How is the abstract knowledge of craft and material properties shared with the user in simulation role-play video games?

2019/2020

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IS71079A Final Project supervised by "Federico Fasce"

A dissertation submitted in partial fulfillment of the requirements for the degree of
Independent Games and Playable Experiences Design (MA)

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Acknowledgement

Abstract

This dissertation aims to bring together information and data on how craft and material properties are included in simulation role play games. The topic of research was inspired by the lack of academic research into craft and crafting within digital games. The research is analysed from multiple avenues, including the point of views of the players, the intentions of developers and the social cultural influences.

In addition to the research into simulation role-play games the reflection of first hand testing and analysis of the crafting elements and mechanics of some simulation role-play games is also included in this paper. The games included are those which fit into the categories of simulation role-play games and include crafting mechanics in different forms within them. Harvest Moon, Stardew Valley, MineCraft and The Sims are just some of the included titles. Collection, material properties, crafting and the use of resources within games are comparatively explored alongside research into culture, economics, ethics and visual design principles.

Contents

Chapter 1: Literature review

1.1 Overview

Crafting has long been a part of simulation role-play games, I feel that the term crafting is best defined by Grow et al. (2017) who define a crafting system within games as a "... collection of game mechanics which enable a player to create virtual objects..." Research specifically into crafting applications within simulation role-play games can be challenging to find and appears to be an under researched area. Simulation role-play is an interesting genre because it links two already established genres that have been brought together, while simulation games, according to Cruickshank and Telfer (1980), provide players with "...a simulated environment in which to play…" which gives them "...insight into the object system or process…"which are being simulated. Digital role-play within video games however is defined by Dumova and Fiordo (2009) as a game "...in which players create customized avatars within virtual environments or worlds…", they go on to say that with in role play games players are expected "...to adopt the persona of the created avatar and function within the virtual world as such." I would therefore define a simulation role-play game as a game which is set in a simulated environment that can be explored through a personalised avatar and gives insight into a range of object systems or processes.

1.1.1 Rationale

There is currently an omission of detailed craft processes in some simulation role play games, this study will explore in-depth applications of crafting in games, seek to broaden the scope of crafting within games and create a possible formula for craft mechanics simplification which takes a more holistic view of the crafting process. The study will draw mainly on the works of Grow et al. (2017) and Potter and Brock (2019), I will also explore works by McCullough (1996), Westecott (2013) and Alfoldy (2017).

1.1.2 Aim

To analyse the way in which the materials, tools and techniques of real world crafts are represented through game mechanics in simulation role play games and how this affects players perceptions of those crafts within a digital space.

1.1.3 Objectives

- To analyse craft mechanics in games
- To identify common traits among craft mechanics in video games
- To collate the opinions of common crafts in games
- To explore how the level of input affects players' crafting experience
- To explore how important material realism is to players
- To suggest a formula for craft mechanic simplification

1.1.4 Research questions:

- How are the principles of gestalt applied to the representation of materials in their use as part of craft game mechanics in role play simulation games?
- How is player inference incorporated as a game mechanics in the omission of steps involved in real world crafting when crafting is simulated in games?
- How does crafting automation mechanics in simulation games affect a player's immersive experience?

1.2 Gestalt principles

According to Encyclopaedia Britannica (2020) Gestalt is a psychological term which was founded in the 20th century and provides "...the foundation for the modern study of perception." it is a German word which in "...modern German…" is used to mean "...the way a thing has been "placed," or "put together."" Encyclopaedia Britannica goes on to say that the theory of Gestalt declares that "... the whole of anything is greater than its parts" and in order to truly understand something it must be analysed as a collective as opposed to an "... analysis of the parts in isolation." Chapman (n.d) deduces that the theory of Gestalt, especially when applied to visual design, "...is based on the idea that the human brain will attempt to simplify and organise complex images or designs that consist of many elements…" this is done subconsciously by rearranging "... the parts into an organised system that creates a whole, rather than just a series of disparate elements."

There are a range of principles defined within the theory of Gestalt, within this study I will be focusing on only four of the principles which are similarity, closure, continuity and the law of Prägnanz.

1.2.1 Similarity

Chapman (n.d) suggests that it is an intrinsic part of human nature to organise things into groups. Within quite a variety of crafting games developers employ a particular mechanic of collating similar materials and utilising a numerical system to inform the player that the singular icon actually represents more than one material.

The use of this principle goes beyond organisation though it is also used within the actual process of the crafting by informing the player of how much of a particular material they require. A particularly useful aspect of similarity is its application within iconography and notification badges.

| Figure 1: Minecraft (2011) | Figure 2: Craft the World (2014) | Figure 3: Animal Crossing (2020) | Figure 4:The Sims 3 (2010) | Figure 5: Stardew Valley (2016) |

The use of symbols not only concisely communicated information and changes to the player but also increases accessibility. Organisation is not the only way in which similarities is used within crafting mechanics it is also used within crafting mechanics that record player skill progression in order to group together crafting techniques of a similar difficulty.

Figure 6: Skill Record Screenshot - The Sims 3 (2010)
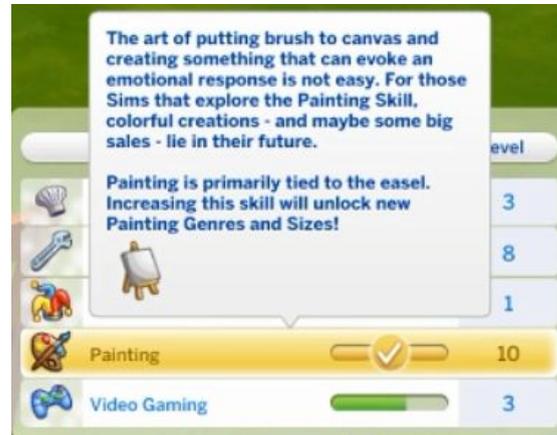
Figure 7:Skill Record Screenshot - The Sims 4 (2014)

In most simulation role-play games at the beginning when a player has not yet gained skills in any particular area there is usually a small variety of items that they can craft and in some cases at a lower quality due to their current lack of skill. The above example shows how

Figure 8: Signs In Crafting Tab Screenshot - Stardew Valley (2016)

As they progress the variety of objects that they can craft and the quality of those objects also increases. It could be summarised that in some applications of craft mechanics the craft double items are grouped in similarity to skill level. This basic concept assists, in combination with the other craft mechanics, in providing a more accurate reflection of real world crafts.

1.2.2 Closure

According to Gkogka (2018) and Chapman (n.d) closure another way that the brain tries to organise visuals into understandable forms, simply put, the brain will endeavour to fill in the missing parts of a visual form which is incomplete to create a whole. This is a fascinating and widely used principle within games. It is a good way to provide opportunities for player interaction that utilizes player inference.
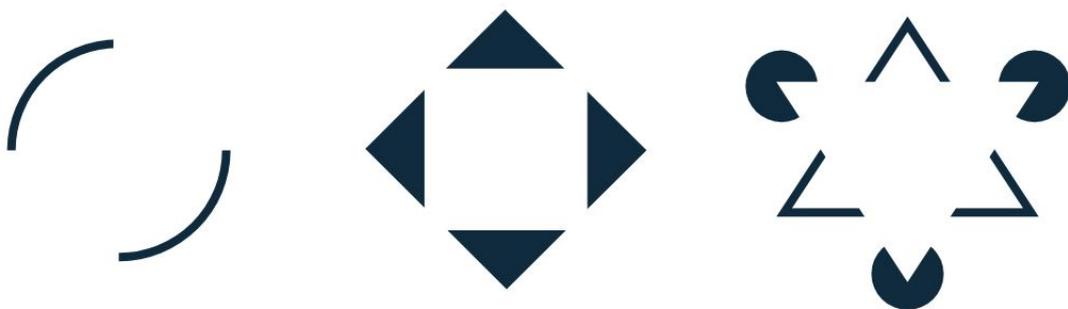

Figure 9: Closure (Gkogka, 2018)

The variety of ways in which closure can be applied make it a particularly useful feature for encouraging player engagements. This is done not just with visual shapes but can also be done using colours and symbols.
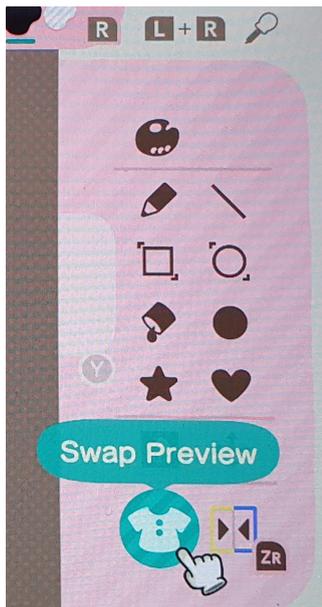
Figure 10: Drawing UI Elements - Animal Crossing (2020)

Figure 11: Time and Season representation - Stardew Valley (2016)
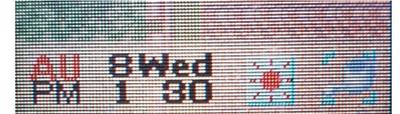
Figure 12: Time and Season representation - Harvest Moon (2003)

User interface elements are a classic use of closure, they allow ease of use by utilising user inference in order to quickly and clearly display the range and function of the tools available. In the above example from animal crossing the icon that I feel best displays this is the paint bucket tool, it is familiar due to its constant use within a range of games, programs and drawing packages but is a very abstract representation of paint pouring from a bucket.

Closure is a particularly interesting Gestalt principle when considering crafts in general; one would start with a particular tool and material or a combination of multiple tools and materials with the aim of combining them in some fashion in order to create something new. Within a range of crafts the visuals and start have little relevance beyond material properties visualised to the final version of the object the player is aiming to craft. As crafting in games relies upon abstraction quite heavily in order to accurately simulate the particular real-world inspiration it also relies upon player inference.

1.2.3 Continuity

Hensley (2016) and Chapman (n.d) define continuity as the predispositions of the human eye to be naturally drawn to and to follow a straight or curved line from one end to another, irrespective of the alternating line colours.

Figure 13: Continuity (Hensley, 2016)

In its application continuity may appear simple but it is the basis for valuable visual cues within games that allow information and instructions to be shared quickly and efficiently. Additionally the use of continuity allows for more inclusive activities engaging player who do not read instruction or want to watch tutorials.

Figure 14: Clay Plate Painting Screenshot -Crafting Mama (2010)

Arrows are a particularly useful tool in guiding players both in terms of physical input and direction, due to the general use and accepted symbolisation they are tried and tested symbols used in a variety of games. They also utilise a key aspect of continuity in that generally the human eye wants to follow the smoothest path.

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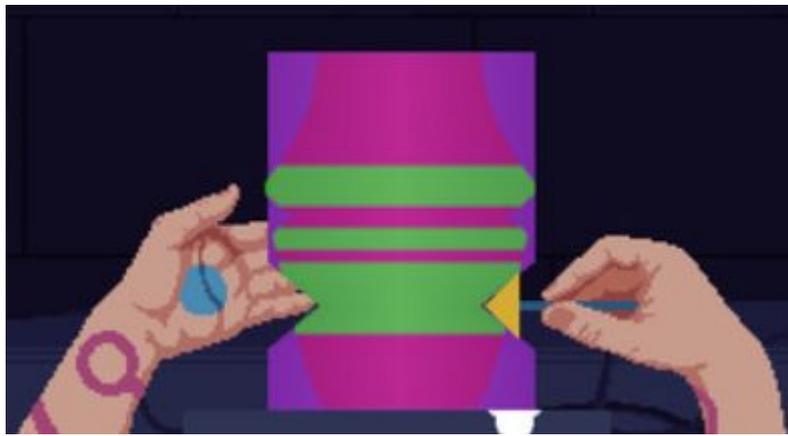
Figure 15: Pottery Mini Game - The Red Strings Club (2018)

Arrows are not the only way in which the principle of continuity is applied in games. The red strings club pottery crafting mini game, which I have found to be one of the best examples of pottery crafting simulation in a game, could be defined as using the method of continuity in its indication of shape by applying colour and tone in order to define the desired outcome and highlight the correct outcome.

Continuity as a game mechanic is not exclusively tied to crafting, it is a widely utilised technique in order to guide and inform players, it draws upon other aspects of Gestalt such as similarity and closure. It is a useful technique in order to communicate with players in non-verbal ways, the use of continuity within games also assists in providing immersion by providing instructions or assistance for the player without breaking the game play flow.

1.2.4 The law of Prägnanz

Encyclopaedia Britannica (2020) defines Prägnanz as "...the neural and perceptual organisation of any set of stimuli will form as good a Gestalt, or whole, as the prevailing conditions will allow." This principle was based on the idea that there are particular characteristics present within certain stimuli when observed as a collective with other stimuli that were not present at all or in the same fashion when observed individually.

Applying The law of Prägnanz in craft is particularly relevant within the application and behaviour of craft materials and craft tools, as some materials and tools can be used in a range of crafts in alternative ways and in some simulation games this alters their behaviour. Within craft mechanics where the player can observe the progress of creation of an object, the use of materials and tools is more clearly revealed.

Figure 16: Inventing with blowtorch screenshot - The Sims 3 (2010)

Figure 17: Metal Sculpting with blowtorch screenshot - The Sims 3 (2010)

For example in the Sims 3, in the ambitions expansion pack, the player has the ability to begin to build mechanical objects. In order to build these objects the player must collect scrap metal from around the town, digging through the piles of rubbish in the dump or through the destruction of other objects in order to salvage usable material. In addition to using the scrap metal to build mechanical objects at the # sculpting skill level the player is also able to use the scrap metal to create sculptures. Within both these applications the material behaves in an almost identical fashion this is shown by the actions of the player while engaging with the material, the tools required, the audio accompanied with the use of the material and the possible side effect of your Sim catching on fire while engaging with the process of using the material and tools. As the law of Prägnanz states individually the actions of the same, blowtorch tool, affects and even the grey black representation of a pile of metal do not explicitly represent the concept of using metal within a craft but their characteristics collectively analysed do provide a recognisable abstraction of the material and its uses. I feel this demonstrates that individually simplifying when combined are still able to convey a conceptual representation of the craft. I particularly use the above example of the Sims as I felt that the alternative uses of the same material and tools within two different aspects of the gameplay was an interesting,, while not unique, application. By changing the location and dialogue relating to the action which the player is performing but keeping the materials, tools and visual effects the same collectively when seen in context it is clear which craft the player is engaging with but only if all aspects are considered collectively.

1.3 Inference

Inference is an interesting and vastly holistic area of study which affects and incompasses a range of disciplines. Gellatly (2012) classified the psychological area of human inference as "...*a tangle of difficult and interrelated issues*…" which "...*include contributions from a variety of disciplines…*" Inference is an imperative feature

within a variety of games aspects from the player inputs all the way to the aesthetic. In relation to craft game mechanics inference draws upon the Gestalt principles of continuity and closure in its visuals and the law of prägnanz in relation to its collective summary of player achievement.

Figure 18: Skills Overview - Stardew Valley (2016)

Figure 19: Skills Overview - The Sims (2014)

Inference in a key feature as it is the predisposition to recognise and understand the available information provided in the format it is displayed. Many of the features can be defined by their relevance to previous experiences. Gold is an accepted colour of reward and usually represents the highest honour, it is used in The Sims 4 to signify that a skill has been mastered along with a tick and a score. The game reflects real life in the way that mastering a skill does not mean you have done everything; it just means you now have the proficient level to achieve anything with a minimal risk of making mistakes and a high change of creating masterpieces.

Inference is an imperative feature within craft mechanics as it assists game designers in creating understandable crafting experiences that in some way simplifie the craft either for design reasons or in order to reflect the limitations of the external hardware the game is being played on.

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Figure 20: Knitting - The Sims 4 (2014)

The Sims 4 (2014) Knifty Knitting stuff pack introduces the ability to knit objects, accessories and a few garments to the game. Within The Sims 4 the interface displays a spiral around the task in order to display the duration and progress of a task, as with most of the tasks in this game the progress is also visually displayed through the animation applied to simulate your sim enacting the task. When painting in the sims the picture being painting is slowly revealed as more brush strokes are added so each experience is slightly different whereas for the knitting The Sims have opted to have the same animation play regardless of what item the sims are knitting, The animation which is played to indicate that the sims are knitting uses colour and length to mark the progress of the knitting.

Inference is a very useful tool in order to incorporate a range of crafts in a cohesive way that can be adapted to the ideologies and mechanics of a game, this makes it a versatile and key feature within craft mechanic development.

1.4 Immersive experience in non-VR games

Immersion is a concept that is intrinsic to games and although often prescribed to virtual reality games has its place in a variety of digital games. IGI Global (2020) has, to date, collated 46 different ways to define immersion, I found number 9 to be particularly relevant, to summarise it stated that immersion was a combination of flow, presence, embodiment, interactivity and transportation. The definition goes on to describe immersion as an environment which requires the player to be focused and to move and engage in the virtual world as their embodied persona. I found this definition to be relevant because, unlike the other definitions, it addressed not just what is required from an environment to encourage immersion but also the behaviours which need to be cultivated within a player in order to immerse them. Both simulation and role play games are designed to give you a sense of immersion and I would say that the above is a good summary of what a simulation role play game aims to achieve when players engage with them.Additionally the Gestalt principles assist in player immersion within gameplay but also share abstract knowledge of crafts and material properties with players.

As proposed by Westecott (2013) crafts are a multifaceted activity that, much like games, draw on not just cognitive processing but also physical movement in order to achieve a desired outcome. Sometimes however the simplification of craft mechanics within computer games can go as far as removing the key elements which craft represent within their enactment, although this simplification does not necessarily affect the gameplay it could be another useful element that game designers could use as an additional tool to encourage immersion.

1.5 Crafting automation mechanics

Csikszentmihalyi (1990) explores Flow in a variety of ways, his ideas about "optimal experience" are particularly relevant to not just player immersion but also to the development of games in general although this was not the discipline he was exploring. The theory of flow has been applied to a range of areas over the past ten years and currently sits within the area of positive psychology, an area where research often refers back to the original 1990 conceptualisation of Flow. Csikszentmihalyi (1990) original theory described the optimal experience as "*...occasions where we feel a sense of exhilaration, a deep sense of enjoyment…*". He goes on to say that these moments "*...tend to occur when a person's body or mind is stretched to its limits in a voluntary effort to accomplish something that is difficult or worthwhile.*" This highlights the importance of balance between challenge and reward in order to entertain and engage players to retain their interest and encourage immersion. The theory was later further analysed by Csikszentmihalyi et al. (2020) who proposed that theory is "*...experienced more often in work than in leisure.*" . Montero and Davies (2017) argue that although "*Csikszentmihalyi's research suggests that flow is conducive to optimal experience.*" it does not "*...tell us anything about whether it is conducive to optimal performance.*" This begs the question, are performance and flow related and how do they influence one another? Csikszentmihalyi et al. (2020) go on to explore that the resources which are available have a positive effect on the experience of flow within a work environment, which they suggest that "*Flow may decrease anxiety, increase employee effectiveness, and enhance job satisfaction…*" Interestingly even in the development of the studies there is little reference to performance and outcome as they felt that these areas are better explored by other theories within the discipline. Economics is another area omitted within the theory of Flow.

Csikszentmihalyi (1990) felt that the connection between economic or social status and well being was ambiguous and therefore felt that there was no difference in the ability to achieve flow. There have however been multiple studies done that have found a direct relationship between economics and wellbeing, Belle et al. (2000) however stated that some of the research Csikszentmihalyi cited in some of his 1999 research actually "*...show economic status to be a significant correlate of psychological distress and diagnosable mental disorders…*"this highlights the idealistic foundation of the theory of flow.

There is of course no way to guarantee that a developers application of flow will appeal to every player. This is especially challenging in simulation games where players need to feel that they have a high level of control over the game direction. Within role play games, putting players in a situation where they are required to perform an

action that does adhere to their ethical or cultural values can quickly break the immersion. Csikszentmihalyi (1990) proposes that true enjoyment comes from having "..achieved something unexpected." Providing a level of challenge and a reward helps ties into the ideology presented by Cook (2012) of Loops and Arcs within game systems. Loops through mental models prompts players to "Apply an action…" within the "...game system and in return…" they will receive "...feedback that…" will prompt further action thus updating "*...their mental model and starts the loop all over again. Or kicks off a new loop*." In contrast Arcs use a similar model but omit the end result of the restating instead providing a final outcome.
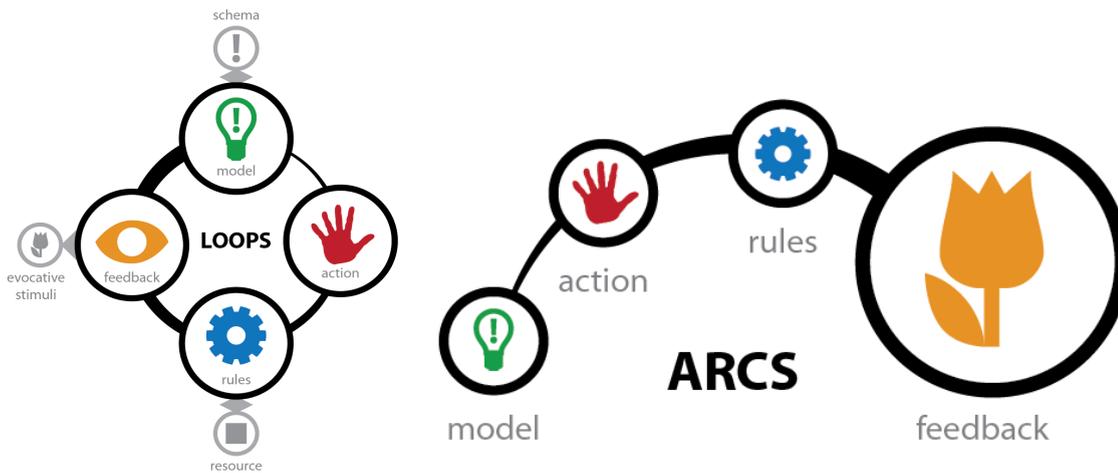

Figure 21: Loops and Arcs (Cook, 2012)

I would define the feedback, rules and model as the mechanics built into a game but the actions are related to the agency players possess as they try to achieve the directed outcome within the virtual environment, possibly even setting their own personal goals based on their engagement and individual challenges. Flow, Loop and Arc features are important aspects to consider within simulation role play games and craft mechanics. Simulation games aim to provide an abstracted experience of a system or object, craft mechanics aim to summarise and express the construction of items or tools and role play games endeavour to engross players in a fabricated environment. The variety of ways in which these attributes can be combined within games allows for a wide range of games within these categories. It was McCullough (1996) who stated that "*For a medium to be engaging, it must be dense...*" so in order to truly immerse players the amount of automation and level of player input must be carefully considered. Loops and Arcs are best used as a model to demonstrate and encourage player action, it helps to set the rules, which in the case of craft mechanics can be modeled off of real world systems to provide opportunities for feedback which can be a summary of skill and experience level.

A recent study by Potter and Brock (2019) explores the similarities between video games and textile crafts, mainly sewing and knitting. Their work particularly focused on the concept of repetitive trial and error within video games, specifically surrounding the way in which players will continuously attempt a task or action, despite the challenges, in order to reach the desired outcome or obtain a reward, they summarised that "…a similar paradox exists in textile craft practices…" of challenge and reward. Csikszentmihalyi (1990) and Cook (2012) also proposed that a level of challenge coupled with a type of reward are important features in keeping

players engaged and facilitating opportunities for enjoyable experiences. When we consider Potter and Brock's comparison of challenge and reward in digital games in comparison to the real-world process of textiles crafting it could be proposed that, in a metaphorical sense, digital game play is in itself a form of craft, learning a skill and developing an understanding of the tools and processes involved.

Focusing on the aspect of modelling and feedback within games is also important to consider the level of user input within these systems. Simulation of crafting is applied in a variety of ways within videogames, the way in which a player engages in a crafting action can also differ depending on the craft even within the same game. Within simulation role-play games the focus is often upon collecting the required resources in order to craft as opposed to players actually having to take action to craft the objects themselves. It could be proposed that players have little agency within the majority of crafting mechanics beyond the collection of materials. It is also however important to note that, as summarised by Stang (2019), although "... t*he kind of "agency" that videogames afford players is illusory...*" it does not in any way make the player less important to the process. It also must be noted that while a level of predetermined outcomes are a common attribute within game mechanics their execution is best received when developed in a manner which provides a convincing or acceptable illusion of player agency.

Games which rely on the collection of materials often focus on a virtual depiction of skill which improve over time based on the player's continued engagement with the crafting system. Games that directly require player input within the crafting mechanic rely on players' real-world dexterity but are also modelled with the concept of the player improving over time through continued practice in using the crafting system. Games which rely mostly on the collection of resources tend to put slightly more weight into the importance of material properties. Stardew Valley (2016) separates resources into a wider range, for example, within the game there are three types of wood Hardwood, Wood and Driftwood, each type of wood is different and where it is found, how it has to be collected, the way it can be used and, depending on the object crafted, how long it will last. Games which mostly rely on player input tend to focus more on modelling the action and desired outcome in the game. In Crafting Mama (2010) the sole focus is on creating the items which the player has picked, there is no need or opportunity to collect resources as they are provided for you but the player is required to follow the directions in order to achieve the crafting steps required to produce an item. For example when threading the needle the player has to wait for the right moment when the string can go through the eye of the needle by clicking on the screen at the moment that the eye of the needle and the string line up, the success of this is solely based on players' input. Based on this idea I created a calculation to work out the player input in percentage.

$$\frac{\text{Engagement Time } (Seconds)}{\text{Craft Time } (Seconds) + \text{Engagement Time } (Seconds)} \times 100 = \text{Player Input } (\%)$$

Figure 22: Player Input Calculation

Using this calculation I explored some of the crafting mechanics included in a range of simulation role play games and based on my own engagement while playing them I created the table below. In order for a more accurate comparison of input levels the engagement time does not include the time it takes to find materials in games which require this step. For some games I was able to play them multiple times and so was able to provide the mode values for my player input in particular crafts.

Game	Craft	Player input (%)
Crafting Mama (2010)	Stuffing felt doll	94 %
	Separating the Clay	96 %
	Threading the needle	97 %
Minecraft (2011)	Craft Table	93 % - 98 %
Stardew Valley (2016)	Sewing	75 % - 80 %
	Object Crafting	92 %
Animal Crossing	Craft Table	33 %
	Painting or Designing	83 % - 90 %
The Sims 2 (2004)	Painting	1 % - 2 %
The Sims 3 (2010)	Inventing	6 % - 27 %
	Painting	1 % - 8 %
	Sculpture	1 % - 5 %
The Sims 4 (2014)	Painting	8 %
	Knitting	19 %

Table 1: Player Input Percentage

The player input is higher is some games like Minecraft and Stardew Valley not necessarily because the player engagement time is higher but because the total duration time only has a few seconds difference to the engagement time. These games provide almost instantaneous results once the correct conditions have been met. In contrast the player input in games like The Sims tends to be lower as it requires players to wait a specific duration of time in order to receive the item they are aiming to craft, this can vary between items or based on the sims' current skill or experience level.

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The level of user input required in order to simulate a craft depends not just on how additional information such as resource behaviour and use are applied but also on the craft which is being simulated. Within the extraction of crafting mechanics within simulation role-play games automation, often done through animation or dialogue, is an important feature in modelling the system and providing players feedback but a level of player input, which creates an engageable level of the feeling of agency is also an imperative consideration when creating a crafting mechanic that flows. Crafting mechanics which rely solely on either player input or automation simplify crafty mechanics to a negligible level but crafting mechanics which sit somewhere between these features are more successful in providing a relatable simulation that reflects real world crafting. Westcott (2013) surmised that "Contemporary craft is about making things. It is an intellectual and physical activity…" as such a digital version should also encompass the aspects of both intellectual and physical activity in order to create a true reflection.

Another area that requires consideration is gamification. Gamification is the application of game mechanics and user experience techniques used in games to areas outside of games, although it usually refers to the areas of education or learning and business or other economic areas it can clearly be seen in a range of simulation game mechanics. The gamification of real world inspired digital crafts is another way in which crafting is abstracted in games.

Figure 23: Felt Doll stitching screenshot - Crafting Mama (2010)
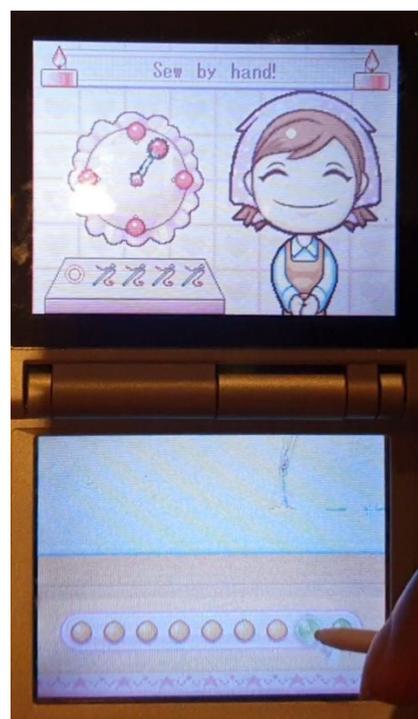
Figure 24: Ribbon Stitching screenshot - Crafting Mama (2010)

Crafting Mama (2010) is a prime example of gamification as within its crafting mechanics it includes classic game techniques in order to engage players while still aiming to accurately reflect the real world steps involved within crafts. The sewing mechanic is particularly interesting as it spans across multiple crafting objects. The

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above screenshots from the DS game Crafting Mama (2010) shows the way in which the game does this, the player input is essentially the same within both contexts, the player must tap in a consistent rhythm matching the movement of the sewing needle although the shape being sewn and the animation of the sewing are different the input method is essentially identical in both the player engagement and the audio feedback. The main mechanic is accompanied by animation, sound and symbols to indicate success or failure clearly utilising the feedback Loop as defined by Cook (2012) which are key features of classic games.

It is important not to identify the gamification of real world crafts as simplification. Gamification, in the context of craft mechanics, is a fanciful abstraction that tends to be inclusive, intent on the inclusion of classic game design methods as an additional feature to the other steps involved as opposed to the contrast of simplification which is the removal or omission of some of the steps involved, with the aim of only including those deemed relevant to the game play or defined as a clear enough represent of the craft demonstrated.

1.6 Culture, ethics and economic influence on crafts

Mortensen (2009) highlights that when analysing a game, an isolated analysis which focuses only on one aspect such as aesthetics will not provide a true and in depth reflection. This idea of a holistic approach to game analysis appears to be related to the ideology of the Gestalt principle of the law of Prägnanz. In order to truly understand the essence of a game all of its parts must be explored as a functioning system. With this in mind I felt that it was important that I also explored other areas that both influence and define some of the games referred to in this paper.

1.6.1 Culture

The influential work of Potter and Brock (2019) focuses upon the technical aspects of challenge, skills and completion of a task, but as my previous research demonstrates there is more to craft mechanics in games than just the technical behaviour of the mechanics themselves. As discussed previously particularly in my exploration of the principles of Gestalt, the human brain is very adept at putting things in an coherent order but when we also begin to consider the application of inference within players engagement with games there are also social cultural aspects, which will be personal to players, that will not only affect the way in which players engage with games but also, especially within creative applications, provide an opportunity for players to express themselves. The Twitter page Brown Girl Gamer Code (2020) provides an interesting example of how the adaptability that creative craft mechanics can be personalised to reflect social cultural inspirations.

Figure 25: *BrwnGrlGamrCode (Brown Girl Gamer Code, 2020) African inspired dresses on Animal Crossing (2020)*

It is proposed by Alfoldy (2017) that digital games which incorporate textiles create comfort by connecting players to physical aspects of their real lives. The inclusion of crafts, particularly recognisable ones such as textiles which are a part of everyday life, are sometimes utilised in simulation games in order to move beyond the aesthetic and become a symbolic representation, they can provide narratives or hints towards cultural or historical inspiration.

Religion in the past has had a great influence on craft and crafting activities. Within the practice of religion there are various examples of the use of a variety of crafting methods. Paintings adorn the walls and ceilings of some churches such as the Sistine Chapel, whose ceiling was painted by Michelangelo (Italianrenaissance.org, 2013). Some churches couple their religious paintings with stained glass windows such as the famous Sainte-Chapelle, built in the 13th Century which has fifteen windows that were intended to illustrate *"... not only biblical narratives but also local history and political authority."* (Farago, 2014). Metalwork is another interesting example of crafts with items such as the Censer, which is a receptacle used to hold incense as it is burnt in some Christan and Hindu practices. As documented by the Textiles Research Centre (2020) textiles is also an integral part of many religions from the Christian Alb, a long sleaved tunic, often made of linen and decoratively embroidered which is worn by some Catholic clergy, to the Muslim prayer mats which Muslims kneel upon to pray. Although craft is not specifically a religious practice I felt religion in games was a key area to highlight due to the influence religion has upon craft, the opportunities for craft inclusion and the rarity for religious inclusion in popular simulation role play games.

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Figure 26: Church and Priest - Harvest Moon (2003)

There are an extensive range of examples that could be drawn upon within games. In the Game Boy Advance version of Harvest Moon (2003) although religion is part of the game it does not alter the game play significantly. A person who becomes a priest is said to be taking up the cloth and a priest is sometimes referred to as a man of the cloth, additionally being welcomed into a faith group was to be welcomed into the fold. The craft related terminology and phrases are inherent not just within faith but would provide a good opportunity to include history within games as part of expanding the inclusion of crafts and material properties in games.

Within simulation role play games there are other aspects that influence the structure and progression of a game and so have a direct and influential effect upon all mechanics within the game and provide the ethical and social economic foundations of a game. The ethical foundations relate to the dark side of gaming explored by Mortensen et al. (2015), these are the areas of games publicly condemned for their negative influence on society, this can range from the idea of violence in games influencing real life violence to the ideas analysed by Costikyan (2002) which highlight that competitions, where there is one winner have been denounced as bad as it is felt that they do not nurture cooperation. The way this reflects into games and game development is based mainly on the ethics of the designer but can also be influenced by the target market.

1.6.2 Ethics

The addition of ethically questionable areas in games, which Mortensen et al. (2015) refer to as the inclusion of dark themes, can be defined as the addition of "*...moral quandaries for players." In some instances these can be enjoyable for players whereas in others it may break the illusion of agency by not providing alternatives.* Games are a powerful medium, Rigby and Ryan (2011) "*...video games seem to have the ability to not just tell us a story, but to let us actively live it, making opportunities for bravery, heroism, and gratitude not the exception, but the norm.*" It could be argued that in this way games also impart their ethical ideals upon the player due to the way in which players are guided or directed to perform or engage in particular activities, in light of this I felt this was a key area to explore. Within real world craft there are ethical issues that are omitted within the simplification process, sometimes purposely but more often just as a result of the simplification. For example in

[22]

Crafting Mama (2010) in the creation of the Bamboo-Copter, because all of the materials are readily available there is no inclusion of the environmental impact and the ecological risks that bamboo can have on the environment.

An example of ethics in game development is the development of the game Stardew Valley. In the early development of the game, upon the request of early game testers, a mechanic that allowed them to kill their farm animals for food was added. While this mechanic reflected real world farming actions and would have ultimately yielded a new range of resources with which to craft culinary recipes. The developer did not feel that caring for and building a relationship with your animal fit alongside killing and eating them so he removed this element before the game was released. Although you can still cook fish and seafood dishes from the animals caught while fishing you cannot however befriend the fish or sea creatures.

In Minecraft before a player can begin to play in a virtual environment, known as a 'world', it has to be randomly generated. Although the terrain, resources and environment are randomly generated there are some criteria that can be specified by the player such as difficulty, size and game mode. The game modes fall into three categories; creative, adventure and survival. Creative mode allows players to freely build and design without limitation on items and have very limited combat. The survival mode, which is where the difficulty setting is applied, relies on players to forage the material, fight monsters, find or grow food and slowly build their environment. Adventure mode is similar to survival mode however, in relation to rewards, the game favours survival mode as there is no opportunity to win rewards in the other modes. In the creative mode players have the freedom to set their own goals and experiment with crafting and building. This opportunity to choose not to fight is an interesting addition to a survival type simulation role play game. In addition the opportunity for open accessibility without players being limited by the rarity of materials or objects provides a high level of creative freedom. As articulated by Grow et al. (2017) this allows for creation "... *without the cost, effort, and destructive modification of raw materials...*" Although removing the need for players to cut down trees for resources eliminates the need for players to consider replanting saplings to replace the trees which have been cut down. This could be viewed as a missed opportunity for sharing important real world impacts of craft materials, in this case deforestation.

In The Sims 2 you can use a technologically advanced machine to absorb a skill from another Sim which also has a negative social effect on the Sim whose skill has been taken. This reflects the idea of letting others do the hard work and then taking credit for their success. In the Sims 2, 3 and 4 you can also insult and fight with other Sims but Sms cannot kill one another. The choice to include these aspects are down to the game developer but the player is not forced to utilise these mechanics. Sicart (2003) describes The Sims as being Idealistic in its omittance of gender bias, its equal economic starting point and its acceptance of homosexuality. Sicart described the game as "...*a game that simulates the perfect utopia of the late capitalist societies*…" he is specifically referring to the western world in this statement. His observations of the Sims do not codem its idealism; he instead heralds it going on to say "...*The Sims, once again, seems to be one step ahead of the societies it simulates*…" I feel that simulated environments all have an aspect of idealism especially in relation to craft

resources where materials are always the perfect size, condition and shape to complete a wide range of tasks, but as Costikyan(2002) states in his comparison of games to puzzles "... *"Games," by contrast, are not static, but change with the player's actions*." Having some familiar elements, such as the idealised representation of materials which remain unchanged, as the world is altered by the players actions and choices can help to define mechanics and make them understandable for the player through the evolution of the game.

In Animal Crossing the responses that the player can provide ti dialogue when a response is required are scripted and generally good natured. Within these simulated environments the social, economic and cultural aspects of the world affect the tools, resources and crafting mechanics. This game focuses on honest hard work and daily socialisation with neighbours.

As Takahashi (2004) states"... *judgments about which games are unethical depend on the eye of the beholder."* It is important to note that it is not just the developers but the player too who makes the final decision on the ethics of a game. As previously discussed player inference plays an integral role in game mechanics and aesthetics, along with the previous knowledge that players lend to developers in order to bring the digital worlds to life players also bring their own social cultural ideas and experiences. Although game developers can omit certain actions or visuals there are still aspects out of their control, particularly in simulation games where the freedom allows players to alter aspects of the game as they play it.

1.6.3 Economics

Predominantly simulation role play games include economics and they influence much of the game play. An example is Animal Crossing (2020) which requires the player to seek out ways to earn money in order to pay off their debt so they can progress. Another example is the Sims series which requires players to seek employment or another source of income in order to pay their bills and buy food. There are even farm simulation games like Harvest Moon (2003) and Stardew Valley (2016) which include economical structures by requiring players to cultivate sources of income in order to repair and improve their dilapidated farm. This need to increase your wealth motivates not just player action in the game but also places a defined value on each activity. As previously explored by Stang (2019) player agency within video games is an illusion, this is not to say that players do not make their own choices but they are heavily influenced by the structure, mechanics, audio feedback and visual feedback that the games encompass.

Colours have a variety of inherent qualities which are more related to a combination of the socio culture background and experiences of those viewing them thanks to the colours themselves. These inherent qualities furnish colours with an ability to hold and share a range of information, such as instructions, directions or even numerical values. Colours have been used in economics in a range of ways in order to display or represent values, particularly red and black. Black is a complex colour, St. Clair (2016) defines black as an expansive and capacious color. Although it is often defined as a shade, tone or absence of light and not a colour it still holds a range of meaning.

One of the few places where black is represented as the positive and desirable outcome is within economic records. Red however in economic records is usually negative and is the undesirable result. It is proposed by Bazley, Cronqvist and Mormann (2017) that the use of red within economic records helps to inform and advise future action. It is thought that, in relation to investment, displaying potential and confirmed losses in red reduces the taking of risks. In addition, past negative stock prices displayed in red directly influence expectations about future stock returns.
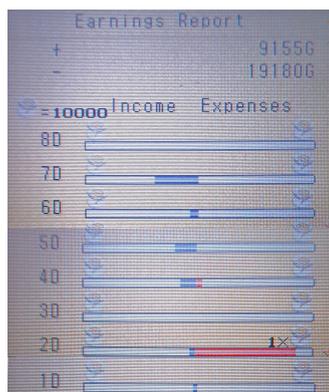
Figure 27: Earning Report - Harvest Moon (2003)

In Harvest moon the earnings, which are calculated from the item or animal shipped or sold, are defined as income. The expenditures, which are calculated from the resources, services or animals bought, are defined as expenses. The game displays each days profits by subtracting the expenditure from the profits of the day, red represents spending more money than came in and black represents earning more money that was spent. This is a simple way in which to direct players behaviour, I feel that as proposed by Bazley, Cronqvist and Mormann (2017) this daily display of economics management most likely has an influence on the future actions of the player, it may also influence that value player put on particular endeavours such as crafting. In harvest moon much of the crafting resources must be foraged or collected and so cost time as opposed to gold but additionally they do not tend to give a high return economically though they have other useful features such as for energy or as gifts.

Figure 28: Overdue Bills - The Sims (2000), sims.fandom.com, n.d.

Figure 29: Bill Summary - The Sims 4(2014)

In The Sims you rent your living space from a quaint bedsit to mansion with coffins in the sub basement you can rent almost any type of abode, but if you fail to pay your bills on time then items in your home will be repossessed by the Repo Person. The Sims (2000), The Sims 2 (2004) and The Sims 3 (2010) all provided visual warning combined with notification and a negative mood badge if you failed to pay and caused your sims belongings to be reposed. The Sims 4 (2014) in line with the digitisation of real life has opted for a less physically based representation of bills. Interestingly they both utilise the colour red as a warning.

In the previously discussed The Sims 4 (2014) Knifty Knitting stuff pack in addition to the inclusion of knitting players can now sell a variety of crafted items online in the game including their knitting. The selling of crafted items is not a new aspect of The Sims but this expansion pack has added an in-game interface that has integrated it more into the gameplay, you can also now donate knitted items to charity or add them to your sims wardrobe so they can be worn. The crafted items that are sold in The Sims are valued based on their quality, their size, their materials and the skill and experience levels of the sim who created it. Using the online systems adds a new dynamic to this list; the price is also based on how much people are willing to pay. This concept of buyer valuation is an interesting reflection of the real world activity of selling crafts. Crafted items automatically have a resale value and some, such as paintings, can appreciate or depreciate over time. It could therefore be argued that the monetary gain may be valued over the crafting process. However with the addition of the opportunity for players to use or keep items I feel enough freedom is included in order for players to apply their own personal value to the crafted items.

The economic influence in games that use this as a mechanic allow game designers to subtly influence player action and although it is a rather directive mechanic than can really alter game play it also provides a dynamic opportunity for player to hold the belief that they have more control as digital spaces provide a platform for economic risk taking or gambling with limited or no influence on the real world coupled with the ability to reset or restart if the result do not suit the players desires. The use of this mechanic can really change the focus of a game and that way in which players engage.

Chapter 2: Methodology and testing

Mortensen (2009) highlights, in relation to game research, the enriched experience of playing a game instead of watching or reading a walkthrough, in order to truly analyse it as a complete artifact. For this reason I combined others' research with my own experiences of playing the games. My research into simulation role play games has inspired my final game idea beyond just the mechanics, it has also inspired the aesthetics, characters and layout. For example, my research has inspired the development process by influencing not just the types of mechanics but also the advantages of consistency in the use of similar interfaces for different aspects of game play. My research into the varied aspects and influences surrounding crafting in simulation role play games has revealed more deeply to me the external influences of the aspects outside of mechanics and aesthetics. It has helped to highlight the importance of ethical and cultural reflection of the development of games. The consideration and inevitable influence of all of these aspects on game play are important and will alter the way that I reflect upon my own practice. Inspired by my research I developed a 2D simulation role play game entitled *Artisan Bay.*

The 2D crafting simulation role play Artisan Bay is set in a seaside town and focuses on creative crafting. The game is a computer game played in the browser and made with the Unity game engine, it aims to bring together a range of creative crafts using principles discussed such as Gestal, idealism and immersion to inform the use and behaviour of different mechanics and game features. I decided to focus upon the creative side of simulation and crafting and have not included combat or killing of other creatures, this is a personal choice based on the ideology of idealisms in simulation worlds. Other game developers whose games have followed this template have been condemned as unrealistic. An abstraction which omits aspects is common in simulation role play games and often reflects the game designers ethics and culture in some way.

The original concept of the game was a 2D craft simulation role play game which brought together a range of different creative crafts. Allowing players to use their own creativity as they arbitrarily explore a simplified abstraction of the process of some real-world crafts. I have developed the game through reflecting upon my research and exploration of players opinions of craft games and mechanics in an assimilation roleplay setting.

Based on my research, game play analysis and survey I created and implemented mechanics within my game that while reflecting the real world also acted as guides to help players progress through the game.. My research took a holistic approach to craft in games with the aim of exploring related influential fields of study. My game research aimed to provide me with first hand integrated experience of the mechanics and features within the focus game genres of my research. I performed the survey in order to gain a better understanding of the player's thought process and opinion of the type of games I am researching. Coupling my primary research with my previous research helped to highlight key areas for consideration and further analysis of crafting in simulation role play games. Additionally I used feedback from mechanics, audio and artwork prototypes in order to improve the interaction between players and the craft mechanics.

Chapter 3: Game post mortem

3.1 Overview

I designed both the player and non playable characters (NPCs) to reflect the crafting theme of the game. Each character has a poncho made from a textile material and some wear protective equipment relevant to their preferred craft or crafts. I did this not only to reflect some aspects of real world craft I found were being overlooked, such as protective wear, but also to incorporate a variety of textures in the cloths to utilise the familiarity of materials in different ways.

In deciding what crafts to consider I referred back to the definition of a craft by Grow et al. (2017) which I used to produce a list of potential crafts to include in the game. Due to time constraints and game mechanics not every craft on the list was included in the final game and some were included as dialogue but not as interactable crafts, I feel this highlights how vast the scope for craft inclusion can be when developing a game. I decided to reflect the expansive nature of craft by including some within the dialogue as although I was not able to make them an integral part of the game I felt it important that in light of the crafting nature of the game they were included in some way, this also adds the potential for future development of the game.

3.2 Craft objects

The craft table and craft oven act as an interface for both the crafting user interface (UI) and the mini games, each mini game has a button with blue text and the crafting UI buttons have black text, it is a very small differentiation that I originally included for my own benefit in the development stages in order to separate the items and script locations. The mini games include painting, knitting, drawing and pottery and the UI based crafting includes a combination of metalwork, woodwork, glasswork and stonework.

3.2.1 Crafting UI

The craft table crafting UI allows the player to create items by combining particular resources. Some items require different resources to others and although most are aesthetic some have additional features such as lamps which provide light. As I attached the same script to multiple game objects, I had to create a separate script in order to hold the multiple values so they could be accessed by other scripts within my game. In order to reference the values from the game objects themselves I used the information I found on a Unity Forum (2016) particularly the response by CodingBruh which gave an example of how to write the code.
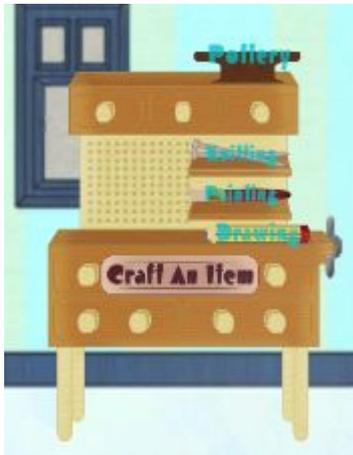
Figure 30: Artisan Bay Craft Table   Figure 31: Artisan Bay Craft UI

3.2.2 Painting and drawing

The painting script was developed from the tutorial by Design and Deploy (2016) combined with tutorials by DitzelGames (2018) and CodeMonkey (2018) in order to save the artwork as a render texture so it could be applied to other objects in the world. I decided not to have an eraser but instead to include an undo and redo button as I felt rubbing out did not fit with the practice of painting but undo and redo were more relevant as game mechanics applied to a simulation.
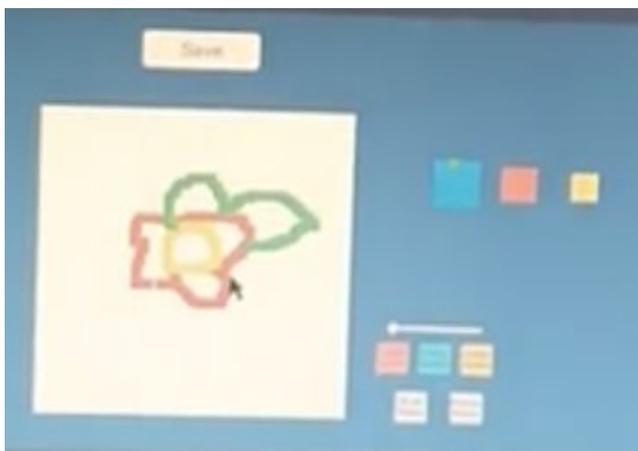
Figure 32: Artisan Bay Early Art Prototype   Figure 33: Artisan Bay Final Art Mini Game
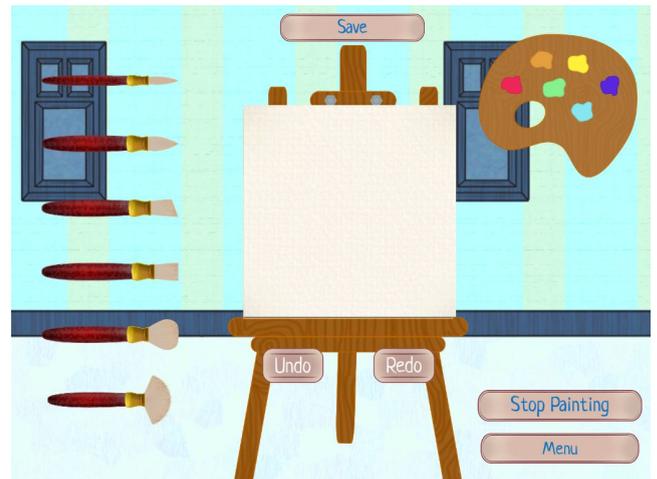
In the drawing mini game, which uses the same script as the painting game, I added a rubber as I felt this was true to the real world craft.
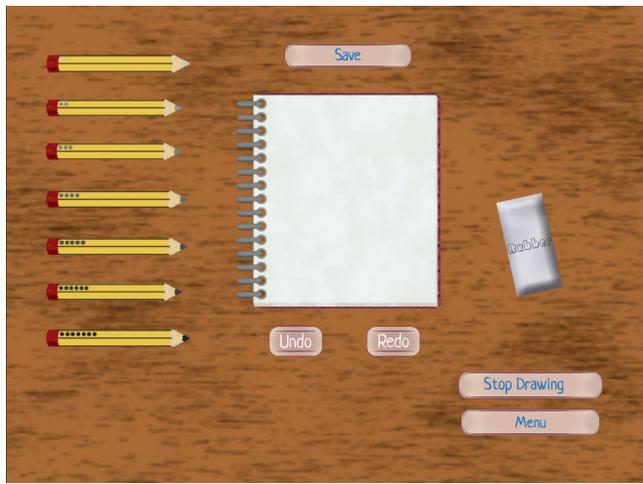
Figure 34: Artisan Bay Drawing Mini Game

3.2.3 Pottery

Inspired by the tutorial by Charger Games (2015) which explored how to rotate a shape using mouse clicks I created a script to expand and contract the shapes along the X or horizontal axis in order to produce the illusion of manipulating pottery on a pottery wheel. I also added an animation to the wheel in order to support the illusion of a pottery wheel. In addition I created a script to allow the player to change the clay type they can use in the pottery mini game.
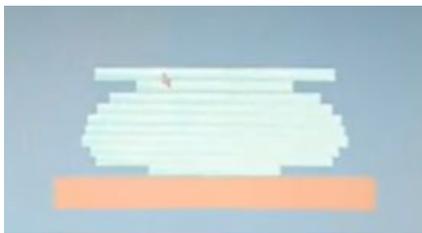
Figure 35: Artisan Bay Early Pottery Prototype
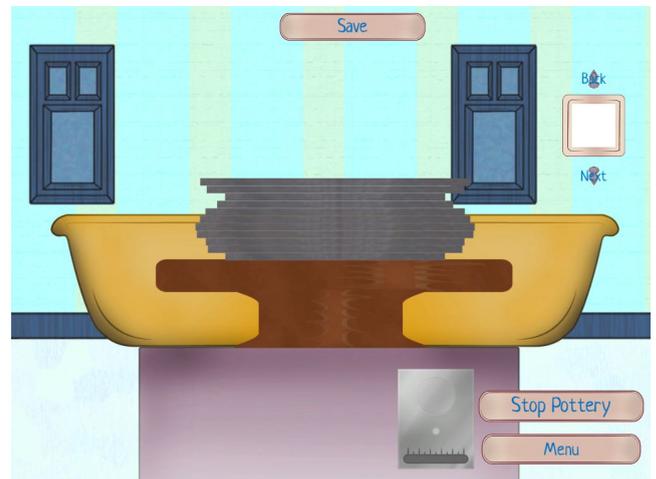
Figure 36: Artisan Bay Final Pottery Mini Game

The tutorial by Goldstone (2010) on how to clamp values in Unity was instrumental in understanding how to apply Mathf scripting in order to create a script which clamped the the minimum and maximum horizontal X value of the size of each pottery segments, this displayed the illusion of molding while recognising the limitation of the material being used. If I were to take this further I would have had different limitations for the different types of clay in order to reflect the real world materials and their rarity or abundance .

3.2.4 Knitting

The knitting game works in a slightly different way to the other craft games, it employs mechanics which are more classically defined as games. The script was adapted from tutorials by gamesplusjames (2018) and PUREHEART (2016) in order to create a rhythm inspired game which utilise knitting symbols in the way players engage with it.
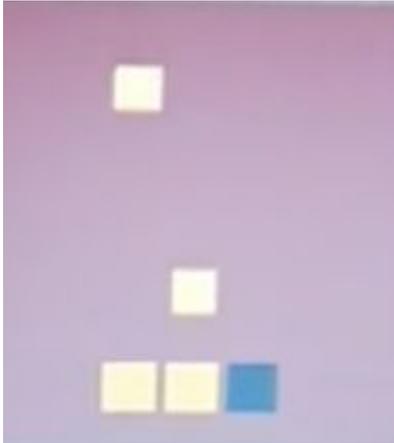
Figure 37: Artisan Bay Early Knitting Prototype

Figure 38: Artisan Bay Final Knitting Mini Game

3.3 Other developments

Within my game there are a combination of crafting mini games and craft user interface crafting which are both over 80% player input. The mini games take longer to produce results but rely solely on player engagement, whereas, although the craft user interfaces require players to first collect the required materials, they provide almost instant gratification and so also have a high player input percentage. I combined the two based on both my research of simulations and player input percentages and my feedback from my primary research about the preferred player input. The mini games are a combination of players relying on their own manual dexterity, hand eye coordination and memory, each mini game incorporates gamification in a different way. The mni games, although attached to the same crafting station, behave independently. The reason I decided to do this was that as a simulation game I felt that, as explored by Rigby and Ryan (2011), a simulation game should present players with a world that is *"... a canvas with no predefined "scripting" of your activities."* In order to provide a better level of autonomy and improve player satisfaction through the increased freedom of creative expression my game needs to provide opportunities for creative freedom.

Craft Mechanic	Player Input (%)
Drawing Mini Game	92 % - 95 %
Knitting Mini Game	82 % - 84 %
Painting Mini Game	92 % - 95 %
Pottery Mini Game	80 % - 86 %
Craft Table	84 % - 88%

Table 2: Artisan Bay Player Input Percentage

Some of the mini games also use the same scripts, layouts and identical or similar inputs but different sprites, this was inspired by my research into Gestalt theory, particularly the law of Prägnanz. Combining these elements of game play and applying them to a new output can still represent a completely different craft while incorporating player inference as the controls will become familiar to the player having engaged with them before, albeit in a different context.

From the results of my survey I found that the majority of people (82%) prefered to rely on the player skill level within crafting games, which generally improves over time, whereas 18% of the participants favoured relying on their own manual dexterity. In light of this I included both avatar skill and player dexterity when crafting within my game. There are mini games which rely highly on player input and crafting objects that allow the player to create through combining recipes of foraged and found items.

In addition to the player skill I also planned to include a mood panel to show the player's mood and energy, which in the original prototype included crafting, social, environment and energy. I simplified the mood panel to only include only two moods; crafting and energy. I did this in order to focus my game upon player direction and not create an environment that led players to believe they had to take a particular path or follow a pre prescribed route in engaging with the main game and mini games. I also decided to make socialising a skill as opposed to a mood in order to define it as an attribute a player could build if they chose to as opposed to a required action. I felt that this was an important feature to have in order to allow the player the freedom to decide how they engaged with my game and what path they wished to follow; a solitary one focused on crafting or a social one focused on discussion of crafts and discussion. I refined and altered the mechanics so that my game had elements of real life, without being a distraction from the main aspect of my game. I also did not want to limit players by forcing them to pick particular crafts by defining different moods for each craft though they have separate skill points. In the final version of my game the mood panel was not included due to problems with the consistency of the code but it was an important development influence in the consideration of player motivation.

In the prototyping phases of my game, players earned skills specifically related to the craft or crafts they chose to pursue, this in turn earned them rewards. I adapted the scripts from Brackeys (2020) health bar tutorial, though I

separated the code into several scripts relevant to the action being performed as opposed to having one script to manage the skill numerical updates as this worked better within the game. I decided to simplify this to more holistic craft skills so players could improve in multiple crafts at a time. The game now unites all crafts the players directly engage with under the artistry skill and all the craft UI under the making skill. Players can also gain skills by foraging for the items they collect around the world and social skills increase each time players interact with NPCs.

In early versions of my game there was going to be an economic element to my game, such as rent, banking, shopping, selling and monetary value to crafting items that the players create, which eventually I removed because as a mechanic it overshadowed the other elements of my game and removed the slow paced atmosphere I was aiming to create. Another reason was that as my game developed I found that the economics not only took over the direction of my game and shifted the focus from crafting to wealth, it also became challenging to value each craft equally due to the different methods, time scales and material. This made some crafts more valuable and also more inaccessible which changed the dynamic of my game. I did not want to have a system that altered player motivation so heavily based on something outside of the crafts themselves, instead I wanted to create a dynamic world with a level of freedom and intrigue to immerse players.

In order to inform and entertain players I decided to incorporate narrative through flavour text, dialogue and stories into my game, this aspect of my game draws its influence from the role play aspect of my research. Crafting is a multifaceted activity that a wide range of communities are built upon, crafts transcend the tangible realms into experiences and shared moments, I wanted to try and bring this into my game to enhance the crafts and expand the breath of material and technical knowledge included in a more interesting way than including instruction or a lengthy fact sheet that did not disrupt the immersion fantasy. This relates to the concept of *"volitional engagement" in games,* explored by Rigby and Ryan (2011), which is directly related to *"...autonomy satisfaction..."* and defines a way to engage players by using *"...well-crafted stories and compelling rationales to awaken in the player an internal desire to walk the path ahead".* Using intrigue instead of the classic direct instruction approach is a feature that although more time consuming than direct instructions creates a new dynamic for a game and provides an opportunity to capture players' attention. This concept can also be applied to linier games that limit player freedom by not providing a range of options or actions.In order to implement the dialogue I used the Fungus (2020) unity asset so I could alter text based on player previous actions. This aspect of my game is important and though altered through play testing and discussions it was not fully developed to the level I feel it could have been, however it did display the premise of the idea and merged into my game well.

Originally all the buildings and areas were in separate scenes but this reset some of the scripts each time a new scene loaded and deleted the players progress which was not what I wanted. Instead of the multiple scenes I made everything part of one scene and instead switched between cameras and UI panels to allow the player to engage in the mini games and utilise the crafting interface. I used the Cinemachine (2020) asset in order to zoom and move the camera based on events, which I defined, within the game.

Through the Info Gamer (2018, 2019) I discovered that I had accidentally put my Event system in a canvas folder when moving some of my buttons which had caused all the buttons in the scene to become unreactive. In addition Info Gamer helped me to fix the raycast problems I had with the world space and camera overlay when using large images which overlapped some of the buttons.

With Artisan Bay the aim was to combine real world craft and craft mechanics into a game in order to display a small range of craft representations and material explorations in games. I focused on the gamification, the simplified simulation and the use of clickable crafting interfaces in order to try and represent the main mechanics used to utilise crafting in video games and to show how they can be combined in a game. I wanted to explore and experiment with how these crafting mechanics could be implemented and merged into a single game as another level of reflection to combine with my research and game testing exploration.

3.5 My ethics

The ethical consideration was a key aspect that I wanted to include in my game, based on not just my personal morals but also some of the key aspects surrounding the inclusion or exclusion of particular materials. My exploration of ethics within simulation role play games has made it clear to me that the inclusion of creative freedom gives game developers little control over how players will utilise that freedom. As a developer I can however control the mechanics and narrative which are important in setting the mood for the experience and feeling I want my digital game environment to invoke in players.

The player movement is performed in the classical up and down or side to side option, I decided not to have running or violence as I wanted to capture, not just, the relaxing nature of crafts, but also, the slower pace of a small town, this was both a personal choice based on my beliefs and a reflective choice based on my research. Players engage with the world through their exploration, conversation and most importantly through the craft mechanics. The mechanics are designed to exclude fighting, killing or violence within the game mechanics or dialogue, although there is no way of stopping it from being included in the crafts themselves. While I am aware that not including these aspects creates an idealised environment I feel that including them would have a negative impact upon the calming creative environment I was trying to cultivate inspired by the positive and calming aspects of the real world crafts I have abstracted in my game.

Chapter 4: Reflection and conclusion

4.1 Reflection

To gain a better understanding of how mechanics can affect players' perceptions of crafts within a digital space it was important to explore not just how players interact but also the processing that happens in players minds and how this can be influenced by players socio cultural backgrounds.

This project analysed real world crafts representation within digital simulation role play games through game mechanics. This analysis required a holistic approach as game mechanics are more than just the code written by game developers, they are also the visuals, the inputs and the player engagement.

Throughout my research I explored and analysed a range of games which fit into the simulation role play genre and included crafting within their game play. I combined ths research with the results I gathered from my survey to gain a better understanding of the way the games functioned and were perceived by players. The list of games I explored was not exhaustive but I feel that the ones which I picked displayed a good range of features and possible application of crafting mechanics. I also feel that it was important that I played the games I researched in order to also gain a first hand experience of the player input methods. In addition to my online research my survey allowed me to collate some opinions of craft mechanics in games. This information helped to direct both my research and my game development, it also gave me key points of development within my own implementation of craft mechanics in my game.Within my survey I discovered that material realism was an important feature and aesthetics were also an important feature to players in relation to crafting games although the most popular crafting game, according to my survey, was minecraft which due to its cube artistic style relies partially on player inference but combines detailed textures with descriptive titles to inform players of materials. This highlights that players are willing to accept creative alternative aesthetics within crafting games, I feel that the theories of Gestalt are very useful to game developers when they incorporate alternative artistic styles to photo realism.

4.2 Conclusion

The use of automation as a part of craft mechanics can have a range of outcomes, it allows for the inclusion of a wider range of crafts and when applied relies heavily on the game designs representation. The use of automation could be applied in a more interesting manner by developing the crafting UI possibly with the inclusion of more complex animation to represent the craft processes or more craft related audio effects.

Simulations are widely accepted to be a representation of real life or the real world, I confirmed this with my survey where the first question required participants to provide a personal definition of a simulation game. Simulations often have a particular focus and so omit aspects in order to focus on the key areas of representation, in order for the simplification to be successful in also accurately representing its real world influences, game

designers rely on player inference. Player inference relies on the aspects I explored in my research on Gestalt principles but also on players' own experiences. In my research I explored the Gestalt theories of similarity, closure, continuity and the law of prägnanz and their influence upon crafting mechanics in simulation video games. This revealed the multitude of ways in which game designers utilise the human brain as an integral part of processing within their games.This also relates to player engagement and immersion, players become part of the world and are integral features in allowing the game to progress. The loop and arc methods (Cook, 2012) were used to inform, engage and direct players into and through carefully designed challenges in order for them to succeed.

Combining my own experiences with my research allowed me to identify some common traits among craft mechanics, especially in relation to the percentage of player engagement within particular craft mechanics. Within my research I had a particular interest in player input and its effect on the crafting experience overall. My analysis of player input levels, using the calculation I created, provided me a new perspective of craft mechanics which brought to light how similar different crafting mechanics are in relation to the way in which players engage with them.

The player engagement percentages have revealed a clear pattern surrounding successful crafting mechanics. Depending on whether the game is designed to focus on the output, the crafted item, or the process, the making or gathering of materials, changes the level of player input. If the output is the main game mechanic focus the player input is usually below 20%. Alternatively when the process is the focus of the crafting mechanic player input tends to be above 75%. Interestingly although different games used similar mechanics the player input percentages were still different depending upon the games main focus which I found fascinating.

If I were to develop my game I would like to further explore combining the different levels of player inputs by combining the craft UIs and crafting mini games in more dynamic ways. In addition to this I feel exploration of alternative economical structures like trading resources or time would be an interesting mechanic to combine with crafting as it would be more reflective of the real world.

I feel that the exploration of creative crafts in digital environments is an under researched area with a vast range of research avenues to explore beyond the aesthetic. If I were to expand my research I feel more exploration is needed specifically in the areas of ethics relationships with craft simulation games and the influence of economic mechanics on crafting in digital games.

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Figures and tables

Appendices

Appendix 1: Link to Artisan Bay [final game]

https://shani-t8.itch.io/artisan-bay

Appendix 2: Survey link

https://docs.google.com/forms/d/e/1FAIpQLSfrfe-p5Sj188pzsa9sN34Vut8OlPNB5vcsngjWZu_zxDWl8A/viewform?usp=sf_link

Appendix 3: Survey results