Tampere University of Applied Sciences

DESIGNING UI IN CASUAL MOBILE GAME

Project: Into The Space

Hy Bui

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ABSTRACT

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Mobile Games place themselves in the top chart of the gaming market, yet not all designers know how to create a smooth interaction world in user interface (UI) mobile games to meet the standard of the current market. This thesis is conducted to determine the optimal method in designing successful Mobile Game user interfaces to create a visually pleasing and fully functional UI for Mobile Games, particularly student's project- Into The Space aiming to provide the freshly graduated student a decent portfolio to work in the game industry.

This thesis is a practical project based on personal practices, trial and error, literature reviews on books, articles, previous studies with related topics, and analyses UI of current trending mobile games to find the formula of designing successful mobile game UI. There was documentation in this thesis of the tools used to create UI assets and wireframes for the project are Adobe Photoshop, Procreate, and traditional pencil sketch.

The result consists of fundamental knowledge of interaction design, notably Mobile Game UI design, a complete set of eye-catching and implementation-ready UI of the Into The Space project, and the game's brand visual identity, which can be used as a junior UI game artist portfolio.

Designing extraordinary UI for mobile games is challenging, yet it is possible as long as designers prioritize their players first and follow the mutual formula of those successful mobile games in the market.

Key words: ui design, game design, mobile games, casual games, casual game art, ui casual game

CONTENTS

1 INTRODUCTION

The growth of personal computers and web browsers has led the way in popularizing Casual games since the 1990s. Being categorized as a genre in video games by purposes, Casual games focus on entertaining or playing as a pastime. Therefore, they do not require special techniques or strategies, yet simple rules, short sessions, and are easy to master. In 2018, Casual/ Hyper-casual dominated the mobile game market as being the most downloaded genre. It is estimated that mobile gaming will potentially gain $95.4 billion (Adjust & Unity 2020). The rise of smartphones since the 2010s has facilitated Casual/ Hyper-casual games likewise reformulated mobile games as effortless touch screens replaced outdated keyboard mobile phones. To reach a broad audience, Casual game designers keep improving in creating aesthetic user interfaces, appealing and catchy art designs to attract more hobbyist players.

This thesis focuses on finding the mutually significant elements of successful Casual Mobile Game UI in the current Mobile Game market and creating one based on those analyses. While working on the “Into The Space” project, the tools used include Adobe Photoshop, Procreate, and InDesign.

Research question

This thesis ran to find the answer to the discussion topic: “How to design successful Mobile Game user interfaces?”

There will be some analyses of successful Mobile Game UI designs since the beginning of the Mobile gaming era to the latest trend to find the formula for creating Mobile Game arts with positive responses from players. Besides analyzing such criteria as to how user interfaces enhance the experiences of gameplay, how eye-catching designs affect users’ intention of installing the games, the essential mutual elements in those trending games; this thesis aims to create visually efficient and fully functional user interfaces for a personal game project: Into The Space.

Thesis structure

The thesis consists of two main parts, precisely fundamental knowledge,

research, analyses of Mobile Casual Games, and documentation of the design process in creating visual and user interfaces for the “Into The Space” project. A conclusion of the overall study and project will be made at the end of the thesis.

2 USER INTERFACE DESIGN

User Interface design is not solely visual design regarding aesthetics but balancing the function and style. Instead of focusing on aesthetic aspects, Interface design should strengthen the interaction design by logically visualizing elements enabling interaction and communication information to users (Garrett 2010, 134-151). To deliver a successful User Interface design with minimum unexpected complexity, designers should adhere to its guidelines, principles, and processes discussed deeper in this chapter.

2.1 User Interface guidelines and principles

Guidelines

Despite remaining controversial as being too specific, imprecision, incomplete, and sometimes ambiguous, User Interface guidelines promote standardized universal usability among designers based on empirical studies.

Navigate the interface

Designers should categorize UI elements according to their similarity in task sequences and name them in descriptive headings to create clear guides for users. On top of that, ensuring the consistent design respecting styles, colors, and size of each category is a key to minimizing the user's workload through straightforward navigation of the interface design. (Shneiderman 2005, 61-66).

Arrange the display

Consistency is an essential requirement while organizing the display relating to terminology, format, color, capitalization. Moreover, there must be an assurance of the compatibility between data display and data entry. It is vital to present only selective data in arranging the display. (Shneiderman 2005, 61-66).

Create eye-catching yet effective design

There are several ways to build a successful brand identity: how positive users react to the brand. When it comes to brand identity, the first impression taken over by visual design influences the user's decision to keep communicating with the brand. Creating eye-catching designs to get the user's attention is not just about aesthetically pleasing, but how effortlessly the design can convey the information to the users. Besides considering what elements draw the user's attention, designers should look for a smooth flow of the user's eye movement because the busier the design, the more the user has to bounce their eyes from side to side. (Shneiderman 2005, 61-66).

Principles

While guidelines are general rules narrowed down to be more specific yet sometimes hard to apply, principles tend to be more clarification and widely applicable. Since it is impossible to create a design that could live up to all user's requirements, design principles are helpful guides in developing a standardized universal design. Design principles need to be pithy and memorable. Moreover, they should be applied harmoniously regarding user research, the context of use, and lessons from empirical studies (Saffer 2010, 123).

Define users' skill levels

The first step of each interaction design should always be to identify the intended users regarding their demographics, motivation, and goal. As the users adapt to current trends, identifying and analyzing them is a never-ending sequence of understanding target users. Therefore, designers can minimize this process by classifying users based on their skill levels, notably novice, knowledgeable users, and expert users (Shneiderman 2005, 66-67).

Analyze the tasks

Having done the user research step, designers should continue analyzing all the tasks that need implementation. There will be an appraisal of all possible actions to categorize them based on task action levels throughout

the task analysis process. Defining the atomic actions is the most arduous yet notable task. The wider the atomic actions are, the harder it is for users to understand what the system is running, whereas there will be a hindrance to the users in performing higher-level tasks when the atomic actions are too small. (Shneiderman 2005, 69).

Determine the interaction style

After carefully underlining users' skill levels and tasks, developers or designers must decide how the user and the system communicate, which can be described as choosing an interaction style. There are five primary methods, including Command line, Menu selection, Form fill-in, Direct manipulation, and Anthropomorphic (Shneiderman 2005, 71). The table below (FIGURE 1) summarizes the advantages and disadvantages of different interaction styles (Galitz 2007, 13-16).

Interaction style	Advantages	Disadvantages	Examples
Direct manipulation	•Fast and intuitive interaction •Easy to use	•May be hard to implement •Only suitable where there is a visual metaphor for tasks and objects	•Video games •CAD systems
Menu selection	•Avoids user error •Little typing required	•Slow for experience users •Can become complex if many menu options	•Most general-purpose systems
Form fill-in	•Simple data entry •Easy to learn	•Task up a lot of screen space •Causes problems where user options do not match the form fields	•Stock control •Personal loan processing
Command languages	•Powerful and flexible	•Hard to learn •Poor error management	•Command and control systems
Natural language	•Accessible to casual users	•Requires more typing •Natural language understanding systems are unreliable	•Information retrieval system

FIGURE 1. Advantages and disadvantages of User Interaction Styles.

2.1.1 Golden rules of Interface Design

In Designing the User Interface (2005, 74-75), Ben Shneiderman presents the eight most applicable principles described as the "golden rules" of Interface Design. The following rules cannot be complete yet they set a standard for students and designers to follow.

Maintain a consistent User Interface

Vital as it is, consistency is the rule most periodically violated since multiple elements are required to maintain coherence, particularly terminology, color, layout, fonts, and styles. Designers can maintain uniformity by using one formula for UI patterns, layout in different screens, and terminology.

Universalize the usability

Designers should skip the "designing for typical users" phase to diversify users but cater to universal usability elucidated as usability for users regardless of ages, genders, disabilities, experience levels, and technology limitations. While novice users find it is easier to achieve tasks with descriptive instructions added, experts users prefer handy shortcuts.

Provide instructive feedback

It is recommended to create effective system feedback for each user action. For any user task performance, the response should be informative for users to achieve a higher-level task. However, the trickier part is the response time since it depends on the speed and flow of the individual thought process. Whereas unnecessary delay can interrupt users' workflow impairing their productivity, a rapidly responsive system will not allow users to have enough time to absorb the information.

Communicate to gain closure

A subtle informative response to any task completion can give users a sense of relief and inform an upcoming group of actions helping them to emerge in the interaction system. A remarkable example is how online shopping websites pop up a 'Thank You' page to communicate with users that their orders are confirmed. Chatbot in any website or application is also an excellent tool for instructing and getting closer to the users.

Prevent errors

Developers and designers must design a system avoiding users' severe errors. The interface itself should recognize the issues and give an instructional yet simple solution once users make errors. The system state

should not be influenced by erroneous actions. If not, there must be a pop-up instruction for recovery.

Allow reversible actions for users

The operator can ensure users' carefree and effortless performance by letting them reverse their actions quickly. Users will be encouraged to explore other options and tasks without any anxiety about redoing everything.

Support internal locus of control

In terms of actions, users should be the initiators, preferably responders, that allow users to be always ready to obtain necessary information instead of passively reacting to tedious actions before accomplishing the tasks.

Minimize users' memory load

Since humans cannot process too much information in a short period, designers tackle this limitation by implementing methods to reduce users' short-term memory load, such as keeping simple displays, only presenting information that assists the operator, providing abbreviations, codes for users.

2.1.2 Display design

Principles for display design

The display is an essential factor in building successful design since cluttered displays can be a turnoff, yet too minimal displays build up short-term memory load on users. Practical displays present crucial data, including consistent groups with logical labels for users' knowledge, suitable fonts, colors, alignment to support task performance. (Shneiderman 2005, 490).

With empirical studies, and expert knowledge, graphic designers create their principles for display design which can be categorized into six rules:

Strive for sophistication and straightforwardness

Visual design is one of the most vital components in display design. By creating sophisticated yet minimal and efficient for users will bring users satisfaction of artistic experiences. However, if the designs focus too much on the surface without any functionality, they can provoke anger and decrease productivity. (Shneiderman 2005, 491-492).

Balance contrast, and proportion

Contrast is a tool for getting users' attention and preferably a communicating conceptual group helping users navigate elements on the page. Moreover, maintaining a harmonious proportion among visual elements, precisely those implementing higher-task levels, might be scaled up a little more than the lower ones reduce learning time for users. (Shneiderman 2005, 491-492).

Regulate logical visual structure

Hierarchical data are all related to each other and are shown in the tree graph. The hierarchy starts with a root, the root has at least one child, and a child can have children. An example of hierarchy in data visualization is the file and folder system consisting of sub-folders inside the main folder. Creating a logical visual structure by balancing those data groups helps users process information more accessible. (Shneiderman 2005, 491-492).

Determine module and program

The module and program for displays should be flexible for users yet preserve uniformity. Maintaining consistency in visual design is never a problem-free process, but there is always a solution for those issues with a deep understanding of the skeleton of the system. By recognizing the design elements appearing multiple times in different contexts, designers can design them once and use those designs throughout the system instead of designing similar elements over and over again. (Shneiderman 2005, 491-492).

Present directly

When it comes to image and presentation, choosing the proper methods of

presenting information directly and cohesively is critical in visual communication between users and the system. Consistent visual styles enhance the system identity and leave users the impression of professional branding. (Shneiderman 2005, 491-492).

Choose distinctive styles

Although display designs should follow standard guidelines and principles to provide universal usability for users, it is still a part of a creative process allowing designers to express their personality through the design with a distinctive style. However, the visual design should not go too far, which might confuse users. (Shneiderman 2005, 491-492).

Color

Color displays add dimension to screen usability. If used properly, color can improve task performance by enhancing the logical organization of data, emphasizing the differences among elements in a more exciting way. Nevertheless, color is often overused, which can be distracting and impair usability. (Shneiderman 2005, 510).

Color is a combination of hue, saturation, and value. Colors monitored on computer screens use the three primary colors of light: red, green, and blue. Therefore, color palette editors label them with R, G, B in generating millions of colors (Galitz 2007, 691).

It is undeniable that color makes interface design more attractive and facilitates the accessibility of information for users. Colors are also a powerful tool in building brand identity. Designers or editors choose a color palette by selecting carefully which colors complement each other. The color palette should distribute color for different purposes. Specifically, bright or bold colors can be used for design elements that need users' attention, while muted colors are better for the background. (Skowron 2020, Role of colors in UX and UI Design).

To avoid misusing colors, designers create some guidelines for themselves:

Use color cautiously

It is fun to play with colors to add characterization to displays, but there is not always a positive result, especially with novice designers. Colorful displays might seem appealing at first, yet they can be difficult to process information or provoke unwanted emotions. Inappropriate use of color might mislead users into searching for information that does not exist. (Shneiderman 2005, 510).

Limit the number of colors

It is recommended to use no more than four colors in a single display and seven colors for the entire sequence of displays. Instead of implementing ten different colors for each item in a menu bar overwhelming users, using only one color for all menu items and the title in a second color, the instruction in the third color helps users navigate the usability better without straining their eyes. (Shneiderman 2005, 511).

Consider the needs of users with color impairment

According to Color Blindness Awareness, there are approximately 300 million people with color blindness worldwide. Moreover, there are also many people having temporary color deficiency due to medications. Narrowing the color scheme in displays also helps users with color blindness. Another solution is to provide a substitute color scheme or support customizable color palettes for users. (Shneiderman 2005, 512).

Be careful with color pairings

There is a contrast between two different colors or shades of color. A design without contrast is perceived as featureless mass. Contrast is seen as an attention-getting mechanism helping users understand the navigational elements of the system. However, too much contrast on display, specifically true black and white or pure red and blue, can disturbingly strain users' eyes. On the other hand, too little contrast like light yellow and white will appear challenging to read. (Rosebrook 2018).

Design on greyscale first

The main goal of display design is to present data in a logical layout.

Similar information can be put in one group within a drawn box which was illustrated in FIGURE 2. It is easier to design in monochrome layout first because the color might distract the primary purpose of creating wireframes. (Shneiderman 2005, 512).

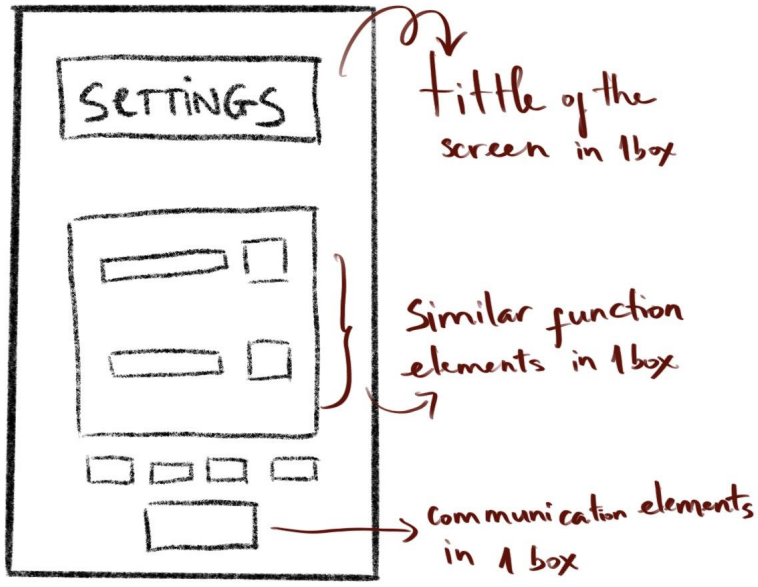


FIGURE 2. Example of arranging elements in monochrome wireframe.

2.2 The design process

Design without a process will add time and complexity to the development of the system. Adhering to an Interface Design process increases efficiency, produces consistent results, and ensures the User Interface design function.

Phase 1: Creating concepts

Instead of finding one perfect design idea, the purpose of ideating is to generate a wide variety of concepts as rapidly as possible. Brainstorming must be done traditionally within pencils and papers or whiteboards and sticky notes. Designers and their team can use different idea-generating methods for this creative process, but they should not overlook the "rules" of brainstorming:

There are no bad ideas

Brainstorming is to come up with as many ideas as possible as a sketch on paper. At this stage of the design process, the quality of the drawing does not matter, but quantity. There should not be any judgment on any ideas. (Saffer 2010, 114-115).

Stayed focused

No discussion is needed at this point, preferably focusing on the flow of thought in generating ideas and being as specific as possible. (Saffer 2010, 114-115).

Do not concentrate too much on one idea

The primary goal of these sessions is to ideate continuously. Going deeper into any ideas can leave for the next phase—instead, the more ideas, the better. (Saffer 2010, 114-115).

Take advantage of the surrounding

Unexpected objects in the room can be inspirations for this creative process. Posting sticky notes all over the walls and whiteboards might also help connect those ideas. (Saffer 2010, 114-115).

No multitasking

Brainstorming requires much concentration. Any little distractions can impair the productivity of brainstorming sessions. Texting, answering emails, or working on other things are better done is other times.
(Saffer 2010, 114-115).

Phase 2: Organizing ideas and specifying the design

After generating conceptual ideas, it is time to categorize them, underline the most achievable ones, and create the screen design. There are standard methods for specifying ideas, such as wireframes, storyboards, and infographics. The type of information and target users determine the specification methods.

This is the stage requiring teamwork from both designers and developers. Once designers nearly complete the primary prototypes, developers will evaluate them on the technical feasibility scale and make suggestions. Designers have a more precise direction to update the wireframes with the team revision, explanation, and approval. (Mehrafrooz 2021).

Designers should keep in touch with developers during this entire phase. While designers visualize developers' data, they provide technical and explanatory reviews. Moreover, some usability tests should be carried out at this stage to prevent as many errors as possible and ensure the design is usable.

Phase 3: Creating a style guide

To maintain the consistency of visual elements in the finished design product, the lead graphic artist should create a style guide for the creative team to follow. A style guide or guidelines of using graphical elements provide designers precise information on how the User Interface should look like, particularly color palette, graphical styles, the font, and its colors, styles, measurement, and use purposes (including titles, instructions, and content text).

Phase 4: Creating sample concept screens

After the wireframes and style guide are finished, graphic designers can create some concept screens in this stage. Wireframes are separate from concept screens. Whereas wireframes are like a skeleton ensuring the usability and information of the design, concept screens are the skin bringing the design to life by visualizing the elements of the skeleton. Together, they create a functional body.

Graphic artists usually create at least two sample looks instead of focusing too much on only one concept. Artists will share the sample concept screens with the development team and clients for technical and commercial feedbacks to develop the finished screen before the implementation stage. Developers also need to review the concept screen thoroughly to ensure the visual elements are programmable. (Silver 2005, 58-59).

Phase 5: Implementing the design

The implementation phase consists of graphics elements and other media elements, including audio, video, and GIF, which will get turned into a running code. FIGURE 3 illustrates a diagram of the Implementation stage. This stage aims to create a functional system that does not need to be a final one yet.

The interface designer is usually the curator of this process, ensuring the programming process runs true to the design. Interface designers will provide additional design details and consult programmers or specialists handling multimedia if any unexpected issues arise during this stage. If necessary, the development team can test the code or modify the design if the screen elements are too difficult to implement. (Shneiderman 2016, 135-136).

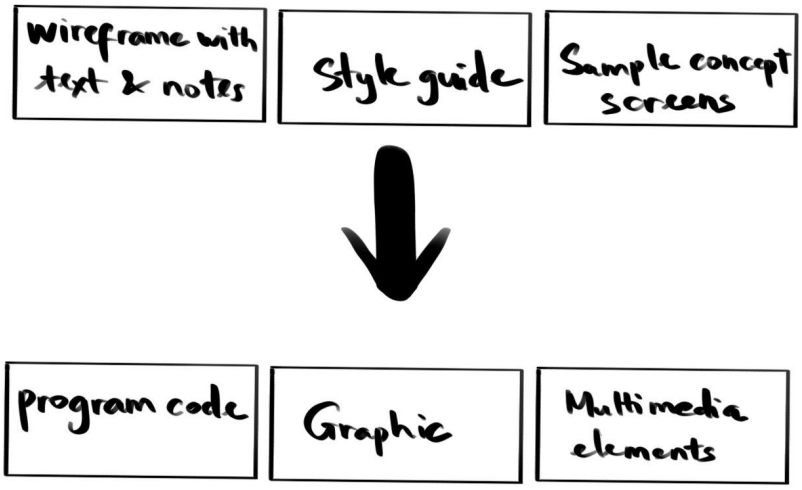


FIGURE 3. Implementation stage.

3 MOBILE GAME USER INTERFACE

The mobile phone is no longer a portable telephone. It has become a primary way to communicate, entertain, transport, navigate, and even commerce. Since the touch screens replaced analog keyboard mobile phones, the mobile phone user interface requires more direct, easy, and intuitive to learn. The smartphone era offers opportunities for bringing interaction designs closer to users, yet it is inevitable to encounter challenges in mobile design.

Small sizes and variable screen widths

Designing for smaller size platforms yet preserving the usability is never an easy process. Mobile devices cannot offer big screens as traditional computers to present information. Scaling down all the visual elements on displays cannot maintain the readability for users; therefore, designers are in charge of selecting primary data to present, leaving the most critical functional elements on the front screen. (Tidwell 2020, 296-298).

Another difficulty in displaying mobile screens is the screen widths. The screen height is not a big problem since it is all about scrolling down. Due to the variable of mobile models, their screen sizes are not always the same. Designers should do usability testing to ensure their designs are scalable and proportional. (Tidwell 2020, 296-298).

Touch screens

Touch screens can be seen as an evolution of mobile phones, enhancing the accessibility for users with a simple touch to select or edit. Nevertheless, that does not mean users have no complications in using touch screens. A common complaint from users is that their fingers are too big to touch those tiny targets on the touch screen. Designers should make the button big enough to touch easily. It is crucial to make targets 48dp x 48dp at a minimum for Android devices and 44pt x 44pt for Apple iOS on each side, and put space between them. (Tidwell 2020, 296-298).

Difficulty in typing

Typing on the touch screen is never an easy experience since the keypad is too tiny and the space among those keys is too narrow, leading to frequent mistypes. Some suggestions for this case are to create the "AutoComplete" function, which predicts the next letter base of what users already typed in, or to allow users to switch to the "AutoCorrect" function, which will correct users' wrong typo. (Tidwell 2020, 296-298).

Challenging physical environments

Smartphones are overflowing in every corner of the world because of their portability and immediate accessibility to media. Unlike traditional computers, there is no limit of environments in using mobile devices, mainly when they are outside under the bright sun, on their cars, buses, trains, or even in bed. Due to the difference of ambient light in different environments affecting the readability of the device display, designers should consider adding feature adapting display brightness to external lighting conditions. (Tidwell 2020, 296-298).

In addition, to be an "on the go" all-rounded device, a mobile phone should ensure the displays are readable for users when they are moving around, specifically on their cars or buses. Moreover, the design should allow users to reverse their actions quickly. (Tidwell 2020, 296-298).

3.1 Basic elements in Mobile Game UI design

All games share some mutual traits in the world of game design despite their diversity, specifically players, in-game, goals, feedback, and rules. This section will discuss the essential elements in UI game design and 'rules' in creating great UI designs.

The basics

Mechanics and interactive feedback

The mechanics demonstrate the goal of the game, instruction for players to achieve it, and what happens when players follow it. Linear entertainment experiences, specifically books, and movies, involve technology, plot,

aesthetics, but mechanics, distinguishing games from other entertainment experiences. The mechanism of the game simulation, supporting interaction among players, and getting the game to work connects the feedback in the game. (Schell 2015, 51-52).

Feedback usually takes form in the game UI design, informing the game's current state for players. There are both positive and negative feedbacks whose function is to provide signals of good or bad things to players. For example, victory or any achievements in the game mission are positive feedbacks, while lost or uncompleted game sessions are negative feedbacks, challenging players to re-play to get the positive feedback of the game. (Graham 2010, Feedback In Game Design).

UI designers should understand the game mechanics to keep players emerging in the game to create informative feedback for players.

Aesthetics

When it comes to players' experience, aesthetics are the most visible trait to players, which defines the look, sound, and feel of the game. In the game design process, it is not just building the game mechanics but an entire experience. Aesthetics in UI design are part of creating an immersive experience for players. (Schell 2015, 52).

Evaluating the right amount of detail for concept art is an important step that should not be overlooked. Artists want to make everything flawless, but stunning arts take an unnecessary amount of time, while a rough sketch might meet the requirement already. Creating simple yet enough detail is an essential skill that must be practiced. (Schell 2015, 52).

Levels of game UI design: from world to content design

Developing a game is a complex process, possibly leading designers to overlook some details throughout the process. To prevent that unwanted situation, designers can divide the game UI design process into different levels of design, from generality to detail.

World design

The world design is all about world-building for a fantasy universe. Art directors will take over this process of building a world where the game will take place. Creating an entire fantasy world is not a simple task, including the plots, characters, settings of the game. Designers should create a map allowing users to keep track of their progress in the game. (JUSTINMIND 2021).

System design

While the world design requires the creativity and imagination of the creative team, the system design needs another team to tackle it in the technological and mathematical aspects of the game UI design. This stage ensures the world design is implemented correctly to bring players the development team's experiences. (JUSTINMIND 2021).

Level design

Designers add rules and plots to provide players straightforward navigation in the game's fantasy world to create levels for users to accomplish throughout the game. The higher the levels are, the trickier they are for users to advance through. Timer or misleading elements can be added to different levels to enhance their difficulty. (JUSTINMIND 2021).

Content design

The content design adds complexity to secondary characters to unwrap the game's story by creating missions, monologues, or dialogue. This stage is the polishing step of the UI design process, leaving the impression of a completed product for players. (JUSTINMIND 2021).

Clean game UI design

Designers should be self-aware of the available distraction elements on display to organize them as least misleading as possible to ensure the essential details get enough attention from players. Decluttering is an

essential step in creating a clean in-game UI for players. (Innovecs Games 2021).

Too dense game UI design can trigger players' anxiety since there is no room for their eyes to breathe. Several elements must be displayed since they are indispensable parts of the game. Designers' challenges in this stage are to select the vital information and elements attentively and arrange them in a logical structure which will not disturb players' in-game experiences. (Innovecs Games 2021).

The rules

Keep it simple

It is undeniable that aesthetics are part of making the game more enjoyable. A game with an outstandingly beautiful UI can draw more attention from players than other games in the same genre. However, designers should not focus too much on aesthetics and overlook the user interface's primary goal of communicating information effectively. Most of the time, the most successful games come with minimal yet stylish UI. (Schell 2015, 391).

Engineers' natural aesthetics should not be ignored, yet make the engineers the navigators and mechanics by giving technical feedback and suggestions. Then the artists will decide the methods of updating the design. (Schell 2015, 391).

Channel information

Choosing the most effective method to communicate information to players requires a great deal of research and analysis. There is a process to determine the best way to present information, including four steps

Step 1: Prioritize information

There is an excessive amount of elements to present, but they are not equally important. By listing all the information and categorizing them based on how frequently players need to see them, designers can sort a prioritized list to show them in sequential order. (Schell 2015, 267-269).

Step 2: List channels

After identifying a prioritized list of information, designers should decide which channels to communicate those data streams. Depending on the information the system wants to convey, the channels are varied and flexible in choosing from, notably the top center of the screen, the bottom corners of the screen, the sound effect and music in the game, the dialogue box over character's head. (Schell 2015, 267-269).

Step 3: Map information to channels

The difficult task is to map the type of information to suitable channels to present on displays. This step is usually done by trial and error, usability testing, and observation of players. (Schell 2015, 267-269).

Step 4: Review use of dimension

There are several dimensions designers can work with on one channel, mainly the display information, the color, size, and font of that information. Using multiple dimensions on one channel can make the information clearer and add some juiciness to the design. However, designers have to educate players on what information these different dimensions on one channel convey to avoid misunderstanding and confusion during game sessions. (Schell 2015, 267-269).

Provide feedback to users

The information provided to players by the game and influencing what players will do next is generally called feedback. The quality of feedback powerfully influences players' experience, expressly how much they understand or enjoy the game.

Feedback in the game has to be continuous yet different depending on the situation. In order to provide good feedback, designers should ask these questions at every moment they suppose to give players feedback:

What do players need to know at this moment?

What do players want to know at this moment?
What does the game want players to feel at this moment?
What do players want to feel at this moment?
What is the players' goal at this moment?
(Schell 2015, 262)

Balance options and simplicity with layers

An interface that provides players as many options as possible is easy to access, yet it might overwhelm players with everything on display, while a simple interface leaves a clean look and soothes players' eyes, yet it needs to educate players about task performances when players want to access higher-level tasks. The key here is to balance them. One solution is creating layers of an interface through mode and sub-modes. (Schell 2015, 275).

3.2 The formula of successful UI in casual mobile games

User interface design is why players want to keep interacting with the game longer or become frustrated after the first few minutes of playing. Good mobile game UI designs need to be thoughtful, requiring an eye-catching art style, a deep understanding of players' profiles, and what they want and need.

It is essential to maintain the clarity in mobile game UI design since too many artistic yet non-practical designs can make players excited at first glance, then leave them with disappointment. Moreover, consistency and conciseness should not be overlooked during the UI design process. This section will analyze some famous and successful casual mobile game UI designs to identify the formula of creating beautiful and practical UI in casual mobile games.

Clash of Clans and Candy Crush Saga

Clash of Clan (CoC) was first released in 2012 and still keeps updating its features to satisfy its loyal players and attract new players. The Clash game family always placed themselves in the top chart of mobile gaming, which

undoubtedly makes Clash of Clans one of the most successful mobile games in history, leading to the flourish of other Clash games. The primary trait populating Clash of Clans all over the world is its great UI and visual branding.

Logo design

IMAGE 1. Clash of Clans logo.

Clash of Clan logo which is showed in IMAGE 1 set a standard for other mobile game logos with its strong typography of the game title and the logo representing the game. Today most mobile games follow this formula in creating their logos. The font chosen to be stylized in the logo is the brand identity for the game as well. Players can easily recognize Clash of Clans or other games in the Clash world with their signature font. Another example of fonts in brand identity is movies and TV series, mainly HP and Stranger Things fonts.

A game logo with only stylized text can be boring to some players; therefore, adding a touch of juiciness by an illustration presenting the game is a golden point for designers when creating a logo.

IMAGE 2. Candy Crush Saga logo.

Following the CoC pattern in creating the logo, IMAGE 2 shows Candy Crush Saga logo stylized the font by shading to the original font. There is also a small symbol in the shape of a tag to add visual elements to the logo.

Character design

A game with several characters will have a higher chance of reaching broader players due to its variety of characteristics, but it is also challenging to create multiple characters with different 'personalities' and maintain their consistency within the game theme.

There are ten main characters in CoC with different traits, skill sets, and appearances. Despite the differences in each characters' look, they are all created in a consistent art style, notably the head-body proportion, color, and shading. Players can create those characters in the barrack as their references. IMAGE 3 showcases their main characters in CoC.

IMAGE 3. Clash of Clans characters (Clash of Clans Nation 2019).

Splash screen design

The splash screen is the first impression of players towards the game once they start to open the game. Mobile game splash screens are not simply a background design but a visual identity following the game's theme. Impressive splash screens help players visualize the world-building in the game more accessible and remember the critical criteria in brand identity effortlessly.

IMAGE 4. Clash of Clans splash screen.

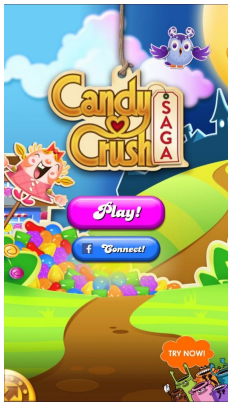


IMAGE 5. Candy Crush Saga splash screen.

Both Clash of Clans and Candy Crush Saga have outstanding splash screen designs, showing their signature traits through their first screen, specifically. At the same time, IMAGE 4 presents Clash of Clans world by expressing their characters' actions with the dynamic perspective and poses which is commonly seen in strategy games; IMAGE 5 brings a lively vibe of a casual game with bright color and visually pleasing style, which perfectly demonstrated Candy Crush Saga genre.

Notably, those two splash screens showcase similar elements, particularly their logos placed in the whole screen's ideal spots, characters, and background. Besides, Candy Crush Saga features more buttons, including Play and Connect.

UI design

When it comes to user interfaces in mobile games, compulsory elements require a thoughtful design to ensure players' smooth interaction experiences, which can be listed as in-game, overlay, setting, progress,

scoreboard, and store. This section will analyze those UI based on the games' screenshots of those categories mentioned above.

In-game

In-game is the screen that players interact with the most; therefore, it is considered one of the most important screens to design and layout well-function UI assets to lengthen the time players spend on playing by providing them the transparent navigation and eye comfort layout. Only essential elements are displayed on the In-game screen to prevent players from being overwhelmed by the cluttered layout. Other elements can be used as overlay layers.

CoC In-game layout in IMAGE 6 only presents crucial information for players on the heads-up display (HUD), including players' health, ammunition, game progress, mini-quest, menu with settings, and shop. Those elements provide information just right for players, letting them feel comfortable with essential functions only.

IMAGE 6. CoC In-game screenshot (Interface In Game 2020).

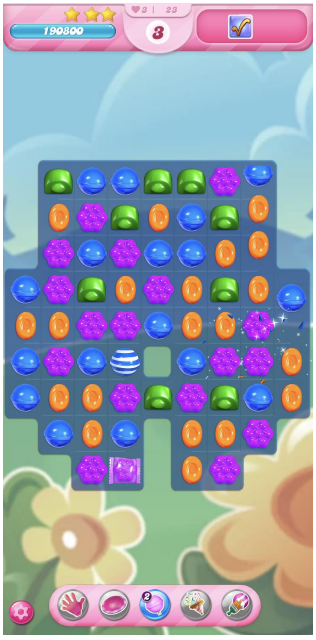


IMAGE 7. Candy Crush Saga screen-shot.

Candy Crush Saga In-game screen featured in IMAGE 7 is quite similar to CoC in the HUD with the player status bar. However, this In-game screen does not provide players the shop menu like CoC since Candy Crush is a puzzle game that adds a store/shop element to the display. Instead, it mainly focuses on expressing the game progress with players' lives and moves.

Overlay

In section 3.1, discussing the essential elements in mobile game UI, there is the rule stating balancing options and simplicity with layers leading to designing the overlay screen. Both CoC and Candy Crush Saga applied that rule in their interface design, but they have different methods for their overlay screens; remarkably, IMAGE 8 of CoC one overlay screen. Designers of the CoC team created their overlay by designing different tabs on one screen, such as Challenges and Rewards. Combining similar elements' layouts by designing their tab is decluttering UI to avoid straining players' eyes. Unlike CoC, the Candy Crush Saga overlay screen is simply a function screen displayed on top of the In-game screen with different functions in one layout which was showed in IMAGE 9. Nevertheless, they both follow the rule, which is darkening or blurring the underneath layer of the overlay one.

This helps players know their previous task is still going on while working on the overlay screen.

IMAGE 8. CoC overlay screen.

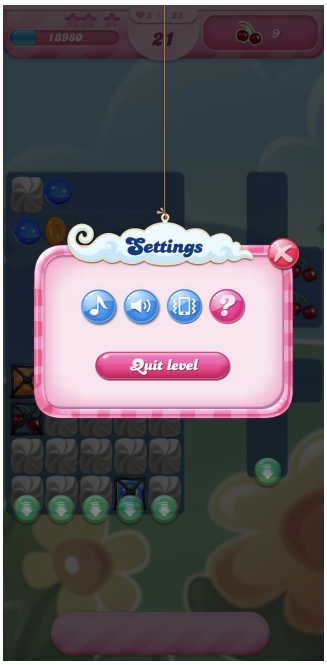


IMAGE 9. Candy Crush Saga.

Settings

Typically, mobile games' main settings screen layout displays four crucial assets, including sound, music, help asset, and players' account information. Depending on different target players of the game, designers can add more assets such as language, instruction, credits.

Progress

To help players keep track of their progress in playing, the game designer should provide several screens to notify them. The progress is usually shaped as a feedback screen, specifically a victory or lose screen. Victory/Win screens illustrated in IMAGE 10 usually present players' scores, their rewards after each round or mission, whereas Lose/Fail screens demonstrated in IMAGE 11 display their score, sometimes missing elements to complete the level, and the retry button.

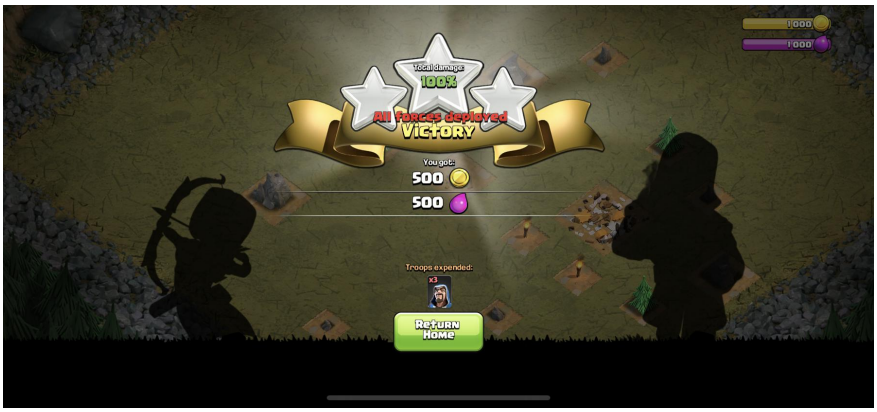


IMAGE 10. CoC Victory screen.

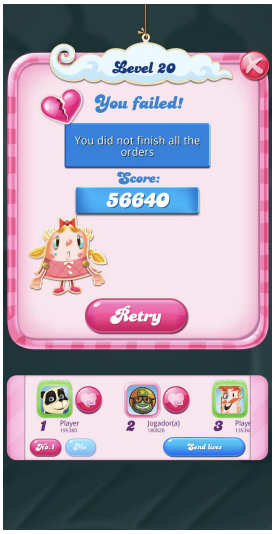


IMAGE 11. Candy Crush Failed screen.

Scoreboard

Players' scores with registered accounts put in the game's ranking system to recognize their performance are called the scoreboard. The ranking system enhances the competitiveness among players. It

should present players' scores, levels along with their ID. The CoC team applies one excellent method of UI layout in scoreboard screen by classifying those rank under friends list, region, and global scale through smaller tabs representing each category showed in IMAGE 12

IMAGE 12. CoC Top Clans screen.

Store

As players get rewards from every completed level or mission, a store/shop asset should be added to use their rewards. A store might provide extra items helping players in challenging missions or in-app purchases where players will pay to get their desired items. Visual artists will take essential roles in designing the store/shop screen since it needs to be appealing and easy to navigate.

Candy Crush Saga store in IMAGE 13 was designed in bubbly style with illustrated market stall, where it provided players great deal of in-app purchase

IMAGE 13. Candy Crush Saga store screen.

4 THE GAME

4.1 Overview

“Into The Space” is a student’s project of creating a finished set of UI assets, layouts of a casual mobile game, particularly a puzzle game with a mechanic similar to Candy Crush Saga. This project aims to practice user interface design through great examples that were thoroughly analyzed and arranged the mutual criteria to infer the formula of designing extraordinary mobile game UI.

The world in this project is around the mushroom galaxy, which is expressed throughout the whole game, remarkably logo, splash screen, map design, prop design, and item design.

4.2 Visual of the game

Visual of the game is its brand identity including characters, logo, and splash screen.

4.2.1 Character design

As this is a puzzle game, characters do not play crucial roles in gameplay processes like strategy games, but they are primarily designed for visual purposes, explicitly enhancing the lively bubble art style.

Due to the mushroom galaxy theme, this character was designed with a UFO as a prop; the rabbit is only displayed on the game's splash screen. If there was no limit in working on this project, some facial expressions might be added to feature the character on more screens, specifically happy for Victory and sad for Fail screens. IMAGE 14 showcases the process of character design with the sketch and final work.

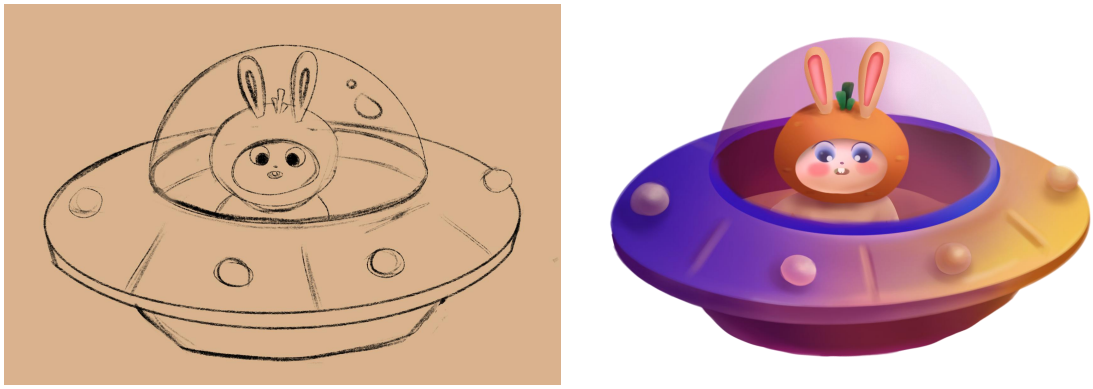


IMAGE 14. Character design sketch and final.

4.2.2 Logo design

There were three vital steps in creating an impressive mobile game logo inferred after analyzing Clash of Clan and Candy Crush Saga logos:

Choose distinctive font
Stylize the font with the cohesive art style
Add a little prop to present the game idea

When this stage started, there were four sketches for the logo, three of which went with the UFO as a prop beside the stylized text; the other one preferred a planet to UFO which was illustrated in IMAGE 15. As the UFO is too dominant compared to the stylized text as a game logo, the sketch with a plant was chosen.

IMAGE 15. Logo sketch and final.

4.2.3 Splash screen design

This project is preferably called a casual game, so its splash screen will enhance the vibrant and lively art style, which is similar to Candy Crush Saga; therefore, the screen needs to present the logo, character, props, and background appealingly, yet maintain the cohesive art style from the beginning.

Into The Space splash screen in IMAGE 16 was created according to the rules mentioned above.

IMAGE 16. Splash screen final.

4.3 UI of the game

4.3.1 UI wireframe

To ensure no missing or redundant UI assets, designers should create wireframes meticulously first by listing all the necessary screens, including in-game, overlay, progress, setting, scoreboard, and store. Once finished with the wireframes, any crucial assets displayed on the screen need to be noted to

provide guidelines of what to design in the UI assets design stage demonstrated in IMAGE 17 below.

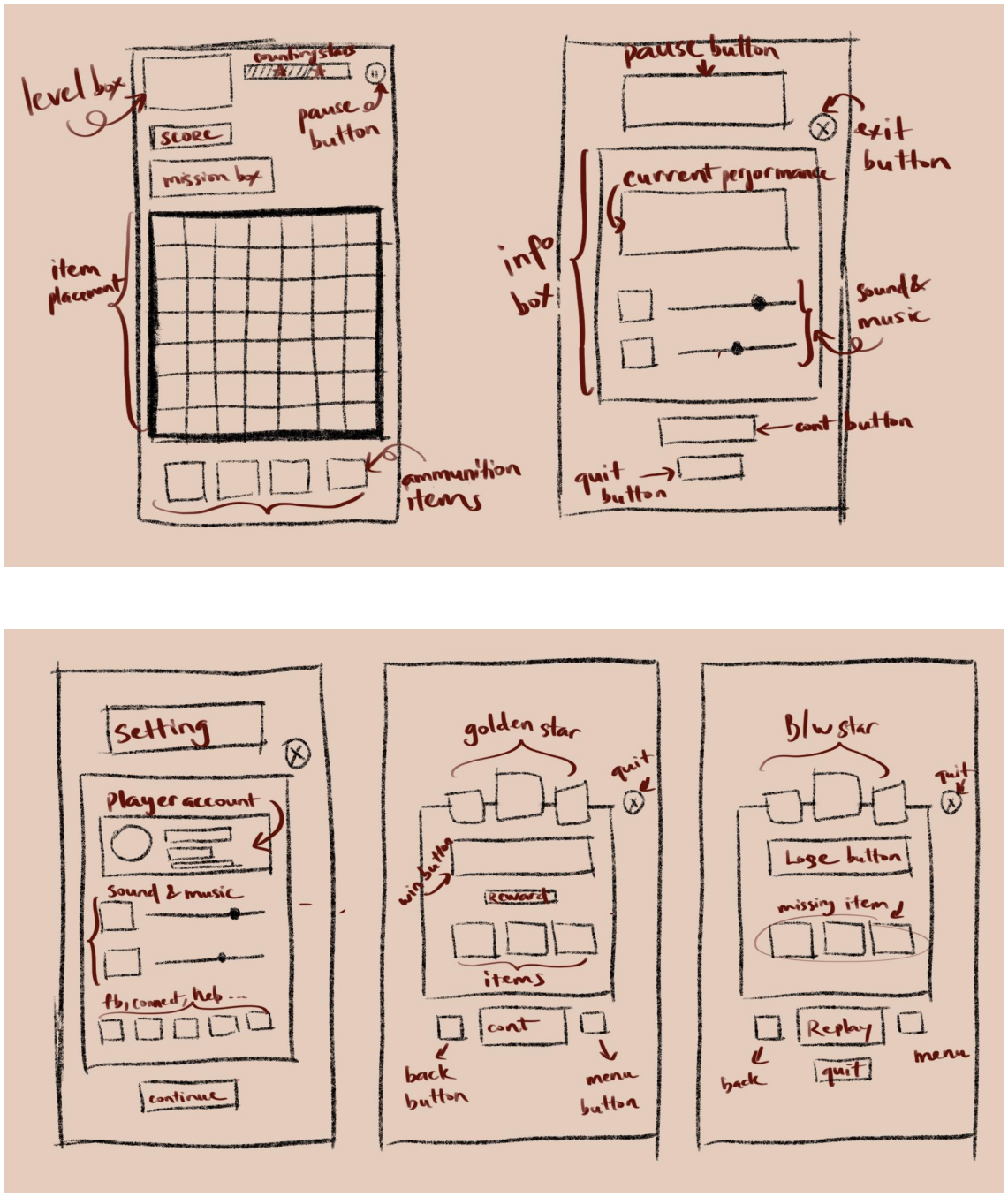


IMAGE 17. UI wireframes.

4.3.2 Map and prop design

Prop design

Props are indispensable parts of casual games since they bring diversity and

liveliness to the game. Choosing the type of props to design is more important than designing the props, as they need to go well under the theme of the whole game, helping players visualize this world with little effort.

Different planets with mushrooms are the props of this project due to the mushroom galaxy theme sketched in IMAGE 18. The color palette used in final props in IMAGE 19 should be the same as character one to maintain the consistency of the project.

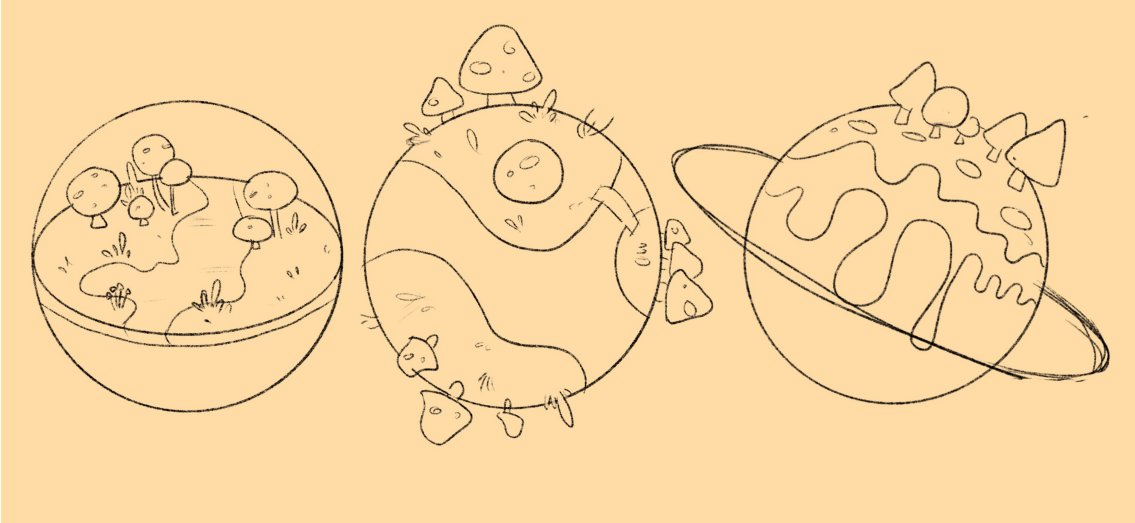


IMAGE 18. Prop design sketch.

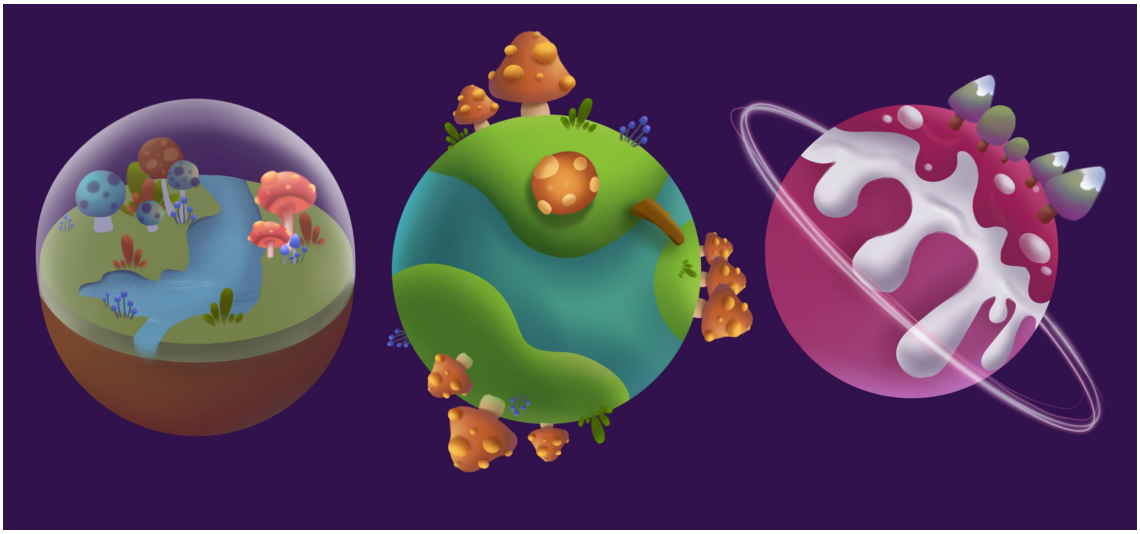


IMAGE 19. Prop design final.

Map design

A map in puzzle games helps players keep track of their progress when playing. Moreover, map design connects all the elements in the world-building into the

most solid fantasy world in the game. The following step of prop design is to arrange those props and additional texture into the map sketched before.
The map should also document how well players performed in different levels by adding UI assets, specifically golden stars illustrated in IMAGE 20.

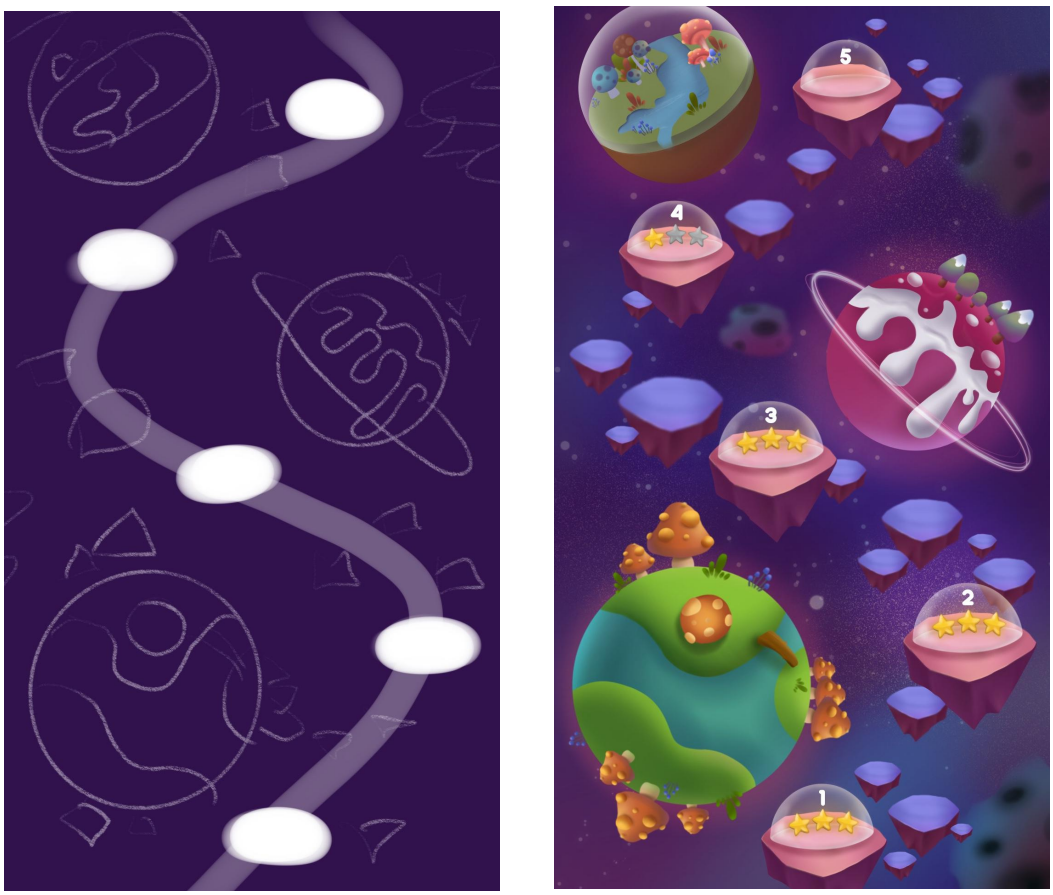


IMAGE 20. Map design sketch and final.

4.3.3 UI asset design

Having finished the UI wireframes of the project, designers need to create essential assets listed on the sketch as of those wireframes, including buttons with different sizes and shapes, infobox, a name box, tick box, level stone, stars, score bar, and items of the game.

This stage took the longest time to finish, requiring the most visual ability of the artist. On working on this stage, the buttons chosen are round rectangles and circles. Specifically, the round rectangle is designed for buttons with text, while

the circle goes with icons. Another vital part of this process is item design. All of them should follow the game's theme as well; with this project, those items are colorful mushrooms. IMAGE 21 showcases all the UI assets and items of Into The Space project.

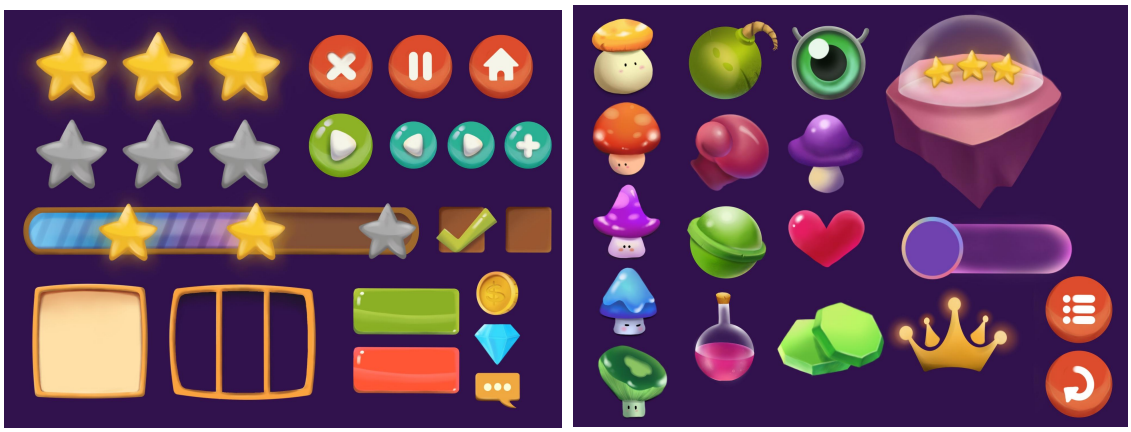


IMAGE 21. UI asset final.

4.3.4 In-game

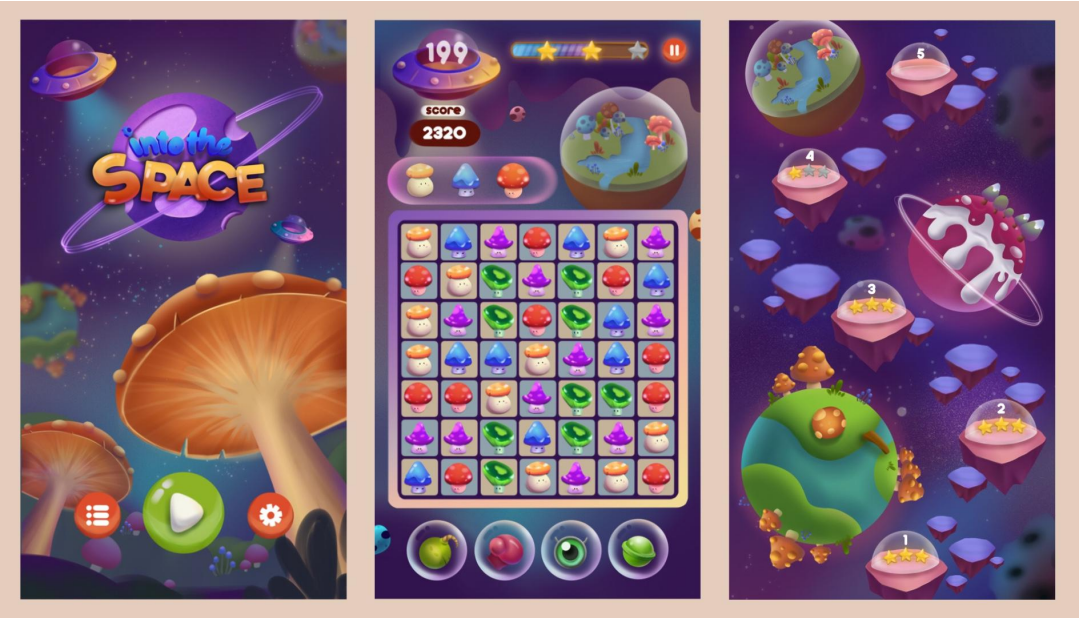
The essential part of the In-game screen is the HUD, which was discussed in the 3.2 section with an analysis of Clash of Clans and Candy Crush Saga In-game screens.

Following the mutual pattern of those examples, the in-game design of “Into The Space” was created based on the previous wireframe. This stage focused on laying out all the elements, assets on the premade wireframes demonstrated in IMAGE 22. By repeatedly testing different layouts and scaling those elements, designers can decide the best-looking UI of the in-game screen.

IMAGE 22. In-game design wireframe and final.

4.3.5 The final UI set

After laying out all the screens sketched in the first stage of UI design, this project is finally in the shape of the implementation-ready UI. IMAGE 23 presents the final UI set of this project.



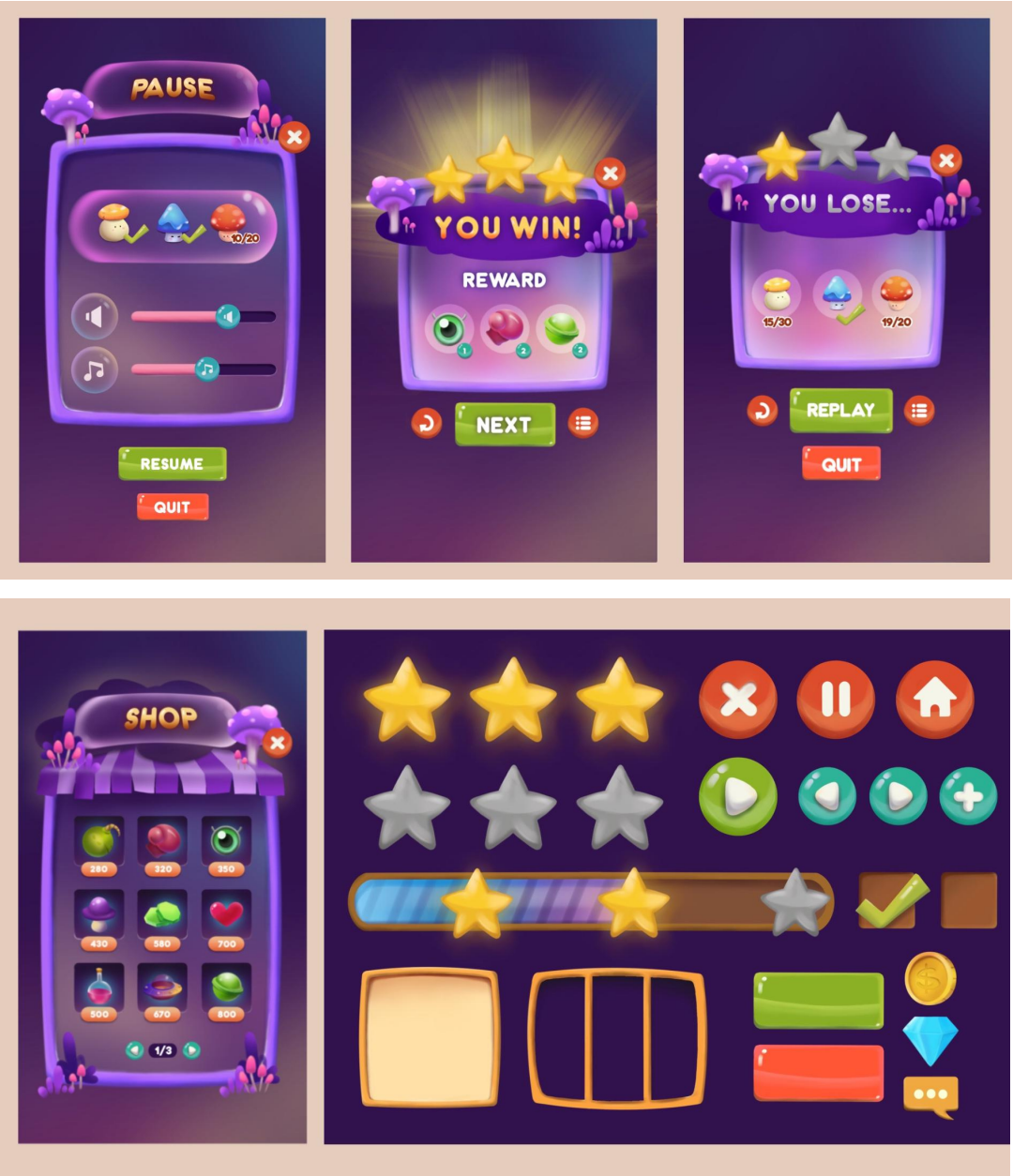


IMAGE 23. The final UI set.

5 CONCLUSION

This thesis was purposely conducted to find the optimal methods of designing user interfaces for mobile games through analysis of successful mobile games and a personal project of a complete set of aesthetically pleasing UI that can support the game design effectively.

Before starting to work on this project, it was required to do much research on academic books, articles, papers, and analysis of extraordinary mobile game UI design to get great exposure to the fundamental knowledge of interaction design in the mobile game, notably UI design. Thanks to all the effort put into the research part, a formula of designing well-function and eye-comfort UI was inferred, remarkably starting with determining the most crucial screens demonstrating the game's signature the best, then working on the wireframe of those screens with thorough notes of UI assets which will be displayed, later designing the props, map, all the essential UI assets of the game, and finally laying out all of them based on the premade wireframes.

Once starting the project, a plan for the process development was already set according to the formula above of designing mobile game UI by listing all the tasks needed accomplishing and arranging them in the order of the most priority task to the least one. This thesis provided me the foundation of mobile game UI design, a chance to finish a practical project, and confidence in UI skills, which is undoubtedly helpful in building a decent UI artist portfolio as a freshly graduated student.

Since the UI set is completely implementation-ready, I can take advantage of it for another self-project that will implement them into Unity, but for now, I am happy with the result of those 2D works.

REFERENCES

A Full Guide To Mobile Game Design: Theory and Best Practices. 2021, March 2. Innovecs Games. https://www.innovecsgames.com/blog/mobile-game-design/

Adjust & Unity. 2020. Hyper casual gaming in 2020: The rise of a blockbuster genre. https://www.adjust.com/resources/ebooks/hyper-casual-gaming-report-2020/

Characters. 2019, March 26. Clash of Clans Nation. https://clashofclansnation.com/characters/

Galitz, W. O. 2007. The Essential Guide to User Interface Design: An Introduction to GUI Design Principles and Techniques. Wiley.

Game UI design: the mechanics of fun experiences. 2021. JUSTINMIND. https://www.justinmind.com/ui-design/game

Garrett, J. J. 2011. The Elements of User Experience. New Riders.

Interface In Game. 2020, December 30. Clash of Clans | Interface In Game | Video game UI. https://interfaceingame.com/games/clash-of-clans/?elements=in-game

Mehrafrooz, B. 2021, July 1. The Secrets of Mobile Games UI Design. Pixune. https://pixune.com/mobile-games-ui-design-a-handy-guide/

Rosebrook, D. 2018, November 22. Design Principle 5: Color. Compass of Design. https://compassofdesign.com/articles/design-principle-5-color

Saffer, D. 2010. Designing for Interaction. New Riders.

Schell, J. 2014. The Art of Game Design: A Book of Lenses, Second Edition. A K Peters/CRC Press.

Shneiderman, B., & Plaisant, C. 2005. Designing the User Interface. Pearson/Addison Wesley.

Shneiderman, B., Plaisant, C., Cohen, M. S., Jacobs, S. M., Elmqvist, N., & Diakopoulos, N. 2018. Designing the User Interface. Pearson Education, Limited.

Silver, M. 2005. Exploring Interface Design. Cengage Learning.

Skowron, M. 2020, August 5. Role of colors in UX and UI Design. UIG Studio. https://uigstudio.com/insights/role-of-colors-in-ux-and-ui-design

Tidwell, J., Brewer, C., & Valencia, A. 2020. Designing Interfaces: Patterns for Effective Interaction Design. O'Reilly Media.