Tampereen ammattikorkeakoulu

A Guide to Designing Skill Trees

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Tampereen ammattikorkeakoulu
Tietojenkäsittely
Pelituotanto

ORAVA, SANTERI
Opas kykypuiden suunnitteluun

Opinnäytetyö 33 sivua
Elokuu 2019

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Opinnäytetyössä luotiin pelikehittäjille tiivis opas kykypuiden suunnittelua varten sekä autettiin heitä päättämään, hyötyisikö heidän pelinsä kykypuiden lisäämisestä. Opinnäytetyössä tutkittiin kykypuiden historiaa, aina niiden esiasteista moderneihin kykypuihin saakka. Lisäksi analysoitiin sekä yksittäisten pelien kykypuita että kykypuita yleisesti.

Tutkimusmenetelmänä käytettiin kvalitatiivista tutkimusta ja työssä hyödynnettiin pääasiallisesti toissijaista tutkimustietoa. Tietoja kerättiin kirjoista, verkkoartikkeleista ja pelien keskustelupalstoilta sekä arvosteluista.

Tärkein tulos oli kykypuiden neljän suurimman vahvuuden löytäminen. Näistä vahvuuksista tuli perusta lähes koko työn teorialle. Kykypuiden analysointi tarjosi mielenkiintoisia oivalluksia sekä niiden toiminnasta että heikkouksista. Työssä onnistuttiin myös erittelemään kykypuiden eri osasia ja selvittämään miten kukin osa vaikuttaa kykypuiden toimintaan. Työ sisältää muutamia yksinkertaisia, mutta tärkeitä neuvoja, joiden avulla keskinkertaisen kykypuun voi muuttaa erinomaiseksi. Näin ollen opinnäytetyö auttanee pelikehittäjiä sekä kykypuiden suunnittelussa että niiden tarkoituksen ymmärtämisessä.

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ABSTRACT

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This thesis offers a concise guide for designing skill trees, as well as helps game developers decide whether their game would benefit from the addition of skill trees. This was achieved by first studying the history of skill trees and then proceeding to carefully analyze both specific skill trees and skill trees in general.

Qualitative, secondary research methods were used for this thesis. Information was gathered from books, online articles, game forums and reviews.

The most important result was the finding of the four main strengths of skill trees. These strengths became the basis of most of the theory in the thesis. The analysis of skill trees yielded some interesting insights into how they function, and what their weaknesses are. Skill trees were also separated into different components and the effects of these components were analyzed. A few simple, yet important tips were provided, which can be used to turn an average skill tree into a better one. As such, this thesis should help game developers in skill tree design and allow them to better understand the purpose of skill trees in games.

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1 INTRODUCTION

One of the major ways in which games differ from other media is in their interactivity. Games give their players control over their own experience in a way that no other media currently does. This is one of the reasons why games are so popular. One of the many ways to increase the player's control over their experience is in skill trees. In this document, the term is also used to cover perk trees, talent trees, technology trees or any other similar systems.

Skill trees are an excellent way to empower players and allow them to personalize their experience. Creating different builds can be immensely fun, and it is no surprise that they have become so popular today. But this does not mean that every skill tree is automatically great, nor does it mean that every game should necessarily have one. The goal of this thesis is to help outline the ways in which skill trees can add value to a game, as well as the costs of adding a skill tree.

2 SKILL TREES AND THEIR POPULARITY

2.1 On skill trees

Skill trees are visual interfaces that allow the player to improve, modify or increase the abilities of their in-game avatar, be it a single character, vehicle, nation or other entity the player is controlling (Picture 1). Skill trees are so named because of the way they usually function. They are an array of skills that start small, but that grow and branch out into a more robust organism (Berry 2013).

PICTURE 1. An example skill tree

Skill trees consist of "nodes", which usually represent either passive or active skills. Passive skills are modifications to the player's avatar which are always active. For example, passive skills can increase the player's maximum health points, action speed, damage resistances and so on. Active skills, on the other hand, are new abilities that the player can use manually. These can include abilities such as new spells or martial techniques, new structures for the player to build or new options to interact with other characters in the game. Naturally, different types of games offer different types of skills to unlock. These nodes are unlocked individually by paying some sort of currency, such as "skill points". Sometimes these nodes also have multiple levels, which allows the player to invest multiple points into them, increasing their potency.

Most skill trees have some sort of gating mechanism to prevent the player from unlocking any skill immediately. The most common gating mechanisms include skill tiers and connections between nodes. This means that certain number of points have to be allocated to lower tier skills before higher tiers can be unlocked, or certain skills which are connected to others must be unlocked before those skills can be unlocked. Most skill trees use one or both methods to gate progress, but there are also other ways to do so, such as locking abilities behind certain achievements in the game. No one way is better than the other, and it is up to the game's developer to decide which mechanism best suits their game.

2.2   The popularity of skill trees

Skill Trees have become vastly popular in recent years. This can be explained by introducing four main strengths for them. Skill trees can add variety, rewards, replay value, and offer players a sense of ownership over their avatar. These are the main ways in which skill trees typically add value to the gameplay experience.

One of the most important metrics for a successful game is the amount of time they can keep the player interested. One common way to keep the player's attention is to offer variety. If the gameplay stays the same for too long, players get bored and eventually stop playing. This is why games strive to have as many different environments, enemy types, challenges and such as possible. Skill trees offer the player a way to modify the way they play the game, which is a great way to increase variety, and in so doing, keep the player entertained for a longer period of time.

Another way to keep the players' attention is to give them rewards. Humans enjoy being rewarded and praised for their successes by nature. This is due to a certain chemical called dopamine, which is released into our brains after being exposed to rewarding stimuli. Dopamine, in turn, makes us more motivated to seek further rewards (Pluralsight 2015). Therefore, it is so important for games to offer a steady stream of rewards for the player. One of the most satisfying rewards for the player is to empower them with new abilities, and skill trees are a great way to do so. Unlocking new abilities and improving them is a very rewarding and

often addicting experience, especially when the player can see all the different abilities they can unlock later and work towards them. This is also one of the reasons why the more powerful upgrades in skill trees are often at the very end. The more powerful the upgrade, and the more work the player must put into getting it, the more rewarding it is when they finally unlock it.

Skill trees also improve games' replay value and allow the players to feel a sense of ownership over their avatar because of their involvement in its customization (Muilenburg & Berge 2016). The maximum amount of skills the player can unlock is usually limited, which encourages careful planning and allows the player to choose their own play style and approach. The unique combinations of skills born through this customization are often referred to as "builds", which offer multiple ways to play the game. Different builds, in turn, have a positive effect on the game's replay value, since the player might not be able to try every skill and play style with a single avatar.

3   THE HISTORY OF SKILL TREES

3.1   The precursors of the modern skill tree

The first appearance of a skill tree-like system was the technology tree in the board game Civilization, released in 1980 by Francis Tresham. A decade later, the game received its first digital version with Sid Meier's Civilization, released by Sid Meier and Bruce Shelley in 1991. This version of Civilization was the first video game to include what could be called a precursor to modern skill trees (Ghys 2012).

In Civilization, the gameplay is centered around building and advancing civilization, starting from prehistory and moving to the future. In the game, the player can research new technologies by investing resources. These new technologies can improve the attributes of the different units and buildings at the player's disposal, allow the construction of new types of units and buildings, as well as offer other benefits. Most of these technologies are connected to each other, which means that researching a new technology would give the player access to research more advanced ones. For example, to unlock computers, the player has to first research mathematics and electronics, both of which have their own prerequisite technologies.

These technology tree systems were mostly seen in turn-based and real-time strategy games, the former of which Civilization is an example of. Furthermore, they were not necessarily visible to the players in-game, even though they were technically present. The progression of technology in these games is commonly tied to the different buildings the player can construct. Constructing certain types of buildings can allow the player to recruit new types of units or construct buildings that were not previously available. Some buildings can also bring other kinds of benefits or allow new technologies to be researched and developed (Heinimäki 2015, 25). Functionally, this is no different from the more traditional notion of a skill tree. Many flowcharts were created to visualize the development options available, and indeed, these flowcharts look very similar to the skill trees found in so many games today. For example, the original Age of Empires, developed by

Ensemble Studios and published by Microsoft Game Studios in 1997, had a flowchart of this nature (Picture 2).
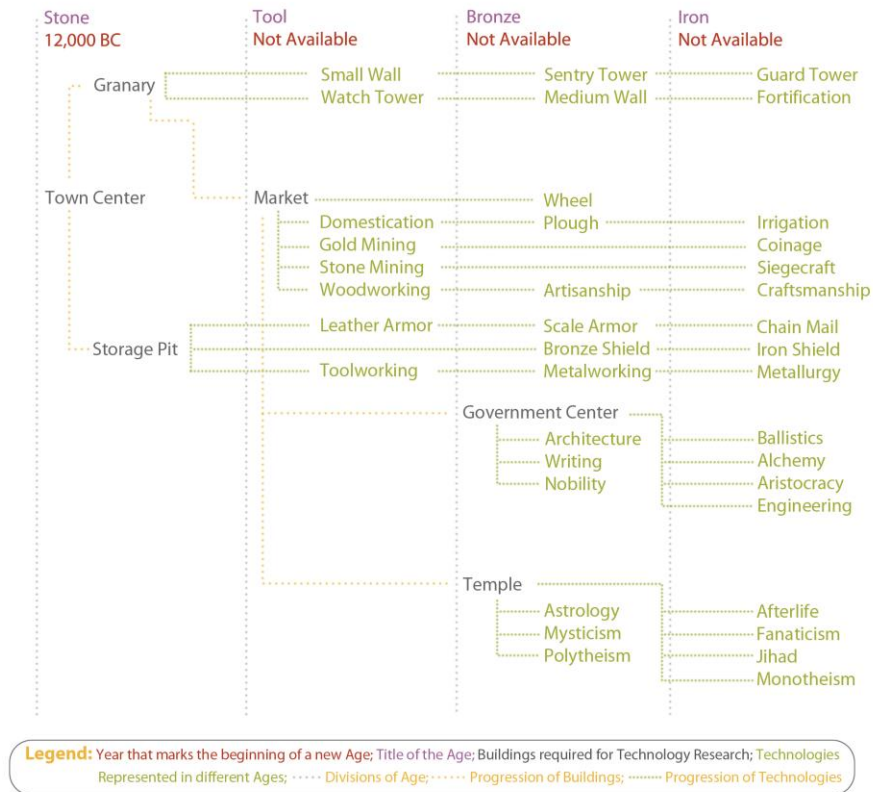
Age of Empires Technology Tree

PICTURE 2. A flow chart made for Age of Empires (1997)

3.2 The birth of the modern skill tree

The first modern skill tree was born in 2000 when Blizzard North released their action role-playing game Diablo 2. This game was the first one to include the kind of skill tree found in so many games today. Though there are a plethora of different kinds of skill trees today, most of them still follow the same formula introduced by Diablo 2. But of course, it all started with the original Diablo, released in 1996.

In the 1990s, computer role-playing games were not easily approachable to many people. Modelled after the original table-top role-playing games, these games bombarded the players with countless character attributes, cluttered interfaces and screens filled with different icons and text. Because of this, they were mostly enjoyed only by the stoutest supporters of the genre.

The original Diablo had one rule during its development, the game had to be simple (Craddock 2018). Blizzard North's goal for the game was to make it so simple that a new player could learn how to play the game almost immediately. In the end, Diablo became a bestseller due to the many advancements it made to the digital role-playing genre. The game had much cleaner interfaces than its predecessors and featured fast-paced gameplay.

But as Diablo 2's development was about to begin, many of the original game's components were re-evaluated. One of these was the game's spell system, in which players learn new spells by finding spell books in the game. These spell books had three sizable problems. First, they were procedurally generated. This meant that wizard characters in the game had to count on sheer luck to attain spell books that would grant them damage-dealing spells. Warrior characters, on the other hand, could make do with any weapon they got get their hands on. The second issue was the spell interface itself. To cast spells, players always had to have the spell book interface open, which was not very intuitive. Some of the developers noted this, and there were differences in opinion between the teams making the game. In the end, spells could also be assigned to mouse buttons for easier casting, and hardly anyone used the spell book interface. The third problem was that any of the game's three character classes could wield most weapons and spells, which detracted from the uniqueness of each character. This uniqueness is a very important aspect of role-playing games, since building your own unique avatar is part of the reason to the genre's popularity.

Dave Brevik, co-founder of Blizzard North, was thinking of an alternative to the original game's spell book system during a morning shower, a common habit of his during game development. The inspiration for skill trees came from Master of Orion, a turn-based strategy game released in 1993, which featured a technology tree similar to the one from Civilization. Brevik thought about the technology trees

found in these games and came up with an idea; "What if player classes could choose their skills, just choose a path through a tree." His early visualizations for skill trees resembled the flowcharts made of those technology trees.

In the end, it was Stieg Hedlund, designer of Diablo 2, that finished the design of skill trees and smoothed out the practical aspects in their implementation. From there, the skill trees expanded rapidly as different members of the development team shared their ideas freely. Though the way the skill trees finally formed may have been quite chaotic due to the amount of people involved in their design, the end results were embraced by players and critics alike. The system was not perfect, but it started a revolution in action role-playing game design which spread to other types of games as well. Over time, many games have made their own additions and changes to the system, and different kinds of skill trees can be found in countless games today.

4   A CLOSER LOOK AT CERTAIN SKILL TREES

In the following chapter, I will be taking a closer look at some games that brought something new to the skill tree formula introduced by Diablo 2. By analyzing these skill trees, it is possible to find their strengths and weaknesses. This chapter is based on my own experiences with the games, combined with what I have learned through studying skill trees and reading the players' opinions from the games' forums and other sources.

4.1   Diablo 2 – the first one

Before looking at any other kind skill tree, it would be best to have a closer look at the ones in Diablo 2. It is, after all, the one that started it all. In this document, I will be looking at the skill trees as they were when the game was launched, before any updates. Diablo 2 originally had five different hero classes, Amazon, Paladin, Necromancer, Sorceress and Barbarian. Each of these classes has access to three separate skill trees containing 10 skills each, for a total of 30 unique skills for each class (Picture 3). Every time when the player's character levels up, a process that is achieved by killing monsters in the game, or completes certain quests they earn a single skill point. These skill points can be invested into any skill the player has access to. Gaining access to skills happens by both the skill tier and node connection mechanisms mentioned earlier in this document. The skill trees contain both active and passive skills, and the player can invest multiple points to the same skill to increase its power.

The amount of skill points the player can get in Diablo 2 is limited, which forces them to choose between specializing in a small selection of skills or spreading out into multiple skills. Limiting the players' options might seem counterproductive at first, but what it really does is preventing the players from making their characters too weak, while offering just enough freedom to make every character feel unique.

PICTURE 3. Diablo 2 Sorceress's skill trees

In short, Diablo 2's skill trees capitalize on all the different ways that skill trees can increase a games value. First, they give the players variety by allowing them to constantly change the way they play the game. Second, they reward the player for each level up by allowing the them to strengthen their characters. Third, they allow players to create unique characters. And lastly, they increase the game's replay value by offering many different ways to play the game, which can only be experienced by playing through the game multiple times with different characters.

The system is not without flaws, however. Since some characters inevitably end up weaker than others with a system like this, planning ahead and studying the options available is recommended. While some people like this, others may find it tedious. To some extent, the system also encourages hoarding skill points to be used for higher tier skills, since the players could not reallocate skill points later. This is not very ideal, as it effectively stalls the players progress and thus, pushes back the system's good points. Some players also hoard skill points because they are not sure how to spend them. Lastly, since it was originally not possible to reclaim any skills points used, every choice stuck with the player for the rest of that character's lifetime. This meant that player could end up messing up their characters with poor decisions and make the game too hard for themselves.

4.2   Path of Exile – the passive skill tree

Released in 2013 by Grinding Gear Games, Path of Exile is a free-to-play action role-playing game that follows in the footsteps of classic action role-playing games, such as Diablo 2. In Path of Exile, the skill tree is called "passive skill tree". As the name suggests, it only contains passive skill nodes. These nodes are unlocked identically to Diablo 2, but each node can only have one point invested in it. To unlock a node, the player must first unlock any node connected to it, indicated by lines drawn between nodes. Each of the game's different character classes share the same tree, but they all have their own "starting point", which designates the first nodes they can unlock (Picture 4).

PICTURE 4. A small portion of the passive skill tree from Path of Exile

To understand how character building in the game works, it is necessary to briefly explain its other aspects first. Since the skill tree has no active skills, those are obtained by inserting gems into the player character's equipment. There are numerous different types of gems and equipment available, so building a character consists of carefully planning and balancing the skill tree, the equipment worn, and the gems inserted into it.

In Path of Exile, the skill tree alone does not necessarily add any variety to the experience on a single character. Instead, the player usually chooses a few types of passives to pursue, and as the character gains levels, the passives merely give numerical boosts to the character's power. For example, the player could make a knight-themed character who is sturdy and uses a sword and a shield, coupled with some sort of physical attack technique. For this sort of build, the player might choose to pursue passives such as "increased maximum life", "physical damage with swords" and "block chance while equipped with a shield". As the character gains levels, the skill tree does not necessarily offer any changes to the player's play style, but instead enforces the one they are currently playing.

Since gaining levels and progressing in the skill tree only enhances the player's current play style, it might not feel as rewarding as many other skill trees. Most of the time, the player will not even see any difference in their characters power when gaining a single skill point. Still, it is satisfying to plot your course through the skill tree and see how your character performs in the long run, so the system is by no means completely unrewarding, the rewards simply come in another form.

The size of the skill tree can also make it quite intimidating for new players. When confronted with the tree for the first time, people may get overwhelmed by the amount of options available, which can often lead to them being very unsure of what to do. And indeed, because of the complexity of the skill tree combined with other aspects of character building in the game, the first characters that players create are often quite weak. It is possible to move skill points from one skill to another using "respec points", which does offer some capacity to fix mistakes made during character building. Still, respec points are not as easily gained as skill points, so it is usually not feasible to completely reset a character's skill tree.

Where Path of Exile's skill tree truly shines is in the replay value it offers to the game as well as its potential for nearly limitless customization. Because of the sheer size of the passive skill tree and the fact that it is complimented by the gem and equipment systems, it is possible to create thousands upon thousands of characters with truly unique mechanics. Even after thousands of hours of playtime, players can still learn new things when creating new characters.

Because of this, the passive skill tree system is considered by many to be among the game's greatest innovations, even if it does not capitalize on all the strengths of more traditional skill trees.

4.3 Kingdom Rush Frontiers – a combination of old and new

Kingdom Rush Frontiers is real-time tower-defence game released by Ironhide Game Studio in 2013. In the game, the player is tasked with building different kinds of defensive towers around a path and casting spells to stops all manner of enemies from reaching the end of the path (Picture 5). The player may also upgrade the towers they have built, with branching upgrade paths. This system is similar to the technology tree systems mentioned earlier in this document. The game also features a skill tree like system where the player may add permanent upgrades to spells or all towers of specific types between missions. Therefore, the game combines a technology tree system with a modern skill tree system.

PICTURE 5. Kingdom Rush Frontiers gameplay

In Kingdom Rush Frontiers, the skill tree has a single branch for every spell and tower type. Each branch has five upgrades that somehow increase the effectiveness of the tower type or spell in question. For example, upgrades for the archer towers can increase the attack range of these towers or give them a chance to fire two projectiles at once. These upgrades are bought with stars, which can be obtained through beating levels and completing certain extra challenges. The player can reset the skill tree freely between levels, which allows them to choose the best strategy for each level (Picture 6).

PICTURE 6. Skill tree from Kingdom Rush Frontiers

The systems simultaneously allow two layers of progression. The first layer comes from building and upgrading your individual towers in each level, while the second comes from the persistent upgrades from the skill tree. This combination allows for many different strategies for clearing levels, and the most difficult challenges require careful planning. This means that players will constantly have to visit the skill tree if they want to maximize their performance and tackle the most difficult challenges. However, since building and upgrading individual

towers in levels is still the more important part of strategy in the game, the player does not necessarily have to keep the skill tree optimized. As such, the system grants players that wish to optimize their efficiency the ability to do so, while still allowing more casual players to progress through the game.

However, the system does have one big weakness. In the end, players are able to unlock almost all upgrades from the skill tree, which effectively removes the second layer of strategy from the game. Once the player has unlocked all the upgrades, there is no more reason to open the skill tree, and the only layer of strategy left comes from building and upgrading individual towers in levels. Of course, this problem only emerges at a very late part of the game, and only if players complete the extra challenges. As such, players can still enjoy the skill tree to the fullest for most of the time.

4.4   Sekiro: Shadows Die Twice – a wasted opportunity

Sekiro: Shadows Die Twice is an action-adventure game developed by From Software and published by Activision in 2019. The game follows a Sengoku period shinobi, or ninja, known as Wolf, as he attempts to take revenge on a samurai clan who attacked him and kidnapped his lord. From Software is known for making brutally challenging games such as Dark Souls and Bloodborne. Sekiro is very similar to From Software's other games for the most part, but one of its new additions is its skill tree system.

In Sekiro, players earn experience points by defeating enemies. When enough experience has been amassed, the player earns a skill point. The skill points can be used to unlock skills from one the game's five skill trees. The skill trees themselves are unlocked by finding items called "esoteric texts" from the game world. Different skills are linked to each other, and the previous skill must be unlocked before the next one. Skills also have different skill point costs, with more powerful skills generally being more expensive. The skills come in two variations. Passive skills, called "latent abilities", and active skills, called "combat arts" (Picture 7).
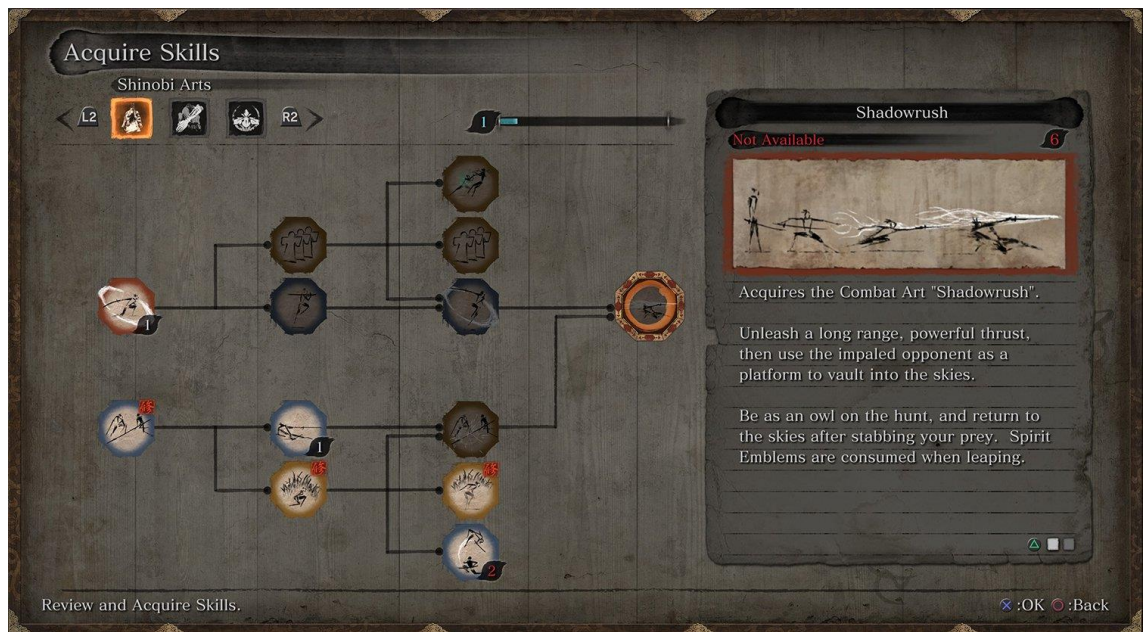
PICTURE 7. One of the skill trees from Sekiro

The first problem of Sekiro's skill trees is the combat arts. While the latent abilities do provide meaningful upgrades for the player, most of the combat arts simply fall short in their usefulness. In most situations, it is far more effective to use the character's basic attacks and items instead of the combat arts. This is because the damage and general usability of most of the combat arts is simply too weak compared to the other options available. As a result, only a handful of combat arts end up being truly useful.

The second problem is in the way the skills are unlocked. There is no limit to the amount of skill points the player can amass, which means that in the end, every player can unlock every skill. Because of this, every character will end up identical in the end, offering no true customization for the player. Furthermore, since skill points are gained by defeating enemies, the player is encouraged to "grind" skill points by defeating the same enemies repeatedly. Grinding may be common in role-playing games, but in games like Sekiro, it is typically not wanted, and can easily end up feeling like a chore.

In conclusion, Sekiro suffers from a typical affliction of many games today. In many modern games, it feels like skill trees are added simply because the developers could not create a more creative way to offer new abilities for the player. It is interesting to wonder how different Sekiro could have been if instead

of skill trees, new skills were tied to different weapons and armor or found in the world. This would simultaneously allow for more customization, while encouraging exploration and giving a more immersive way to unlock new skills.

5 SKILL TREE COMPONENTS

In this chapter, skill trees are divided into different components. These components are analyzed for their effects on games to pinpoint the purpose of each component, as well as how they can increase or decrease a game's value.

5.1 The amount and size of skill trees

Games with skill trees often have more than one of them. The reason for adding multiple skill trees is simple; It makes it easier to make clear distinctions between what kind of play style or theme each tree offers. For example, in Diablo 2, the skill trees of the Sorceress class are "cold spells", "lightning spells" and "fire spells". The player is immediately able to have some sort of understanding as to what the trees have to offer from merely looking at their names. If every skill is in the same tree, it might be easier for the player to make a "jack of all trades" type of character, which can decrease the uniqueness of each character.

In short, multiple skill trees make it easier to create different play styles for different trees, without the need to necessarily make the individual trees more complex. In some games, multiple skill trees are also used to offer progression for specific parts of the player's toolkit. For example, Far Cry Primal, released in 2016 by Ubisoft, has separate skill trees for fighting, gathering, hunting and other skills (Picture 8). In games like Far Cry Primal, skill trees are not necessarily added to offer different play styles, but rather to allow the player to make their preferred activities in the game more efficient.
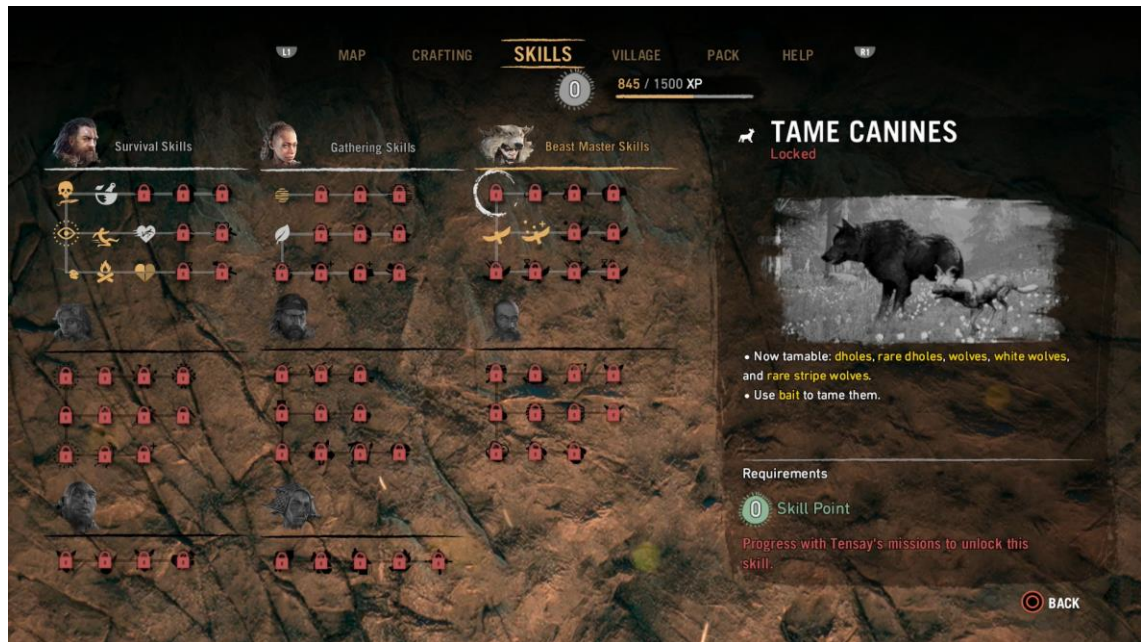
PICTURE 8. Skill trees from Far Cry Primal

The sizes of skill trees in games also vary. Both large and small skill trees have their advantages and disadvantages. Large skill trees offer more options and possible skill combinations, but they also require more effort from the player to use effectively. This is why they are mostly seen in role-playing games, where character building is very important and well-rounded customization is expected. Small skill trees, on the other hand, may offer less possibilities, but are much easier to use. Because of this, they are often found in games that simply aim to give the player some sort of progression, without requiring too much extra effort.

It is up to the developer to decide the balance between complexity and ease of use, which can be a tricky thing. Take Path of Exile for example; The game's vast skill tree has undoubtedly caused countless players to give up on the game. And yet, it is considered by many to be among the game's best features.

5.2   Skill types

Ultimately, the most important part of a skill tree is the skills themselves. If a skill tree has no useful or interesting skills, there is no point in using it. All skills can roughly be sorted into passive and active skills, and they both have their own uses.

The purpose of active skills is to provide the player with new tools. When a player unlocks a new active skill, they can immediately see the effect on their gameplay, since they can use the skill directly. Because of this, active skills generally feel more rewarding and offer actual variety to the gameplay. However, they are also more difficult for the developer to create, so the amount that can be added to a game is more limited. As such, it is important that every active skill is both useful and fun to use. If the players do not use the skill, the development time used for creating it is wasted.

Passive skills are simpler. Since their effects are always active, they mostly give numerical boosts to the players' attributes. The purpose of passive skills is not necessarily to offer variety to the gameplay, but to simply increase the player's power. As mentioned earlier with Path of Exile, passive skills often allow the player to specialize in a specific play style and enforce it. Depending on the situation, the player might not even see the effect of passive skills, other than as a number in the game. There are exceptions of course; Sometimes passive skills can offer more easily observable changes. For example, a passive skill could make all of the players attacks have a small chance to send out lighting strikes that arc between enemies. This kind of passive skill would technically be no different from an active skill, other than in the fact that the player cannot control when it is activated. Passive skills are easier for the developer to create, since they do not necessarily require anything more than numerical boosts. But because they do not work very well alone, they often require some other type of progression alongside them.

5.3 Gating and unlocking mechanisms

As mentioned earlier in this document, gating mechanisms are used to prevent the player from unlocking any skill immediately. Without gating mechanisms, the player would have no cause to pick anything but the most powerful skills in a skill tree, which would make the whole tree pointless. Gating mechanism allow the developer to control the player's growth and provide an environment where the

game's challenges remain sufficient even while the players become more powerful.

Another function of gating mechanisms is to prevent the player from choosing inefficient combinations of skills. With gating mechanisms, it is possible to lock certain skills behind others. This limits possible skill combinations and ensures that certain skills are only used alongside ones that synergize well with them. When designing gating mechanisms, it is important to keep a good balance between limiting the player too much and offering too much freedom.

The way the skills are unlocked is also an important factor of a skill tree. Typically, skills are unlocked either by "leveling" the player's avatar, which is often done by defeating enemies and completing quests, or by collecting some sort of currency. Unlocking mechanisms are mainly used to control the pace with which players get new skills, but they can also be used to encourage the player to do certain activities in the game. It is, however, important that these activities are interesting enough on their own. If the player has no other reason do an activity other than to unlock skills, then that activity should most likely be modified or replaced with something else.

6   THINGS TO CONSIDER BEFORE ADDING A SKILL TREE

So far, this document has mostly tackled the ways in which skill trees can add value to a game. And yet, the fact is that not every game needs a skill tree. And indeed, for some games, skill trees can do more harm than good. The purpose of this chapter is to make it easier for game developers to decide whether their game needs skill trees, and what kind of skill trees would be most ideal.

6.1   Does your game need it?

The first thing to consider before starting to design a skill tree for a game is whether or not the game actually needs one. If the skill tree does not add any value to the experience, then it is best scrap it. The reasons for adding skill trees have already been looked at earlier in this document, now it is time to focus on the reasons for not adding one.

If the skill tree simply serves the purpose of forcing the player to do something, it easily becomes a nuisance to the player. For example, the developers behind the upcoming action-adventure platformer game Mirror's Edge Catalyst have argued that the addition of a skill tree into the game will encourage players to use skills that were often overlooked in the previous title in the series. This is a prime example of a skill tree that does not attempt to add something new to the game, but instead aims to fix something that is not working. Locking skills behind skill trees does not automatically make players want to use those skills, they should be interesting enough on their own (Quirke 2016).

Skill trees always require at least some extra effort from the player. Even in the simplest of skill trees, the player has to open the skill tree interface, navigate through all of its many icons and figure out what to do next. If the skill tree does not offer any genuinely interesting new options for the player, the act of using it merely takes time away from the rest of the gameplay.

Skill trees are not the only way to offer skills and other forms of progression. In role-playing games, skill trees might often be expected, but in other genres, it might be a good idea to think of other, more immersive ways of offering progression. For example, skills could be unlocked by completing certain missions, finding hidden items or defeating certain powerful foes. In most non-role-playing games, skill trees often become a missed opportunity to integrate skill acquisition more closely into the gameplay. In Ori and the Blind Forest, a platform-adventure game developed by Moon Studios, the player can unlock new skills by finding "Ancestral Trees" in the world (Picture 9). This process feels natural and gives a plot-related reason as to why the character unlocked a new skill.
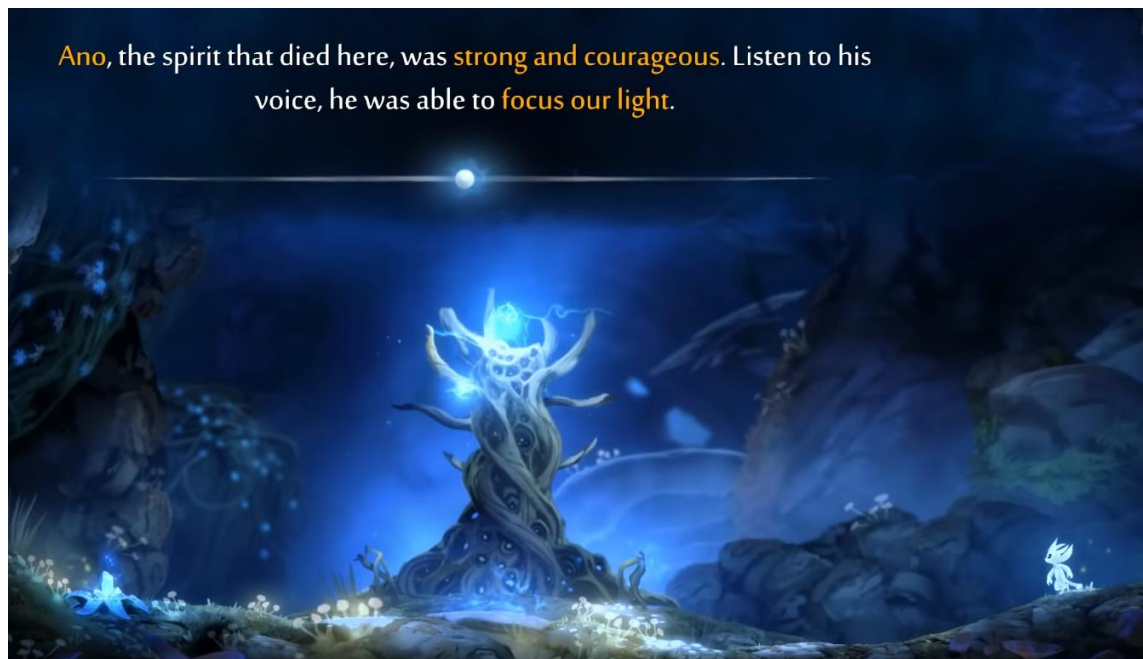
PICTURE 9. An Ancestral Tree from Ori and the Blind Forest

6.2 What kind of skill tree to add?

As made clear by this document, there are a lot of different approaches to making skill trees. Player want to have fun when playing games. It is up to the developer to understand what makes their game fun, and how to promote that fun with skill trees. Deciding what kind of skill tree to create can be made a little easier with a single question; What do you want the skill tree to add to your game?

This is where the four big strengths of skill trees, variety, rewards, sense of ownership and replay value, come into play. Rewarding the player is the easiest of these to fulfill with skill trees, as players will often be satisfied with any sort of progression. As long as the player feels that the skill tree did something, they will feel rewarded. For adding variety, it is necessary to offer skills that somehow change the way the game is played. Sense of ownership comes from offering the player enough options to make an avatar that feels unique, which requires the skill tree system to be complex. Lastly, replay value can be increased by offering multiple play styles with the skill tree, while limiting the player enough so that they cannot experience every play style in a single playthrough.

And so, the decision of what kind of skill tree to make boils down into which of these four strengths are most important for the game in question. While role-playing games often tend to go for most of these, it is not always necessary. For an action-adventure game, for example, it could be enough to simply offer some variety into the gameplay with a linear skill tree, without the need to offer many choices.

7 WHAT MAKES A GREAT SKILL TREE?

Skill trees can be found in all kinds of games today. In most cases, they do add something of value to the games, even if they are not always needed. Still, a good skill tree is one that feels like it truly belongs in the game, instead of feeling like it was simply added as an easy way of offering progression, or simply because so many other games have skill trees as well. This chapter offers a few simple, yet important aspects that can make an average skill tree great.

7.1 Making it meaningful

It is important to make every choice the player does feel meaningful. In the best skill trees, choices should have consequences. If every skill in a skill tree can be unlocked eventually, the tree is not living up to its full potential. As pointed out earlier with the case of Sekiro: Shadows Die Twice and Kingdom Rush Frontiers, the ability to unlock all skills often takes away from a skill tree's value. Either by decreasing the need for strategy, removing variety between avatars or lowering the games replay value. The best skill trees limit the players just enough to make choices feel meaningful.

7.2 Quality over quantity

Many skill trees have more skills than they really need. Some developers choose to add skills to make sure that every branch of a skill tree has the same amount of skills or some other aesthetic reason. Others may add them just to make sure the progression in the game lasts long enough. In many cases, these are not a reason enough to add more skills. In a good skill tree, every skill choice is meaningful and adds something to the experience. If a skill feels like it does not really do anything, it might be best to replace or simply remove it. Simply put, it is better to have a few great skills than a dozen useless ones.

7.3 More than just power

Many skill trees simply allow the players to become more powerful, without really changing the experience itself. The best skill trees do more than that. They change how the game is played, augmenting its core aspects. When designing a skill tree, it is important to figure out how people of different skill levels and preferences can get the most out of it. Some players might want skills that make the game easier for them, while others might want skills that allow them to progress through the game faster. The best skill trees offer these different play styles and make each of them viable.

7.4 Usability in skill trees

Skill trees are visual interfaces, which means that they should be as easy to use as possible. Usability is important, because if users cannot do what they want to do effectively, they are likely to seek other alternatives. Of course, when it comes to games, these alternatives mean other games. An interface that is too difficult to use can be reason enough for a player to seek another game.

In 2001, Whitney Quesenbery, the User Experience and Usability Expert and former President of the Usability Professionals' Association, offered five criteria for good usability. These are effectiveness, efficiency, engagingness, error tolerance and ease of learning (Quesenbery 2001). Because players use skill trees constantly when playing a game, it is important that they meet these criteria.

Effectiveness is about whether users can complete their goals with a high degree of accuracy. In the case of skill trees, this means that each skill should be described clearly for the player, and it should also be clear how those skills can be unlocked. Information is the key element of this; Everything should be explained with as clear and simple language as possible.

Efficiency is about speed; How fast can the player unlock a new skill with the skill tree? Basically, this means the number of steps that players must take to reach

their goal. Clearly labeled buttons and shortcuts help in this. The most efficient skill trees require only two steps; Opening the skill tree and clicking on a skill.

Engagement, as the name implies, refers to how engaging the something is to use. Engagement occurs when something is pleasant and gratifying to use. This is particularly important for skill trees, since games themselves are expected to be engaging. Aesthetics are the key to increasing engagement. Skill trees should not only look good, but also look like they naturally belong to the game.

Error tolerance refers to how easy it is for users to minimize making errors and recover from making them. In the case of skill trees, this means choosing the wrong skill by accident or picking an inefficient combination of skills. Asking confirmation from the player before unlocking a skill can help with preventing this. Gating mechanisms also exist partly to prevent the player from choosing bad skill combinations. Still, many players will inevitably make mistakes, which is why many games offer some way to refund skills.

Finally, ease of learning means how easy it is to learn how to use an interface for the first time. The best way to support this is to design systems that match a user's existing mental models. This is one of the reasons why most skill trees look and function so similarly to each other. Many players have gotten used to using skill trees, and as a result, they have certain expectations as to how skill trees work.

8 CONCLUSION

The purpose of this thesis was to offer a concise guide for designing skill trees, as well as help game developers decide whether their game would benefit from the addition of skill trees. The aim was to first study the history of skill trees and then proceed to carefully analyze both specific skill trees and skill trees in general.

The guide was initially supposed to be a separate document altogether, written in a more relaxed manner and containing my personal opinions. But as I was writing this document, I began to question why I would write the same things a second time. And so, I decided that the guide would instead be a condensed version of this document. Since the objective of the guide was to be helpful to game developers, I thought I should remove the parts that were not directly tied to skill tree design. To achieve this, I completely removed the history and game skill tree analysis segments. With this, I was left with only the more theoretic parts of the document.

In the end, perhaps the most important result of this thesis was the finding of the four main strengths of skill trees. These strengths quickly became the basis of most of the theory in the document. The analysis of skill trees also yielded some interesting insights into how they function. Writing this document allowed me to become far more knowledgeable about skill tree design, and I believe that anyone who reads this document might have the same experience, which, of course, was the main goal of the thesis itself. In retrospect, the subject of this thesis could have been narrowed more carefully, since it was quite broad. Also, there could have been many more things to write about, such as more practical tips for skill tree design.

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