for additional assistive features



REPORTING INTERFACE

From the Start menu and from the Scoring screen, the OTs should be able to access a report that provides more detail about the player's performance. The report should graph the player's performance across all of the recipes completed during the most recent session, so that the OTs and players can see any improvement achieved by playing the game. The report graph would show a stacked bar graph showing the player's total score broken down between points for time and points for collecting the correct ingredients. If any bonus items were used to bump up the score, these would also be indicated on the graph.

In addition, the OTs should be able to export raw data from the game to keep on file. This data should be organized to align with the specific skills being practiced: memory, attention, planning, problem solving. (See Reporting for more details)

It's desirable to extend the reporting to include the lifetime sessions of the player rather than just the single session. This feature could be accomplished either by managing player profiles or some other method of linking multiple play sessions.

SUMMARY

- » In game reporting for OTs
- » Report shows scores from each recipe played or replayed within a session
- » More detailed reporting available through option to export raw data



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Memory:

- » The game increases the number of ingredients in the recipe, mixes the order of ingredients on the list, and limits how many times the player can reference the list while shopping.

Attention:

- » The game increases the number of sections in the grocery store and the number of food items that fill the shelf. In more advanced levels, distractions like phone calls from game characters interrupt the player.

Planning:

- » The game develops simple math and decision making skills by introducing a budget for each recipe and increasing the number of servings required to make dinner. Later levels introduce nutrition alternatives at different prices to challenge the player to make the best choice.

Problem Solving:

- » The game's later levels introduce changes to the recipe while the player is shopping, asking them to find new ingredients or adjust the amount of food they're buying to serve more people. In addition, familiar items become out-of-stock, forcing players to find alternatives.

BONUSES

If players do well, they may be rewarded with bonuses that they can use in more advanced levels to improve their score. Players have the option to activate bonuses items at checkout to boost their score to pass tough levels.

- » *Waiting Taxi*: the taxi gets the player home sooner, allowing them to reduce their time for that level.
- » *Super Coupon*: the coupon reduces the total cost of the ingredients helping to get a recipe under budget
- » *Secret Sauce*: the secret sauce acts as an ingredient wild card, replacing a required ingredient for the recipe
- » *Calling Stockboy*: the stockboy brings specific ingredients to the player.

UNLOCKABLES

The game has two types of unlockable content to motivate players to continue playing the game. First, they unlock new levels with new celebrities by completing recipes. Second, the players receive rewards like photos taken with the celebrity and their avatar, and gifts from their celebrity guests.

When the player completes a recipe, the finished meal pops up to give them a visual representation of their success. In addition, the celebrity associated with that recipe also appears to thank the player.

After the players plays through a few recipes, they start to get gifts from the celebrities. These gifts become part of the scenery in the player's home. The players can view a gallery of celebrities they've unlocked in the form of photos taken with the player character they selected.

SUMMARY

- » Each level is associated with a recipe and celebrity guest(s)
- » Doing well in a level unlocks harder levels with new celebrity guests
- » Increasing difficulty built around four themes: memory, attention, planning, problem solving
- » Bonuses for completing levels can be used to improve the players' scores in later levels
- » Other unlocks include cosmetic items and photo album of celebrity guest

SCORING

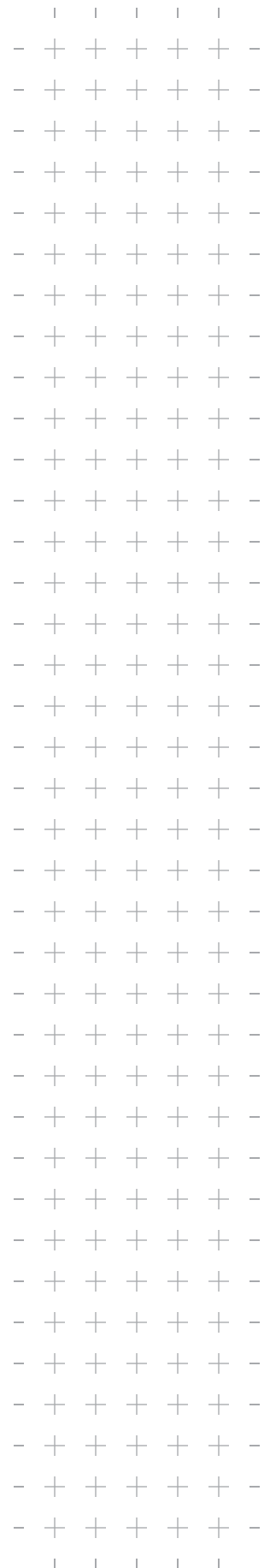
The players' performance in the game is scored on speed (closeness to goal time) and accuracy (correct number of ingredients selected).

Players are awarded points for finishing under the goal time and for every ingredient they collected correctly. Going over time and collecting incorrect ingredients earns the player no points. In later levels where distractions or changes to the recipe occur, time is added to the goal time. If a couple of alternative ingredients are available, then fewer points are given for having less optimal ingredients.

Depending on how well a player scores, they can either receive 3 stars, 2 stars, or 1 star. The scoring must clearly communicate to the players any errors they made and what they need to do to correct their mistake.

SUMMARY

- » Scoring based on speed and accuracy
- » Players receive a 3 star rated based on their score
- » Any mistakes in the ingredients collected need to be clearly identified



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CHANGES IN GAME STATE BASED ON DIFFICULTY LEVEL

| DIFFICULTY LEVEL | MEMORY | ATTENTION | PLANNING | PROBLEM SOLVING |
|---------------------|-------------------------------------|--|--|--|
| 1 | 1-2 ingredients list limit = unl | 1-2 sections 4-8 decoy itm distractors = 0 | list ordered = T portions = 1 \$\$\$ alts = 0 health alts = 0 | alt itm req = 0 itm change = 0 port change = 0 |
| 2 | 1-2 ingredients list limit = 10 | 1-2 sections 10-15 decoy itm distractors = 0 | list ordered = T portions = 2 \$\$\$ alts = 0 health alts = 0 | alt itm req = 1 itm change = 0 port change = 0 |
| 3 | 3-5 ingredients list limit = unl | 3-5 sections 10-15 decoy itm distractors = 0 | list ordered = T portions = 3 \$\$\$ alts = 0 health alts = 0 | alt itm req = 0 itm change = 1 port change = 0 |
| 4 | 3-5 ingredients list limit = 10 | 3-5 sections 20-30 decoy itm distractors = 0 | list ordered = T portions = 4 \$\$\$ alts = 0 health alts = 0 | alt itm req = 0 itm change = 0 port change = 1 |
| 5 | 3-5 ingredients list limit = 5 | 3-5 sections 20-30 decoy itm distractors = 1 | list ordered = F portions = 1 \$\$\$ alts = 1-2 health alts = 1-2 | alt itm req = 2 itm change = 0 port change = 0 |
| 6 | 6-8 ingredients list limit = 10 | 6-7 sections 30-40 decoy itm distractors = 0 | list ordered = F portions = 2 \$\$\$ alts = 1-2 health alts = 1-2 | alt itm req = 1 itm change = 1 port change = 0 |
| 7 | 6-8 ingredients list limit = 5 | 6-7 sections 30-40 decoy itm distractors = 1 | list ordered = F portions = 3 \$\$\$ alts = 1-2 health alts = 1-2 | alt itm req = 0 itm change = 1 port change = 1 |
| 8 | 6-8 ingredients list limit = 3 | 6-7 sections 30-40 decoy itm distractors = 2 | list ordered = F portions = 4 \$\$\$ alts = 1-2 health alts = 1-2 | alt itm req = 1 itm change = 1 port change = 1 |

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ASSISTIVE OPTIONS

Some players will require additional assistance to play the game even at low levels. The OTs can turn on the following assistive options, if they deem it necessary to get the player started with the game.

- » Remove countdown timer from player screen
- » A sidebar box containing info that is always visible:
 - » *Ingredient list always visible when shopping*
 - » *Budget total always visible when shopping*
 - » *Items in cart always visible when shopping*
 - » *Items on list automatically checked off when player adds item to cart*
 - » *Total cost of ingredients in cart automatically totalled*
- » Player gets warning before checking out if they have the wrong items in their cart
- » Hints activate to prompt the player to highlight sections or food items if the player delays. These prompts can become more noticeable the longer the players hesitate.
- » Tutorial activates and directs players through an early level using text pop-ups and the hint system to lead the player through the game

SUMMARY

- » Difficulty increases in attention, memory, planning and problem solving each affect specific changes to the game
- » Additional assistive options can turned on if necessary
- » OTs should be able to adjust difficulty within these theme to match players abilities
- » The game state can be defined by referring to the difficulty levels of each theme

AUDIO/VISUAL DESIGN

The visual design of the game should be bright, simple and animated. The player characters will present older adults in a positive light, emphasizing their autonomy, dignity, liveliness and humour. The style of the game will be lighthearted and comical without being slapstick.

Food items need to match the cartoon-like style of the game but clearly look like their real-world equivalent.

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PLAYTESTING RESULTS

OT’S OBSERVATIONS

Even if players had difficulty with the game, most seemed to be engaged and have fun, according to the observers.

Most difficulty that the observers reported was prompting players on where to touch to do things in the game.

There was a clear barrier for the players with moderate impairments that patients with mild impairment didn’t encounter. The game needs to be easier to accommodate this group.

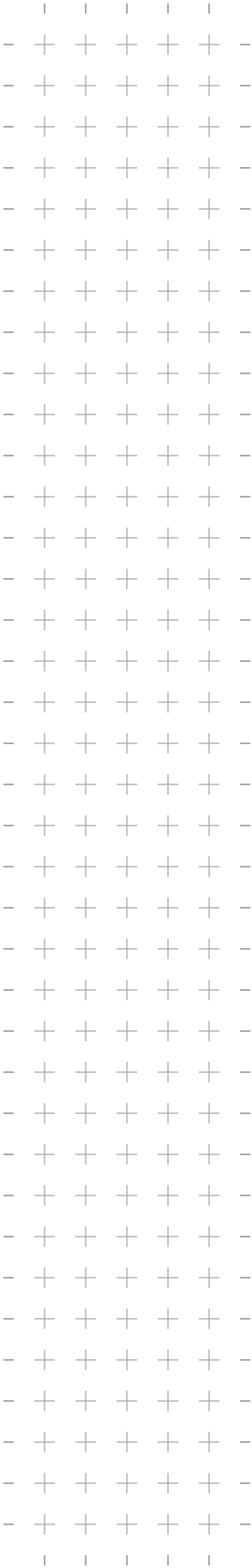
Observers reported that players understood what they needed to do to win and improved as they played. Patients with mild impairments learned quickly, but those with moderate impairments had trouble playing the prototype. Even four-item recipes were too difficult for some players.

Observers reported mixed results in players’ ability to correct mistakes and replay without assistance.

RECOMMENDATIONS

Players may not have known how to correct their mistakes using the interface (i.e. to select cart, or go between list and cart). Correcting the interface layout and consolidating the cart with the list should remedy this issue.

Replayability might be an issue due to beginning difficulty set too high or troubles with the interface. Issue can be resolved by having easier recipes and/or consolidating the list and cart in the interface.



PLAYER REPORTED FEEDBACK

Players reported that they had fun and felt that they could get better with more practice. Results were positive to mixed when asked if they understood how to correct mistakes or understood how to win.

The majority of playtesters also described their experience as fun or interesting, although calling it interesting might be a more polite way to show neutrality or reserving judgement.

Biggest issues with game were navigating the shelves using arrows, going from one section of the store to another by using the map, looking at their shopping cart, and adding/removing items from cart.

The players had the easiest time starting the game and looking at the list, selecting items from the shelves, selecting recipes, going to check out from the map. This ease of use might be because all of these items are located in the central focus of the screen

RECOMMENDATIONS

The players reported that they had the most difficulty finding groceries and checking their cart. The trouble with finding groceries might be related to using the arrow to move along the shelf and return to the map to move to another section.

Some of the food items need better/more recognizable icons, or the items are in sections that the players didn't expect (i.e. dry goods) or are in a different form they expected (fresh turmeric vs spices).

The issues related to checking the cart came from having this feature out of the players centre of focus. In addition, when players did select the cart, it "looked the same" as the list, confusing some players.

All of these interface problems were compounded by the interaction points being located outside of the players' centre of focus.

SUMMARY

- » Both OTs and players reported that they had fun playing the game
- » There is a wide range of ability between mild and moderate impairment
- » Most issues related to navigating interface rather than understanding game and goal