



CHOOSING JUICE

Enabling Fun in Games through
Better Visual Design

Tero Koskela

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Option of Interactive Media

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ABSTRACT

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This thesis aims to find out how a game can be more rewarding and motivating by improving its visual elements that are not directly dictated by the gameplay. Using the GuitarBots game as an example of a game that does very well in the gameplay department but fails to excite player with additional depth, rewards and feedback, this thesis explores the importance of good feedback, interesting game worlds and characters.

In order to understand what produces fun in games, this thesis will first define games in relation to work and explore and explain how rewarding affects both activities. The thesis also presents different rewarding schemes and how they affect player behaviour. Additionally, in order to understand what keeps the players engaged and ready to invest time and effort into a game, the thesis looks the flow state and the mechanics and requirements of producing and maintaining it.

As a way to provide an interesting context for the game and its rules, this thesis presents the importance and design of game worlds. Closely related to game worlds, this thesis also looks at the function of characters in the game. They are presented both in terms of their visual design and their meaning to the player and the story.

As the final element of a fun game experience, this thesis presents the concept of juice, which is a type of excessive positive feedback given to the player at nearly every possible moment of interaction or success. Without it, a game feels unresponsive and dull. This thesis presents a list of elements where juice can be applied.

The research presented in this thesis was applied into practice by designing a game using the same engine as GuitarBots, but with completely reworked visual style and assets. The project is presented along a design document that outlines the visual style and elements of the game.

character design, game design, game worlds, juice, visual design

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GLOSSARY

Casual game	An easily accessible game based on simple rules, aimed at mass markets
Combo	A series of successful actions
Cutscene	A non-interactive sequence in a game
First-person shooter	An action game that the player experiences through the eyes of the protagonist
Metroidvania	A game based on exploration enabled by gathering new items
Power-up	An item that grants the player avatar special abilities
Third person perspective	Graphical perspective portrayed from a certain distance behind and above the player character

1 INTRODUCTION

1.1 Thesis goals and practical project

This thesis aims to find out how a game can be made into a more rewarding and motivating experience by improving its visual design and game design aspects that are closely related to it, such as inducing the flow experience and the in-game rewarding mechanisms, and how well planned visual elements can help a game give player better feedback and produce a more engaging and personal experience. My research is used to improve the guitar learning game GuitarBots, which I have been working on as a visual designer in the Ovelin team since early 2012. I have chosen my research subjects based on what is currently most lacking in the game.

Instead of laying out practices for designing high-quality graphic assets as such, this thesis will concentrate on what to take into account when designing and planning the overall art direction in a game based on its theme and especially the game world in order to produce a rich and atmospheric experience. This thesis will also study character design and how characters affect the player's experience when playing a game, and what to take into account when designing the characters themselves.

To look at the visual design of a game alone would leave the result shallow: the game might be interesting to look at, but it is more than likely that the design would overlook possibilities that can be incorporated in the design by trying to enable the flow experience as much as possible. Likewise, it would be impossible to create a truly rewarding experience in gaming without understanding the mechanics of reward delivery in games, as well as the different types of rewards given to the player.

To tackle this dilemma of producing fun in and through games, this thesis divides the gameplay experience into different aspects of motivation and fun. In order to understand what actually motivates a player to action, this thesis presents what makes people play games in the first place, and what separates playing from working, despite some of their shared qualities. This thesis also presents typical rewards given to players in games and how they affect the game experience. To better understand how rewarding affects player behaviour, this thesis presents it from a behavioural psychology point of view. As an example of this, this thesis also looks into the idea of positive reinforcement and how it

can be applied into game design through positive game design. This thesis also explores the mechanics of fun and the flow state and will present how those can be taken into account in both game design and the design of visual assets for games.

From a more closely visual-design related point of view this thesis looks at how the overall basis of the graphic design of a game should be set up by designing the game based on a specific game world, setting and theme. This thesis also presents what should be taken into account when designing a game world and its characters. As a way to further enable flow and improve both the game feedback and how the user interface works, this thesis explores the idea of juice in the design of the graphical user interface.

The findings in this thesis have been applied into practice by designing a proposal for a game using the same engine as GuitarBots, but built from the ground up with a new theme and setting, and also with specific emphasis on both fun and atmosphere. The design document includes a proposal for a game with artwork explaining and detailing the game world, character designs and other elements of the design. The user interface is also redesigned to create a uniform experience that carries the theme of the game to all parts of the experience, and present ways in which gameplay and the user interface can be made more juicy, allowing the game to give better feedback to the player about their success and development.

1.2 What is GuitarBots?

GuitarBots is a casual learning game designed to teach players how to play the guitar. It has a curriculum that starts from the absolute beginnings of learning how to play and advances up to very complicated exercises. During the course of the game the player learns how the guitar works, starting from plucking the strings and pressing the correct frets to play simple melodies, and stretching all the way to playing full songs with complex chords and melodies. The player also learns how to play in rhythm with the background music in the game. The content is divided into three sections: basic, intermediate and advanced exercises. Currently the music content of the game consists only of original songs written for the game, combined with a number of public domain songs with familiar melodies.

1.3 My role in the GuitarBots project

I have been working in the GuitarBots team since the beginning of the project. My roles have included tasks related to graphic design, user interface design, character design and many other areas related to visual design. For most of the development, I have been the only visual designer working on the game, although during the pre-release development phase a 3D artist also worked on the game, building the scenes and creating the character models based on my designs.

1.4 GuitarBots Gameplay

The main gameplay in GuitarBots takes place on a simplified guitar fretboard which scrolls on the bottom of the screen. The guitar strings on the fretboard, stretching horizontally from the left side of the screen to the right, indicate both time and which string the note is played on. Notes appear as rounded rectangles on top of the strings, the number on the note telling the player which fret to press, and the color indicating the finger the player should press with. A ball bounces on top of the fretboard, telling the user when to play the note. As the fretboard scrolls from left to right, the notes move toward the ball which bounces on them. If the player plays the correct note, the block turns green. If the note is not right, the block turns red. The player is always presented with an arc that shows which notes the ball hits next. If the timing of the player's input is not right, a red arc appears to show where the point of impact was, showing whether the player played early or late.

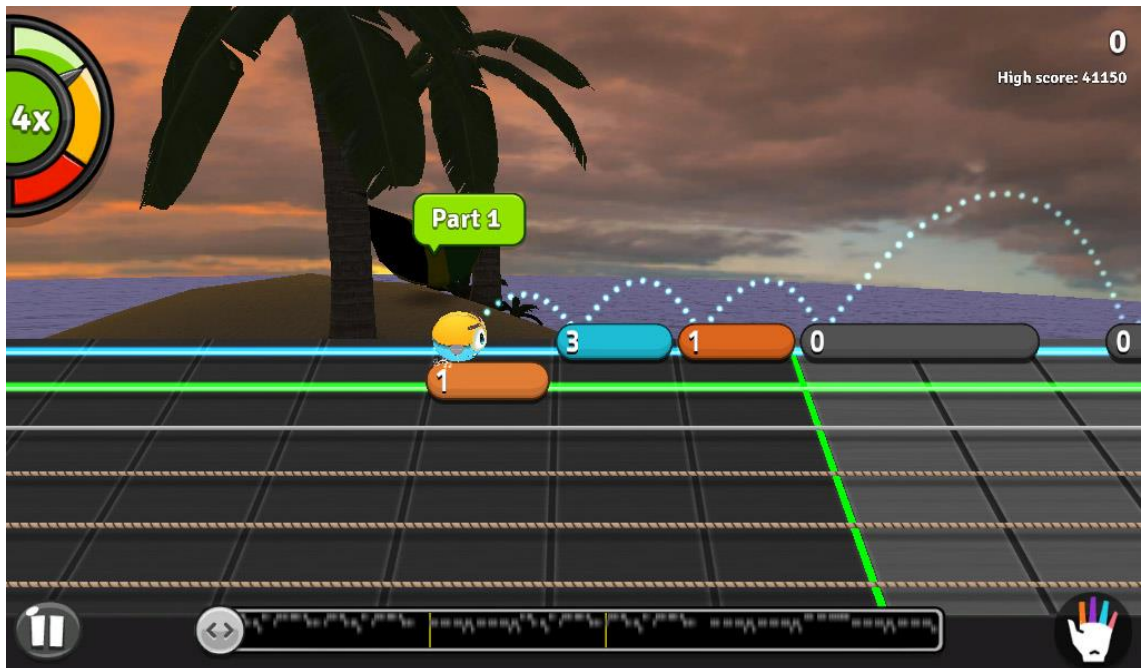


FIGURE 1. The main gameplay mode in GuitarBots.

If the player is able to play the correct notes, he or she completes the level. However, if the player fails too many notes in a row, the background music becomes muffled, telling the player that they are about to fail the song. If the player still fails to play, the song ends and the player fails the level.

Since learning new skills and new songs is a complex process and reading and playing music on the fly can be very difficult, especially for faster songs, the player can also play in practice mode to first learn the songs. In this mode, the song loops and the player can scroll to whichever point in the song they wish to play. In practice mode, the game shows whether the player plays right or wrong, but there is no penalty for mistakes. Playing in practice mode does not unlock new levels.

1.5 Player progress in GuitarBots

The player progresses in the game and the learning curriculum by unlocking new levels. Completing songs gives the player stars that unlock the next levels. A song can be completed with a minimum number of stars, still allowing the player to move to the next level, or the player can attempt to get full stars. Each song is divided into up to five parts, each with three stars to collect. If the player plays all notes and chords in a song part perfectly, the three stars turn into platinum to indicate a perfect performance.

The player also earns badges by playing the game. These can for example be earned by playing a certain number of chords or notes, or by playing for a certain time. Playing all the songs in a weekly challenge also rewards the player with a badge.

1.6 The current state of the art direction and visual aspects of the game

Currently GuitarBots is visually in a state of disarray because of a mix of different styles. In the course of over two years of development, the game has changed from its initial state in a sprawling and uncontrolled manner. Elements have been added and removed, creating a mix of new and old elements that do not communicate well together. For example, the main menu screen has been stripped to nothing but a blue background with clouds floating past and a play button. A new user coming to the product for the first time is presented with this nearly empty view, immediately communicating an unfinished product and an uncaring attitude towards the game.

As elements have been removed and focus has shifted, the remaining graphical and theme elements have become almost something of an afterthought. The robot characters themselves have been reduced to background assets that have little connection to any part of the game, making it questionable whether it is even wise to call the game GuitarBots anymore. The game world feels empty and pointless, which leads to a lack of atmosphere in the game.

The game is very good in listening to the player input and noticing what they do right or wrong, but fails to excite the player and give feedback that would make them feel enthusiastic about their progress. Although the game rewards success with stars and gives the platinum stars as a reward for a flawless performance, the feedback in general feels lacklustre and boring and mostly fails in making use of the techniques that other games use in rewarding the player. At the end of a level the player sees their Guitarist Level meter filling and occasionally adding a new number to their guitarist level, but there is no celebration – success is only measured and presented as a number. The game does reward a new high score with a stamp declaring "new high score!" along with a quite literal stamping sound, giving feedback that is factual and bureaucratic at best.

Despite the player improving as a guitarist, the experience remains visually the same throughout the game. Naturally the player learns a new skill and has the chance to apply it into practice in increasingly interesting exercises, but the game that presents these exercises and skills remains unchanged. There is no visual representation anywhere in the game of the player progress. The badges that the player can earn are presented more as announcements than achievements. They can be found and viewed later, tucked away in a drab box inside the player profile screen.

2 WHY PLAY – GAMES AND WORK

In order to understand initial player motivation and the mechanics of a rewarding experience, this part of the thesis will be looking into the concepts of work and play, since they both incentivize tasks with rewards. Both when playing and working, we undertake often significantly challenging efforts and expect to be rewarded for our invested time and effort. However, with work, the tasks are often determined by someone else than ourselves which makes them less interesting and less pleasurable. Participation in completing these tasks is not usually voluntary to us. In the case of games, the tasks and rules to complete them are also set by others, but our motivation in participating in them is genuinely our own. To more accurately separate games from real-life work, we first need to define games in more detail.

Although video games and games in general are available a vast number of different genres, all games share some characteristics that are required so that the experience can be classified as a game. Despite all the differences and variety in games, we are intuitively able to recognize a game and tell it apart from real-life work. (McGonigal, Jane, 2011, 21.)

2.1 What are games?

Defining what games are is a difficult task, and attempts to define games vary. In his book *A Theory of Fun for Game Design*, Raph Koster lists famous game designers' definitions of what a game actually is. Sid Meier, the creator of the world-building strategy game *Civilization*, defines games as "a series of meaningful choices". Ernest Adams and Andrew Rollings define games as "one or more causally linked series of challenges in a simulated environment". Katie Salen and Eric Zimmerman state that games are "a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome". (Koster, Raph 2005, 14.)

Koster himself approaches games from the viewpoint of pattern recognition, calling games iconic depictions of patterns in the world. According to Koster, games are puzzles we solve, master and file away – the only real difference to real-life challenges, such as work tasks, is that the stakes are lower. (Koster 2005, 34.)

2.2 Traits for defining games

A more useful way to find out what games are and to separate them from real-life work is to define a list of traits that a game includes. In the book *Reality Is Broken*, Jane McGonigal lists four different traits that can be found in any game.

1. A goal

The goal provides the player a sense of purpose by giving them a specific outcome they are working to achieve and by orienting their participation throughout the experience. Whether the goal is being at the top of a high-score list or finishing the game plot or whether it is set by the players themselves, it always exists. (McGonigal 2011, 21.)

2. A set of rules

The rules are the way the game limits the player's attempts to achieve the set goal. By removing or limiting the most obvious ways of reaching the goal, the rules encourage creativity and strategic thinking in the player in order to reach the goal. To emphasise the meaning of a defined set of rules, McGonigal states that the freedom to choose the most logical and efficient methods to complete a task would be the very opposite of a game – and destroy the fun. In other words, by limiting the means of performing a certain task, games make the task more interesting and tackling it more motivating. (McGonigal 2011, 21–23.)

Interestingly, Koster does argue that because of their rule systems, games are disposable: after mastering them through practice, the player will inevitably get bored of the task. In other words, the more formally constructed a game is, the more limited it is. (Koster 2005, 38.)

3. A feedback system

Using such elements as points, levels, score or other means to measure progress, the feedback system informs the player about their progress in the game and how well they are doing. It can provide the player both a promise of being able to complete the game at a later point as well as a motivation to reach that goal. (McGonigal 2011, 21.)

According to McGonigal, the feedback loop in digital games is nearly instant – there is virtually no gap between action and response. In games like Tetris where the difficulty

is automatically increased to match the player's skill level, the entire game acts as the feedback system, constantly telling how well the player is doing and how much progress they make by countering their efforts with higher difficulty. (McGonigal 2011, 24.)

4. Voluntary participation

Voluntary participation enables the person playing the game to knowingly accept the rules and requirements set by the game. Additionally, the freedom to enter or leave the game at any point helps the player accept even stressful and challenging tasks as a safe and pleasurable activity. The game dictates the rules of the experience, but it does not force the player to participate. (McGonigal 2011, 21.)

According to McGonigal, although features like interactivity, graphics, narrative, rewards, competition, virtual environments, or even the idea of winning are most likely present in games, they are not the defining features of a game. The traits listed by McGonigal are the features a game cannot exist without – remove any of the traits and the experience becomes something else than a game. (McGonigal 2011, 21.)

2.3 Playing and Working

As her condensed definition of choice for what games are, McGonigal presents a definition of games by Bernard Suits: “Playing a game is the voluntary attempt to overcome unnecessary obstacles”. This definition includes the key element on her list of game traits to what differentiates games from work: the idea that the effort is voluntary. (McGonigal 2011, 22.)

Games are hard work that we choose for ourselves and which makes us happy. When playing a game, we are intensely engaged, which puts us in a mental and physical state that creates a surge of positive emotions and experiences. All our neurological and physical systems that are connected to our happiness – our attention system, our reward center, our motivation systems, our emotion and memory centers — are all activated when playing games. (McGonigal 2011, 28.)

We find hard work in games fun because games allow us to choose the work we participate in. To help understand the work-filled nature of games, McGonigal lists a set of

different types of work found in games. High-stakes work is the most evident one in video games. It presents the player with the possibility of fantastic success and horrible failure. Busywork is predictable and monotonous work, such as gathering resources or solving simple match-tree puzzles. Mental work requires us to solve puzzles and think of new strategies to win an opponent. Physical work, such as playing games with the Wii or the Kinect, allows us to use our actual body movements to play. Discovery work activates our curiosity, for example when exploring unknown worlds and looking for hidden secrets. In teamwork, we work with others to defeat obstacles that would otherwise be out of our capacity and help others to achieve their goals. Creative work requires us to find new solutions and strategies to solve complex problems. (McGonigal 2011, 29–31.)

According to Koster, fun is in fact contextual. Playing games actually most often includes hard work, but the reasons why we engage in the activity dictates how we experience it. Games allow us to experience success with no real risk of failure – at least the kind that would be harmful to us. (Koster 2005, 96.)

2.4 Playing and Working for a Reward

Since games include, and arguably even mostly consist of hard work, we need to define the concept of actual work. Working is often a necessity driven by the need for an instrumental reward, whereas playing games is driven by our desire for fun and satisfying experiences.

The difference between working and playing and the importance of rewards in them is crucial. Hard work that we do not choose ourselves and someone else requires us to do is likely to be less motivating than hard work in games. It's often not the right work for the right person at the right time. It may not be tailored to meet our strengths, we are not in control of the work flow and we may never see what it amounts to in the end. It is lacking in proper feedback, or the feedback we receive can be too harsh and critical. (McGonigal 2011, 29.)

This kind of unsuitable and undesirable work is typically performed in exchange for an instrumental reward. However, giving someone an instrumental reward in exchange for performing a challenging, difficult or boring task is often not a good motivator. The

drive to take on these tasks in the first place is necessity, which leads us to often being reluctant and unhappy to perform these tasks, and the idea of receiving an instrumental reward in exchange for our input is not often very motivating. Although common business sense might dictate that rewarding work with money would yield great result, it is often not the case in reality. (Pihl, Nils 2013a.)

When comparing work and playing, McGonigal presents the idea that the opposite of play is not work, it is depression. Depression gives us a "pessimistic sense of inadequacy" and a "despondent lack of activity". Playing games puts us in a state that is the exact opposite of these: we feel optimistic about our own capabilities and enjoy a rush of activity. These give us the kind of intrinsic satisfaction that real-life work often fails to deliver. (McGonigal 2011, 28.)

2.5 Conclusion to play and work

When comparing work and play, work typically and at its worst happens solely for the instrumental reward and offers little other satisfaction. While gaming includes hard work and often requires considerable effort and practice, it gives us a deep and rewarding sense of satisfaction that work often fails to deliver. This is mainly because when playing games, we are free to choose the hard work we invest in – it is just the right work at the right moment for us. If we don't find the experience satisfactory or find it frustrating, we are free to drop out at any moment at will.

3 REWARDS IN GAMES

In order to better understand the relationship between games and work, this section details the mechanisms of rewarding that are used to indicate player success, and how they are used to induce positive emotions in players by rewarding them for their actions and progress. This section presents a list of different types of rewards given in games and how they can be classified by whether they are intrinsic, extrinsic or instrumental and how this affects the way the players perceive them. This part will also look at behavioural psychology in order to see how players act with different rewarding schedules, and how different rewarding schedules motivate different kinds of behaviour. This section also presents the idea of positive game design as a way to enforce certain player behaviours by employing a something scheme.

3.1 Classifying rewards

The rewards that playing games gives to the player are often intrinsic and the rewards one gets in exchange for their real-life work are typically instrumental. To understand the difference between these two types of rewards, they need to be defined in more detail.

3.1.1 Intrinsic Rewards

Intrinsic rewards are rewards that are rewarding in themselves. For example, we enjoy experiencing beautiful things, but they are not directly useful to us in any way. As an example from games, reaching a new area in a game can be intrinsically rewarding to the player without any additional conditions.

McGonigal divides intrinsic rewards into four categories. In our lives and as players, we need satisfying work, the experience of feeling successful, social connection and a sense of meaning. (McGonigal 2011, 49.)

The idea of satisfying work varies from person to person, but it includes conditions that remain the same for everyone: we want to be immersed in meaningful, demanding activities that allows us to see the direct impact of our input. (McGonigal 2011, 49.)

The experience of being successful helps us feel powerful in our lives and gives us a feeling that we are getting better at what we do over time. (McGonigal 2011, 49.)

We desire social connection to share our experiences with others and build bonds with them. A lot of our happiness comes from spending time with the people we care about. (McGonigal 2011, 49.)

We also want to have a sense of meaning, of being a part of something larger than ourselves. We want to contribute to something that has significance beyond our own lives (McGonigal 2011, 49–50.)

3.1.2 Instrumental Rewards

Instrumental rewards have value that can be used to acquire something else. Money is the simplest example of an instrumental reward. It gives us the feeling of financial safety and allows us to do what we enjoy and acquire the things that are necessary for our survival, but in itself, it is not very interesting. Money is a necessity used to maintain access to other necessities of life, and purchase the things and services we desire.

In games, actual rewards (directly resulting from player actions and success) can be divided in multiple ways and into multiple classes. For example, they can be divided into intrinsic and instrumental rewards as discussed before, or into intrinsic and extrinsic rewards.

The intrinsic/extrinsic model describes the mechanics of reward delivery. In this model, an extrinsic reward is something tangible – in the context of the game – given to the player, while an intrinsic reward is something that is perceived. The intrinsic reward in this model could be the player's feeling of success, while the extrinsic reward could be a badge, an item or some in-game currency to represent that success. In other words, the intrinsic reward is the players' own reward to themselves – "I take pride in this achievement" – while the extrinsic reward is the game's reward to the player. (Pihl, Nils 2013b.)

In his article Predicting Behavior: Dissecting Rewards, Pihl gives an example of being praised by a loved one. In the intrinsic/instrumental model the praise is intrinsically re-

warding (it feels good), in the intrinsic/extrinsic model it is an extrinsic reward, as it requires another party to give it to you. (Pihl 2013b.)

3.2 Reward Systems

Video games use multiple systems of rewards and reward delivery. These range from the very common-level and instrumental (feedback system and score system, experience points) to complex and gameplay altering (in-game items, unlocking access). The rewards in games can also happen completely outside the actual or interactive gameplay experience (cutscenes, achievements). In their paper Game Reward Systems: Gaming Experiences and Social Meanings, Hao Wang and Chuen-Tsai Sun describe the following rewarding systems found in games and how they affect the player's experience.

3.2.1 Feedback and Score Systems

The simplest and most obvious system for communicating success to the players in any game is the feedback system.

3.2.2 Score Systems

The score system is one of the earliest systems for games to assess player performance. It serves as a tool for players' self assessment as well as a means for comparison with other players. In general, the score system has little effect on actual gameplay, although it is common to reward certain scores with powerups or other in-game advantages.

Nowadays the score system also has an important role in ranking players in online leaderboards, allowing players to compare their competence in games. (Wang & Sun 2011, 3.)

3.2.3 Feedback Messages

Feedback messages are the one of the simplest ways in which games reward the player. They are mostly used to provide instant rewards and they provide the immediate feedback that is crucial to flow experiences. One example of a feedback message is the word "perfect" that is visible in most rhythm games in one form or another to indicate a flaw-

lessly placed action. Due to their nature, the feedback messages are not collectable or available for comparison with other player. They also do not directly affect gameplay. (Wang & Sun 2011, 5.) As Jesper Juul points out in his book *Casual Revolution*, their value lies in the praise that they give the player and the feelings that they produce. (Juul, Jesper 2010, 45–49)

3.2.4 Cutscenes

Cutscenes often provide rewards for successfully defeating big tasks in games, such as defeating a boss enemy. They are used to tell the story of the game and motivate the player to advance it by playing. They have no tangible function in the game, but they provide a visual experience that functions as a milestone, marking the player's success. (Wang & Sun 2011, 5.)

3.2.5 Experience Point System

Common in role-playing games and increasingly adopted into other game genres as well, the experience point system rewards the player's actions by giving the player experience points for repeatedly and correctly performing certain tasks or correctly using their avatar's skills. This is an instrumental reward, as the skill points are usually used to level up (enhance the skills of the player's avatar in the game, making the avatar stronger and more capable to take on more challenging areas and enemies). (Wang & Sun 2011, 4.)

The experience point system directly affects the gameplay by making certain in-game tasks easier to accomplish, as well as expanding the ways the game can be played. In other words, the experience point system also enables the intrinsic reward of allowing the player to experience new areas, challenges and features of the game. (Wang & Sun 2011, 4.)

3.2.6 Item Granting System

Item granting systems are also common in role-playing games. They reward the player with in-game items that for example enable access to new areas by added strength or other attributes. They can also be purely cosmetic, only adding a visual representation

of successful gameplay to the player's avatar. Often in massively multiplayer online games the items have both functions, practical and visual. (Wang & Sun 2011, 3.)

The items can also be made accessible through the exploration of the game world, which adds incentive to the player to explore the game world, for example during a downtime in the game's story. Items are also very commonly rewards for beating bosses in role-playing games, often rewarding the player with more advanced equipment needed to move further in the game.

The Zelda franchise uses item granting as an integral gameplay mechanic. In many Zelda games, the game world is arguably open to the player right from the beginning – at least in the sense that there are no arbitrary barriers or levels to complete. However, without gaining certain items and through them the abilities they provide the avatar, entering some areas is impossible. As the player discovers the paths that are accessible in the avatar's current state and finds items that enable the avatar to acquire new skills, the previously inaccessible areas become accessible.

This model is also a key element in the "Metroidvania" genre of games. Originally typical to the Castlevania and Metroid games, the player is encouraged to explore a vast labyrinth of different rooms, corridors and areas. Through exploration, the player discovers new items that give his or her avatar new items and skills that enable further exploration. In that sense, the exploration is both the action and the reward.

3.2.7 Resources

Resources are items that have a practical use in the game, such as wood, iron or other natural resources in a strategy game or extra lives in platformer games. This category also includes in-game currency that can be used to acquire new items, skills or features for the player's avatar. Such systems often coexist with the experience point systems in role-playing games. (Wang & Sun 2011, 4.)

3.2.8 Achievements

Achievements are most often titles or badges that players collect for either their avatars or their own player accounts, often appearing there for other players to see and compare

(in this way, they can also create a kind of meta-game of building one's player profile and accumulating "player score" – like the gamer score on the Steam service). Achievements are often given out for accumulating a number of repeated tasks, such as defeating a certain type or enemy for a certain number of times. They can also be given as a type of "in-game souvenir" when defeating a particularly difficult boss or traversing through a difficult area. (Wang & Sun 2011, 4.)

Achievements often also encourage players to complete tasks that often are not obvious in the game, motivating the player to play in challenging ways and exploring the game world and even the limits of the game engine. Achievements can also encourage players to play in a more efficient way, helping the player to become a better player in the process.

3.2.9 Unlocking Mechanisms

Unlocking mechanisms give players access to new areas, content and game modes. In the simplest form, this takes place in many casual games such as Angry Birds: once you complete a level with a passing score, the next level becomes accessible. (Wang & Sun 2011, 8.)

3.3 Behavioral psychology and rewards in games

3.3.1 Behavioral Psychology and Rewards

Although playing a game often induces intrinsic rewards in itself, additional rewards to the player are very important as well. In his article Behavioral Game Design John Hopson outlines a model based on behavioral psychology for rewarding the player. Behavioral psychology looks for rules in how test subjects learn and how their minds respond to their environment. Despite that many of the tests have been made on animals, it appears that many of the results are species-indifferent and thus apply to humans, and players of games, as well. Where game theory studies how a player should react to a certain situation or action in a game, behavioral psychology studies how they actually do react. (Hopson, John 2001.)

In behavioral psychology, a contingency is a rule or set of rules that dictates when rewards are given out, in a test or in a game. For example, this could refer to the number of experience points a player needs to gain a new level in a role-playing game, or the number of points that a player needs to achieve an extra life in a platformer game. This means that the actions of the participant, test subject or player, provide a reward when specific requirements are met. A reinforcer is the outcome of an action, usually used to refer to a reward. A response is the action of the player that fulfils the contingency. (Hopson 2001.)

3.4 Ways in which Rewards Affect the Gameplay Experience

This understanding of behavioral psychology helps game designers to craft more motivating reward systems that produce desirable behaviour in players. Using and experimenting with different ratios and intervals for reward delivery game designers are able to hone the players' experience in a way that keeps the players captivated in the experience and motivated to finish the game. (Hopson 2001.)

Different ratios and intervals for rewards affect the way a player plays the game and how much satisfaction the experience provides. A ratio deals the player rewards when a certain number of actions has been completed, for example every time after successfully completing a set number of stages. In a variable ratio, a specific number of actions is still required, but that number is randomly generated each time. The player does not know the exact number of actions required, only an average based on previous experience. (Hopson 2001.)

1. Fixed Ratio

A fixed ratio typically produces a similar pattern of activity each time. The first actions never get rewarded, so player activity starts off with a long pause and ends with a steady burst of activity. Once the players decide to try and achieve the reward, they act as fast as possible to do so. This can be problematic to game designers, as the long pause can often cause the player's attention to wander. Also, if the ratio increases each time (as with experience points needed to gain a level in a role-playing game), the pause also increases, which can eventually lead to a loss of motivation with a seemingly unachievable reward. (Hopson 2001.)

2. Variable Ratio

A variable ratio typically provides a steady flow of activity from the player. It is not as high as the activity during the burst phase in a fixed ratio, but it is more consistent without the pause that is present in a fixed ratio. Since rewards can be given out for nearly any action, there is always incentive to do something. For a high and constant rate of play, a variable ratio contingency is the best. (Hopson 2001.)

3. Fixed Interval Schedule

In an interval schedule, a reward is given after a certain amount of time has passed. For example, a game could introduce a power-up every 30 minutes after the last one has been collected. In a variable interval schedule the period of time changes with each reward. (Hopson 2001.)

Like with the fixed ratio, a fixed interval also includes the pause that can be problematic, since the player motivation at that point is low. However, there is no burst of activity leading to the reward. Instead, the activity increased gradually until the timer runs out. (Hopson 2001.)

4. Variable Interval Schedule

As with the variable ratio contingency, the variable interval also gives the player a constant reason to be active. As a collected reward may reappear at any time, there are few low points where a player's attention may wander. However, unlike with a variable ratio, the appearance of the reward is not dependent on activity, the rate of the activity will be lower. (Hopson 2001.)

5. Special Cases

Special cases for these contingencies include for example chain schedules, where the reward is the result of multiple contingencies. In a role-playing game this could include reaching a certain area, defeating a number of enemies and clearing a boss battle. In these cases, players often consider access to the next stage of the contingency a reward in itself. (Hopson 2001.)

Another special case is reward extinction, where the game stops giving the player a reward they have come to expect. Typically this provokes anger and frustration in the player. A related phenomenon is behavioral contrast, where the player is given a rather simple reward multiple times. If the game then changes the reward to something more significant only once and then returns to the usual reward, the player is not satisfied since they already expect the higher reward. In other words, reducing the level of reinforcement is very punishing for the player and harmful for the game designer. A sudden loss of reward should be avoided whenever possible, instead phasing out rewards over time or giving other ways to achieve even more meaningful rewards. (Hopson 2001.)

3.5 Positive game design

In his article Positive Game Design, Chris Bateman presents an atypical possibility in the use of rewards in games. He suggests applying the animal training technique of positive training into game design, especially in education games, and presents his application of the technique. (Bateman, Chris 2009.)

The positive training method takes advantage of the principles of operant conditioning in order to enforce desired behaviour and eliminate the undesired. Positive training at its simplest is based on three rules:

1. Rewarded behaviour gets repeated.
2. Ignored behaviour stops.
3. Once a behaviour is in place, variable rewards will strengthen it. (Bateman 2009.)

3.6 Rewarding to reinforce behaviour

According to Bateman, learning and operant conditioning are related in a way that makes this technique work on both animals and humans, and even in games. In other words, anything a player does right in a game should be rewarded at least in some manner, creating a link between the reward and these behaviours. A typical example of reward-induced player behaviour in games is breaking crates. Almost without exception, players tend to break any crate they find in a game, having been conditioned through countless games that there can be rewards (powerups or other objects to pick up) inside – a behaviour that, according to Bateman, is so strongly conditioned that it occurs even

when players are specifically told there are no rewards to be found in the crates. (Bateman 2009.)

3.7 Positive and negative punishment

Punishment in games can be divided into two different types: positive and negative. Positive punishments are mostly disadvantages for the player, but such that can usually be overcome. For example, if a player fails, their character dies and they have to replay a certain area. However, nothing is permanently lost to the player: they replay the section and continue where they left off the previous time. On the other hand, a negative punishment temporarily removes something that the player wants. Examples of this kind of punishment include a temporary loss of an ability, or disrupting the score mechanic in a way that sets the player back. (Bateman 2009.)

In his concept of positive game design, Bateman suggests that the positive punishment should never be permitted, and even the negative punishment should only ever be used to prevent completely unacceptable behaviour. Punishment should never be used to encourage the desired outcome. Instead, in order to encourage the desired outcome the punishments should be as neutral as possible – failure should ideally result in no additional gain or progress being added, instead of loss of previous progress. According to Bateman, it is typical of player to attempt different actions to see if they work, and stop doing them once they see that it produces no change in the game. (Bateman 2009.)

However, due to gameplay restrictions and demands, the complete abolishment of punishment is usually not wise or even possible to implement. In place of typical, positive punishments Bateman suggests other methods. For example, the player character can become visually less interesting by losing color as a punishment for an undesired action, or when taking damage it can be shown on the character without having a gameplay effect. This way, the player is assumed to attempt to keep the character looking as good as possible, which is an incentive to avoid damage. (Bateman 2009.)

For performance-based challenges Bateman suggests setting the player subtly a few steps back from where they were. For example, if the game has a combo counter based on success, instead of completely breaking the combo in the case of player failure, the game could only subtract some steps from the combo. (Bateman 2009.)

3.8 Variable rewards

Although desired behaviour should be systematically rewarded in the beginning of the training (or the game), identically repeating rewards and obvious rewarding schemes are bound to become boring. To avoid this, a variable rewarding scheme should be used. By giving a new reward for an existing behaviour can help strengthen it significantly. Once a player has learned that defeating enemies gives them rewards, applying a random rewarding scheme to the action can make it extremely compelling for the player. (Bate-man 2009.)

3.9 Applying positive design ideas to GuitarBots

Since balanced challenges are a crucial factor in the flow experience, too hard sequences and especially punishment for failure in these can easily inhibit flow and break the game experience. To avoid this, the game could find atypical ways of communicating to players the errors that they make.

Punishment for failure is a complicated method of teaching. On the other hand, it is useful that the player clearly knows that what they are attempting is wrong, but it can also be very discouraging when learning a new skill. Currently GuitarBots levels end in "death" when a player either misses too many notes in a row or plays too many wrong notes. If the player fails too many notes, the background song first becomes muffled, and if the player is unable to recover and continues playing the wrong notes, the song ends and the player has to start it again from the beginning.

In a positive game design model, player failure would not result in death. Instead, the game could tell the player that they are failing using visual means (for example by showing the player character react negatively on screen, changing the colours on the entire screen and making the note or chord blocks and the fretboard shake) and by using similar audio effects as currently, but more purposefully and with shorter reaction time from the game. Possible other effects could include slowing down the song after too many failed notes, which would allow the game to adapt to the skill level of the player.

A "bullet-grazing" mechanic that Bateman mentions in his article could also be applied: if the player is able to smoothly recover from the brink of failure and resume playing the song normally, they could receive some kind of reward, for example in the form of additional score. However, Bateman does point out that this is somewhat likely to result in players purposefully attempting these situations for the rewards that they give. (Bateman 2009.)

Another possible positive design method would be to loop a song instead of stopping it. If the player is unable to finish a section of the song, instead of punishing the player by telling them that he or she failed, the song could continue by repeating the failed section. This could be the musical bar or the entire song part. This way, the player does not necessarily feel discouraged by their inability to play a certain part, but rather get more practice in that sequence in a way that adapts to the player's needs.

In a learning game, punishment for failure is also very problematic since the game is not meant to test existing skills but teach new ones. In this respect, "killing" the player character for failure is entirely counter-productive. Instead, situations like this could also be applied in the teaching: if the player is unable to play the notes, it is possible that they simply cannot grasp the melody or the rhythm based on the visual presentation. GuitarBots already has a guitar synthesizer that is able to play back all the exercise notes the game is expecting. By adding this synthesis to the loop, the game would not only let the player try again, but also let the player hear what they are expected to play.

3.10 Rewarding in games – closing thoughts

Rewarding the player in games helps motivate the player to try harder and play in different ways, but it is not necessary for the player to feel successful. Different reward systems and reward-giving ratios and schedules communicate success and progress to the player, and even encourage the player to more activity inside the game. However, the player usually does not play specifically for the reward. In this sense, rather than try to offer rewards as goals for the player, games should find the best ways possible to enforce the intrinsic positive feelings of the player with encouraging feedback and other, more meaningful markers of success.

In the end, as much as the players choose the work they want to invest in, they also choose the rewards they take from it. The intrinsic rewards received from gaming go beyond any other kinds of rewards video games can give the player. In this sense, the player is also the one giving themselves the reward for their effort. Understanding this and building a perfect balance of rewards and good feedback can greatly improve player experience in GuitarBots.

4 THE FLOW EXPERIENCE AND PLAYER MOTIVATION

A key element of an enjoyable gaming experience is the feeling of success. Having already engaged in the activity of playing the game for whatever reason, the player needs to remain interested in the experience in order to continue investing time and effort into it. In addition to giving the player interesting rewards and good feedback, the experience needs to adapt to the player's skill level to keep them at just the right balance of difficulty. Ideally, when a player is engaged in a challenge set by a game, they enter a state of flow. In this state, a person is focused in what they are doing, feels like they are in control, is able to react without thinking and is not aware of himself or herself. Perhaps most importantly, the person is engaged in the activity for the sake of the activity itself. This is obviously an ideal state to experience both when playing games and learning new skills, so inducing and enabling it in the player of GuitarBots is very important.

Flow and motivation lead to increased engagement in games, which in learning games such as GuitarBots can lead to increased performance and knowledge gained through the game. The longer the players spend with the game and with tasks given through it, the more likely they are to learn. To better understand how games attempt to help the player enter the state of flow, I will first present the conditions which increase the probability of achieving the flow state, as well as ways in which games can enable these conditions. (Murphy et al. 2013, 18)

4.1 Defining flow

In 1970, the Hungarian-born psychologist Mihaly Csikszentmihalyi experimentally evaluated and defined the concept of flow. He found out that a person's skill level and the difficulty of the task at hand affected their cognitive and emotional state and their performance in their activity. When a person's skill level is too low for the task at hand, the conflict leads to anxiety. When their skills are too advanced and the task is too easy, it leads to boredom. However, when the skill level and difficulty are just right, people enter a state of flow. Csikszentmihalyi initially discovered the state of flow in top athletes who would often describe their record-breaking performances as being "almost effortless". He gradually discovered that this state of optimal experience occurs in almost all kinds of human activity, from factory work to creating art, and from simple acts like reading to the extremely demanding work of a surgeon. He recognized that in this

state, people become highly focused, are less aware of themselves, experience an altered sense of time and feel fully in control of what they do. This state he named flow. (Baron, Sean 2012, 1, Murphy et al. 2013, 2)

Csikszentmihalyi described this state as being something where "people are so involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it even at great cost, for the sheer sake of doing it". He also stated that "the flow experience acts as a magnet for learning - that is, for developing new levels of challenges and skills". (Baron 2012, 2, Murphy et al. 2013, 2)

4.2 Enabling the flow state

Csikszentmihalyi was able to outline four conditions of a task that increase the probability of flow state:

- Concrete goals with manageable rules (clear tasks)
- Goals that fit player capabilities (an attainable, balanced goal)
- Clear and timely feedback (feedback)
- Eliminate distractions (concentration/focus) (Baron 2012, 1.)

In order to induce the state of flow in games, the designer needs to ensure that the four conditions are met. (Baron 2012, 3.)

4.3 First pre-requirement of flow: Concrete goals with manageable rules.

The player of a game needs to understand the goal they are working to achieve. If the player does not understand the problem, solving it will become frustrating. When a breakdown occurs in information processing, people can lose comprehension of the task goals and rules, which in turn negatively affects flow and problem solving techniques. In these cases, people often attempt to use methods of problem solving that have worked before and are likely to fail. (Baron 2012, 2.)

To avoid the breakdown in information processing, a game needs to take into account the player's limited ability to process and direct their attention while playing. Even though people are capable of handling a large amount visual, auditory and other kinds

of information at the same time, there is still a large amount of information that goes unprocessed. If our attention is divided because of competing signals and information given at a too fast pace, our ability to process all the information becomes restricted. When this restriction of processing information happens, people become anxious about their goals and their accomplishment and are likely to fall out of the flow state. (Baron 2012, 2.)

In games, accomplishing goals in itself reinforces the desire of the player to keep accomplishing – for example, leveling a character is rewarding enough to encourage the player to strive for the next level. Having concrete goals with manageable rules that the player understands creates a positive goal-achievement cycle that facilitates flow. (Baron 2012, 2.)

4.4 Second pre-requirement: Challenges must fit the player capabilities.

Especially in the earlier parts of a game where many new skills, techniques and concepts are introduced, the game must carefully balance the player experience on the very fine line between too easy and too hard. If skills are introduced either too quickly or too far apart, the player will react negatively. If the players are unable to accomplish goals even though the rules and tasks are clearly set, the gameplay experience will become dissatisfying and frustrating, which is likely to create stress-provoking drops in performance that hinder player performance. These kinds of drops inhibit flow and severely decrease the overall enjoyment of the gaming experience. In other words, if the difficulty curve in a game rises too steeply, the player is likely to react by quitting the game. (Murphy et al. 2013,11, Baron 2012, 2.)

There are a number of ways in which designers can balance their game for optimal flow. For example, the game should be designed for the right target audience with awareness of their initial skill. The game should introduce new skills and techniques at the right time and one at a time, without overwhelming the player with over-specification and too much information. The interface should also grow with the player skill to avoid starting off with too much distracting information. A chapter-based design where the challenge is built on previous knowledge is a good way to balance challenge against player skill.

A typical example is a structure where a tutorial sequence is followed by a series of increasingly challenging levels of reasonable length. (Murphy et al. 2013, 12)

The consequences of failure in necessary but minor tasks should be small, in order to ensure that players have learned the skill necessary in order to continue without discouraging them too much. Recovery after failure should also be short, and complete failure as a result of a simple mistake should almost always be avoided. The player should also always receive enough feedback to know how they can improve their performance. The game should give hints that point them in the right direction rather than giving them the answer straight away. (Murphy et al. 2013, 14)

In the case of games like GuitarBots that teach the player a new real-life skill, balancing between too easy and too hard is especially hard, since the game not only has to teach the player how to play the game but also the new ideas, information or skills the game aims to teach the player. This can lead to either overloading the player with too much information or dragging them through basic tutorials when they would already be ready to move on. (Murphy et al. 2013, 12)

The balance between difficulty and skill can be addressed by implementing dynamic difficulty adjustment. It can be applied in a variety of different forms, from making challenges easier to using visual effects to for example highlight areas of screen. (Murphy et al. 2013, 12)

Repetition can be used to help players apply a skill over and over and become better at it over each iteration. The key in effectively using repetition in learning games is to use it so that the players get the information necessary to improve their performance with every repetition. The tasks also need to be designed so that the player actually wants to repeat their actions and remain in the flow state. (Murphy et al. 2013, 13)

The use of reflection can also help learning. Thinking about their performance and discussing it is useful to the learning process of the player. The problem with reflection is that it tends to create breaks in the gameplay that should be avoided. However, using natural breaks in gameplay such as the death of a player's character can be useful. This way the designer can use an interruption in the gameplay as a moment of reflection for

the player, and to provide them information about what caused their failure and how they can improve their performance. (Murphy et al. 2013, 14-15)

4.5 Third pre-requirement: Clear and timely feedback.

Communicating to the player how well they are doing is vital in all games. People who get good feedback want to perform more. In games, feedback helps players measure their progress and enables them to correlate their actions to outcomes in the game. For example, when completing a task, a level or the entire game, feedback on this progress strengthens the player engagement and sense of accomplishment. In smaller scale, timing the feedback right is important. When feedback is given at the right time, it leads to strong associations between action and its outcome. If the feedback is given too early, the association is less likely to take place than if the feedback is given either at the end or midway through the action. (Murphy et al. 2013, 6, Baron 2012, 3.)

According to Csikszentmihalyi, the feedback can be more important than the activity we engage in to receive it, and that any kind of feedback is enjoyable as long as it is related to the activity and the goal in which one is invested. Game goals and rules would often be meaningless outside of the game, but what matters is the symbolic message in the feedback to the player, the feeling of success. Feedback in general is critical for understanding a process and it should be timed correctly, be meaningful and stated in positive terms. It should also attempt to help correct mistakes if they have been present in the performance. (Murphy et al. 2013, 6)

Feedback in games can be made more effective and given through various means, which can include progress bars and indicators, counters and other completion marks. Changes in the user interface, such as enabling or disabling actions can also be used. Feedback can also step in to help the player when the game notices a lack of action. Feedback used in these cases can be small clues like arrows pointing to the right direction or course of action. Feedback about unimportant actions should be minimized. Instead, games should strive for feedback that is focused on the player's progress towards the goal at hand. (Murphy et al. 2013, 6)

Subtle changes in text should be avoided when giving feedback, as they are hard to see and often go unnoticed. Motion, change of color and size and other noticeable changes

in contrast help player notice the feedback. If the player does not notice the feedback from the game, it is as good as nothing and from the player's point of view never occurred. (Murphy et al. 2013, 6)

4.6 Fourth pre-requirement: Remove information that inhibits concentration.

In order to enter and maintain the flow state, the player needs to have as few distractions as possible. Finding and evaluating the information important to the tasks at hand in a game becomes increasingly difficult when the player has to deal with a large amount of competing and distracting information. When this information is buried under layers and layers of visually appealing but ultimately distracting graphics and effects, it is often lost to the more flamboyant effects. In other words, the game interface and actions should be designed so that the player is not distracted by unnecessary information when they are using the core functions. (Baron 2012, 3.)

The designer uses the game interface as a tool to communicate the content of the game to the player. The player uses the interface to tell the game what they want to do and the interface in turn tells the player how the game reacts. In other words, the game interface is where the communication between the game designer, the game and the player takes place. The interface should be easy to use, avoiding such distractions as difficult control schemes. It should also be coherent and re-use previously taught metaphors for new actions. The game interface should always be able to provide the player clear feedback, clearly communicate game goals and highlight them and minimize unnecessary distractions. (Murphy et al. 2013, 8)

4.7 Enabling fun through flow in GuitarBots

A great deal of what is typically categorized as being part of the flow experience can also be described by simply calling it fun. Engagement, deep involvement, motivation and being "in the zone" typically are what people would call a fun or enjoyable experience. Understanding this and enabling it in the design of GuitarBots is vital in order to make the game feel motivating to the player. While some of these methods of enabling flow fall out of the visual designer's field of work, some are specifically linked to the way the graphics are designed. (Murphy et al. 2013, 22)

Learning how to play an instrument has traditionally been hard work. Ability plays a certain role in learning, at least in how quickly the student is able to grasp the new skill and how well they eventually master the intricate details, but most of the learning happens through practice. Learning by traditional means usually happens with either a teacher or by self-learning. A teacher is able to give good feedback on what the student is doing right or wrong, but the problem with traditional learning is often that the lessons take place once a week – the rest of the time, the student is left to practice on their own. During this time, they get little feedback and have little outside motivation to practice. One of the greatest ways in which GuitarBots can help a beginner to learn how to play the guitar and invest time into learning is to give them additional motivation that is not directly linked to learning a new skill. By having elements in the game that are engaging on their own and such that the player wants to return to them, even when they are not necessarily driven by the will to learn to play the instrument itself, the game has something that draws the player back to both the game and learning the instrument simultaneously.

A crucial way to improve flow in the learning experience and the musical skill is by giving the player good feedback, in some ways far better than a traditional music teacher could give them. The game is able to instantly tell the player note-per-note whether they are doing right and giving them encouraging and exciting feedback for it. The game can also correct their errors in constructive ways. In the long run, the game can also have overarching goals that help the player visualize their development on a larger scale. Although anyone could print a book with essentially identical content as the game, the book would definitely fail in giving the sense of achievement and feedback as they are learning.

In the context of my project it is crucial that the design takes into account the pre-requirements of the flow state and helps to enable them as much as possible. To ensure this, the design has to be simple enough at the right times as to not obstruct any important information that the player needs, while still giving the player as much timely and positive feedback as possible.

The user interface of the game needs to take into account the amount of information the player can process at a single time. The user interface should help direct the player to the right option at a given time. This can for example include disabling menu items at

the beginning of the game in order to ensure that the player chooses only options that are accessible to them at their skill level, or opening the level selection at the place where the player should continue when they return to the game. A good choice of colors can also help player both notice all the useful elements in the menu or obscure elements that are not important at a given point, for example by displaying monochrome versions of buttons and icons when they cannot or should not be pressed. Additional graphic clues such as pointers and tips can also be used to direct the player to the right direction.

The main gameplay should also support the pre-requirements of flow. From a visual viewpoint this can include such considerations as balancing the visual effects with the information on the screen. This can for example mean ensuring the fret of any note the player has to press is always visible enough to the player, despite everything that is visible on the screen. The main gameplay needs to give the player as timely feedback as possible, both about what they do right and what they do wrong. Feedback for the right actions should be encouraging and visually interesting, while feedback on what the player does not succeed in should be informative and clear. Any change in score or other such numeric or textual information that the player should notice needs to be both as visually interesting and clear as possible. Helping the player notice this kind of feedback can mean changing the color, size, animation or other visual elements of the text. For example, instead of simply adding to the number in score counter, the game can make the numbers roll up to the higher score, bounce or wobble to indicate change and rain particles down the screen.

These flow-inducing abilities and motivational qualities should be central to the design of the game. The game should still remain as technically functional and educational as it is, but with these in mind the game could be amplified into an addictive and massively more rewarding experience.

5 VISUAL STYLE AND GAME WORLDS

5.1 Visual style in GuitarBots

From a visual design point of view, the biggest problem in the current state of GuitarBots is the lack of a uniform visual style and unifying theme. Currently the game is essentially a mix of elements that has accumulated into the game over the two years it has been in development. Because of this, the main problem of the visual assets is not their quality, but rather their cohesion. The game gives little explanation of the combination of elements that is presented to the player – from the player's point of view, the game happens nowhere in particular and has a background animation of guitar playing robots for no particular reason. This is problematic, because the players are in a way left alone to piece together a cohesive experience.

To address this problem, this section of the thesis concentrates on researching the areas in GuitarBots that are currently the most visually as well as conceptually lacking and how they could be improved. These are:

1. The lack of a game world and the atmosphere produced by it
2. The lack of relatable, personalized characters and interesting character design
3. The lack of a uniform user interface with great feedback

In this section I present what needs to be taken into account in order to design an interesting game world and to design characters that fit it and are appealing to players – not so much what it takes to design high-quality assets, but ways in which the game itself can be made a fertile ground for the designer's ideas to grow in. In order to achieve this, this part concentrates on ideas that tie the game elements together: the atmosphere of the game, the setting, how the game world is related to the gameplay events and such. These are not only intended as building blocks for the designer, but rather as something that the player can also build their expectations of the game on and reflect their progress to.

I also present what to take into account when designing characters for a game – again, not so much from the perspective of creating high-quality graphical assets, but starting

from understanding the need for and purpose of characters in games – what characters are to the players and to the game and what they communicate and mean to the player.

I also want to improve the way the game gives feedback to the player, both when the player is successful and when they fail. I also want to design a user interface that communicates well with the game world and ties the elements of the game together, while enabling the player to receive the best possible feedback from the game. This is made possible by applying the concept of juiciness in games into the design of the user interface and its functionality.

5.2 Building game worlds

When designing the original version of the GuitarBots game, the lack of any unifying game world and theme was a massive problem. The game did not take place anywhere in particular, which meant that there was little ground for building the overall design style. Creating the characters was unnecessarily hard, since there was no setting for them to appear in. In order to improve the game and build a deeper and more captivating experience for the player, this section details how game worlds should ideally be designed and how they affect and even define the overall experience of a game. I wanted to find out what are the elements that need to be taken into account when designing a game world. Instead of delving into the practicalities of how a world should look like, this section defines what a game world is beyond its graphics. This creates a basis for the designer that he or she can build on when creating their designs.

5.3 Game Setting

In his article *Narrative in Videogames*, Patrick Holleman states that the setting is where game design and game narrative meet. It is what fundamentally sets games apart from other types of narrative by giving the player the freedom to explore the world freely. By allowing the player to discover new areas, characters and events through their actions and decisions, even simple and repetitive tasks can become captivating. According to Holleman, the setting is in a sense able to create and induce the fun in games, by giving the player new things to discover. Another example of the importance of an interesting setting that Holleman points out is the pleasure of getting lost in a game world. When the game world is well-designed enough, it offers players interesting things to explore

and discover, even when they have stepped out of the intended narrative of the game. (Holleman, Patrick 2011.)

5.4 Game atmosphere

In his article *Atmosphere in Games* Matthew Bentley presents a definition of atmosphere in games. According to him, atmosphere is "the feeling that is touched upon by only that particular combination of imagery, sound, music (or lack thereof), story, gameplay and the sense of agency which games are so well-known for." In order to create an experience that is optimally more than the sum of its parts, a game needs to be able to create a certain atmosphere. When these parts are combined in the right way, the game enables immersion in the players. (Bentley, Matthew 2013a.)

By involving the player emotionally and actively through player action, games are able to feed the player's imagination in far more effective ways than other media. By allowing the player to act as an active agent inside the world where the narration takes place, the player is able to discover the story as an active part in it. By helping cultivate immersion in the player, even a learning game could help the player move from a goal-oriented playing style into a more process-oriented experience. (Bentley, 2013a.)

5.5 Enabling atmosphere in games

Although graphical realism in games is something that developers often strive for, Bentley argues that truly deep atmosphere in games is created by leaving the player cognitive gaps to fill for themselves. In other words, a game attempting to appear as realistic as possible is more likely to fall short in creating an experience that truly connects with the player on an emotional level. As an example of this, Bentley compares the *Borderlands* and *Bulletstorm* games. Both share the same basic gameplay mechanisms (first-person shooter) and initial setting (post-apocalyptic world), but *Bulletstorm* is presented in the most photorealistic way possible, while *Borderlands* is created with a cel-shaded, cartoonish look. According to Bentley, the more stylized artistic vision of *Borderlands* sets it apart from other similarly themed games and creates an atmosphere that helps the players immerse themselves in the game. (Bentley, Matthew 2013b.)

Instead of using highly realistic and technically cutting-edge graphic assets as the main focus of the design process, a game can be "designed for atmosphere". In a game designed in this manner, graphics support the overall mood of the game and help strengthen the atmosphere established by the other parts of the experience. Instead of opting for a continuous display of dazzling graphics and effects, in a game built for atmosphere visual flare can be used as a way to reward the player. (Bentley, 2013b.)

Another point that Bentley raises about game atmosphere is visual-emotional congruence. This refers to how the different sections of the game should feel as uniform as possible. For example, when a game moves from gameplay to a cutscene or a menu, the visual feel of the graphics should remain the same. This helps the player feel that the world of the game is one uniform and cohesive whole. (Bentley, 2013b.)

Designing the progress inside the game world in a way that supports and maintains the established atmosphere is also important. For example, when a character in a game passes through gradually changing areas, the game world itself helps to visualize the progress of the player, which in itself is rewarding to the player. In this way, the game progress does not only happen on a technical and quantified level, but also on an experiential level. (Bentley, Matthew 2013c.)

5.6 Sekaikan and Game Worlds

In the article Characters and Worldbuilding, Zack Wood introduces a Japanese term closely related to game atmosphere, sekaikan. It can be translated as "worldview" of a game, and it can be divided into two main ideas. Firstly, sekaikan refers to the idea that a game world exists beyond what is on the screen. The world might not be physically accurate or realistic in terms of the visual design, but it feels alive and real. Secondly, it refers to the overall vision of the creator of the game. This includes the game world, the visual design, the rules, the controls and the story. These together create the "feel" of the game world. An effective combination of these elements leads to good sekaikan, which in turn creates an interesting and compelling game world that the player wants to return to, whether it is through replaying the game or even through other media. (Wood, Zack 2013, 4.)

Wood also talks about applying the idea of *sekaikan* and the worldview of a game by summarizing the idea of a game into one simple statement. For *Katamari Damacy*, a game in which the player controls a small creature that rolls items together to form larger and larger balls, the worldview can be summed into "getting bigger". He also suggests considering the game world from all angles, even from the ones that have no direct relation to gameplay or no significance in the game. For example, the game creator should consider such questions as "what is the political system like" or "what is the source of energy". (Wood 2013, 5.)

5.7 Tools for building game worlds

To create the desired atmosphere in a game, the designer has to create and define an engaging game world. In his article *Fundamentals of Game Design: Game Worlds*, Ernest Adams details the dimensions of a game world, which are some of the game design decisions and tools that define the players' expectations of the game as well as the gameplay experience. (Adams, Ernest 2009, 1-2.)

The game world is an artificial, imaginary universe that the events of the game take place in. However, a game world as such is not a necessity. For example, a game of chess takes place nowhere in particular, although the pieces suggest a medieval war setting. A game of *Stratego* takes place on a board that is printed to resemble a landscape, although it could just as well be played without a visual representation of a game world – however, it is the game world that makes the game more interesting and easier to relate to. In other words, the game world is what invites the player into the game. (Adams 2009, 1-2.)

According to Adams, the more a player understands about how a game works and the gameplay mechanics, the less they pay attention to a game world. As the players become more skilled in a game, they start to concentrate on the elements of the gameplay and possibly pay less attention to the setting of the game and for example how it is presented visually. However, when approaching a game for the first time, the game world is what creates and sustains the interest of the player. The game mechanics are not easily presentable to a possible player, but the game world and its visual qualities present the promise of fantasy that the game offers to the player: who they will be, where they will be and what they will do when they play the game. (Adams 2009, 1-2.)

5.8 Game world dimensions

When defining a game world, the designer needs to take into account a number of dimensions that describe the inner workings and style of the world and set the limits for the actions and events inside the game. These are the physical, temporal, environmental, emotional, and ethical dimensions. Although closely related to the work of the visual designer or the concept artist, these dimensions go beyond what the game world simply looks like. (Adams 2009, 3.)

The physical dimension defines games by their spatial dimensionality. This means defining the simulated physical space in which the events of the game take place in and the player movement therein. This dimensional space is not restricted to the visual representation of the space, since even text-based adventures define the space for player actions, typically divided into rooms. The physical dimension also defines the scale of the game. This can include distortions of the scale necessary to make the game playable. For the artist, this can mean balancing between realism and ease of use. The temporal dimension defines time inside the game world, whether it is dependent on player action or whether it passes on its own. (Adams 2009, 3.)

The environmental dimension helps to set the atmosphere of the game by defining the art style of the game. The environmental dimension provides the contextual background of the game world, defining the appearance of objects and characters as well as the culture and values of the game world. The emotional dimension refers both to the emotions of the inhabitants of the game world as well as the emotions that the game seeks to evoke in the player. The balance of risks and rewards in the game creates feelings of success and defeat, while the narrative of the game allows the player to experience the emotions of the characters in the game. The ethical dimension refers to the definition of right and wrong in the game world, which is often already defined along with the setting of the game. (Adams 2009, 3.)

Game style defines the intrinsic style of the world as well as the style in which it is presented to the player. For example, a game can take place in a medieval city presented either in a highly realistic or a whimsical cartoon style. While the setting can remain the

same, the different art style creates different expectations to the player. (Adams 2009, 3.)

5.9 The importance of game worlds

The game world and its atmosphere are the promise of adventure and escapism that the game presents to the player. The game world tells the player what to expect, who they will be and where the game will take them. A game can exist as only a set of rules and abstract graphics to illustrate the gameplay events, but the proper use of atmosphere and a well-defined game world and visual style makes the experience deeper for the player and makes the experience engaging on a more personal level. In the case of a game like GuitarBots that to a certain extent utilizes and attempts to define a game world with a certain setting but fails in it, the player is unable to relate to the experience on the desired level.

Although GuitarBots is essentially a learning game that could exist without any game world context, the lack of a proper game world still leaves the experience emptier and less personal than it could be. Without these elements the game loses a lot of what makes it an interesting and compelling product and brings the experience closer to a learning tool, which in turn means losing many of the advantages that a well-designed game has. The user can enjoy the functionality of the game, but they lack a deeper connection to the gameplay and their development in their skill. Using a proper game world that is interesting enough on its own can lower the bar for the player to start learning to play the guitar as well as invite them back to return to the game world, creating other incentives to play besides the learning.

For the visual designer, a well-defined theme and vision for the game world is crucial. By establishing a setting and a style the designer is given a set of tools they need in order to produce high quality graphical assets. Defining the game world and style together before producing too many assets also helps the designer to create artwork and assets that are cohesive throughout the product. Defining the game world in the terms of its dimensions helps the artist and visual designer understand the demands and needs of the assets created for the game. This includes for example how the characters are able to move, what kinds of assets can be produced and what kind of scale they need to appear in.

5.10 Characters

Having explored the design of game worlds it is important to also understand the characters that populate them. This section details both why it is important to have good and interesting characters in a game and how to design them. Video games are unique in the sense that they allow the player to participate in the story from the inside and as an active element, instead of being a spectator who experiences the events from the outside. This immersion in the game partly happens through characters and through the actions that the player performs via these “actors”.

From a practical viewpoint, the design of a character for a game needs to communicate multiple qualities and meanings to the player: the nature of the character as a gameplay element, the qualities of the character related to the narrative of the game, and the elements of the visual design of the character that makes it distinguishable from other characters and elements of the game.

5.11 Understanding characters in games

To build the basis for designing good characters for a game, the designer needs to understand the relationship between the player and the characters in the game, especially the ones they choose for themselves to control. Unlike in other media, characters in games are not separate from the viewer. Their actions are not, at least entirely, dictated by the author of the story. Instead, the player is given the possibility of experiencing the story from within, often while being able to influence either the events of the story or at least the speed at which the story unfolds. Unlike in a traditional narrative, the player can choose to spend more time doing things they enjoy and speed through parts they find uninteresting. (Kelly, Tadhg 2012.)

In his blog post *On Player Characters and Self Expression*, Tadhg Kelly argues that the player is always separate from the character on the screen. He argues that believing that players themselves take on the role of the character they play with is a common misconception that stems from the legacy of pen and paper roleplaying games. In these kinds of games, the player controls an imagined entity, their player character, that is expected to behave in a certain way, unrelated to the nature and personality of the player. The

games expect the player to "play their part" in the story, customize their character to give it more depth and make choices that the actual character in the game world would make. In other words, these games produce meaningful experiences and allow the player both to rewrite the story and play the games within its set of rules. (Kelly 2012.)

In many popular games, the characters are actually very empty and do not offer much in the way of role to play. In games like Super Mario, no-one even considers playing "in-character", and the game does not reward such behaviour either. This, according to Kelly, sums up most games – playing with and controlling a character in a game tends to bring out the player's own personality, rather than imposing a role in the narrative on the player. (Kelly 2012.)

Although the player does take on a certain role when choosing a character and playing a game, they are not performing like an actor or, in this case, a puppeteer would. Instead of providing the players roles to step into, different archetypal characters in games offer them the possibility to choose a character they can use to project their ego and express themselves with. In role-playing games, certain races of creatures (humans, orcs, elves, dwarves) or character classes (paladin, fighter, thief, mage) represent a typical kind of character that remains essentially the same from game to game. Rather than finding an interesting role to play in the story, the player chooses a character from these races and classes that best represents their personality and playing style. (Kelly 2012.)

5.12 Storysense

Storysense is a narration approach coined by Kelly that treats the game story as a backing track to what the player does, bringing together the game world, its characters and the player. The player is free to drop in and out of the story as they wish, paying attention when it is interesting and dropping out when it is not. The game does not reward playing "in-character". According to Kelly, storysense enhances the sensation of a world in motion – the story does not necessarily center on the player or their actions, but happens around them, strengthening the atmosphere and sekaikan ideas presented earlier. (Kelly 2012.)

Storytelling through cutscenes rarely works in games, regardless of the quality of the production or the storytelling. It is hard to tell a good story in a game and according to

Kelly, the most successful stories in games are in fact "sensed", not told. When narrative in games gives up on traditional storytelling and instead reduces it to the level of setting objectives for the player, the games give the player more room to express themselves through the characters. According to Kelly, successful storysense requires a great character for the player to interact with the world, a great world to interact in and with, as well as great opportunities for self-expression. (Kelly 2012.)

5.13 Designing good characters

When designing characters for games, the designer needs to take into account multiple aspects of the character: the nature of the character as a gameplay element, the qualities of the character related to the narrative of the game, and the visual design of the character that makes it distinguishable from other characters and elements of the game.

In his article *Building Character*, Toby Gard argues that the most important rule in character design for games is "the game comes first", meaning that the type of game being developed dictates many of the character design decisions. Gard advises the designer to look for "the clearest, simplest way to represent an idea" – in an extreme application of this, a game might not require a character at all, so one should not be "forced" into it. In other words, the character should be a part of the game world and communicate elements of the game itself in the same way as the other design elements in the game. (Gard, Toby 2000, 1.)

5.14 Characters, identification and immersion

In games, the player is either expected to immerse themselves into the game world through the character and identify themselves with it, or alternatively to perceive the character as an actor that they control on the screen. Typically the choice between an immersive avatar character and a character actor depends on the type of game being designed, first-person games usually relying on the avatar and third-person games on a character actor. In other words, in a game with a first-person point of view, the player is expected to become the character, but in a third-person point of view, they control the character but do not necessarily personally identify with it. (Gard 2000, 2.)

The avatar character is a representation of the player inside the game world, but an actor has more qualities distinct from the player: they have their own personality, characteristics and even their own mind, possibly even their own will. When playing a third-person game and controlling a character, the player perceives the successes and failures happening in the game world to happen to their character, but in a first-person game, the player feels that the game events happen directly to themselves. Given this distinction, it is important that in a game with a first-person point of view, the avatar does not interfere with the player's immersion and that the game treats the player character as an empty slate that the player fills for themselves. In a third-person point of view, the designer does not need to be as careful with breaking the illusion of player immersion, which allows for a more traditional style of storytelling. This can include dictating the character's personality and emotions and even controlling how the character behaves and the decisions he or she makes. (Gard 2000, 2-3.)

To distinguish between the character types, Gard presents a list that helps sort them in order of their design detail.

1. **Avatar.** Only visual design needed.
2. **Actor.** Needs full character design with a "one-sided" personality. The character should have personality that the player knows and relates to, but in a way that it does not conflict with the player's experience.
3. **Non-player character.** Full character design is required, as the player has no control over the character and its actions .(Gard 2000, 3.)

5.15 Character design – visual design

When designing the character attributes, the designer should take into account all the visual clues that people interpret when meeting a new person. These include factors such as height, weight, sex, race, attractiveness, clothing and other accessories, as well as body language, posture, movement and such attributes. People subconsciously gather this information of people at a glance and make assumptions based on their personal sets of stereotypes, matching patterns with their pre-existing expectations. The designer should employ these patterns in perception to create characters that players are interested in and like – or dislike, if so desired. (Gard 2000, 3-4.)

People tend to put similar presumptions into how people carry themselves as what they look like. In his article *Drawing Basics and Video Game Art: Character Design*, Chris Solarski discusses non-verbal communication and body language and understanding how it helps character design. Bodies, their posture and their movement communicate who characters are as individuals, what they are feeling and their personal traits. Body language and posture play a major role in how a character is perceived and the characteristics it communicates. Even with all other identifying features removed, the character's pose, posture and body language should still be unique to that character and its personality. Using unique poses to describe the character is especially useful in still images, for example in marketing. A silhouette of a character should be distinguishable and communicate enough information for the player to tell different characters apart and to recognize for example their gameplay qualities, such as strength, speed or defence. (Gard 2000, 8. Solarski 2012, 4.)

The way a character moves and how it shows the weight it carries makes a huge difference in making it feel alive and communicating its qualities to the player. The concept of a character's unique poses should be applied into the movement itself. For example, how a person walks suggests a massive amount of information about him or her. According to Solarski, it is important to note that realism does not usually equal believability. He argues that it is hard to portray real-life subtleties in animation unless they are exaggerated almost to the point of a pantomime of good acting. (Gard 2000, 8. Solarski 2012, 4.)

In the article *Better Game Characters By Design*, Catherine Isbister presents a list of words used to describe the way people move their bodies and the relation of their movement to the personal qualities they express. Isbister presents a list of the factors discovered by P. E. Gallaher in the study *Individual differences in nonverbal behavior*. (Isbister, Katherine 2006, 1.)

1. **Expressiveness.** The amount of variety and energy there is in the expressions and gestures in a person when communicating with other people.
2. **Animation.** The amount of energy a person shows in their general movement.
3. **Expansiveness.** The amount of space a person occupies when moving.
4. **Coordination.** The grace and smoothness a person shows in their movement.

(Isbister 2006, 1.)

These qualities of a person's movement and their personality have been found to be linked to each other. For example, a person who is fearful by nature tends to display less expansive movement and less animation. Women tend to display more expressive qualities, while men typically move in a more expansive way. Body type is also linked to the way a person moves, typically taller people are more expansive while muscular people are described as more animated and coordinated. Taking these connections between movement and personality into account when designing how a character is animated can help greatly improve the sense of depth that it communicates to the player. (Isbister 2006, 1.)

5.16 Character design in practice: Character shape

Solarski presents a method of designing characters that is based on "thumbnails". This means quickly designing characters using basic shapes to establish their form and details. When designing the shape of character, the designer can employ a method of building them out of basic shapes to first sketch out a silhouette that already communicates their basic qualities. Using primary shapes to build the initial silhouettes of characters help communicate emotions – or example, a character built out of rectangles is visually and likely emotionally different than a character built out of triangles. Repeating patterns help keep the character uniform and express its qualities. The same shape can be rotated and scaled to build all parts of a character's body. (Solarski 2012, 4.)

To determine whether the character design as a whole is visually unique enough to stand out from other characters, it is useful to look at its silhouette. It should retain the essence of the character, even when scaled down or viewed from afar. For example, the characters in Team Fortress 2 are designed in a way that they can be easily distinguished by only seeing their silhouette. (Solarski 2012, 4.)

5.17 Character design in practice: Character costume

A consistent costume design helps the player recognize the characters they are introduced to. Uniform design for a character's costume helps establish the character and in a way imprint the character in a player's mind. The color scheme of the costume should be kept simple and iconic, helping to strip the overall presentation to its essence. Ideal-

ly, a character can be stripped down to its primary color swatches and still communicate the idea and essence of the character. The costume design for a character should also communicate the function of the character in relation to its environment, telling the player why the character is especially suited to its world. The details of a character's costume also often communicate the abilities and specific traits of a character, such as the spider web details on Spiderman's costume. (Gard 2000, 5, 7-8.)

5.18 Wrap up on characters

Characters are the human element that brings the game world alive. Characters in games are complex entities that have multiple meanings and roles, for example as a part of the story and as a gameplay element. The player uses the character as a gateway to enter the story and to experience the game world, ideally becoming a part of it and experiencing the game and its possible story from within.

Understanding the relationship that the player has to the playable characters in the game is important for good character design. The game should not expect the player to take on the role of a puppeteer who makes the character play out their part in the story, but rather enable the player to experience the story and the game world through the character, enabling a storysense experience. If the player is given a choice with the characters, it is likely that he or she will choose a character that enables them to play in a way that fits them, or one that they in other ways relate to -- rather than playing the role of a character, players tend to play their own role and choose a character to support their own gameplay preferences.

The depth in which characters are designed in games depends on their gameplay qualities. The game world dimensions and the way the player interfaces with the world also affects the type of characters created for the player and how deeply they are defined in the game, through the story or otherwise. The character is the player's means to enter the game world and they are free to explore it from the inside. The game designer should take this into account when designing games that are aimed at high immersion and give the players freedom to complete the character with their own qualities.

When designing the characters, the visual designer has to be able to communicate the qualities and personality of the characters through their appearance. This can include

everything from the physical build of the character, their posture and the way they move all the way to the kind of clothes they wear. A game also has other requirements for the design, such as keeping the characters visually distinct from each other and the other visual assets on the screen.

In the case of GuitarBots the characters are ideally used as a backing element that gives depth and liveliness to the game world and helps the player visualize and relate to their progress. Giving the player a choice of character allows them to personalize their experience into something that they relate on a personal level. The characters in a game like GuitarBots do not need a deep back story or a well defined personalities, since they should be intended as a visual representation of the player who is playing the game and a way to bring the game and its world alive, rather than serving as elements of any story.

The rewarding and customization possibilities of the characters should also be considered and built upon. For example, choosing one's own character and seeing that character develop and being able to customize it with new and interesting items and accessories creates a visualization of the player progress that is both rewarding and personal. Giving the player the ability to display their characters and possibly communicate with other players with the character gives them more incentive to further customize and personalize their character.

5.19 The user interface and juiciness

The user interface is the place where interaction between the game, the designer and the player happens. Its primary goal is to provide functionality that allows this, but it also often acts as a feedback system to the player, giving them feedback about game events that is not easily or adequately communicated using only the gameplay assets. To maintain and enable a flow experience for the player, the user interface needs to be simple, but still provide interesting, encouraging and timely feedback.

The user interface has to echo the other style and setting choices discussed earlier in the game world part of this thesis. Creating the user interface assets with the same graphical style and making them match the setting of the game, the designer can tie this artificial and in itself purely functional layer together with the game as a whole.

In GuitarBots, the interface gives some feedback to the player, but the presentation is lacking in terms of helping the player feel successful and achieve the flow state. The timing of the feedback is often vague and out of context, happening at either the wrong place in the screen or completely after the performance. The graphical assets used for this feedback are also dull and unencouraging.

The graphical quality of the user interface assets is also a problem in the game. Attempts to limit the size and number of graphical assets to keep the download size very small has also led to a bottleneck in the quality of the presentation. This emphasis on frugality has forced the design to be generic and forego the possibilities of applying a proper matching style for the assets. The user interface also lacks most of the animation that would help tie it together contextually and make it flow through each screen as well as react properly to game events and player input.

In order to determine how to improve the visual feedback given to the player in GuitarBots, this section presents the concept of juiciness in games. Juiciness adds life to an otherwise overlooked and uninteresting part of the game. It can also help the player by telling them whether the actions they do are meaningful by giving more interesting feedback for actions that are desired. It can also help the player feel more powerful and give them a sense of control over the actions and events in the game. It also adds to the professional feeling of a game by adding a "game-like" interactivity that players expect – according to Purho, without this kind of interactivity, a game "feels off". (Gray et al. 2005, 3., Gamasutra 2013.)

In his book *Casual Revolution*, Juul describes juice in the feedback systems of casual games. In addition to function (using the game) and information (has the player for example completed a level) the game interface and feedback system can and should also provide a significant amount of rewards and satisfaction to the player. For example in the massively popular casual game *Peggle*, when a player completes a level the game rewards them with rainbows, texts exclaiming "Extreme Fever" and by playing a triumphant rendition of Beethoven's *Ode to Joy*. The term juiciness is used to describe this kind of excessive positive feedback given to the player. It does not simply communicate information or make the game easier to use, it also makes the game an immediately pleasurable experience. It is specifically related to the feedback for the player's actions,

making them feel especially competent and clever about their actions. In terms of usefulness in the context of the gameplay experience, it is in essence useless – it does not alter the gameplay itself in any way. (Juul, 2010, 45–49.)

Another perfect current example of this type of juicy feedback is the massively popular mobile game Candy Crush Saga. When successfully completing the level, the player is treated to an excessive series of feedback sequences with verbal feedback ("divine!"), colourful explosions, rows of candy being destroyed in a flamboyant manner and finally, bizarre fish swimming into candies with a corresponding color, producing even more explosions – all the time accumulating the player's score. This is both a ridiculously exaggerated and incredibly rewarding sequence in exchange for the player's input in what is essentially a monotonous game consisting mostly of busywork.

In casual games, the juiciness often takes place in the user interface and it addresses the player directly. In games directed at a dedicated gamer audience, such as first-person shooters, the juicy feedback is often diegetic, meaning that it appears inside the game world. An example of diegetic juiciness is a visually advanced explosion rewarding the defeat of a strong boss battle or other such encounter. In other words, hard core juiciness takes place in the 3D space of the game, casual juiciness happens and addresses the player directly in the player space. (Juul 2010, 45–49.)

In their presentation Juice It or Lose It, Martin Jonasson and Petri Purho present a list of juice-inducing effects that a developer can apply in their games.

- **Color.** Color can be used to distinguish the meaningful elements of the user interface or other game graphics from elements that the player should not pay attention to.
- **Tweening.** Tweening, short for “in-betweening”, is an animation technique that makes animation more lively and less linear. For example, moving an object in a linear manner from one place to another is usually not very visually interesting, but adding an increasing or decreasing curve to the movement animation makes it seem more natural.
- **Squeezing and stretching.** Squeezing and stretching objects while moving them or at the point of impact adds to the feeling of momentum. For example, when

an object quickly moves across the screen horizontally, stretching it on the same axis makes the movement seem faster and more life-like.

- **Sound.** Sound can be used to make animation more meaningful and game objects more realistic. Examples include using different sounds for successful or unsuccessful attempts, as well as wanted or unwanted actions. Sound can also add a feeling of material to gameplay elements.
- **Particles.** Particles add a visually interesting response to actions in the games. An object that simply disappears when being destroyed seems artificial, but adding a puff of smoke gives meaning to the event. Particles can also be used to indicate player success and interactions between objects.
- **Screen shake.** Adding screen shake to the impact of game objects or for example to the player character taking damage adds a feeling of weight and physical realism to the elements of the game. (Jonasson, Martin & Purho, Petri 2012.)

5.20 Juicing the Bots

Using these techniques in GuitarBots can help the user interface come alive and add to the feeling of a complete, well thought-out product. Adding juice is especially important for the player feedback in order to make it more encouraging, interesting and prominent. Rewarding successful streaks of notes and chords with beautifully designed and animated combo counters and interface messages, along with encouraging sounds creates a layer of immediate feedback that currently feels lacking in the game. Particle effects can be used to further decorate and emphasize these messages. Smaller particles can be used for less significant events and completing levels can be rewarded with full-screen particle showers and other effects.

The juice effects can also be applied to the entire main gameplay interface. Correctly played notes and chords can be indicated with special effects along with current system of color coding for right or wrong chords. Screen shakes and particle effects can also be added to successfully completing a particularly difficult note on the fretboard or other events in gameplay that the player should feel excited and successful about. Screen shake and particle effects can also be utilized to indicate missed or failed notes. This can include effects such as shaking the screen on impact when hitting the wrong note, or combo counters or other elements disappearing in a puff of smoke when the player misses a note.

The animation of the user interface should also be taken into account in order to create an interface that feels alive and easy to understand and interact with. Switching between screens should create meaningful flows and items should appear on the screen in a smooth and meaningful manner, instead of switching from one screen to another without any transition or with a linear movement curve. Appearing items should pop up in a fluid manner or slide in smoothly. They should also move in succession so that they illustrate the hierarchy or order of the items already in the animation, or move as a whole to indicate a connected group of items. The most important items on the screen should be animated to draw the player's attention toward them and guide the player along on a path of desired interaction throughout the game and its interface.

Using these techniques helps tie together all the elements of the game from the gameplay and its design to the visual style, the game world and its atmosphere. Juice creates a uniform product that feels alive and interactive to the user, and is easy to use because of the sense of meaning it gives.

6 THESIS PROJECT: GUITARTOWNS

6.1 Thesis project

The research in my thesis was applied into practice by producing a design document for a redesigned game based on the GuitarBots engine with an emphasis on both atmosphere and producing a rewarding game experience for the player. Special emphasis was also put into creating a matching combination of setting and graphical style. The design document presents both the overall art direction as well as mockup images of different events, feedback messages and screens in the game. The design document and the mockup images also include character and background assets and assets for the user interface graphics for the game.



FIGURE 2. Design document page showing the main menu mockup.

The design document details the basics of a new guitar learning game called GuitarTowns. The goal was to design a game where the events tie in together with what the player is doing and a game that ties together the game and learning to play the guitar. In the game, the player chooses their character, starts a band and goes on a tour of different areas and cities. The progress in the game is visualized by moving through different locations on a map and unlocking new areas to explore. The player is also given the ability to customize the members of the band with items, costumes and instruments unlocked through successful gameplay. The player can unlock these items as well as badg-

es and other content by playing levels with high scores. For the scope of this design document the decision was to keep the actual gameplay as it is in the current GuitarBots engine and only focus on the overall presentation of the game, leaving out most functional changes to the gameplay.

6.2 Art direction

In order to combine the game content and its design, the inspiration for the art style was drawn from concert poster design. Designers working with concert posters, especially for smaller venues and indie bands, often use a similar design style. Typical elements of this style include the use of interesting, old-fashioned slab-serif fonts, intentionally rough graphic treatments and the use of found or distressed artwork. Since the posters are often still printed using the silkscreen technique, the designs typically take this into account by using a limited number of colors and large and visible raster patterns. These are all elements that have been incorporated into the art direction of GuitarTowns. This is especially visible in the background graphics, but it also applies to the style decision in the user interface graphics as well.



FIGURE 3. The user interface design.

Since the assets for the design document were created for the iPad, the goal was set for creating assets that would naturally fit the mobile platform and would not look out of place compared with other mobile games. In order to clearly separate the background

elements and the interactive elements, the more poster-inspired style was mostly used for the backgrounds and a more game-like approach for the interactive elements.

6.3 Game world



FIGURE 4. Concept artwork for the game world.

The game takes place in a world where a battle of bands is arranged each year. However, only bands with sufficient touring experience can compete in the event. The player takes the role of the lead guitarist of an aspiring band that is desperate to take part in the battle of the bands, and naturally win it. However, the problem is that none of the musicians in the player's band are very well educated in their instruments, and their gear is also a bit on the lousy side. The player's band has to tour the various areas of the game world, playing in different locations, ranging from little clubs to large open air festivals, in order to gain the experience, skill and equipment required in order to compete in the battle.



FIGURE 5. Example locations from the game.

The player's band moves between the areas in their beat-up old tour van. Different musical styles are popular in different areas of the world, so the band needs to prove their proficiency in a variety of genres of music. The different styles also affect the visual style and mood of the areas, as well as the types of locations where the band performs. The area map reflects the overall conditions and style of the area, each area with its own quirks. The atmosphere of the areas changes from one to the next, which is communicated with color choices, change in the ambient sound effects and overall visual elements on the map.

Each area is presented to the player from an aerial view, showing the different locations that are available and the paths the player can take to move between them. Each location contains a number of exercises and songs to play. These can be full songs or simpler exercises that help the player learn the techniques, chords and other elements of playing the guitar needed to play the full songs. Passing the full songs is required in order to move between locations, and training enough with each practice exercise is necessary to move into new areas. The player is often given branching paths leading to different locations. This way, they have the ability to play another location if they get stuck on one.

6.4 Characters and backgrounds

The player takes on the role of the band lead, who has to lead his or her band into victory in the battle of the bands. Like the player, the band lead starts from learning the basics of the guitar and represents the player in the game world, sharing the same challenges and difficulties as the player.

When starting the game, the player is able to customize the band lead character in a way that suits them. The game offers a selection of pre-set character types with their specific character traits and appearance. The player can also customize the initial outfit and gear of the character, choosing from a limited set of initial costumes and accessories. The player can also choose guitar gear that suits their character.

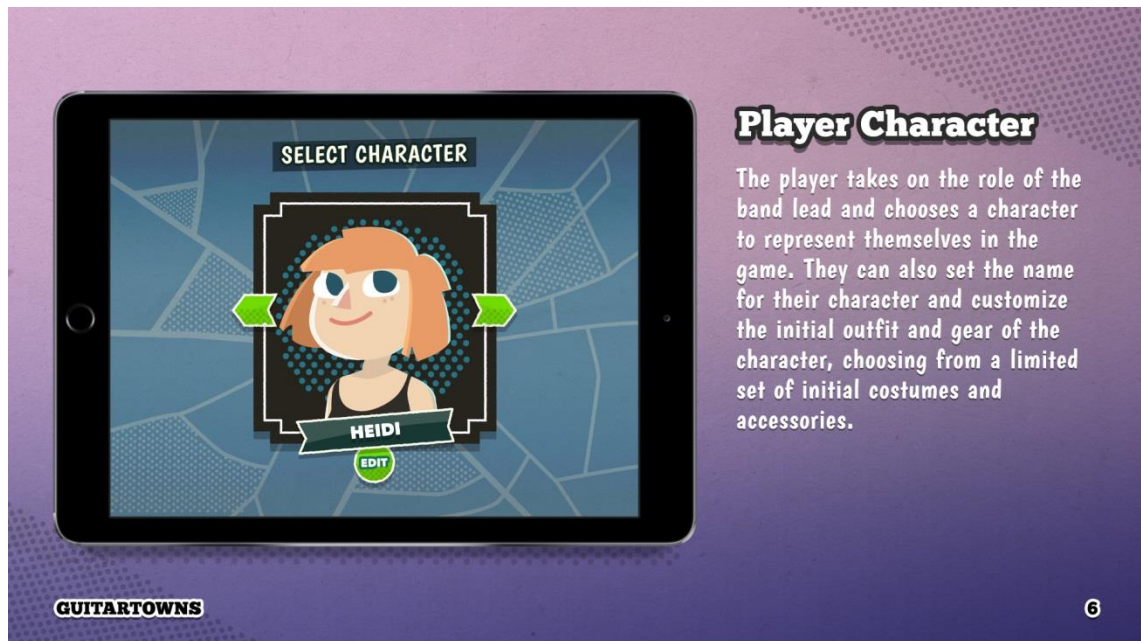


FIGURE 6. Choosing the player character.

The other members of the band are pre-set in the beginning, but as the players progress they are able to add more members to their band or replace old ones with new characters. These band members do not have an effect on the gameplay, but the player is also able to customize their appearance by discovering new items through playing.

Players of the game can choose to make their band profile public. Other players can see the profiles, the player's guitarist level and statistics of how well and how much the user has been playing. The time spent playing and the number of notes and chords played are

presented as statistics, and the band itself communicates the dedication and success of the player. Players who have played more will have a band with fancier gear and outfits to display than players who are just beginning, despite how well they have been playing. This way, the emphasis on the shared profiles is dedication to learning rather than talent or skill.

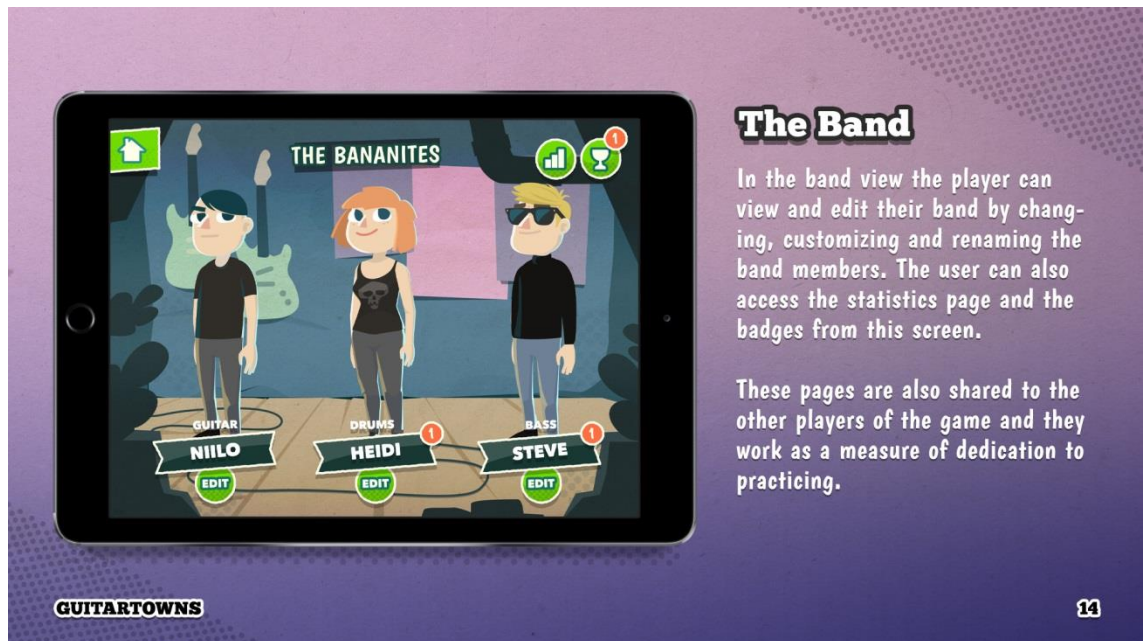


FIGURE 7. The band profile page.

6.5 Main gameplay

The main gameplay mode shows the player's band performing in different locations and venues, depending on the area the band is in. Like in GuitarBots, the band plays in the background and reacts to how well the player plays. For example, playing well makes the band perform happier moves, while playing wrong causes them to react negatively. The audience and other elements of the venue visualization also react to player performance with animation and sound.

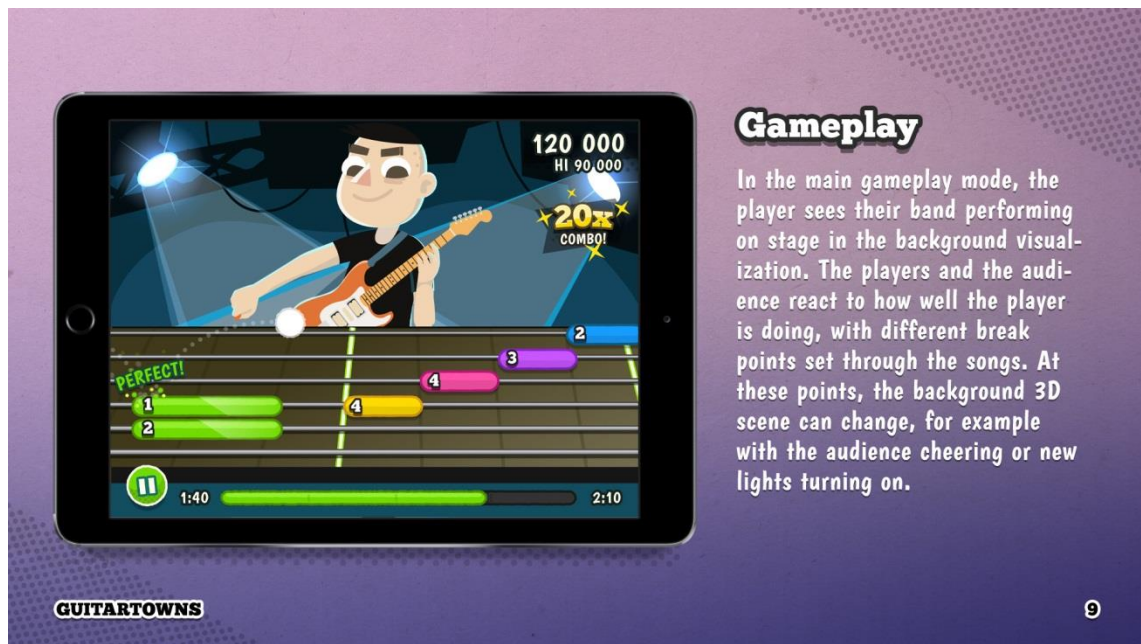


FIGURE 8. An image showing concept art of the main gameplay mode.

The final level in each area is always the biggest venue. In these levels, the background visualizations also support the part structure of the exercises, with the background visualization changing as the player enters a new part of an exercise. This can for example include new lights turning on, audience cheering or stage backdrops changing.

The background scene is created in cel-shaded 3D, which enables easy and fast production, while keeping the graphics in line with the casual style of the rest of the game. Some animation elements such as changing expressions on the characters faces and particle effects like smoke can be created simply by changing textures. Customization elements like accessories and new instruments can also be easily added to the scene with this style. This style of 3D animation also makes it easy to run the visualization even on modest hardware. The image used in the design document is a concept mockup of the style created in Illustrator.

6.6 Feedback and juice

To improve how the game communicates with the player, the user interface has been designed to give the most encouraging feedback possible. Each successful player action is rewarded with relevant and timely feedback. For example, playing a streak of correct notes is rewarded with combo counters that become increasingly stylized as the number of notes grows, starting from simple numbers and ending up in golden numbers emitting

particles. Also, when the player plays single note, timing information for each note pops up above it. Reaching a new part in a level is appropriately communicated during gameplay.

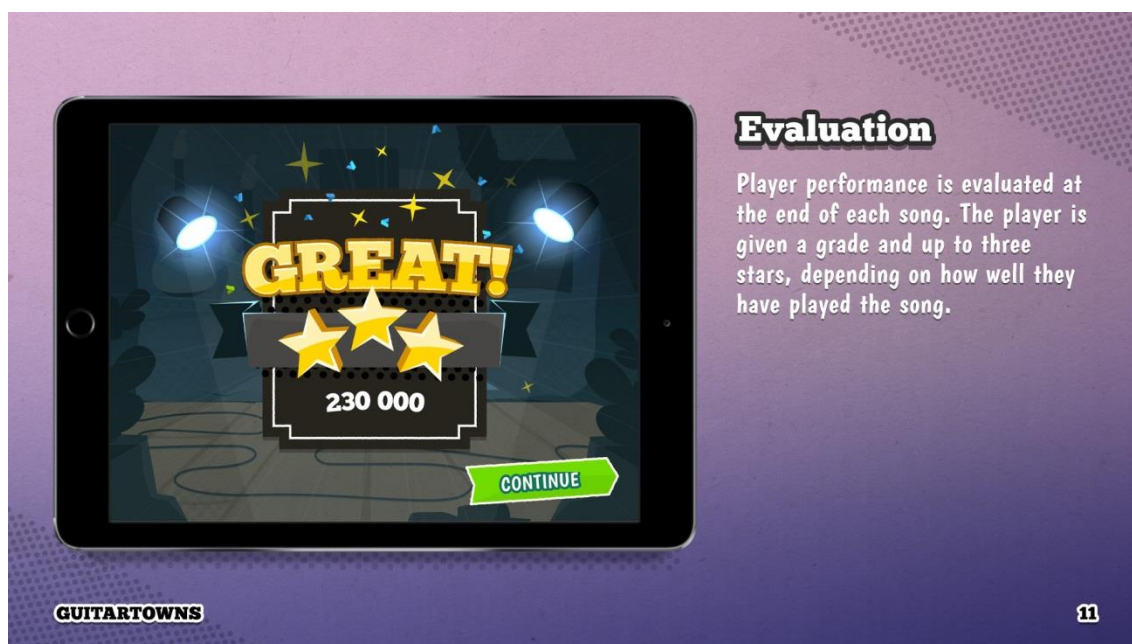


FIGURE 9. Player performance evaluation.

When the player completes a level, an overall grade of their performance is presented to the player. The presentation of the feedback changes depending on the grade the player gets, ranging from a perfect performance to complete failure. A perfect performance results in more stylized visual presentation with golden text and different kinds of particles raining on the screen and other effects. In the case of failure, the text turns burning red and smoke rises from the grade.

6.7 Rewarding the player

Instrumental rewards are given to the player in exchange for the repetition that is necessary in order to learn to play the guitar. To ensure that the player is not able to access overwhelmingly challenging exercises too early on, movement between cities is restricted. To move to a new city, the player needs to buy gas for the tour van of the band, and the money to buy the gas is earned by playing short exercises where the player repeats small melodies and chord sequences that help build the skill needed to play the songs in the game. Only by being able to collect enough money by playing these exercises, the player is ready to move to the next area. Each location on the area map in-

cludes at least one of these kinds of exercises, and they also ensure that the player is able to learn the skills necessary for playing the song exercises in the current location.

While these types of instrumental rewards are often not typically very encouraging to the player, they fit well with the repetitive nature of practicing a melody, a chord or a chord change. The game gives context to the practicing and visualizes the learning. The true reward for the repetitive learning comes from reaching the new area.

Badges are given to the player in reward for successfully completing different voluntary tasks or milestones in the game. These tasks can vary from completing a certain city and other progression-related tasks to gradually reaching milestones for example in the number of played chords or notes.

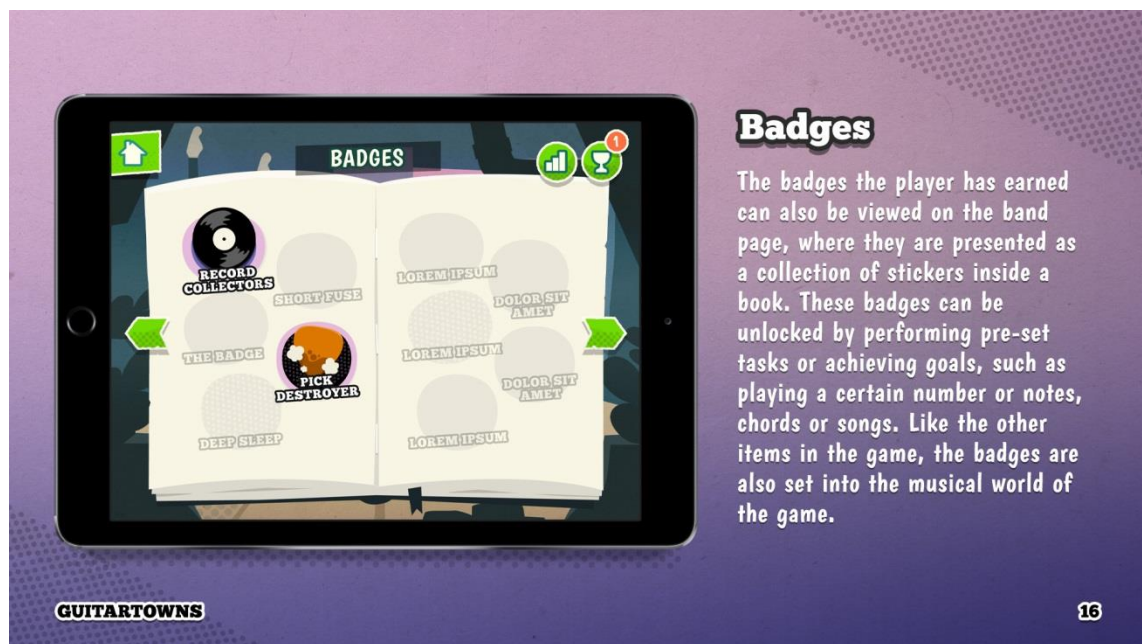


FIGURE 10. The badges appear as stickers in the player's collection.

Customization items are rewarded to the player for dedicated playing. These rewards are not given directly for any specific event, but rather spread out over the exercises in a random way that encourages the player to play more, and even play levels they have already completed to further enhance their skills. This way, playing longer and practicing more is made more rewarding.

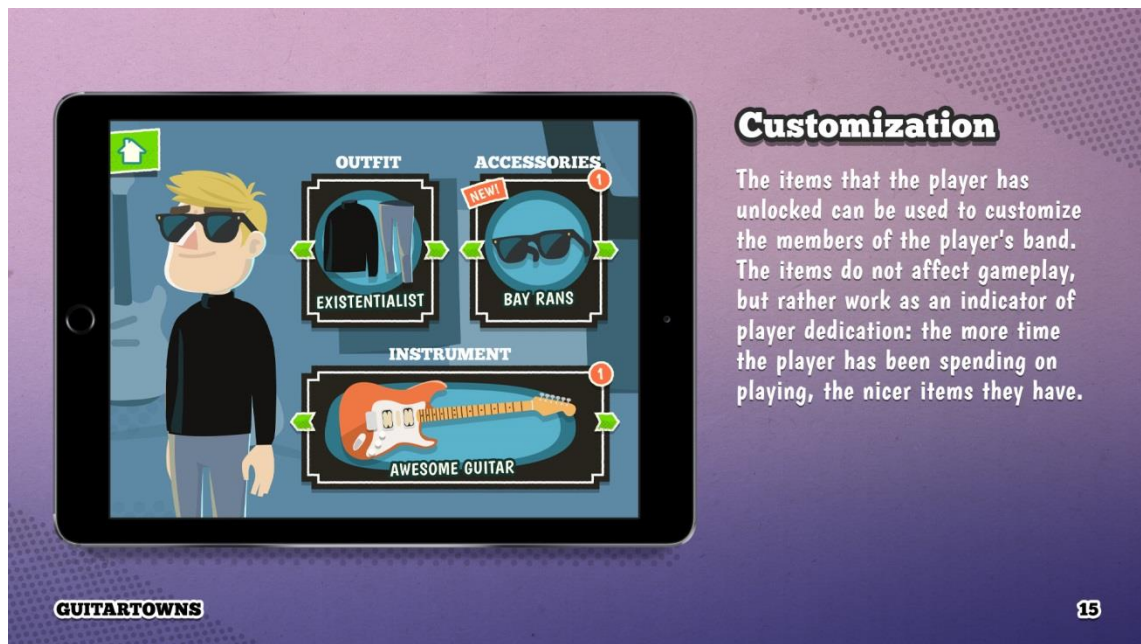


FIGURE 11. Choosing customization items for a member of the band.

Additional items can also be rewarded for playing small optional sections in the exercises. These can for example include small note interludes in between chords that more advanced players can play, while beginner players are only expected to play the chords. The beginner players can return to these exercises after their skills have developed and collect the rewards. These notes are visually separated from the other items on the fretboard and clearly indicated as being optional. Later in the game these optional exercises can for example include playing notes from the right scale instead of a set melody, allowing the player to improvise in a way that the game is able to understand. This way, the exercises offer fun optional challenges even at the higher levels.



FIGURE 12. Examples of rewards given by the game.

At the end of each level that has included chords that are new to player, these new chords are rewarded to the player as chord cards. These chord cards can be viewed in the player's chord book, which acts both as the container for these rewards and a reference for all the chords. Especially in the earlier stages of the game these rewards appear fairly regularly as the player quickly picks up a basic set of chords. Making each chord a collectable item encourages the player to learn every chord available in the game, making it an objective to learn how to play each chord, rather than simply displaying them in a non-interactive list for reference. Learning familiar melodies or even full songs can also function in this way, with the melodies and songs the player has mastered available to be collected in a similar way for further reference.

As a way to communicate player progress and learning, the game also awards experience points for playing. Playing new exercises for the first time or completing them first time rewards the player with more experience points than replaying old exercises. This way, the experience points reflect the player's actual progress in the game and encourage the player to try new challenges and to learn new aspects of guitar playing. These experience points count towards increasing the player's guitarist level. At earlier stages the levels are easier to achieve, while in the later stages of the game collecting enough experience points requires more practice.

The game gives a grade for the player's performance along with up to three stars. Stars function as the measure of completion of each level and location, as well as the means for unlocking the next locations on the current area map. A perfect performance is not necessary for unlocking the next level or location, but the player can attempt to achieve a perfect performance, which is rewarded with gold stars.

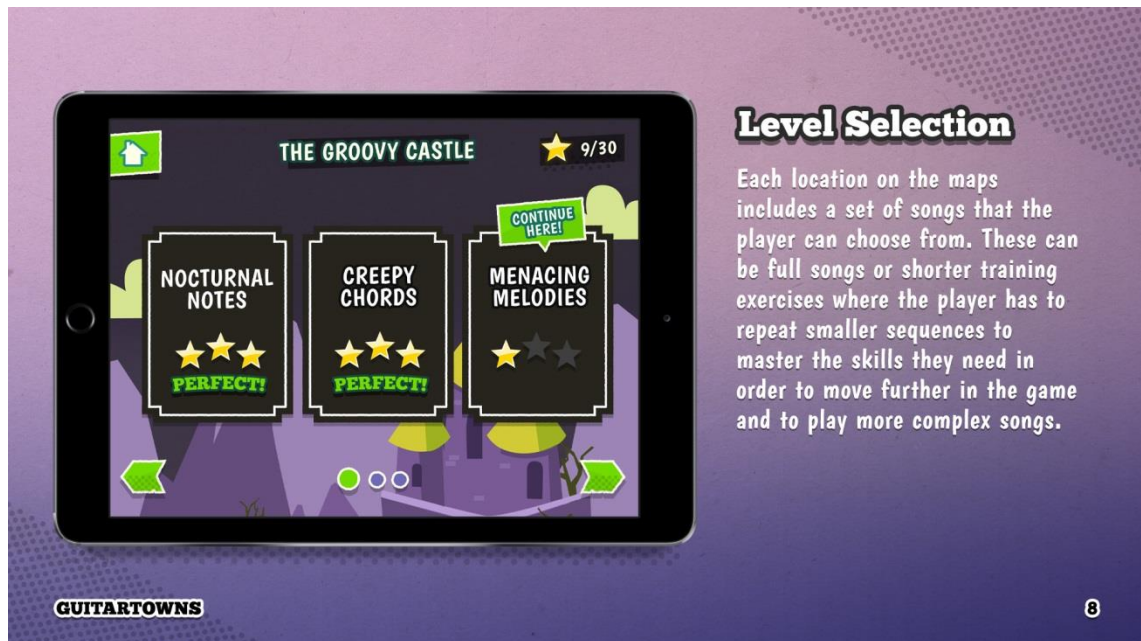


FIGURE 13. Level selection and stars.

6.8 Asset creation

The assets used in the mockup images were created in Adobe Illustrator as vector files in order to avoid any problems with scale and size. Vector files can be scaled to any size, so producing assets from these files for virtually any resolution and aspect ratio is quick and easy. The assets were created with the iPad in mind, so the aspect ratio of the screens in the design document is 4:3. Adjusting the screens to other devices is easy and only requires changing the placement of items and changing how much of the background images are cropped.

In order to design assets that are fast to produce and easy to reuse, they have been created with the most efficient techniques possible. Most of the objects in the game are created with the basic Illustrator tools, using simple techniques like drop shadows and automatic roughening and warping effects to create a more lively and cartoonish look. To

connect the assets to the overall visual style, a simple raster pattern is used to combine them with the concert poster style.

To make the creation of new user interface assets, buttons and other elements as quick as possible, Illustrator effects such as strokes and drop shadows with the icons and the text were used. For example, to create a new button all the designer needs to do is duplicate an old one, replace the text and scale the background, and the rest of the style (the stroke, slight arcing and shadow) is done automatically. In case these assets would be used for an actual game, most of the text would have to be created dynamically in the actual game. With this in mind, simpler text effects such as a simple stroke and drop shadow were used for the assets that require text that is redrawn in the app. Some assets that require more advanced effects should be pre-rendered.

6.9 Thesis project conclusion

In general, GuitarTowns is an attempt to address all the areas of design that GuitarBots neglects. By giving the player a world that is both interesting to explore and closely related to the skill they are learning, the experience moves beyond a simple learning app and becomes deeper. Establishing a clear theme and setting that connects with what the player is doing and speaks to the player is important in making them feel connected to the game. By giving the player characters that are meaningful to them and the ability to customize them, the experience becomes more personal and meaningful. By increasing the amount of feedback given to the player and by connecting it better with events in the game and player success, the game feels more alive and more rewarding.

Naturally the design document is only the beginning of everything that can be done in the game to improve it. By adding more depth to the game world and the background story, the world of the game becomes alive and the player is interested in returning to it, regardless of the learning aspect. By adding more collectable content the player is encouraged to put more effort into playing as well as possible to achieve the highest possible scores in order to unlock and collect more content. An important area that was not fully explored in this design document is the social connectivity in the app. For example, social elements such as more interaction and competition between the bands of different users can be added into the game.

7 CONCLUSIONS

The purpose of this thesis has been to find out how a game can be made more rewarding and motivating by improving the visual elements that are not necessarily dictated by the gameplay. GuitarBots was used as a practical example of a game that is functional but lacking in the elements that add to the game experience. The research was applied into practice by designing the basis for a new game based on the same gameplay engine. The current problems that the material researched in this thesis attempted to fix or improve on include a confusing setting, a poorly defined game world and meaningless characters. The feedback given to the player is also lacklustre and unencouraging and not designed in a way that supports creating and maintaining flow. Additionally, the idea of juice in game design or interface design is not applied at all. The experience also remains largely the same throughout the game. Even though the challenge increases and the levels and songs become more complex, all the visual assets remain exactly the same through the entire span of the game progression. The player is also unable to track their progress in a meaningful and interesting way. Additionally, the user interface feels unresponsive and uninteresting.

The most pressing issue in the current game has been the lack of motivating and encouraging gameplay. To make the playing enjoyable and exciting, the game should be designed around producing flow experiences. This means optimizing player attention, keeping the difficulty at just the right level and giving timely and meaningful feedback for the players' actions. The game should give the player the possibility to progress at a steady pace, perform at right level with the right amount of challenge and give feedback that acknowledges the player's effort and rewards it accordingly.

In regards to producing more rewarding experiences, the main discovery in this thesis has been the importance of player participation in this process. A well-designed game does give rewards to its player, but it also has to take into account that the strongest rewards are the one the players give themselves. Understanding this, the game should offer possibilities for the player to always achieve new feelings of success, instead of pouring meaningless rewards on the player in the hope of producing satisfaction. In a guitar learning game the new skill and the ability to play music is in itself intrinsically rewarding to the player, and the game should try to enforce these feelings as much as possible.

By understanding and applying the idea of juice in visual and gameplay design, the game can be made to feel much more responsive and alive. The game should feel interactive, reacting to both player input and game events in a way that feels alive and human, rather than mechanical. The game should also take advantage of every possible situation where it can give feedback to the player, whether it is feedback of a state of events changing in the game or the interface, or responding to a player interaction. This can be achieved by utilizing visual effects such as changing colors, animations and other visual elements as well as by using sound and text feedback.

In addition to improving the feedback of the game, a proper game world needs to be designed and defined, should the game have one. Game worlds are not merely visual coating that is added to the game in order to make it look more pleasing to the eye. Instead, they are the glue that holds the whole gaming experience together and gives it a logical context that all events should follow. The game world also gives context and meaning to the tasks that are given to the player. For example, even the boring and repetitive parts of learning can be made into interesting and motivating exercises by placing them in a meaningful game world context and giving logical rewards for them. The game world also acts as a measure of progress, unlocking new areas as the player learns new skills. In a sense, the story of the game can be told through this progress as well, and the player takes part in telling it and acting in it.

A well-defined game world, setting and style are also the requirements for good and uniform visual design. They give the building blocks and limitations that designer needs to take into account and use when designing the art direction of the game. If these elements are not in line with each other and do not form a cohesive whole, the game is confusing to the player.

Giving the player the ability to choose the character that suits them and represents them in the game allows them to form a personal relationship with the game. However, the player is not searching for a new role to play as an actor in the game story, but rather looks for a character that represents themselves in the game world. In other words, instead of entering the game world as someone else, they bring themselves into the experience. Giving the player the ability to customize their character allows them to make their game even more personally meaningful. By giving the player the ability to display

their customized characters and equipment to other players, the game encourages them to play more in order to gather more interesting items.

The design elements and considerations presented in this thesis are not necessarily a perfect fit for each game, and there are naturally other elements of game design that are also equally necessary in designing and creating a successful and fun game. A game with expertly designed rewarding schemes, brilliant consideration of juice and the most visually and narratively appealing game world still cannot exist without good gameplay. In the case of the GuitarBots engine, the core gameplay was already functional and proven to work well, but without the elements presented in this thesis, the experience did not feel complete.

The main learning from this thesis is that the process of creating a game should be understood as a whole, where each element and area of design affects the game. Areas that can be overlooked as merely visual coating such as the game world and its style are in fact the elements that keep the game together, make it understandable to player and lure the player into the experience. A game on its own is merely a set of rules that the player accepts and functions by, but when set into an interesting game world, they are given a context and logic that makes them easy to accept and understand. A game that has a game world will most likely include characters, and understanding the function and presentation of these characters is vital to the designer. By giving the player good and timely feedback on their effort the game is able to encourage and direct the player into the right direction, whether it is an action inside the game or continuing to play in the first place. Rewarding the player for their success helps to direct the player in the game and produce the desired behaviour. By adding juice to the game and especially its interactive elements also adds to the feedback and feeling of interactivity.

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