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Video game achievements

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ANNIINA TALJA: Video game achievements

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This thesis focuses on video game achievements in gaming platforms. The aim of this thesis is to research and analyse achievements and then conduct a study about them. The research area covers firstly video games, and how people are motivated to play them and what kind of playstyles there are. After that, video game achievements are examined by their type and design. Lastly, we will examine what effects video game achievements have on video game players, video games, and the development of video games. The achievement environments and user interfaces of the gaming platform Steam will be showcased as well to better understand how achievements can be viewed in the gaming platform.

The study about video game achievements is conducted with a survey to gather data about video game players' opinions on achievements and also how would they like to view and sort their achievements in gaming platforms. The results of the study are then used in the purpose of designing and implementing a functional front-end achievement environment application which can be used to sort and view achievements.

According to the results of the survey, some players like video game achievements, while some do not. The achievement environment application was designed and built to sort achievements among other things by game, unlocked / locked, and how many players have unlocked the achievement, which is also known as global unlock percentage. As a suggestion by the survey participants, the application has sorting by unlock time and alphabetically by the name of achievements and games as well.

Keywords: video game achievement, Steam achievements, achievement environment, video games, motivation, challenge

TURUN YLIOPISTO
Tietotekniikan laitos, Teknillinen tiedekunta

ANNIINA TALJA: Videopelisaavutukset

Pro gradu -tutkielma, 77 sivua, 5 liitesivua
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Tämä pro gradu -tutkielma keskittyy eri pelialustojen videopelisaavutuksiin. Tutkielman tavoitteena on tutkia ja analysoida videopelisaavutuksia, ja sitten suorittaa tutkimus niihin liittyen. Tutkielmassa käsitellään ensin videopelejä ja sitä, miten ne motivoivat ihmisiä pelaamaan niitä ja millaisia pelityylejä pelaajilla on. Tämän jälkeen tarkastelemme erityyppisiä videopelisaavutuksia sekä miten saavutukset on suunniteltu. Viimeiseksi tutkimme videopelisaavutusten vaikutusta pelaajiin, videopeleihin ja videopelien kehitykseen. Käymme myös läpi Steam-pelialustan saavutusympäristöjä ja käyttöliittymiä, jotta ymmärrämme miten saavutukset näkyvät kyseisellä pelialustalla.

Tutkimus videopelisaavutuksista suoritetaan kyselyllä, jolla saadaan kerättyä tietoa videopelipelaajien mielipiteistä videopelisaavutuksista sekä siitä, miten he haluaisivat seurata ja lajitella videopelisaavutuksia pelialustojen saavutusympäristöissä. Tutkimuksen tuloksia käytetään toimivan saavutusympäristön suunnitteluun ja toteutukseen, missä voi seurata ja lajitella omia videopelisaavutuksia.

Osa kyselyyn osallistuneista pitää videopelisaavutuksista, kun taas osa ei. Kyselyn tulosten pohjalta toteutettu saavutusympäristö lajittelee saavutuksia muun muassa pelien ja saavutettu / ei saavutettu mukaan, sekä kuinka monta pelaajaa on saanut saavutuksen (global unlock percentage). Lisäehdotuksena toteutettiin myös saavutusajan mukaan lajittelu sekä saavutusten ja pelien lajittelu niiden nimien mukaan aakkosjärjestyksessä.

Avainsanat: videopelisaavutus, Steam-saavutukset, saavutusympäristö, videopelit, motivaatio, haaste

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1 Introduction

Video games are a popular form of entertainment whether one plays a game themself or watches another player playing a game. Gaming as an entertainment and as an industry have grown much in the past years (Entertainment Software Association, 2022; Wijman, 2019). For players to play and keep playing games, there needs to be something motivational in video games for the players to feel driven to play. Video game achievements can be a motivation to some players. They are extrinsic rewards outside the actual video game, but they offer specific tasks to be done in the game and when players complete those tasks, they gain a feeling of accomplishment.

In 2005 Microsoft brought Gamerscore and Achievements to their Xbox Live! online service. Soon after, Steam and PlayStation published their own achievement systems, and achievements have stayed in gaming platforms for almost 20 years. Steam (Valve, 2003) is a video game digital distribution service and it is the most popular and commonly used PC gaming platform. Each Steam user has an account and player profile on Steam, when the player plays video games, they may complete an achievement and gain it to their account. Steam, its achievements, and its achievement environment will be used as a reference in this thesis.

We will research in this thesis multiple aspects of video games and video game achievements to in order to gain knowledge and understanding about them. We will focus on two research questions:

1. How do video game achievements affect the gaming experience?
2. How are video game achievements displayed in gaming platforms? Could they be displayed and viewed better?

In this thesis, we will next focus on video games and discover what motivates people to play them, what kind of playstyles there are, and how do they change over time. From there we move to achievements and define what is a video game achievement, and what type of video game achievements there are. We will also examine the design of video game achievements, what elements and components they consist of and how they function. In Chapter 4, we discuss about the effects of video game achievements. Aspects to the effects are video game players, video

games, and video game developers. Chapter 5 showcases Steam achievements and achievement environments in Steam UI (user interface). Conducting a study about video game achievements is done in Chapter 6. Results of the study are discussed and used to design an achievement environment where players can view and sort their achievements. The achievement environment application was created in cooperation with Julius Virtanen. Lastly, Chapter 7 will compile together our knowledge about video game achievements.

2 Video games

Before we discuss about achievements, we will first focus on video games, and later in this chapter we will focus especially on why and how people play video games. Video games are electronic games which are nowadays usually played with gaming consoles, computers, or mobile devices. Playing video games is a form of interactive entertainment since players can play out and affect the events in them. This aspect sets it apart from other popular entertainment mediums such as watching television, listening to music, or going to sports events or theatre shows, where the participants often cannot affect the events of the medium. As a hobby, video gaming is becoming more common. Video game players are wide and diverse group of people by their age, gender, ethnicity, and socioeconomic status according to 2022 Essential Facts About the Video Game Industry (Entertainment Software Association, 2022).

Besides playing video games, watching others play them is also a form of popular entertainment nowadays. Esports (or electronic sports) is a competitive form of playing video games where professional players or teams compete against each other in organised tournaments or leagues. The competition, skills of the players, and the organised events attract audience in esports. Players playing video games can stream and make gaming videos for others to watch on live streaming and video sharing platforms, such as Twitch and YouTube. Creating this streaming or video content can be a job or a hobby for many players. Gaming streams and videos can also present competition and skilful playing, but the content can also show other aspects of gaming for the live audience of a stream or the viewers of a video. Such content could be a "Let's Play", where the player documents their own playthrough of a video game, an example being James Turner's Let's Play series of *The Sims 4 Cottage Living* (Maxis, 2021) on his YouTube channel, where he plays and experiences the Cottage Living gameplay of *The Sims 4* with his Sim character (Turner, 2021). Viewers can react to and make comments about the gameplay and also suggest what the player should do in the chat of a live stream or the comment section of a video. On top of that, viewers will get to know the game as the playthrough progresses, which may get them to buy and play the game themselves too.

Video gaming history starts back from 1960s when the first video games were invented in research institutions where there was a possibility to use computers. After that, in the 1970s, arcade video game industry began to grow and gained popularity for video games and gaming.

Development in technology brought consoles and computers, and thus video gaming, to people's homes in the 1980s and 1990s, with consoles such as Nintendo Entertainment System (NES) by Nintendo and PlayStation by Sony. Handheld consoles became popular in the 1990s too, led by Nintendo's Game Boy. The late 1990s and early 2000s saw decline in arcade games for home consoles and computers became more common. During the 2000s, Microsoft joined the console market with their Xbox console and overall consoles were developed and released as new successors for the originals, for example Nintendo released Wii, Microsoft Xbox 360, and Sony PlayStation 2 and 3. At the same time, computer gaming expanded to internet and online gaming platforms, such as Steam (Valve, 2003), which distributes video games. Online gaming and MMO games (massively multiplayer online games) grew bigger and more popular. The same happened to browser and social games on social media platforms, such as Facebook, since the games were often free to play, and the platforms gained more users. In late 2000s and early 2010s, mobile gaming evolved and rose to popularity with the invention of smartphones and their app stores, App Store for iPhone and Google Play Store for Android being the most well-known. During the 2010s, handheld consoles were displaced by mobile gaming, otherwise console, computer and mobile gaming experienced growth in market size and revenue. Virtual reality (VR) and augmented reality (AR) were successfully introduced and joined with video gaming as well. VR headsets give players an immersive gaming experience, while AR games merge real world with rendered graphics. Late 2010s to current days, has experienced the return of handheld consoles with Nintendo Switch and Steam Deck, and the gaming industry is still growing.

With video gaming having a long history and being a popular form of entertainment, in the past decades there has been research about video games as well as, why and how do people play them. What motivations do players have for playing video games and what do they receive from playing them? What kind of ways are there to play video games and why do players play differently? In the next two sections, we will discuss and try to answer these two questions.

2.1 Motivations for playing video games

People play video games for many different reasons, and these reasons can differ from one person to another. As mentioned earlier, video games are a form of entertainment, and research has shown that "to have fun" is one of the main motivations for playing games but it is not the

only motivation as some research suggests, according to Reid (2012). In addition to entertainment, other main motivations are to pass time and to relax and relieve stress (International Software Federation of Europe, 2010). Also, escapism, social interaction, challenge, and learning are reasons why people play video games (Reid, 2012; Pitic & Pitic, 2022). Many of these reasons to play video games can improve one's everyday life, well-being, and skills (Pitic & Pitic, 2022).

Entertainment, to pass time, and relaxation and stress relieve motivations consist of changing more negative feelings and emotions to positive ones or mainly increasing the positive ones. Playing a game and getting excited by its story and gameplay decreases boredom while increasing fun and inducing other positive emotions (Pitic & Pitic, 2022). Experiencing positive emotions and stress relief by playing video games affects players physically by reducing blood pressure and heart rate, and also emotionally by improving moods, such as tension, depression, and fatigue (Pitic & Pitic, 2022; Russoniello et al., 2009).

Escapism as a motivation to play means that a player prefers living and spending time in a game's virtual world over the real world. The preference may come from trying to forget and avoid unpleasant real-life problems such as health issues, having a hard time at work or school, or relationship difficulties. According to Pitic & Pitic (2022), playing video games because of escapism offers players a sense of control and feeling of satisfaction, and they can also work out their negative emotions. On the other hand, feeling escapism may come from being strongly interested in a game's virtual world and its possibilities that do not exist or are difficult to access and experience in real-life, such as fantasy and sci-fi elements or flying planes and progressing from an amateur aviator to a professional pilot.

Social interaction is a common need for people, though some need and enjoy it more than others. Social aspect of video games is a motivation for many players to play since they can play in real life or online with friends, family, or other people, who can become their new friends. When people interact with other individuals it improves their physical and mental health (Pitic & Pitic, 2022). Playing video games can offer friendship and belonging since players can become part of gaming community where they feel connected by their interest and experience of playing games (Sherry et al., 2006; Przybylski et al., 2010). While playing together, players can communicate and plan what to do next, whereas in real life, while meeting

new people or friends, they can connect with each other and feel related by talking about video games.

Challenges and succeeding in them motivates people to play video games (Sherry et al., 2006). Video games offer challenges to players whether the challenge is about completing a level in a platform game, figuring out a puzzle to progress in an adventure game, or managing multiple factors, for example finances of a company, happiness of the employees, and production quality, in a simulation game about running a business. Przybylski et al. (2010) point out that virtual environments are structured in a way that challenges gradually increase in line with the player's progress through the game. With this gradual increase of challenge, players can continually experience competence and success as they progress in the game. For games, it is important to balance the challenge difficulty and player skills because underwhelming challenges will lead players to boredom whereas overwhelming challenges will lead them to frustration. This balance is linked to flow experience which will be discussed in more detail. Video games can present competition, which can be a motivation for competitive players to play them. Competition can be linked to challenges as well since it can be direct competition against another player or team in a shooting game or showing off one's talents to progress quickly in a game. Players feel satisfaction by winning over and dominating other players (Sherry et al., 2006; Przybylski et al., 2010).

Learning can be a motivation to play video games, but it can also be a benefit that many players might not realise (Pitic & Pitic, 2022). Video game genres and the variety in them, makes it so that there are video games about almost every possible subject you can think of, whether a game is focused on one topic only or wide range of them, players can learn about the subjects by playing games. For example, simulation games, which usually simulate real world activities, have topics such as driving vehicles, flying planes, cooking food, building houses or cars, and managing your own zoos or football clubs. While the actions in a video game often do not accurately correspond with real life, the game teaches and gives insight into the topics, nonetheless. Language and skills, such as problem solving, cognitive, and motor skills, can be learned and improved by playing video games (Pitic & Pitic, 2022). Lastly, playing video games gives players experience about gaming. They learn about the mechanics, controls, and interfaces of games, and can apply this knowledge to other games they play (Przybylski et al., 2010).

A motivation is what gets a player to play video games and it can keep them playing too. Theory of Flow Experience by Mihály Csíkszentmihályi from the 1980s and 1990s presents the concept of flow (Reid, 2012). Flow is a state of mind in which a person is fully immersed into the activity they are performing. The person's emotions are positively energised which are, together with focus, aligned to perform the activity. The state of flow is linked to intrinsic motivation which means that people have internal motivation to do an activity because it brings them enjoyment and satisfaction, whereas extrinsic motivation is about motivation by external factors, such as receiving a reward. Nine elements, such as clear goals, balance between required skills and provided challenges, sense of time distortion, and engagement in the activity for its own sake, are required from the activity and the person for them to experience flow. According to Reid (2012), these elements of flow have been studied and found to support that "video games possess ideal characteristics to create and maintain flow".

The discussed motivations to play video games earlier in this section have been positive motivations but there are negative motivations too (Reid, 2012). There has been research about video game addiction which can be described as toxic or negative motivation for playing video games. It can supress and impair individual's other interests and activities, such as education or occupation, relationships, other hobbies, and well-being (World Health Organization, 2020). Another common negative subject researched with video games is violence and aggression. Shooting and fighting games portray violence and players control the characters and the actions in these games. According to Reid (2012) and also Anderson and Warburton (2012), some research has found that video games increase aggression, while other research dispute this. There is also difference between the feeling of aggression and the action of violence, as well as people having various risk factors which affect aggression and violent behaviour. Violence in multiplayer video games could be linked to competition and domination which were discussed earlier in this section.

2.2 Playstyles in video games

The way people play video games, even one and the same video game, can be very different. Many attributes of players and video games themselves affect the playstyle of the players. The motivation to play video games which were discussed earlier, have a great influence on how players play video games. Video game players have different experience and knowledge of

video games, which impacts their ways to play video games. In addition, players have different kind of preferences and habits which combined with the mechanics and gameplay of video games influence what actions they perform and how they do them. The situation and environment in which video games are played can also affect players' playstyles, for example, when they play with friends compared to when they play alone. Additionally, players might want more challenge to video games as well, and they choose play games in a way that is in compliance with the rules of the challenges. In the next four sections we will go through these aspects and discuss how they affect playstyles of players.

2.2.1 Experience in gaming

Prior experience of playing video games in general with different devices and controls can help players when they start to play a new video game. Some of the new game's mechanics, like movement and item usage, or user interface, like inventory or character design, can be similar to other games. Also, the gaming device and its controls or controller have an effect on the playstyle since they can be very different (Przybylski et al., 2010). With a computer, players can use keyboard and mouse, where the movement keys are often W, A, S and D keys, while playing on a console with a controller, the movement is done by moving the controller's analog stick (also known as a control stick or thumbstick). Usually, game developers try to make the game mechanics easily understandable and controls easy to get used to.

Having experience and knowledge of how to play video games are on different levels with totally new players compared to players who have played the game for many years. New players do not know, and at the beginning might not remember, the game mechanics unlike the more experienced players, who can advance and succeed in the game in more effective and better ways. This separates their playstyles. For example, in *Minecraft* (Mojang Studios, 2011) players can fight differently and cause damage diversely based on what weapons they use and how they attack. Weapon usage requires knowledge of how to gain the resources for the weapons and how to craft them if the weapon can be even crafted. Fighting and its end result may differ on whether players know that hitting an opponent, for example, while falling from a jump, causes a critical hit which deals more damage compared to a regular attack.

Gameplay possibilities based on the game mode and difficulty of a video game can also affect the playstyles of players. Video games often have few game or difficulty modes which players can choose to play. Each game mode has different limitations and goals which players have to follow and try to achieve. The difficulty effects on how many and how hard the limitations and goals are. For example, in *Minecraft* two common game modes are Survival and Creative. In Survival mode players must collect resources to craft tools and build structures to be able to fight and survive in the world, whereas in Creative mode players have access to all and infinite amount of resources, can fly and are invincible. *Planet Zoo* (Frontier Developments, 2019), a simulation game about constructing and managing a zoo with emphasis on wildlife conservation, has equivalent modes for *Minecraft's* Creative and Survival modes, which are Sandbox and Challenge modes. In Sandbox mode, players have unlimited money to build and manage their zoos, can place any animals into the zoo's habitats and do not need to unlock any items, while in Challenge mode, players start with fixed amount of money, do not have access to all animals, and have to do research to gain items for the animals and for the zoo construction. Creative and Sandbox modes allow players to focus on more relaxed playing and creativity without having to take part in the survival and resource gathering or business and management gameplay of the games.

2.2.2 Player types

Not only player's decision on what mode and difficulty they play impact their playstyle, but the genre of a video game also affects it since different genres offer games which have certain gameplay and action possibilities for players to do. Players can prefer one type of gameplay compared to another, and thus they play the game differently. Player's motivations, actions and goals in a game define how they play it and can differ them from other players. Some players want to focus on fighting and becoming the most powerful fighter so they can beat any opponents, while others are excited about building the most beautiful and grand structures which are admired by other players. Some may want to level their character's skills to maximum level to gain more effective and special actions, and whereas fully exploring every place of the game world and collecting everything is what other players wish to do so that they have all the collectibles and items of the game.

Richard Bartle's taxonomy of player types (Bartle, 1996) classifies players based on their in-game preferences and motivations into four different player types. Bartle created the taxonomy based on his experiences creating and managing MUDs (multi-user dungeons or domains) and inspecting the player community. MUDs are multiplayer real-time virtual worlds, usually text-based. The taxonomy can be used to describe players of multiplayer video games and it can be applied to players of single-player video games too. Bartle's player types are:

- **Achievers**: set goals for themselves and try to achieve them. They also focus on gathering points, levels, collectibles, and items in a game.
- **Explorers**: prefer to find out and discover as much as they can about the virtual world. They want to map out the world but also experiment the physics of the world, for example glitches and bugs.
- **Socialisers**: enjoy the social aspects of a game. These include role-playing, interacting, and chatting with other players or NPCs (non-playable characters).
- **Killers**: impose themselves on other players and the virtual world. Often the imposing is attacking or causing havoc instead of giving friendly gifts.

Bartle has later on expanded the four player types into eight types by dividing each original type into two subtypes (Bartle, 2003). While Bartle's player type model, as a four or an eight, provides foundation and understanding to the motivations of why players play differently and what type of gameplay they enjoy, it has weaknesses according to Yee (2005). Firstly, the presented components of each player type may not be highly correlated since, for example, desire to chat may not have any connection with desire to role-play. Secondly, the proposed types might be overlapping and not truly distinct types. For example, a player might be equally an Achiever and a Socialiser but in Bartle's model each player is one type only and has one primary motivation. The type and motivation define their playstyle and every, even non-primary, motivation is done in the interest of the primary motivation. Lastly, Yee points out that Bartle's theoretical model does not provide practical way for players to assess and identify what player type they are.

Yee (2005) conducted a study and created a component model that accounts for players to have more than one motivation for playing. This model, similarly to Bartle's model, is based on players of multiplayer video games but can be applied to players of single-player video games

too. The three main components are Achievement, Social, and Immersion, which have three to four subcomponents which relate to certain motivations for playing a video game. The component model is built as follows (see Table 1):

- **Achievement**: Advancement, Mechanics, Competition
    - Motivations in this component are based on fast advancement in the game, analysing and understanding the game system, and competing with other players in battlefield or leader boards.
- **Social**: Socializing, Relationship, Teamwork
    - Motivations in this component are based on meeting and getting to know other players, forming meaningful relationships with them, and working together instead of solo.
- **Immersion**: Discovery, Role-Playing, Customization, Escapism
    - Motivations in this component are based on exploring the world and finding new locations and items, being immersed in the game with their characters by role-playing, customising their characters style and appearance, and escaping to the game world from real life.

The subcomponents correlate with other subcomponents within the same main component but do not correlate much with the subcomponents of the other two main components. The study for the component model used a list of 40 questions related to player motivations. A player has a score on every motivation component, meaning they can score high on Advancement and Socialising, for example, without either of them being a primary motivation. This player can also be differentiated from other player who scored high on Advancement but low on Socialising. A low score on a component tells that a player is not motivated by that kind of actions and playstyle. Yee (2005) mentions that this model's weakness is the possibility of other motivations existing which are not accounted for.

Table 1: The component model about player motivations created by Yee (2005). The subcomponents are grouped under their main component.

Achievement	Social	Immersion
Advancement Progress, Power, Accumulation, Status	**Socializing** Casual Chat, Helping Others, Making Friends	**Discovery** Exploration, Lore, Finding Hidden Things
Mechanics Numbers, Optimization, Templating, Analysis	**Relationship** Personal, Self-Disclosure, Find and Give Support	**Role-playing** Story Line, Character History, Roles, Fantasy
Competition Challenging Others, Provocation, Domination	**Teamwork** Collaboration, Groups, Group Achievement	**Customization** Appearances, Accessories, Style, Color Schemes
		Escapism Relax, Escape from Real Life, Avoid Real Life Problems

As discussed, categorising players into different types may not be the best approach in finding out players' motivations for how they play and understanding their playstyles. The component model or similar approach is better since players can present multiple motivations. Overall, players often know before hand, based on their own experience, or will find out how they can play a video game in a way that suits them. If a player's motivations and playstyle do not fit with a game, they might stop playing it. The main motivations and playstyles of players can change if their preferences change and it can alter, when they play different games, change their playing environment, or try a challenge.

2.2.3 Gaming environment

The environment or situation a person is in can affect their actions and they may act differently compared to another environment or situation. A player playing a video game can also be affected by their playing environment and situation which can lead to them changing their playstyle either for a moment or for the entire play session. For example, a busy and loud environment can cause distraction and make a player lose focus on the game which affects the game, because of this the player might have to change their playstyle to be able to win the game. A change in one's gaming environment and set up, for example, their computer monitor

breaking and them having to play with a laptop computer, affects how they play as well. A laptop computer often has lower performance and smaller display than a desk top computer which changes the whole playing experience and also the playstyle, since the player has to adapt to the changed view of the game world and not as smooth or fast character movement as they are used to.

By default, playing a video game with others compared to by oneself has an effect on playstyle. When playing alone, a player can focus on their own motivations and preferred gameplay – they can advance in the game at their own pace and play in a way they want to. Whereas playing with others, each players' experience, motivations, and preferred gameplay can affect the way the whole group plays together. In addition, playing with friends compared to playing with strangers makes a difference too. In a team formed with friends, the players know each other and can more easily discuss what they want to do and how they will do it. For example, a group of friends can plan that the one friend who is the best driver of them will be the one who drives the whole team during a mission, or they can strategize what roles and weapons they use within their team, and how they attack an opposing team. Whereas in team formed with strangers, there might not be any communication and the members may not play well together at all. Some may not even try to complete the mission or win the round, and thus they disrupt the other members' game.

Lastly, playing for one's own entertainment is different compared to playing for other people's entertainment. As mentioned earlier, streaming video games and making gaming videos have become a popular form of entertainment in the past decade. A player who streams while playing a game can talk with the audience about the game or other subjects, react to the gameplay, and read comments written by the live viewers from the chat. In a similar way, players who play a game and record themselves playing it, often talk about the game, explain what they are doing, or react to what happens in the game. The viewers can suggest and comment what the players should do in the game, and this can lead the players to perform actions they normally by themselves would not do. Moreover, since these players are performing to an audience, they might change their playstyle from their normal one to make the gaming content more interesting and engaging by playing in a more entertaining, dramatic, or difficult way. For example, they could choose gameplay options that lead to dangerous situations for the characters or other difficult situations where they have a chance of failing or succeeding.

2.2.4 Challenges

As mentioned in Section 2.1, many players like to play video games for relaxing. They enjoy the story and gameplay of video games, and they do not want more pressure or difficulty to be able to progress in the games and finish them. On the other hand, there are players who enjoy playing video games and also want to challenge themselves in gaming. As discussed earlier, most video games gradually become more challenging with enemies becoming more powerful and harder to defeat or puzzles turning more complex and difficult to solve, for example. On top of this, some players deliberately create and play with challenges that restrict and change the way they play in order to complete and succeed in these challenges.

Speedrunning is a video gaming challenge format where the goal is to complete a video game as fast as possible. The fastest players gain recognition and top places in leaderboards, such as speedrun.com. Players who do speedruns, commonly known as speedrunners, have to study and learn the most optimized routes, actions, and general gameplay, character, and completion mechanics of the game they speedrun, and after that they have perform them in a near-perfection manner (Lafond, 2018). A single mistake with character movement or mishap with items can cause irretrievable time loss and a speedrun record to a player. Speedrunners may often take advantage of in-game glitches, bugs, and other programming mistakes and inconsistencies to finish the game faster (Groß et al., 2022). Speedrunning changes the gameplay experience as well, since often whole missions or parts of them, long routes to checkpoints, and dialogue between characters are skipped entirely.

As speedrunning is a competitive challenge, it has rules which speedrunners must follow. The rules are agreed upon by the speedrun community and they differ between games and the speedrun categories. According to Groß et al. (2022), common speedrun categories for many games are *any%*, *100%*, and *glitchless*. Any%-run consists of completing the game by any means within community-wide rules, while 100%-run requires finishing every objective in the game before completing it, whereas glitchless-run has a rule of not using any glitches during the speedrun. During the past decade, speedrunning has become a major part of gaming videos and live streams (Hay, 2020; Lafond, 2018). Players can speedrun and share their attempts trying to beat their own, their friends, or world records in front of the viewers. Marathon events and live streams are held where many players speedrun different games to showcase their speedrun expertise.

Besides speedrunning, there are other kind of challenges for players to push themselves in video games which are usually done in a more casual way, where mistakes only cause setback for the player in completing the challenges but do not make the entire play irrelevant. One common challenge is 100% completion, which entails doing the following objectives, completing the game, exploring all areas, finishing all missions, collecting all special items, mastering all skills, etc. Without the element of speedrunning, 100% completion can be more relaxed but still highly thorough playthrough of a game for players. They can progress in the game at their own pace without having to plan, remember, or optimize every route, mechanic, and action in the game. In addition, games have different aspects that can be used to challenge one's gameplay. For example, completing platform video game *Crash Bandicoot* (Naughty Dog, 1996; remastered version, 2017) without gaining extra lives on any levels is an extremely difficult challenge. Each level has "Wumpa Fruits" and crates scattered around them, meaning that the player has to focus on not collecting over 99 Wumpa Fruits, since that gives an extra life, and they have to be careful about what crates they break, since those contain Wumpa Fruits and even extra lives. Another example could be playing *Dark Souls: Remastered* (FromSoftware, 2018) while having equipped the Calamity Ring, which causes received damage to be doubled. As a default, Dark Souls games are notoriously difficult action games, where the player has to fight monstrous and supernatural beings and also face several powerful enemy bosses.

Many video games also have achievements which can be obtained by completing different tasks in the games. Achievements combined with the element of challenge produce the 100% achievement completion challenge, where players try to obtain all achievements of a game they play. This can be referred to as "achievement hunting" (Jakobsson, 2011). Video game achievements will be discussed and studied in more detail in the following chapters.

Overall, different kind of challenges change the way games are played, while still motivating players to play and also entertaining them and a possible audience. Challenges can be created and performed by anyone, and they can have a strict or lenient ruleset, which guideline the challenge performance. Video game challenges can also offer other benefits to players, such as deeper understanding of the game and its mechanics, improvement of problem solving and motor skills, and feeling of accomplishment when they overcome the challenges.

3 Achievements and video game achievements

In this chapter, we will address video game achievements. More precisely the focus in on what a video game achievement is, what types of them there are, and how are they designed. Let us first define and get better understanding about what is an achievement. After that we can focus more closely on achievements in video games. According to Dictionary.com (2022a) an achievement is:

- something accomplished, especially by superior ability, special effort, great courage, etc.; a great or heroic deed: his remarkable achievements in art.
- the act of achieving; attainment or accomplishment: the achievement of one's object.
- *{Digital Technology.}* a title or icon associated with a user profile or account that indicates the person's skill or rank in an online community, especially on a gaming platform.

Based on the first two general definitions of what an achievement is, we can determine that an achievement is something a person accomplishes. To accomplish something, the person has to fulfil a requirement as "accomplish" is defined as "to bring to its goal or conclusion" (Dictionary, 2022b). Thus, obtaining an achievement means the person has to meet the certain requirements set by a goal. Continuing, an achievement is something that needs utilization of special skills by the person who obtains the achievement. The used skills have to be special in the sense that they are superior to other people's skills. Only the person with these skills can obtain the achievement.

Furthermore, obtaining an achievement has an effect on the social status as the first and third points indicate. The person who accomplishes a great deed also achieves a heroic status in their social community since they can display and tell others about their achievement. Although, the achiever does not necessarily have to share their achievement, they can admire and feel proud of their achievement by themself.

Compiling these points to one overall definition, we can summarize that:

> *An achievement is a symbol of accomplishment which is obtained by displaying special skills and which may give the achiever a superior status in their own community.*

With this definition of an achievement, we can now apply it to video game achievements and see how well it applies: can video game achievements be considered as achievements.

Video games can be bought by almost anyone and those people can play the game and potentially obtain at least some of the achievements. It can be argued that most games do not require a special skill set to play or even complete because most games are developed in a way that they are accessible so that different types of players with different skill sets can play them. Nonetheless, completing a game is an achievement since most players feel accomplished when they have finished a game from start to finish.

However, this seems to be in contrast with the earlier definition, since many players are displaying the same set of skills when they play and complete games, and also potentially obtain same achievements of them. Therefore, we can say that playing video games and obtaining achievements does not require special skills, as in a special set of skills that only one or few people have. But as mentioned in Chapter 2, players use and develop their skills when they play video games, so it takes some skills to play games and obtain achievements.

Thus, we can come to a conclusion that video game achievements do not perfectly fit the definition of an achievement that was summarized earlier. However, video games still have achievements and players achieve them while playing the video games. In defence of calling video game achievements as achievements; achieving some achievements do not require as rare of a skill set as defined in the earlier definition. For example, getting promoted, finishing a big personal project, and even obtaining video game achievements are considered as achievements even though many people have done and will do these. In the next section, we will inspect video game achievements more closely.

3.1 Video game achievements

Microsoft, who was the first to bring video game achievements in 2005 to their gaming platform with Xbox 360 console, describes video game achievements as “game-defined goals that are stored and displayed in your profile” and that “achievements can be as simple, complex, or off-the-wall as a game wants” (Medler, 2009). However, *game-defined goals* concept could be expanded little bit more to better include and categorize different types of achievements and

where the objective for the achievements come from. According to the summarized definition of an achievement in the previous section and Aabom (2014), video game achievements can be described with and categorized into the following three concepts:

1) Player-defined achievements
2) Game-defined achievements
3) Platform-defined achievements

The three different concepts define more specifically where the focus of the achievement is and where the objectives of the achievements come from. The names of the three concepts indicate the difference how the original game-defined goals concept is divided. In the next three sections, we will take a look at and explore each concept more closely.

3.1.1 Player-defined achievements

Player-defined achievements are goals that the player has set for themself. The goal is often hard to accomplish and also takes the player away from the main story and side quests or makes them harder. As discussed in Chapter 2, speedrunning is a common and difficult challenge that players can set for themselves when playing video games. Also, challenges which introduce rules and restrictions to the gameplay can be used to challenge oneself, for example, finishing *The Legend of Zelda: Breath of the Wild* (Nintendo, 2017) with only using a tree branch as your only offensive weapon instead of using more powerful weapons, such as the Master Sword, makes the game more challenging. These kinds of challenges can lead the player to earn game or platform-defined achievements but the objective for the achievement comes from the player themself.

Player-defined achievement can be just a task that the player wants to do. For example, many open world video games have special places in the world which the players can explore and visit. One such place could be the Avengers Tower in *Marvel's Spider-Man* (Insomniac Games, 2018). When playing as Spider-Man in *Marvel's Spider-Man*, the player can set a goal of making their way to the very top of the Empire State Building by swinging and climbing, and from the top view the Avengers Tower, which is a special and notable place in the Marvel Universe and also one of the highest buildings in the game. Once the player has reached the top

of the building and viewed the tower, they feel achieved by completing their own goal. The journey up was an exciting experience, and they can now admire the views. This achievement is player-defined because the player set the goal for themself, and they also rewarded the achievement to themself. The game does not show any special visual representation about the achievement; however, Spider-Man may make a general comment about the overall view or the sight of the Avengers Tower. Getting to the top of the Avengers Tower itself can be a player-defined achievement too but the player is also rewarded with “Hero for Higher” platform-defined achievement.

In the game, shooting web slings and swinging with them is an important part of the character movement and those movements can be performed well by jumping off a high building. Jumping off and swinging down the very recognizable Avengers Tower could be a player-defined achievement too. Considering just viewing the tower or swinging down it, next to feeling achieved, the player's only symbol or graphical representation of the achievement would be a picture or a video of the situation (see Figure 1). The player can show off their own player-defined achievement by posting and showing the picture or video to others.

Figure 1: Reference pictures which players could take when they have achieved player-defined achievements of reaching the top of the Avengers Tower and swinging down it or viewing the tower from a distance in Marvel's Spider-Man (left picture (Donellan (2022)) and right picture (Anderson (2018))).

3.1.2 Game-defined achievements

Game-defined achievements are in-game achievements or rewards like stars, badges, ribbons, and in-game items, which players obtain while playing and progressing in the game. Since the

achievements are implemented and given to the players inside the game, game-defined achievements are often the game's main reward system (Hamari & Eranti, 2011).

For example, when a player completes a level in a game, they will receive an achievement for level completion. The achievement can be displayed as stars from one to three and the number of stars directly correspond with the player's score and predefined scoring system in the completed level. Figure 2 shows how many stars and points were earned in level two of *Candy Crush Saga* (King, 2012). The stars are the main reward system in the game, and they are awarded after every passed level based on the score players get in that level. Players of *Candy Crush Saga* can see how many points their friends have earned in each completed level, this gives players insight about how well their friends have played.

Figure 2: Level 2 completion screen in Candy Crush Saga. 153,960 points reward the player with 3 stars.

Badges and similar symbols are often rewarded to players when they complete certain goals in video games. The symbols can portray the player's score from completing a level, but they can also be achievements from different tasks in one level of the game or in the whole game. Badges might not be obtained every time the player completes a level but rather, for example, after certain number of levels have been completed with a certain high score or after completing

some limited special levels. In a similar way to the star classification from one to three, badges can also have classification from bronze to silver to gold, but they can also display some other kinds of achievements in the game. In *Geoguessr* (Geoguessr AB, 2013) players try to pinpoint their location based on what they see in Google Street View photos by trying to identify writing, architecture, flags, flora etc. Players can also often move and change their view in the Street View photos, but this can be disabled to make the gameplay more difficult. *Geoguessr* awards badges to players who complete certain goals in the game (see Figure 3).

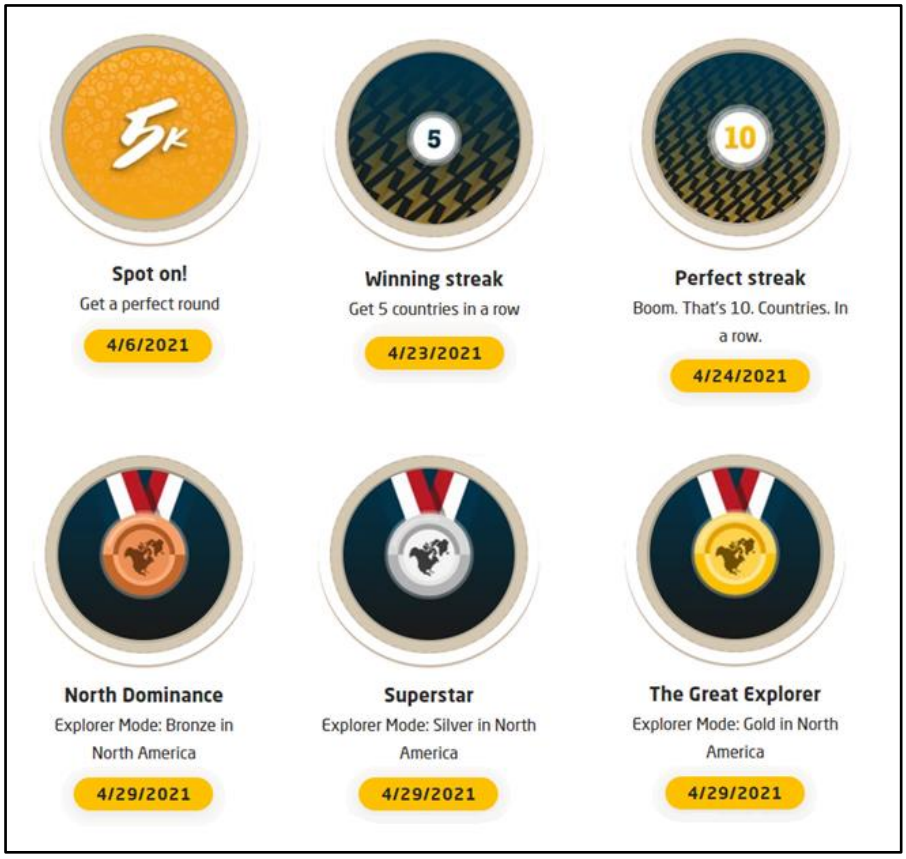

Figure 3: Few badges that have been achieved in Geoguessr. Note the badges from bronze to gold in the bottom row. They are achievements of earning specific scores, each higher than the last, when playing Explorer Mode in North America.

Video games also often have different goals which reward the player with some in-game items or game features after the goal has been achieved. Levelling up your character, progressing past the 100th level, and completing a task or a mission in some games are examples of game-defined achievements. The reward for achieving these can be unlocking a new area or game feature which boosts the gameplay and gives the player a sense of novelty or receiving in-game items which the player can use to progress in the game or customize their character. Figure 4 portrays the player completing one bundle in one room of the Community Center in *Stardew*

Valley (ConcernedApe, 2016). Each room has many bundles to complete, which individually reward the player with some in-game items and after completing each bundle in one room, the player will receive bigger in-game item reward.

Figure 4: Completion of the Spring Foraging Bundle. It rewards the player with Spring Seeds. The main reward is Bridge Repair, which unlocks a new area in the game, the Quarry. The player has to complete six bundles all together to get the main reward.

The rewarded in-game items can be booster items to help clear levels in level-based games, ammunition or a new type of weapon is common reward in shooting and fighting games, while exploration and adventure games unlock new areas for players to explore. It can be argued, and certainly researched more, whether a new area or something like experience or skill points can be considered items in video games. Either way, these are in-game rewards that players receive when they achieve different goals in video games. It is worth noting that game-defined achievements and their rewards, especially stars and badges, give players some feedback about their playing, compared to player-defined and platform-defined achievements, which often do not offer much feedback. Some levels, rounds, or maps can be difficult at first but with experience the player can play better and get higher ranking achievements.

3.1.3 Platform-defined achievements

The last concept is platform-defined achievements which are achievements that are part of an achievement system and their user interface on different gaming platforms. The platforms have developed or had online services where they could publish their achievement systems, for example Xbox (Microsoft, 2005), Steam (Valve Corporations, 2007) and PlayStation (Sony, 2008). The platforms have different systems, tracking of achievements, and even names for their achievements, for example, Xbox and Steam have achievements, while PlayStation calls its achievements trophies. When players speak of video game achievements, they most commonly refer to platform-defined achievements.

The gaming platforms have separate sections in player profiles, store pages of games, and the games' pages to generally see the video game achievements. This way the players can see if other players have collected any and what kind of achievements, and whether a game they are buying has them. The game's page displays information and different events about the game, for example, news and updates, but it can also show the latest and all achievements the player and their friends have achieved in the game.

In gaming platforms, the main environment to view one's own achievements is from their own achievement collection, where there is a list of all the games they own in the platform and the achievements of the games. In Steam, players can view their achievements by viewing their "Games" and then selecting to view "My Game Stats" under each game to view that game's achievements (see Figure 5). Steam does not have a fully separate achievement environment on their platform, whereas PlayStation 4 (Sony, 2013), which is used in reference pictures, has its own "Trophies" category which also shows how many total trophies one has collected. In "Trophies" players can find a list of their games and by selecting a game, they can view that game's achievements (see Figure 6).

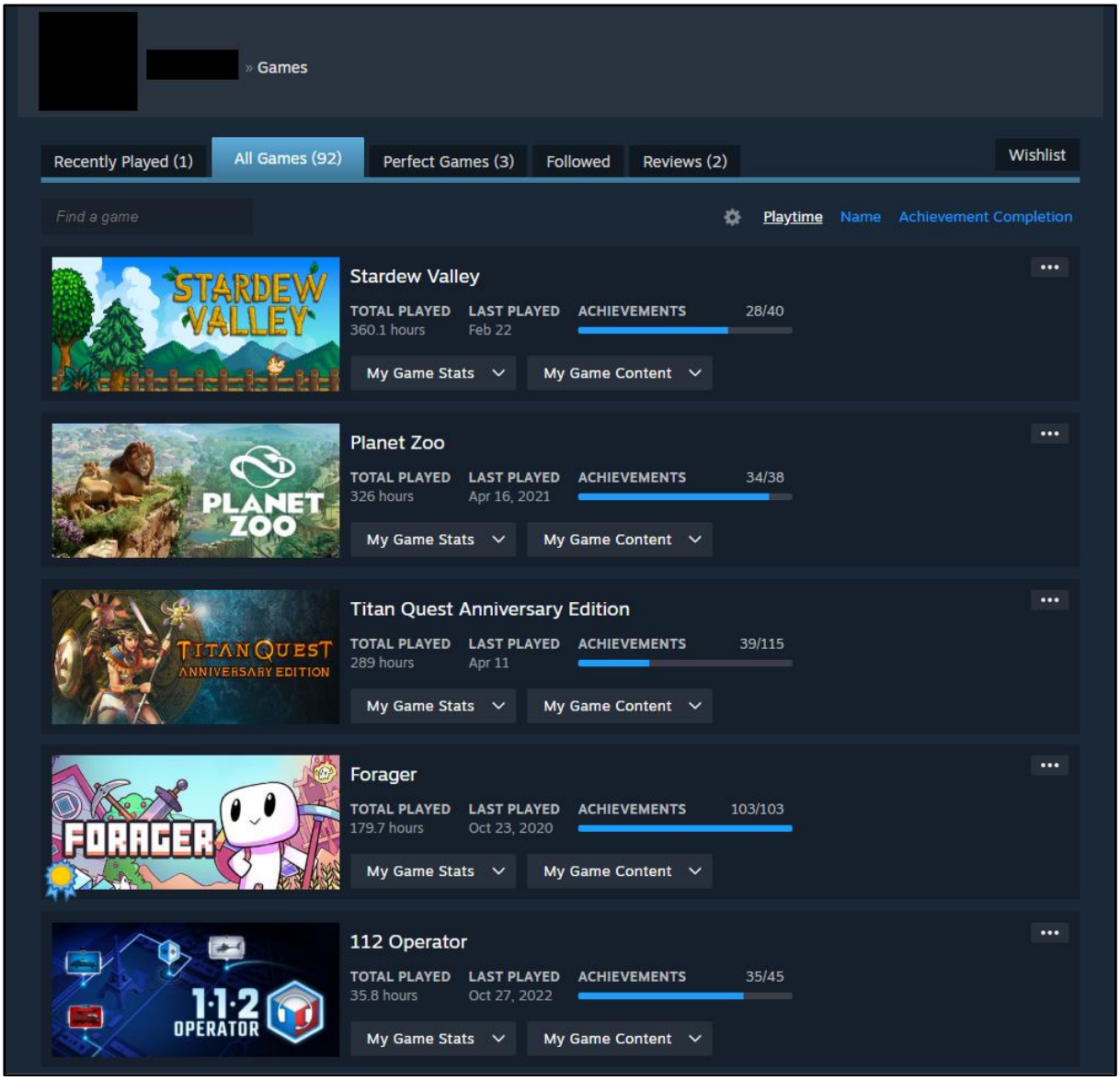

Figure 5: In Steam, "Games" section from one's profile shows information about their achievements on the platform. Each game in the game list shows information about the game, such as total hours played, date of last time played, and also achievements, i.e how many achievements of the game have been achieved from the total number of achievements. Player can check their own achievements of each game by selecting "My Achievements" under "My Game Stats". Note that Forager game (HopFrog, 2019) has a ribbon in its picture to show that all achievements of the game have been achieved.

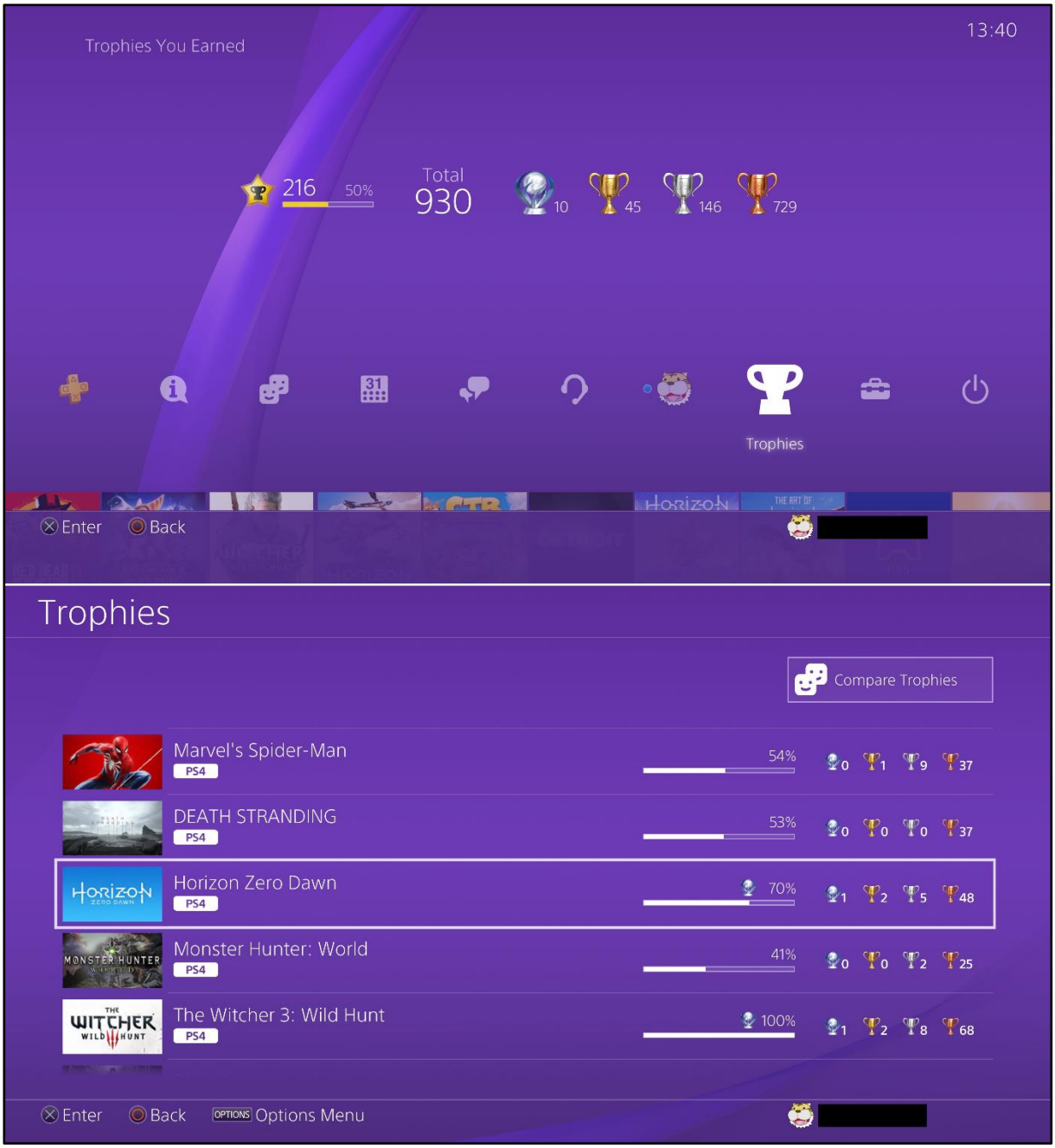

Figure 6: PlayStation 4 trophies have their own Trophies section in the menu of the gaming platform. Before selecting Trophies, players can see how many trophies they have collected all together and what level trophies they are. Earning achievements also gives players points which are measured by their Trophy Level which is level 216 in the figure. Selecting Trophies shows players a list of their games and each game informs how many and what level trophies have been collected and presents trophy percentage of the progress towards total achievement completion of the game.

Looking more closely at the achievements on these platforms, we can see that they are quite similar to each other (see Figures 7 and 8). Their designs, which will be discussed next, are the same. Both platforms also display the unlock time of the achievements, so players can see when they played the game and gained the achievements. PlayStation 4 has a couple more pieces of

information displayed than Steam. First, there is level of the achievement presented with a bronze, silver, or golden trophy. Each game on PlayStation has one platinum trophy which is rewarded once all the achievements of the game have been collected. Second, there is global unlock percentage which shows how many players of the game have unlocked the achievement. Third, there is a screenshot of the achievement's unlock moment.

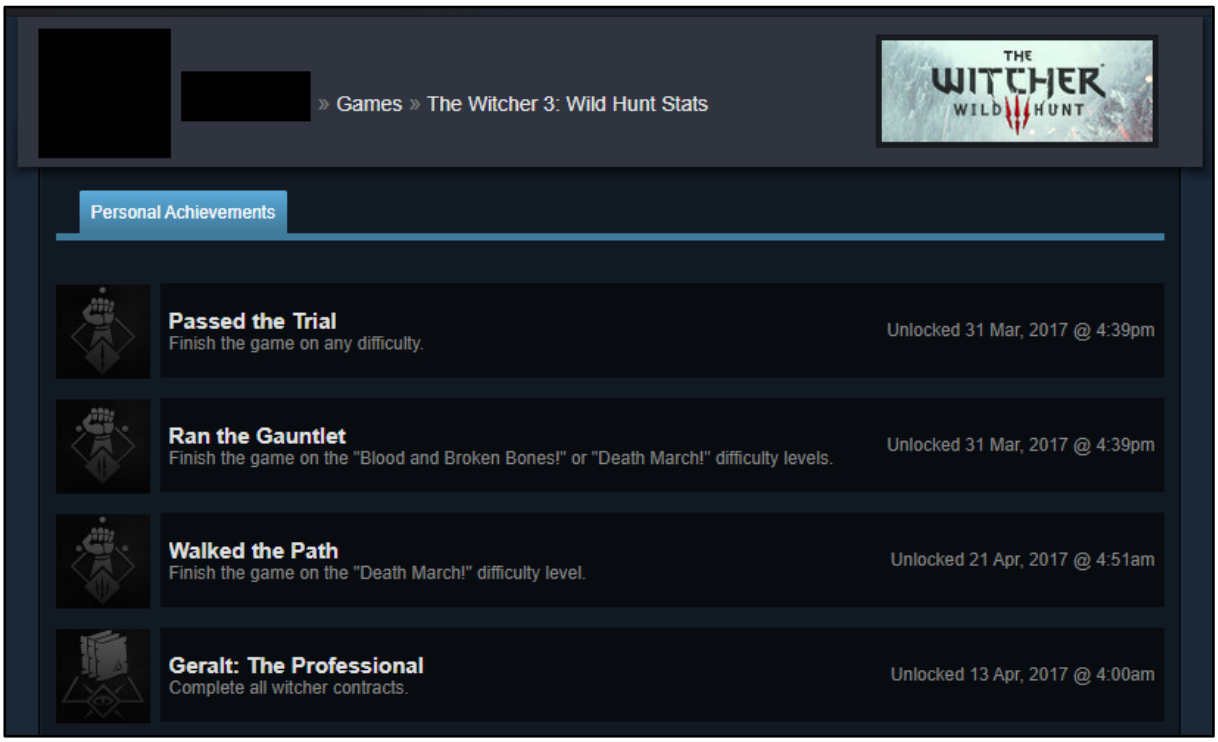

Figure 7: View of four The Witcher 3: Wild Hunt (CD Project Red, 2016) achievements, which have been unlocked in Steam.

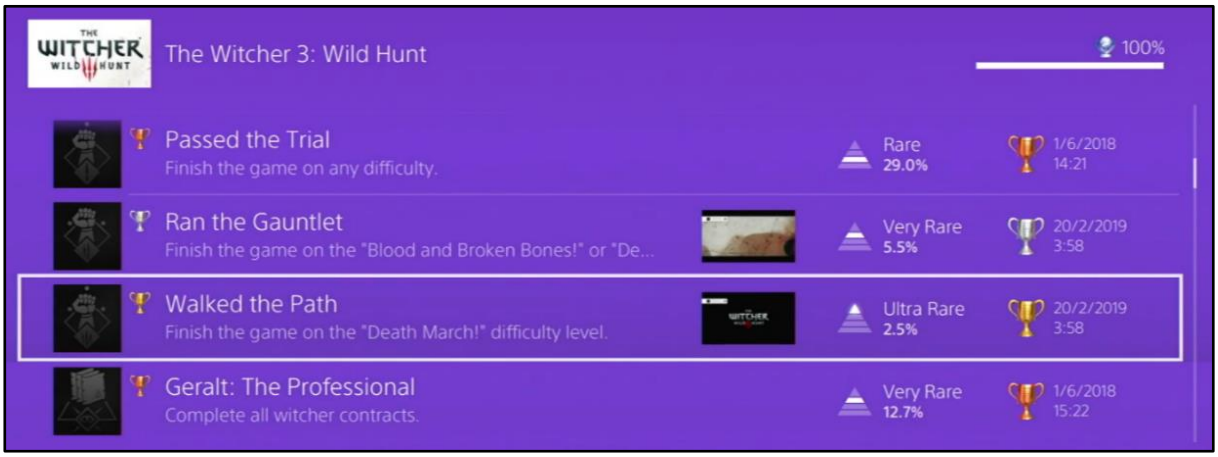

Figure 8: View of four The Witcher 3: Wild Hunt (CD Project Red, 2016) achievements, which have been unlocked in PlayStation 4.

Platform-defined achievements are unlocked when player reaches certain goals set by the developers of the games. The unlocked achievements are added to the player's achievement collection, where they can be viewed. Platform-defined achievements do not affect the game itself the same way as game-defined achievements do since there is no in-game reward from achieving them. However, when the player unlocks an achievement, there is an option to have a small visual pop-up which shows the earned achievement during the playtime.

Platform-defined achievements and the achievement systems of gaming platforms are subjects of debate on whether they enhance or weaken players' gaming experience and the games themselves. Chapter 4 will focus more on the effects that video game achievements have in video games and also on playing and developing games. The rest of this thesis will be centred around platform-defined achievements, and thus "video game achievements" or "achievements" will be used to describe platform-defined achievements unless otherwise stated. Furthermore, Steam will be used as a reference in discussion and inspection of achievements as well as in pictures of achievements, unless otherwise stated.

3.2 Design of video game achievements

Before we look into why video games have achievements and do they have significance in games and gaming, we will examine the visual design of video game achievements – how are achievements presented to the players. Hamari and Eranti (2011) discuss and explain in detail about this matter. Most achievements have a signifier, a visible part, that players can look at and receive information about the achievement. Besides the signifying element, achievements also have a second element: the completion logic. Completion logic defines what is required from the player and also from the game state for the achievement to be completed and unlocked.

3.2.1 Signifying element

According to Hamari and Eranti (2011), the signifying element of an achievement consist of a name, an icon, and a description. These are the components that make an achievement unique and separate it from other achievements. But as seen in figures 7 and 8 of Section 3.1.3, achievements of a same game have the same signifying elements even on different gaming

platforms. Gaming platforms support and some games use “Hidden achievements” which do not show any components of the signifying element to the player until they have achieved them.

Figure 9 shows three achievements of which one has been achieved, i.e. unlocked, and two have not. The achievements are from turn-based strategy game called *Sid Meier's Civilization VI* (Firaxis Games, 2016) where the player develops their chosen civilization from an early settlement through many in-game millennia to become a world power and wins the game by achieving one of several victory conditions (three victory conditions can be seen in Figure 9). The player competes against and engages in many ways with other civilizations during the game.

Figure 9: Three achievements of Sid Meier's Civilization VI in Steam. The top achievement has been unlocked, the bottom two have not.

Name

A game's achievements have a unique name that sets them apart from other achievements of the game. However, different games can have achievements named exactly the same, for example, “Millionaire” is common name for an achievement in games that have a currency mechanic, and the player can earn money in the game to become a millionaire. Usually, achievements' names connect to the lore and theme of the game. The names can be very straight-forward, or they can be more nuanced. They can also hint about how to achieve the achievements. The name of the achievement “Veni, vidi, vici” in Figure 9 has historically nuanced reference since it quotes a famous phrase by Julius Caesar and it translates to “I came, I saw, I conquered” which refers to one of his quick conquest victories.

Icon

Achievements use a visual component, an icon, to also represent them. Icons of achievements are often different within one game and also between different games. Often, they are designed in a way which differentiates the achievements from other achievements of the same game but the achievements of one game can be recognized and connected to each other by their icon design. Symbolism and references to the theme and topic of the game give meaning to achievement icons. For example, the icon of "Veni, vidi, vici" achievement is a golden sword on top of a golden shield and they are framed with golden olive tree branches (see Figure 9). This icon's elements of sword and shield represent battle and war, while the elements of golden colour and olive tree branches represent power and victory.

The icon of an achievement in a gaming platform commonly has two states, colored and faded or greyed, which directly correspond with has the achievement been achieved or not. This can be noticed in Figure 10, while Figure 9 has a grey lock depicted as the icon of achievements that have not been achieved.

Figure 10: Two achievements of Titan Quest Anniversary Edition (Iron Lore Entertainment, 2016). The bottom achievement has not been completed so it is colored grey unlike the top achievement which has been achieved so it has more vivid colour. Note how the achievements have the same icon. In Titan Quest, all achievements have the same helmet in the icon, but the colour of the helmet and the border differentiate from bronze to silver to gold to red.

Description

The description usually tries to capture what is required from the player to complete the achievement (the completion logic). The completion logic can be difficult to capture in a short description or the developers can obscure the description on purpose to make it harder to achieve for the players. The description of "Veni, vidi, vici" achievement in Figure 9 tells quite clearly what the player has to do: win a normal game on any difficulty and with any civilization by going to war with the other civilizations and conquering their cities and joining them to your

civilization. Understanding the achievement descriptions may require a knowledge of the game and its mechanics and terminology, i.e. “Domination victory” means getting all the other cities to join your civilization, however it does not necessarily have to be through war and conquering as the game has other ways to do it too. While the term “Domination victory” can be difficult to understand in the example, the description of “Pharaoh's curse” achievement tells you even less about how to complete the achievement (Figure 11).

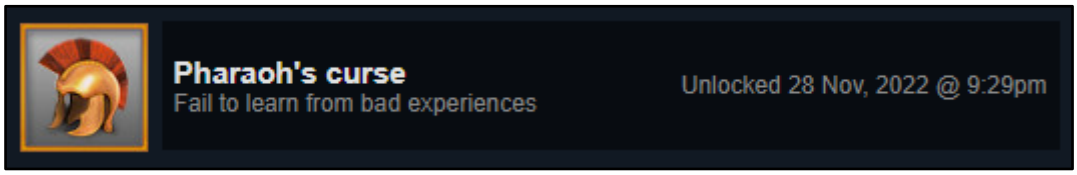

Figure 11: An achievements in Titan Quest Anniversary Edition. The description is very vaguely written so that the player does not know how to achieve the achievement. How, when, and where must the player “Fail to learn from bad experiences”?

3.2.2 Completion logic element

As mentioned earlier, the completion logic of an achievement defines what must happen for the achievement to be unlocked. It is separate from the achievement description which the player can see. Hamari and Eranti (2011) found out from conducting a study that being familiar and knowing about the game mechanics of the game makes it easier to understand the completion logic. They also list that the completion logic element consists of four components, mentioning that an achievement's completion logic can consist of more than one of them:

1) an action or an event – a *trigger*
2) *pre-requirements* for the game setting
3) *conditional* requirements for the game state which determine whether the action or the event will be counted towards a given achievement
4) *multiplier* which indicates the number of times the previous components have to be completed

Trigger

What change is required to the game state in order to unlock the achievement is the question that is answered by the achievement’s trigger component. An action from the player and an event of the game system can cause the trigger that unlocks the achievement. Figure 12 shows

two achievements: “Good point” from *Titan Quest Anniversary Edition* and “Investment Banking” from *Sid Meier's Civilization VI*. “Good point” has an action from the player (i.e. puncture) as the trigger, where as “Investment Banking” has an event of the game system (i.e. at the start of the turn) causing the trigger.

Figure 12: The top achievement portrays a player action as the trigger and the bottom achievement portrays a game system event as the trigger.

However, events are not always triggered by the game system. Multiplayer games and their achievements can have event triggers which are triggered by the other players. For example, an achievement starting with “At the end of the game have...” in a multiplayer game can be triggered by another player when they reach the winning conditions of the game and cause the game to end. Actions of another player are perceived as events.

Pre-requirements

Pre-requirements are requirements for the game setting which cannot be affected while playing the game. The pre-requirements are chosen and selected before the start of the game, and they include selections such as game mode, play time, difficulty, and character class. Even playing during a special season of a game can be a pre-requirement for some achievements of some video games. To achieve “Master of Shadows” achievement in *Titan Quest Anniversary Edition*, the player must win and play the game at Legendary difficulty, which is the hardest difficulty, as a Rogue class character, which means that they have only Rogue skills available and at their use (see Figure 13).

Figure 13: "Master of Shadows" achievement from Titan Quest Anniversary Edition has two pre-requirement component parts in its completion logic, i.e. Legendary difficulty and Rogue class character.

Pre-requirement for an achievement can also be "any" as seen in Figure 9, where the three achievements have description ending in "any difficulty with any leader". The end of the description could be removed but it does tell the player that they can choose to play an easy or a difficult game, with any one of the leaders of the game to be able to achieve those achievements. The achievements also hint that there are other achievements which require playing with certain difficulty or certain leader for the player to actually achieve those.

Condition

Condition component answers questions such as how, when, where, in what timeframe and with whom the trigger should take place. The condition component includes requirements that have to exist in the game state in the moment or have to have happened earlier in the game before the final action or event trigger, which would unlock the achievement, takes place. Figure 14 portrays a *Titan Quest Anniversary Edition* achievement, which requires the player to "Defeat ten enemies over the course of one Stoneform spell". This achievement's first condition is that the player's character uses the Stoneform spell, but that requires other conditions to be met first and they include playing an Earth class character (pre-requirement) and earning at least 11 skill points so that the character can unlock the Stoneform skill. In addition, the player needs their character to do damage to the enemies with something else than their offensive weapons since Stoneform spell prohibits character movement. This type of damage can be done with other skills or special equipment that can cause damage. All of this has to be done in about six seconds which is the duration of the Stoneform spell.

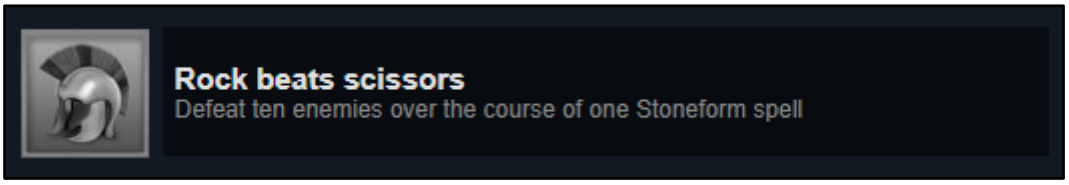

Figure 14: "Rock beats scissors" achievement from Titan Quest Anniversary Edition has many conditions that are not explicitly mentioned in the description. The player has to progress towards the conditions during the gameplay and then trigger it.

According to Hamari and Eranti (2011), "Conditions are attributes that create additional difficulty to carrying out the actions or making an event happen". Conditions make the achievements more difficult to achieve because they require the player to sometimes make pre-requirements and also know and concentrate on how the conditions work and how they can achieve the achievement. This is especially the case when conditions build up on top of other conditions.

Multiplier

Finally, multiplier component defines how many times the trigger has to be carried out while having the pre-required game setting and within the pre-defined conditions of the game state. Simple example of this component is shown in Figure 10 with the "Avatar of Thanatos" achievement which has a multiplier component of half a million with a trigger of kill monsters, together the whole description reads as "Kill half a million monsters". However, the multiplier component can be more complex which can be seen with "Altoholic" achievement (see Figure 15).

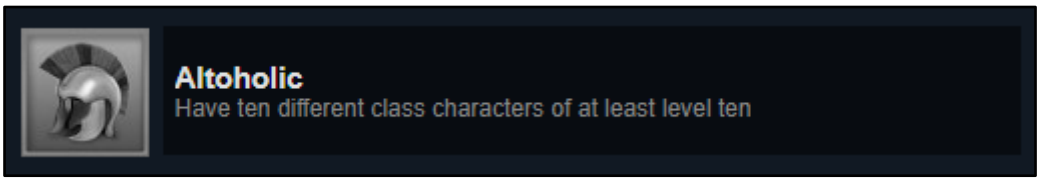

Figure 15: An achievement of Titan Quest Anniversary Edition which has a multiplier of ten and two condition components that require the player to have a character of at least level ten, and the characters have to be different classes.

4 Effects of video game achievements

Now that we know more about video game achievements, in this chapter, we will examine their effects on playing video games and developing them. Do achievements bring something more to video games and playing them, or not? Are there benefits or disadvantages to gaming experience from achievements? How do players collect achievements? Also, what how do achievements affect the development of video games? Before trying to answer these questions, we will first discuss more generally about achievements in gaming platforms.

The original version of video game achievements were physical patches given by video game publisher Activision in 1980s (Hilliard, 2013; Hamari & Eranti, 2011). For example, players could play *Pitfall!* (Activision, 1982) and once they had gained 20,000 points, they would have to take a photo of the score in their television, get the photo developed, and mail the photo evidence to Activision. After some time, they would receive the Explorer's Club patch in mail. As discussed earlier, present-day achievements came to the currently popular video gaming platforms of Xbox, Steam, and PlayStation in 2005 to 2008. Steam being an online video game distribution service, whereas Xbox had Xbox Live! and PlayStation had PlayStation Network as their online services, made it possible for achievement systems and achievements to be added into these platforms and their video games. Nowadays, PlayStation and Xbox require games to have achievements to be published on their platforms. Players create their own accounts to these online services of the gaming platforms, where they can play, socialize, and compete with other players. Regarding achievements, players can track and view their achievements in their player profiles, and also showcase their achievements to other players (Fraternali & Galli, 2014; Cruz et al. 2014).

Achievements are part of the achievement systems in gaming platforms. Achievement systems are component structures in gaming platforms which offer, present, manage, and share achievements of the platform (Fraternali & Galli, 2014). Achievement systems also offer functionalities and APIs to video game developers to define and implement achievements into their games. According to Montola et al. (2009), achievements are optional and a secondary game system, outside the core video game. Since platform-defined achievements do not affect the events or progress of the core video game, they can be seen as optional or secondary, but Hamari and Eranti (2011) argue this being possibly problematic. Some players specifically try

to collect achievements in the achievement systems; thus, achievements are not optional or secondary. Hamari and Eranti (2011) point out that “achievement systems should be viewed as games of their own”, which is supported by Jakobsson (2011). Players can play the achievement system by trying to complete the achievements, which can be comparable to completing a video game, or competing with friends or other players in who has the most achievements or who has collected certain achievements first, which can be comparable to multiplayer video games and their leaderboards, all the while they also play the core video game.

A clear distinction in the achievement systems of popular platforms is that while they track achievements, such as the total number of achievements, other platform specific achievement statistics are also used, such as Xbox’s Gamerscore and PlayStation’s Trophy Level. These are shown in player profiles and the achievement environments. On Xbox, achievements have Gamerscore points and the achievements of one game make a total of 1,000 points. Developers assign the points to the achievements as they see fit, but usually harder and more complicated achievements have higher point score compared to easier one’s (Jakobsson, 2011). On PlayStation, each trophy accumulates points for the Trophy Level but unlike Xbox’s Gamerscore, these points are not explicitly displayed. Higher-level trophies earn more points than lower-level trophies (Aoki, 2020).

4.1 Player perspective to achievements

Now that we know and understand more about achievement systems and achievements in them, we can better assess how and why players react to achievements the way they do, and do achievements bring something more to video gaming. Generally, video game players can be said to have and experience positive, neutral, or negative emotions about achievements. Closely linked with Section 2.1 about motivations for playing video games, collecting achievements present some motivations and aspects to why players collect them and what they offer to players. One main motivation regarding achievements is that they offer completion and accomplishment whether it is about obtaining all achievements or one specific achievement of a game. Achievements bring replayability and different kind of gameplay experimentation to players too. Social and competitive aspects are represented in achievements and in the achievement systems. (Jakobsson, 2011; Cruz et al., 2014).

Jakobsson (2011) structured three categories for players regarding their approach to achievements based on his study on Xbox achievements and Xbox 360 player community. The categories are Achievement Casuals, Hunters, and Completists. Jakobsson notes that these categories are not distinct or final since players can have traits from each of the categories and they may change their approach over time. However, similarly to Bartle's player types in Section 2.2.2, Jakobsson's categories can be used as a foundation to understand how players approach and view achievements. Furthermore, Achievement Hunters and Completists or Completionists are common words in gaming communities.

Achievement Casuals relate to achievements in a casual manner to put it simply. Achievements are in the background of the gaming experience for Achievement Casuals, and they do not think about achievements unless they accidentally unlock one during gameplay. Achievements may come into play once they have finished a game but want to continue to play it. Continuing to play the game is considered reasonable and worthwhile because achievements give directions on how the game can be played more, and usually in a different way than during the first playthrough.

Achievement Hunters consider the achievement system to be more important than the video games, and they also often enjoy playing the achievement system as much as or more than the games. They play any games even outside of their preferred genres, especially short and easy games that may not offer the most exciting gaming experience, to be able collect achievements. Achievement Hunters' engagement towards collecting achievements is similar to "grinding", which is a term in video gaming culture to describe players repeating same actions in video games for long period of time to achieve certain result, such as levelling their character or earning in-game currency or special items. Hunters do not necessarily care to 100 % complete the achievements of games, they rather collect the easy and time efficient one's to maximize their total number of achievements, Gamerscore on Xbox, or Trophy Level on PlayStation.

Achievement Completists approach video games with will to systematically complete and collect everything in-game, this is also observed by Cruz et al. (2014). A game is unfinished if all of its achievements have not been unlocked. To Completists, achievements make their dedication to playing games more concrete and visible. Often, they focus on specific games which they enjoy playing and spend a lot of time on completing them. They care more about the one completion of a game than the total number of achievements or Gamerscore which

separates them from Achievement Hunters. The long commitment and effort put into completing a game and gaining the last difficult achievements can be important factors in feeling accomplishment and having a positive gaming experience (Cruz et al., 2014).

Some players do not care about achievements since they are extrinsic rewards for playing video games and they do not affect the gameplay. Achievements can be viewed as absurd and meaningless tasks included in games for players to have some extra content (Cruz et al., 2014). While playing video games many players may obtain achievements, but those who do not care about them are not motivated to specifically try and collect achievements or increase their achievement statistics, Gamerscore, or Trophy Level. Even though some players do not care for achievements and want nothing to do with them, they still are part of the achievement systems and gain achievements to their player profiles. This type of mandatory participation can feel repulsive and controlling (Cruz et al., 2014), although achievements can be hidden and ignored in platforms for the most part.

In Jakobsson's study (2011), one participant said that for them achievements are a way to record their gaming history. Player profiles store achievements and information about them, such as unlock time, which can be used to track one's gaming history. This way the achievement system does not significantly change the player's gaming experience but still positively affects it. Those participants in the study who were Achievement Hunters, enjoyed the social pleasure and bragging rights of achievement hunting, such as being at the top of the leaderboards for having the most achievements or the highest Gamerscore. In addition to the social respect and motivation, collecting achievements can present competitiveness in Casual, Hunter, and Completists players. Since achievement systems enable players to see their friends' achievements or top players in leaderboards, even Achievement Casuals and Completists may start to play the achievement system rather than the actual video games, which is considered to be the approach of Achievement Hunters.

In Section 2.1 about motivations to play video games, we mentioned that a negative motivation is being addicted to playing video games. Closely linked to or even the main reason for this can be an addiction or obsession to collect video game achievements, which according to Wang et al. (2021), is a likely addiction to develop if one is motivated to play video games mainly because of the achievements. Addicted players may feel social or self-imposed pressure to collect some or all achievements of video games which is a more negative effect of

achievements, compared to players who feel positively surprised when they, for example, accidentally unlock an achievement or have enjoyed another playthrough of a game because they were "inspired" by an achievement to play the game in a different way (Cruz et al., 2014).

Another negative effect or implication about collecting achievements is that those who do it purposefully, play video games wrong or miss the point of playing video games according to some players (Jakobsson, 2011; Cruz et al., 2014). Especially Achievement Hunters and Completists are said to waste their life or have nothing else in their life but video game achievements, which diminish their motivation for playing video games and feelings of accomplishment. Jakobsson notes how this is the same "attitude that the surrounding society often exhibits towards gaming as a whole". Players can also feel major dissatisfaction and frustration if they are not able to collect some or fully complete a game's achievements. This may affect negatively to their whole gaming experience regarding that game. Sometimes the achievements can be just that hard to complete or require player to play a game mode they do not enjoy playing, some examples include, achievements of completing a level in a minute or being the weekly top 1 player, while another game can have achievements for its single-player and multi-player game modes, thus making it outright unpleasant to try and collect achievements for those players who dislike playing with other players.

To those who enjoy video game achievements, they are a way to add depth and value to video games and to the gaming experience by having additional goals and challenges to work towards to besides only completing the main story or quests of a game. Achievements can negatively impact collectors and their gaming experience, for example, causing frustration if the challenge is too difficult. On the other hand, some players consider achievements to be meaningless, not valuable, additional content. Overall, motivations and reasons to collect video game achievements can make different players react completely the opposite ways.

4.2 Collecting achievements

We have already discussed how different players approach achievements and collecting them, and how some players do not care about achievements, but there are few other aspects to this. When achievements came to gaming platforms, Jakobsson (2011) remarks that there where games which had all of their achievements unlocked by only playing and finishing the games

once. With these kinds of games, it is easy to collect all the achievements, but they do not add value to continue playing the game, challenge players in trying to accomplish them, or make players try something new in the game. The achievements need to matter and engage players for them to feel motivated to replay the game.

Story driven games which have one direct storyline to play where players can also control only one character, might not be the most motivating or exciting games to play again because players may feel like they have experienced it fully by completing it. Other story driven games can have different characters with different skills or actions, or multiple storylines which can change based on actions and choices that the players make. Some players enjoy playing both of those types of games only once, while others may be motivated to play the second type of games again because they offer different and new gameplay. However, if these games have interesting and engaging achievements, more players may play both of these types of games even after they have completed them once.

In addition to achievements providing players with feeling accomplishment and elevated social status, there is another aspect to collecting them than it being only motivating. Reiss (2004) proposed and developed a theory of motivation called *The Theory of 16 Basic Desires*. The basic desires cover motives which determine people's behaviour, and one identified basic desire was the desire to collect. Collecting things, such as books, merchandise of specific band, or baseball cards, and forming collections of them is a hobby many people enjoy. With video game players this combines the joy of playing video games and collecting video game achievements.

Whether players play games once and unlock some of the achievements or if they play the games a second or more times to collect some more or all of the achievements, they have collected their achievements by themselves. It is common to watch videos or read guides that help players to complete difficult quests in video games, and in a similar way, there are sources to help players collect the achievements of the games they play. Even though using help, the players have still collected their achievements by themselves. However, as there is cheating in playing video games, there is also cheating in collecting video game achievements. Usually third-party applications, such as *Steam Achievement Manager (SAM)* (Gibbed, 2008), make it possible for players to unlock their own Steam achievements as they wish.

4.3 Video game developing and achievements

Designing and developing a video game is long process involving many people who work on different parts of the project. There is not a lot of information or research about development or implementation of video game achievements, for example, when are they usually introduced in the project, who are part of designing them, or are achievements designed in one go. Naturally, since projects are different these questions can have many different answers. When a game is brought to a gaming platform to be published, its achievements are most likely then implemented to the platform's achievement system, so it could be assumed that the achievements have been designed before that at least. Steam API, which was quickly mentioned at the start of this chapter, has documentation for integrating Steam Achievements to an application.[1] Even though there is not much research about this matter, there are couple of aspects we can discuss in more detail in this section.

In video game industry and video game development, video games are usually measured in multiple ways, such as units sold, weekly players, reviews written, or awards won, to determine whether a game is successful and good or not. This can affect the developers and publishers of the game in terms of whether they make a sequel to the game or how they decide a game's project scope and use of resources. In addition to those other factors, achievements can also be used to measure video games. Some games have achievements, such as "Complete level 1", "Complete level 5", and "Complete the final level", which are linked to the story or the main quest of the game, and these achievements can be used to track the completion rate of the games (Bailey & Miyata, 2019). With completion time statistic, this can provide useful data and information to the amount of content in and length of the new game.

The design and development of video game achievements can vary depending on the game and the developer. Discussing with two game designers, Bycer (2013) explains that "achievements should not be a required element of game design as not every game supports them". Creating meaningful achievements can be hard, and Bycer with his guests do not want to create meaningless achievements that clash with the game and its gameplay, an example being getting kills as the medic in *Team Fortress 2* (Valve Corporation, 2007) which is a multiplayer first-person shooter game. The main task of a player who plays the medic character is to heal other

[1] https://partner.steamgames.com/doc/features/achievements/ach_guide

players in their team and not try to get kills. Either way, as discussed in Section 3.2 about design of video game achievements, the achievements can be as easy or hard, or meaningful or meaningless as the developers and designer decide to make them. The meaningfulness and value of achievements mainly comes from each individual player who play the game and collect its achievements. There are however games and developers who make their opinion about achievements well-known. One such game is *Undertale* (Toby Fox, 2015), which does not have achievements in Steam, but since PlayStation requires them, the developer made them (Figure 16).

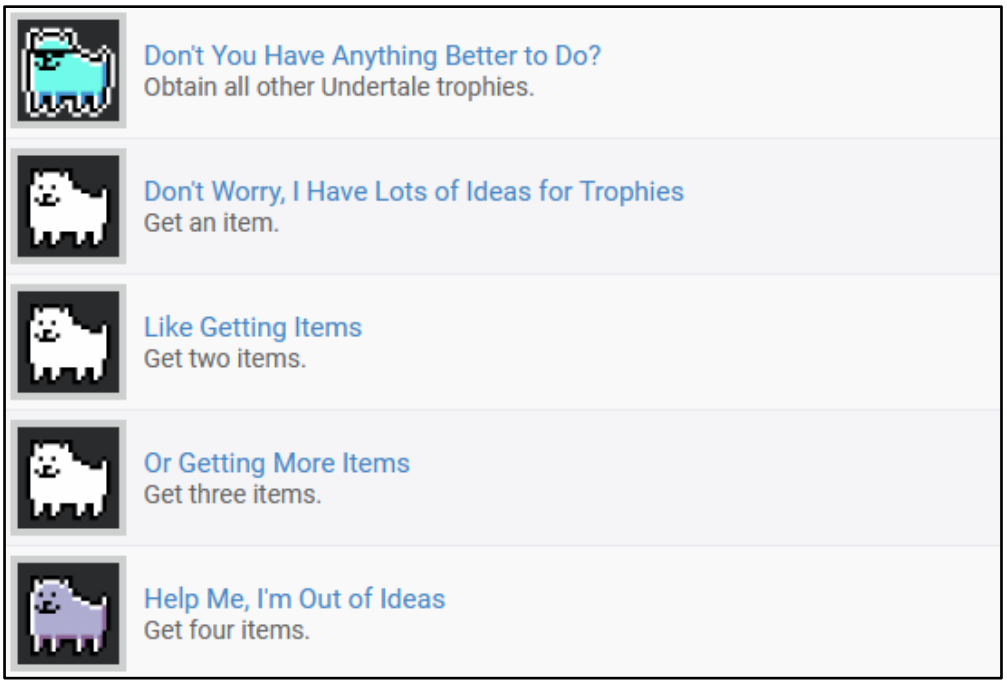

Figure 16: Toby Fox, the developer of Undertale, did not want to add achievements to the game. The names of the pictured achievements are intended to be sarcastic.

5 Achievements in Steam

In this chapter we will examine and take a closer look at achievements in Steam. While we have seen little bit of Steam and its achievement environment earlier in Section 3.1.3, now we will examine the whole platform closer and see how achievements are presented throughout the platform. We will look at different Steam user interface (UI) elements and components which display achievements. Lastly, we will also note how achievements are presented during gameplay when players unlock them.

In this showcase, we will focus on one game, *Vampire Survivors* (Luca "poncle" Galante, 2022). With one game only, the information and design elements of the achievements, for example, the number of unlocked achievements and the icon designs of them, will stay the same or similar to each other. The game has been bought and played on the platform too. Some of its achievements have been unlocked but some have not, so that we can see the achievement progress of the game and also the difference in how unlocked and locked achievements are displayed in Steam.

Vampire Survivors is a 2D shoot 'em up video game, where the player controls an automatically attacking character with a starting weapon and tries to defeat waves of monster enemies in an endless stage. Defeating monsters gives experience gems and once the character levels up, the player can choose to add a new weapon, upgrade an existing weapon, or gain bonus effects, such as faster movement or larger attack range. A round typically has a time limit of 30 minutes, after which a strong enemy called Death will spawn to ensure that the round ends. The game has challenges, such as survive long enough with a specific character, which unlock in-game items for players, but these challenges are the same as the game's platform-defined achievements. After each round players see their statistics from the round, for example, their damage with each weapon and items they collected, including if they have completed challenges these will be displayed too.

5.1 Showcase – achievements in Steam UI

In Steam, bought video games are added to Steam user's account and then listed and shown in their Library menu. The top left corner in Steam lists the menu categories which are Store,

Library, Community, and the player profile. After selecting a game in Library, in this case *Vampire Survivors*, players will see the home page of the game (see Figure 17). The home page UI displays a banner picture of the game, the Play button, links to the store page and guides of the game to name a few, and also other information of the game, such as total playtime and number of achievements. The ratio of unlocked achievements to total number of achievements is presented with a numerical format of 120/184 and also with a progress bar.

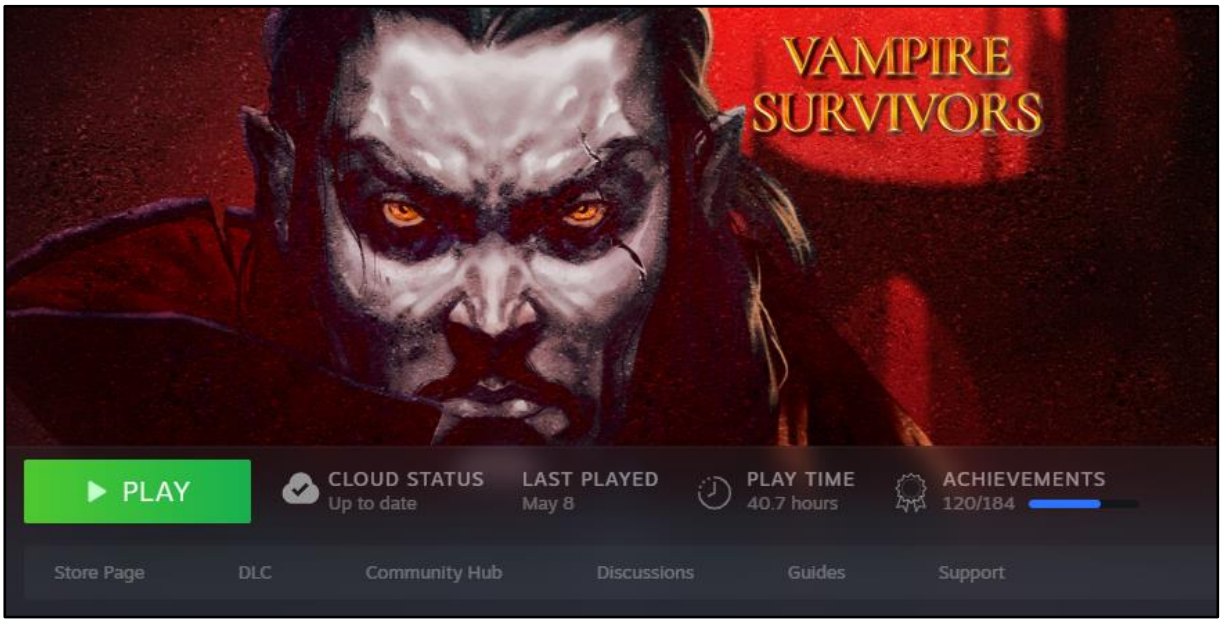

Figure 17: Top part of Vampire Survivor home page. Achievements are displayed in the right side in numerical format and as a progress bar. The ribbon next to Achievements presents whether the game is a "Perfect Game" meaning have all achievements of the game been collected or not. The ribbon will be blue and yellow once all achievements have been collected.

Below the top part of the home page, is the "Activity" section. Activity feed holds and displays different events of the game, such as news and updates from the developers and unlocked achievements per day by the player themself and their friends. Figure 18 shows few unlocked achievements of two different players in Activity feed. After a game session, players usually return to the home page of the game and if they have unlocked achievements, they can see the achievements at the top of the feed.

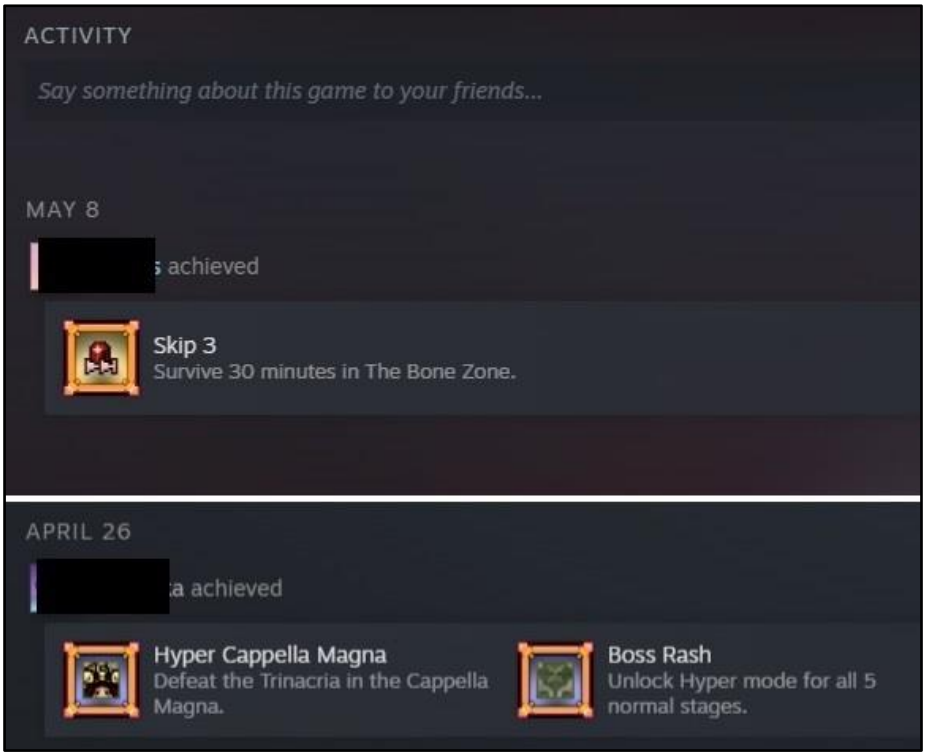

Figure 18: Activity feed showing two players having unlocked achievements. The feed is sorted by date. An event about unlocked achievements can hold and show eight individual unlocked achievements with their signifying elements but if more than eight has been unlocked in a day, the event's last achievement will read "… and X more achievements".

Lastly in the home page UI, next to Activity feed on the right side is a panel showing, for example, "Friends who play", "Achievements", and "Screenshots" (see Figure 19). The Achievements section displays the same ratio and progress bar as mentioned earlier about the number of achievements but there is also a percentage of the ratio. The last unlocked achievement is displayed with its signifying element, while below that is some slots for icons of other unlocked achievements, where the last slot can display a positive number if more achievements have been unlocked. The number of slots depends on how wide the Steam application window is. Under the unlocked achievements are the locked achievements which are displayed in the same way of having slots for icons of the locked achievements, where the last slot can display a positive number if there are more locked achievements. In the lower right corner of the Achievements section is "View My Achievements" button which leads the player to view a more informative list of their own achievements of the game.

Figure 19: Achievements section in the right side panel of the home page displays the most information about the achievements in the home page. It also leads players to view and check their achievements in more detail. If players hover their cursor above the achievement icons, they will see more detailed information about them.

Moving away from the home page UI to Steam's Store and to the store page of *Vampire Survivors* (see Figure 20), where players can buy the game. In the store page, players can also see gameplay footage or pictures, synopsis of the game, general review type in negative to positive scale, release date, developer and publisher, and user-defined tags that describe the game, such as "2D" or "Single-player". These help players to understand and form an opinion about whether to buy the game. In addition, under the top part of the store page, there is even more information about the game, such as available DLC (downloadable content), supported languages, system requirements, and of course whether the game has achievements (see the lower right corner of Figure 20).

Figure 20: Achievements are displayed in a game's store page in a small section on the right side of the UI if the game has achievements. The section is titled "Includes X Steam Achievements" and it displays three icons of the game's achievements. Next to the three icons is a button to view all achievements, which leads players to see the Global Achievements of the game.

Player profiles in Steam do not show information about achievements in a similar way which there are separate tabs and information about owned games, screenshots, or reviews for example. Because of this, players must go to their Games tab to see their games and more overall and informative view about their achievements of each game. This UI has been discussed earlier in Section 3.1.3. where Figure 5 shows more games than just *Vampire Survivors* (see Figure 21). Players can see the familiar Achievements component with the numerical format of 120/184 and the progress bar in the information panel of the game. In the game's information panel, there is a drop-down menu "My Game Stats" where players can select to view "My Achievements" or "Global Achievements". These two different achievement environments will be examined next.

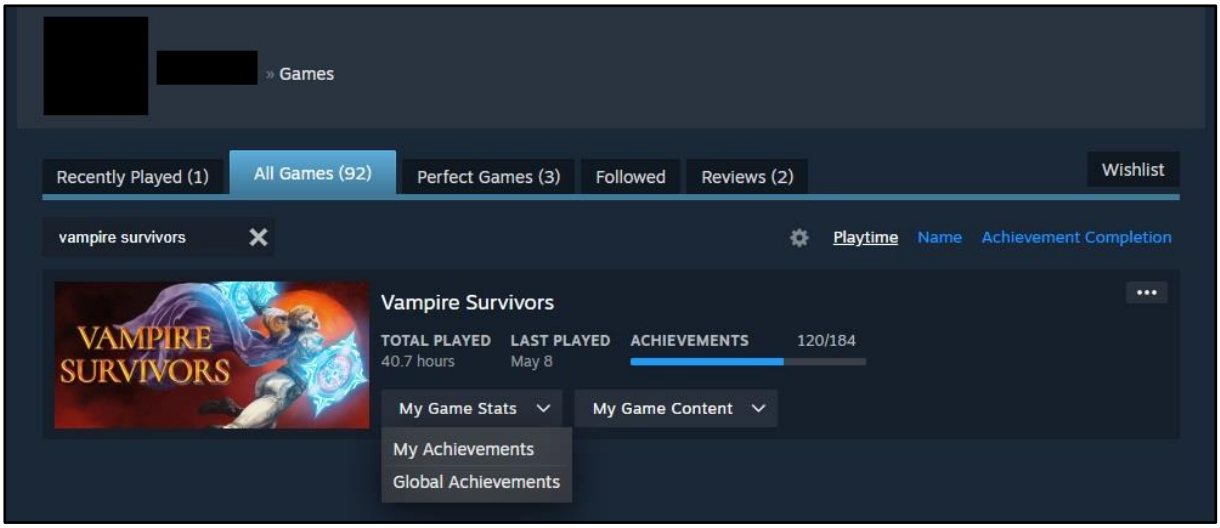

Figure 21: A player's Games tab showing Vampire Survivors and its information panel from all of the games they own. Among other information, the game's achievement completion number and progress bar are displayed. More detailed view of the achievements can be seen by selecting to view the statistics of the game.

First, we will inspect the Personal Achievements environment (see Figure 22). The game, which achievements are viewed, is displayed with its name and picture at the top of the UI. Below that on the left side is a statistic about playtime of the past two weeks and a button to view the Global Achievements, while on the right side is again the familiar achievement completion statistics in numerical format, percentage and as a progress bar. Then there is the list of achievements, first unlocked achievements are displayed and then locked achievements after a noticeable gap to help players separate them. All achievement, except hidden ones, display their signifying element components, which include name, icon, and description. Unlocked achievements have a text reading their unlock time and their icons have more colour and a visible frame, while locked achievements do not have.

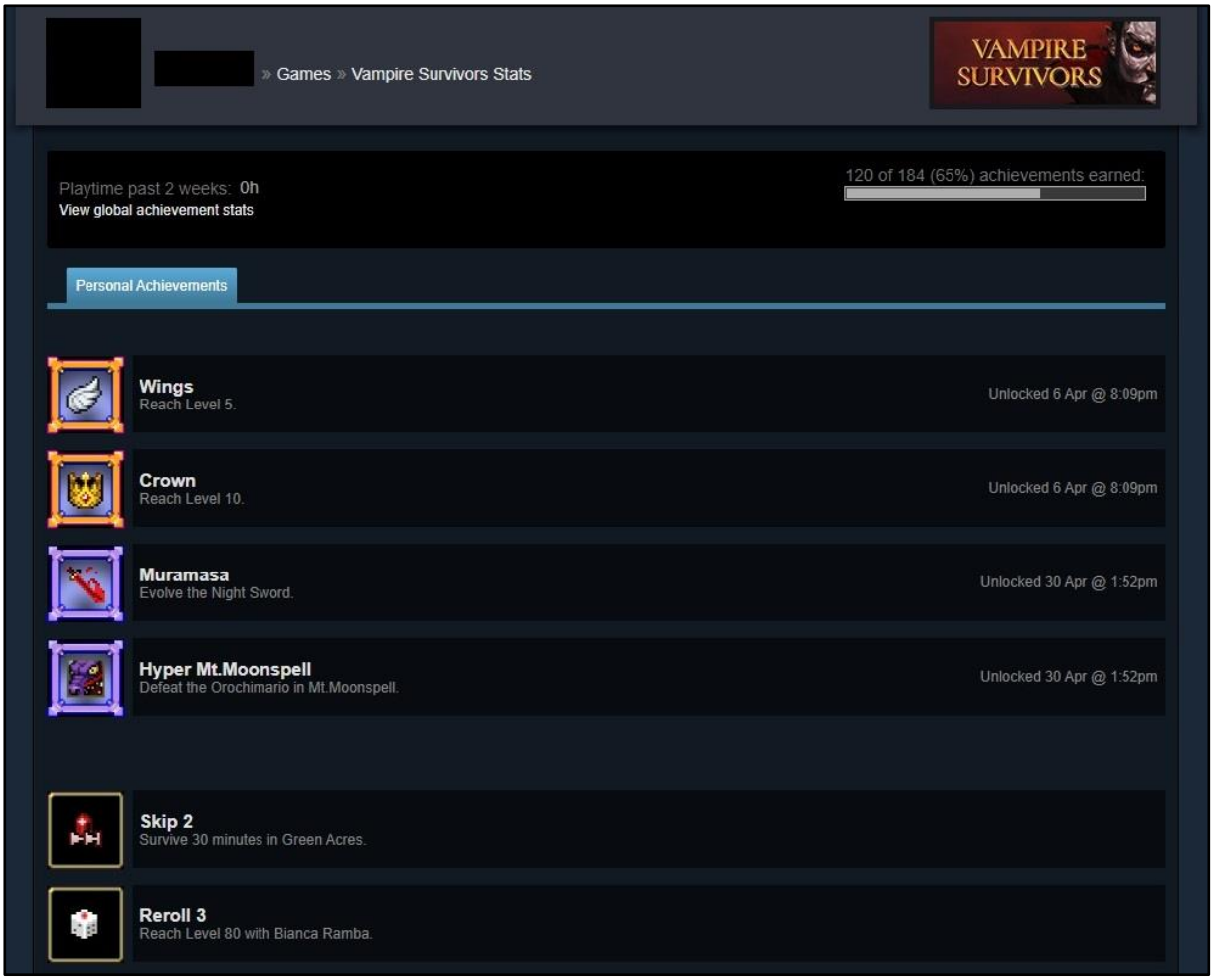

Figure 22: Player's Personal Achievements of Vampire Survivors. The four top achievements on the list are unlocked while the bottom two are locked. The picture has been edited to show only four unlocked and two locked achievements, actually it would first show 120 unlocked achievements before showing 64 locked achievements.

Second, we will examine the Global Achievements environment which shares likeness to the Personal Achievements view (see Figure 23). The game and once again the player's statistics of earned achievements are display at the top of the Global Achievements environment. The achievements are listed in the UI in a similar way to the Personal Achievements environment but the achievements' bar components which display their name and description components of their signifying element are now percentage-based progress bars. The progress bars represent how many players of the game have earned each achievement. For example, the most commonly earned achievement of *Vampire Survivors* is Hollow Heart which requires the player to "Survive 1 minute with any character". It has a completion percentage of 98.6% since it is fairly easy to complete even if a player plays the game for the first time. By scrolling down the list players will see more and more rarely earned achievements. The achievement list has the icons of each achievement of the left and right side of them, the right-side icons portray the

earned achievements of the player themself by having a frame around the icon if the achievement has been unlocked.

Figure 23: The Global Achievement environment presents how many achievements of the game have been earned by all players of the game. The completion rate is displayed as a percentage. This figure only presents the four most and the four least commonly earned achievements. Vampire Survivors has two DLCs and regarding achievements, they are shown as different color achievements. Generally DLC achievements are the most rare achievements in video games since many players may not own the DLC expansions or they have played the base game before the DLC has been published.

The last Steam UI component regarding achievements that we will examine is a player profile. While it has been said that achievements cannot be viewed in one's own profile, in Steam players can edit their own player profiles. The profiles have spots for showcases in which player can display things, such as favourite games, items, badges, screenshots, and also achievements. However, these featured showcases are behind a requirement of being at least on Steam level

10 and using Steam Points at Steam Points Shop to buy these showcases. Steam level can be increased by crafting badges, completing community tasks, participating in Events, and gaining special Event badges, and lastly Steam account turning one year older. Steam Points are earned by buying games on the platform. Gaining the possibility to present showcases in one's profile is not the easiest task. Figure 24 shows a player profile which has the two available achievement focused showcases. The Achievement Showcase can be used to display any unlocked achievement the player has, while the Rarest Achievement Showcase automatically displays the rarest unlocked achievements of the player, which are measured according to the global unlock percentage.

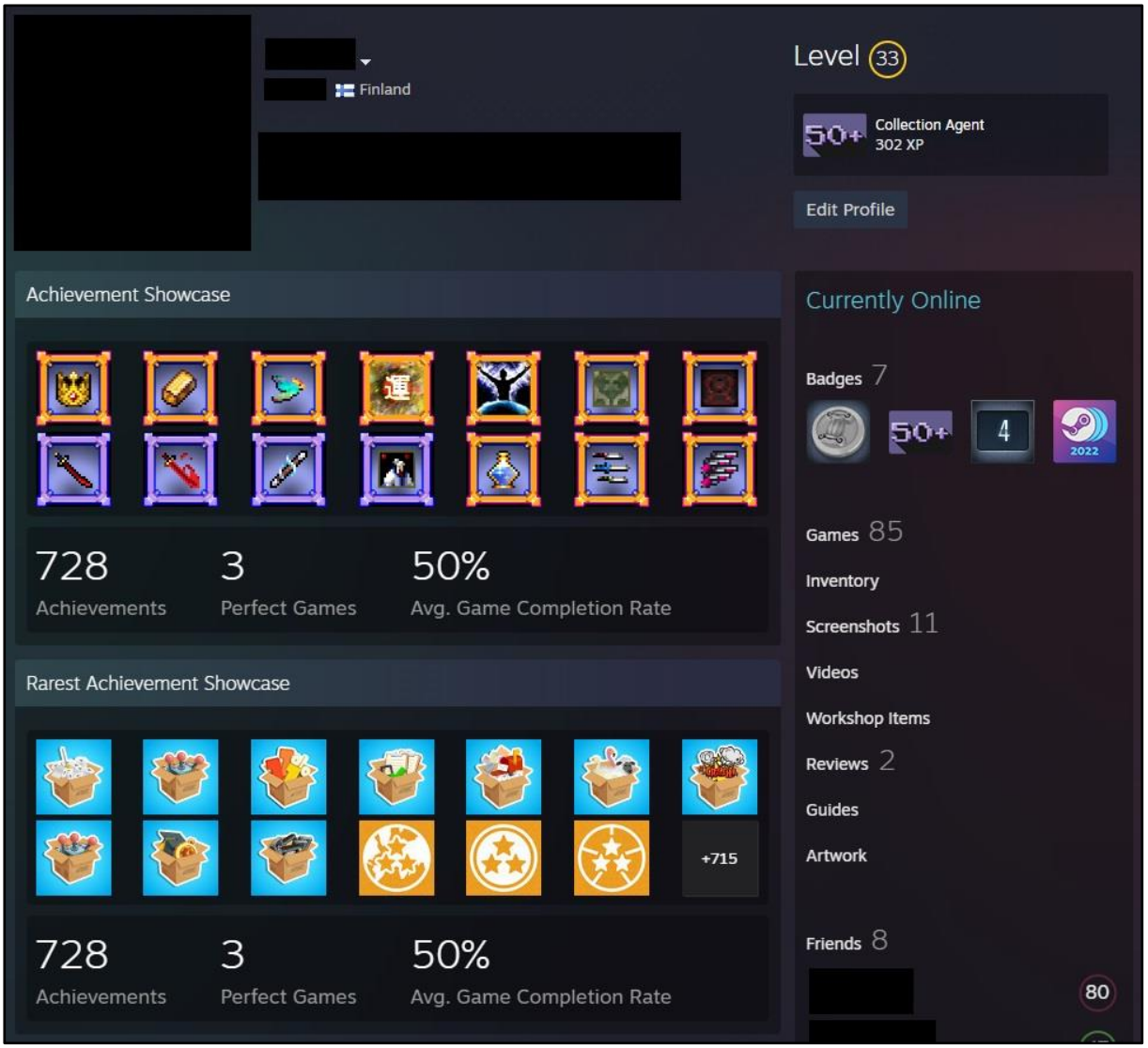

Figure 24: Steam profile displaying the achievement showcases. These showcases are the only elements in Steam which exactly display the statistic of total number of unlocked achievements a player has. The showcases also display the number of Perfect Games, i.e. player has earned all achievements of the game, and a percentage which describes average game completion rate, i.e. how many achievements of played games has the player earned from the total achievement amount in those games.

Lastly, we will see how achievements are presented to players while they play a game and unlock an achievement during the gameplay. As explained at the beginning of this section, *Vampire Survivor* has in-game challenges which are the same as its platform-defined achievements. Figure 25 shows the statistics screen after the round during which the player completed a challenge. Right after the round ends, the player gets a pop-up in the right lower corner informing them about achieving a Steam platform-defined achievement. Different games check for the completion logic of achievements in different points of the game, for example at the end of a round, after certain actions in the gameplay, like selling items or shooting, or at the loading screen, when a player finishes a mission or moves into a new area.

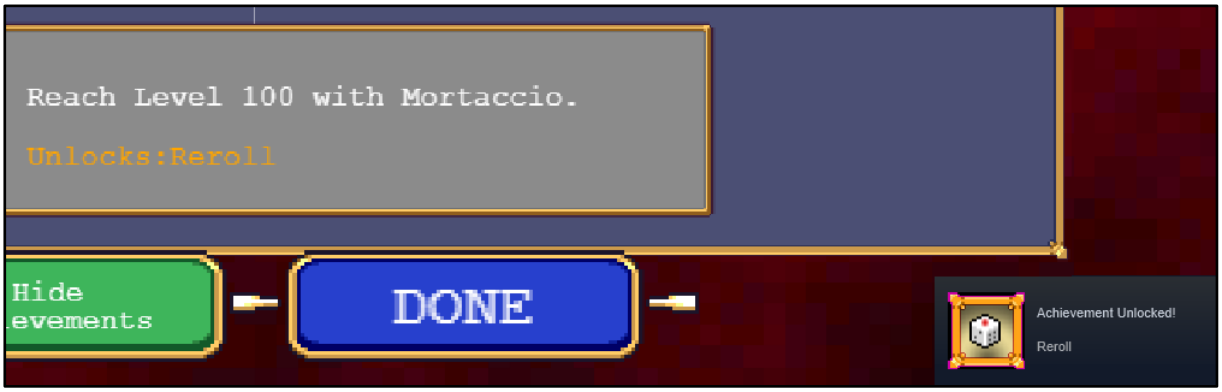

Figure 25: The statistics screen displays completion of a challenge called "Reach Level 100 with Mortaccio" which unlocks Reroll, while the pop-up displays completion of the platform-defined achievement. The pop-up shows the achievements icon and name.

5.2 Discussion

Overall, as we have just seen, achievements are displayed and shown widely in Steam UI. Taking into consideration the discussion in Chapter 4 about how some players enjoy achievements, while other players do not, Steam UI has achievement elements designed quite well for both types of players. Those who like the achievement system and achievements can search for and look at these achievements in Steam, whereas those who do not like achievements can mostly hide or ignore them. The pop-up about achieving an achievement can be hidden and players do not need to display any achievements in their profile. While the word "ignore" is far from what UI designers hope users to feel and experience, on the other hand it is good that players are able to ignore achievements. Achievements are part of Steam UI but, for example a small section lower in the store page or a small Achievement component with

120/184 and a progress bar at the top of the home page are easier to ignore than seeing the whole Global Achievements list.

In turn, players who enjoy the achievement system in Steam and want to see and check their achievements can feel that achievements are present at the important parts of the platform, such as the Store or Library. Seeing whether a game has any achievements or what kind of achievements can affect the buying decisions of players or make them more motivated to play the new game. In Library, players can quickly check if a game they are about to play has locked achievements and what those require to be achieved from the game's home page.

One omission in Steam UI regarding the achievement system and achievements, is that there is not easily and directly accessible place to see one's total number of achievements. It either requires editing one's profile on top of needing Steam levels and Steam Points or navigating to one's Library or Games tab and manually counting achievements of each game. For a platform which already has the achievement system and the statistic element to display one's achievements, the statistic could be made accessible to all players. For example, there could be Achievements tab in player profiles similar way there is Games or Screenshots tabs as can be seen earlier in Figure 24. That tab could show the statistic about players' total achievements and even gather together and display more information about achievements the way Games tab does it currently with Personal Achievements list and also Global Achievements list.

Players who are Achievement Hunters or Completist may often want to track and check their achievements in more detail than what is possible in Steam or in other gaming platforms they use to play video games. As showcased earlier, there are no ways to sort one's achievements, Personal Achievement view displays unlocked achievements before locked one and Global Achievement view has the achievements sorted from most common to most rare, but there is not more advanced sorting for one's achievements. For this reason, there are third party applications, such as Completionist[2] to view and sort one's achievements by different sorting criteria, such as unlocked or locked, unlock date, and visibility.

[2] https://completionist.me/

6 Designing an achievement environment

Compiling together all the information about video game achievements we have examined and discussed, and also taking into account the aspect that gaming platforms do not have comprehensive ways to track and sort one's achievements in the achievement systems of the platforms, I conducted my first albeit small-scale study about video game achievements and achievement environments as a part of this thesis.

This study had two scopes, and those were to research and find out:

1. How do players react to achievement, and what do they think about collecting achievements?
2. What do player think about achievement environments, and how would they like to view and sort their achievements?

In this chapter, we will first introduce the structure of the survey and then examine it. Then we will try to answer the presented research questions of the study by gathering and inspecting the results of the survey and combining the results with our current knowledge of the matter. Results of the survey will also be used in Section 6.2 to design and create an achievement environment where players can view and sort their achievements in multiple different ways. The design process and final result will be presented. Lastly, we will discuss more generally about the results of the survey and design process, and also address possible faults and bias within the conducted study and research.

6.1 Survey

The study was conducted as a survey on Google Forms. As a survey administration application, Google Forms was easy to use and make the survey with, even though it was a first time for me. The application and the created survey were accessible to participants with a link. The participants were in the beginning my personal friends or family members but from there the participant scope became wider as the survey was spreading. Thus, the survey participants include some of my friends and family, their friends and family, members of two different and larger gaming groups, and members of a gaming group that focuses on achievements. The

survey totalled to 48 answers in about a month's time from April 12th to May 6th, 2023. Participants were only required to have played video games on Steam or PlayStation, and thus believed to have knowledge and experience about achievements in general and achievement environments of these platforms.

The survey with its questions can be fully examined in Appendix A. The survey was divided into two parts. The first part had questions about participants' basic information, gaming history and habits. Whereas the second part had statement questions about achievements and achievement environments, which were answered on a Likert scale from 1 to 5 (strongly disagree, disagree, neutral, agree, strongly agree). The last statement question presented five ways to sort one's achievements, because of this the scaling was adjusted to answer how important and wanted the sorting way was, thus the scale was from 1 to 5 (not at all (important and wanted), slightly, moderately, very, extremely (important and wanted)). This question also had 6th answer option to write some other way to sort achievements. Appendix B presents all the answers to these statement questions. Last two questions of the survey asked participants to comment anything about achievements in case they had something on their mind after answering all the questions about achievements and to give feedback and thoughts about the survey as a whole.

Following questions were asked in the first part of the survey to better assess and understand each participant's experience about video games and achievements. Questions 1, 2 and 3 had multiple choice answer options, while questions 4 and 5 were answered in writing.

Q1. How old are you?
Q2. How many years have you played video games?
Q3. On average, how many hours do you play video games in a week?
Q4. Select one or both of the following gaming platforms (Steam and/or PlayStation) based on your gaming preferences, and write your answers for the following three questions:
    4.1. How many years have you used the platform to play video games?
    4.2. How many games do you have in the platform?
    4.3. How many video game achievements do you have in the platform?
Q5. How many "Perfect games" do you have on the gaming platform(s) you selected in Question 4?

The second part of the survey presented statements about achievements and achievement environments to the participants. The statements were divided into two groups. One group had statements focusing on what do the participants think about achievements and collecting them, while the other group's statements addressed achievement environments and how achievements could be viewed and sorted. The statements were mixed so that statements which related to the same matter were not presented to participants in a row. Following couple of statements are presented as an example:

Q7. I enjoy it when I receive an achievement while playing a game.
Q22. I have replayed a video game to get an achievement I did not obtain in the first play-through.
Q27. I often check my account's achievements in gaming platforms.
Q42. I am interested in sorting and viewing some of my video game achievements.

6.1.1 Survey results

In this section, we will review the results of the survey and see what the participants thought about achievements and achievement environments. Part 2 had statements and most of those were categorized based on their topics, for example couple of statements were themed around the replayability aspect of achievements, while another group has a social aspect. Few statements are opposite of another, and two statements are almost the same, this was done by design to see if the participants answers stay the same. The next section will focus and examine statements about the achievement environment and sorting of achievements. We will also try to find out if there are correlations between some questions and answers.

Answers in part 1 of the survey (Figure 26), which focuses on the gaming history and experience of each participant, shows that most participants have a long gaming history. One twelfth of participants, 4 players, have played video games under 10 years, but over 40 % have played video games for more than 25 years. Many have started to play video games in their childhood, most likely in the 1980s or 1990s. Considering the research group, this can be explained with many of them being video game players and playing video games as a hobby or a work. Question 3 about playing hours had a lot of variation. Based on age, most participants most

likely have work or school but still many participants take time to play. It might not be everyday but perhaps few times a week.

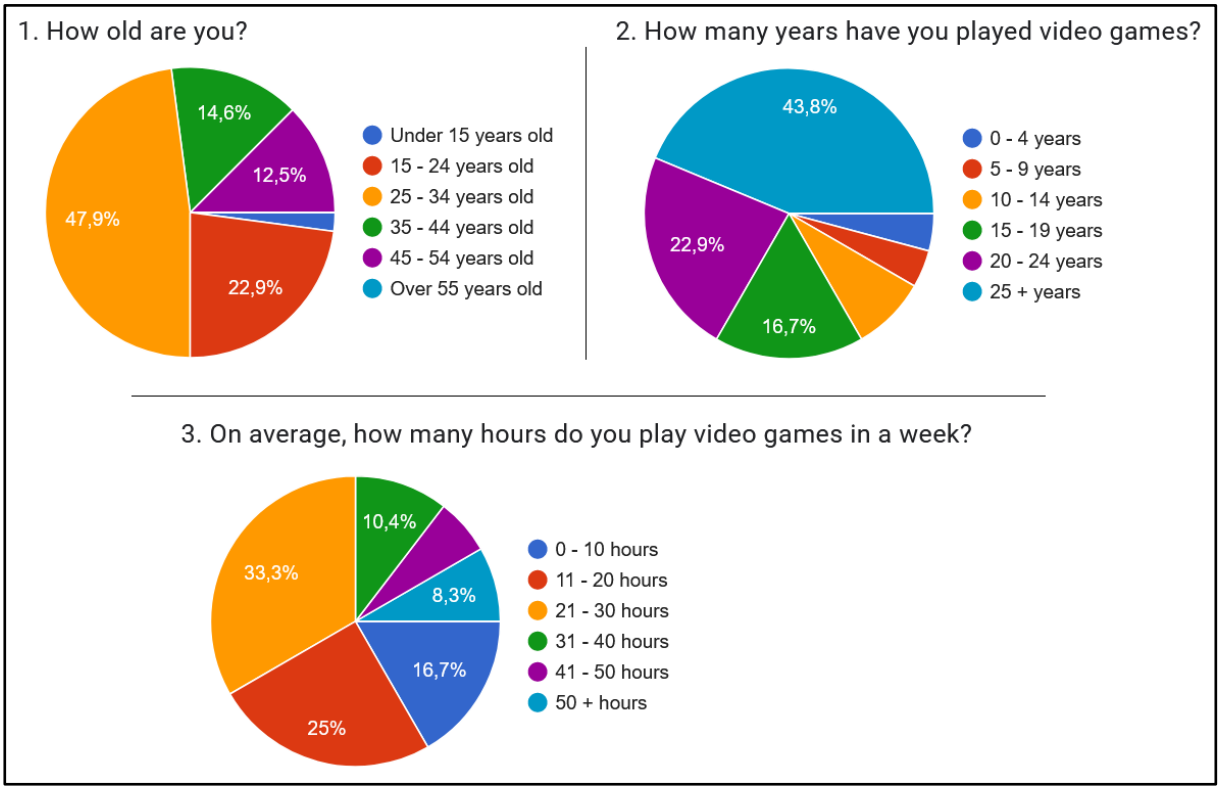

Figure 26: Pie chart graphs about the answers to the first three question of the survey.

Couple of participants' Steam or PlayStation account age match when they started to play, while others have clearly had other consoles or even arcade experiences before Steam or PlayStation 3 which introduced achievements to the platform. 46 participants from the total of 48, answered to Steam questions, while PlayStation questions was answered by 16, exactly third of the participants. This difference may come from participants having only Steam account or their computer being more easily accessible than PlayStation console while answering the survey. Based on the achievement numbers and Perfect Games, it was quite easy to spot the participants who most likely came from the gaming group which focuses on achievements. These players had tens of thousands of achievements and about thousand Perfect Games. Otherwise, many participants can be said to have a good amount of achievements based on their games and account age. 14 participants had zero Perfect Games, while having hundreds of achievements, thus we can expect that many of them are not Achievement Hunters or Completists. This can be proven based on their answers to other questions but nonetheless, they have played video games for other motivation than collecting achievements.

Moving to the statement questions and answers, we can categorize the statements to seven groups based on their themes and aspects on achievements. The groups are receive, collect, replayability, social, check, design, distraction, and buy. Next, we will discuss the answers to the statements of these groups.

Receive is about receiving and getting achievements. While 75 % enjoy receiving an achievement while playing (Q7), only 55 % pay attention to the achievements they receive while playing (Q19).

Collect is meant to describe more dedicated collecting of achievements than receiving them. Almost two thirds like to obtain all or as many achievements as they can, while the other third do not like to do that (Q9). This type of scale provides affirmation to some feeling motivation because of achievements, whereas some do not feel that. Interestingly, over 56 % strongly agree and 30 % agree to having tried to achieve a specific achievement (Q24). This has almost 10 % difference to enjoying receiving an achievement. Statement about collecting all achievements of a game being a big achievement gained a lot of support, 70 % agreed (Q18).

Replayability concern achievements making games more replayable. While more participants, 46 %, do not play games again after completing them (Q28), majority of them, 66 %, think that achievements can make a game more replayable (Q11). Playing a game more for exploration (Q17) is clearly more motivating compared to playing it more to collect achievements (Q35), 75 % to 60 %.

Social is about an aspect of achievements that include other players. While comparing one's own achievement to a friends' (Q15) and being interested in seeing friends' achievements (Q32) have quite balanced answers between disagree and agree sides, sharing and showing achievements to friends is majorly disliked, since 54 % disagree and 19 % are neutral (Q20). People are curious so they may like to have a look at other players' achievements. Enjoying playing multiplayer games and trying to collect achievements with friends or other players was answered evenly across the scale (Q37).

Check indicates if and when players check their achievements. It is almost as popular to not check achievements of a game before starting to play it (Q23) than it is to be interested in

checking what achievements one unlocked after their game session (Q16), 27 participants disagreed in Q23, while 28 agreed in Q16.

Design category is about design of achievements. Similar answers were given to opposite statements about paying attention to achievements versus rarely focusing on achievements to notice their design (Q31 and Q39). However, participants highly appreciate achievements having special design elements, such as achievements' names having puns or references to the game, 79 % agrees with the statement (Q39).

Distraction aspect addresses achievements being distractions to playing video games. Only some players, 10, lose focus on the game when they get the pop-up notification about receiving an achievement (Q12). It can be distracting or even affect the gameplay experience if players receive notifications in playing situations where they have to concentrate or are immersed into the game's story.

Buy concerns looking at achievements of a game before buying it. Just over two thirds, 71 %, were disagreeing or being neutral about them being more likely to buy a video game based on if it has achievements (Q10). Exactly two thirds do not even check if a game has achievements before they buy the game (Q30). Thus, we can come to a conclusion that achievements do not lead players to buy games.

6.2 Designing and design process

While the survey asked about achievements and achievements environments, the important questions and answers were about how participants wanted to view and sort their achievement because that information will be used in this section to design an achievement environment where people can view and sort their achievements in different ways. I examined the survey results about the wanted ways to sort achievements and designed a sketch of the achievement environment, while Julius Virtanen worked on the development of the functional application. We worked together to make this achievement environment.

The original idea was to make the achievement environment design to be a mock-up of Steam. In a way it would have been similar to Figure 22 and follow the suggestion made in Section 5.2

about Steam profiles having a separate Achievements tab, the same way there is Games tab. The original design was planned to be made as a detailed prototype design with only couple of functional features. Design tools and application, such as Figma or Adobe XD, were intended to be used in the design process. However, the plan for the design process changed when we decided with Julius that he would develop and implement a functional front-end application based on my first basic design sketch. The application would allow the design to be showcased with full functionality instead of just static images and mock-ups, and it would demonstrate the application's UI and interaction far more effectively and even across multiple devices, such as computer, table, and mobile screen sizes.

Based on the survey and especially the answers to questions 14, 27, 29, 34, 38, 40, 41, 42, and 43, I compiled and inspected data about what type of viewing and sorting the participants wanted to have in achievement environments. Firstly, over 64 % of the participants were interested to see their achievements on a gaming platform (Q14), while another almost 60 % were interested in sorting and viewing their achievements (Q42). Strong support was given to achievement environment being useful feature in gaming platforms, two thirds of the participants together agreed and strongly agreed (Q38).

Statement about often checking one's own achievements in gaming platforms was evenly distributed between opposite sides, 9 to 10 on strongly disagree and strongly agree, and 12 to 13 on disagree and agree (Q27). Question 29 presented close to half of the participants answering neutral and only few more answering agree side than disagree side on liking to have a separate achievement environment on gaming platforms.

Almost 30 % of the participants answered strongly disagree, while another almost 30 % answered agree, to being interested in their achievement statistics, such as unlock time or level of the achievements (Q34). Sorting one's Perfect Games (Q40) and being able to compare one's own achievements to friends' achievements (Q41) were quite evenly distributed across the scales in both questions.

According to these answers, participants are interested in seeing and sorting their achievements but were divided about having interest to achievement statics and often checking their achievements. Perfect Games and comparing achievements with friends were not significantly

wanted features, so viewing and sorting with these will not be featured in the achievement environment design.

Question 43 presented ways to sort one's achievements. Most wanted sorting way was by unlocked/locked (37 participants (77 %) on important and wanted side), closely followed by global unlock percentage (35 (73 %)), and then by game and also by level or rarity (31 (65 %)). Sorting and viewing hidden/visible achievements gained mostly moderately and just slightly leaning to not important or wanted side. Even though level or rarity sorting was wanted, the fact that Steam achievements do not have levels or rarity, made it so that it was not included in the design. All the other sorting ways were included in the design and final implementation of the application.

There was an open-ended writing answer space for question 43 where participants could write a way to sort achievements. There were three sorting ways from five answers which I took into consideration and thought were good additions to my design, one was date achieved/by time/unlock time which mean the same and most often is called "unlock time", the other sorting way was alphabetically, and the final sorting way was by achievement. As showcased earlier, unlock time is often displayed in achievements that have been unlocked. While the participant suggesting alphabetic sorting did not specify it more, I envisioned it to be combined with sorting by achievement, so the result was that the names of games and achievements can be sorted alphabetically.

To summarize, I have taken the following sorting ways to be part of the design: by game, by achievement, alphabetically, by unlocked/locked, by visibility, by unlock time, and by global unlocks. The top main feature is to have the players total achievements and Perfect Games statistics displayed clearly to every player. The first basic design sketches, made in Paint, had two main views in the designed achievement environment. The first view is the overview of achievements, while the second view is the sorting view of achievements.

The first view is the general overview of one's achievements (Figure 27), it consists of a list of played games which have information about the games and most importantly statistic of unlocked and locked achievements. Top part of the view has the username of the player and the statistics of total number of achievements and Perfect games. The same top part is in the other view. Below the top part is a button to "View Achievements" and also sorting the game list by

last played, by name, and by achievement completion. These sorting ways are replicated from Steam. The game list also has a mark on games which achievements have been all collected to better indicate that those games are Perfect Games.

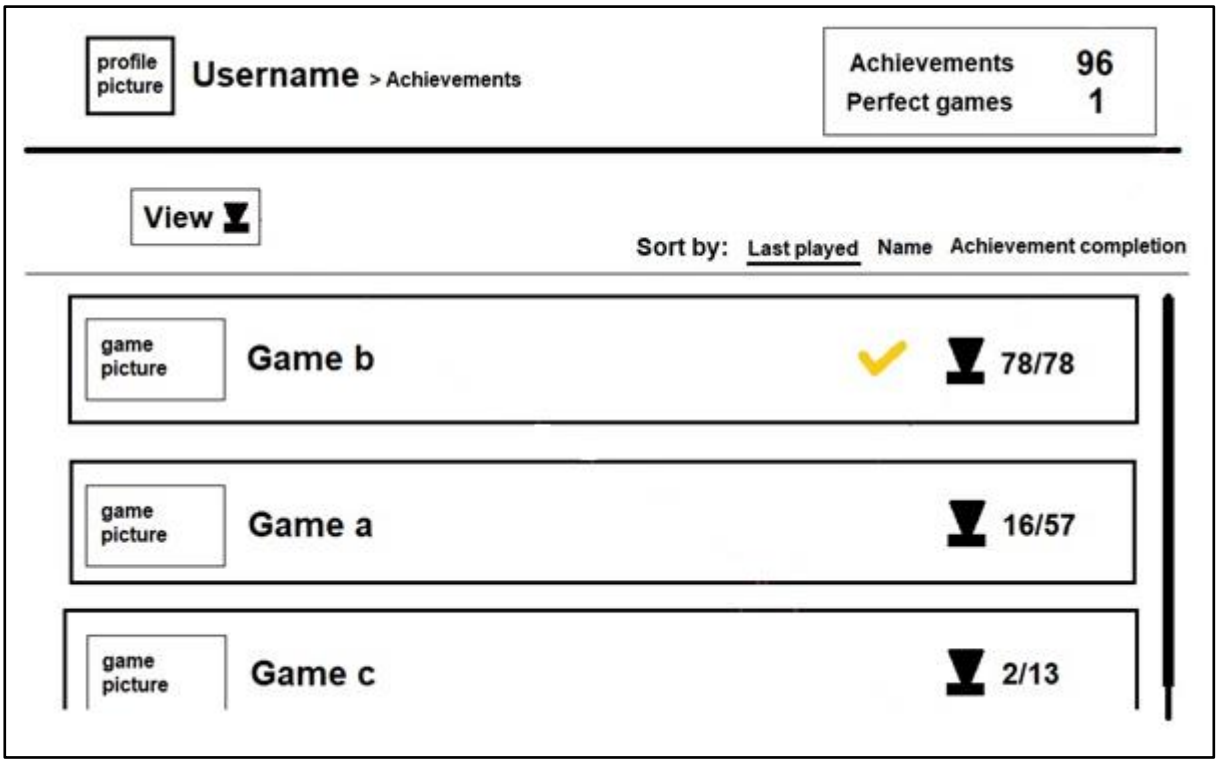

Figure 27: Basic sketch of the achievement environment and its first view which generally displays information about the games and their achievements.

If the player clicks one of the games in the game list, they are taken to the second view, the sorting view of achievements, where the achievements have been automatically sorted by the game that was clicked (see Figure 28). On the other hand, if the player clicks the "View Achievement" button, they are taken to the same second view but this time the player can view all achievements that have been unlocked (see Figure 29). Once in this view, the player can sort and view their achievements with the different ways to sort which were mentioned earlier. One important feature regarding accessibility is the "Back" button, by clicking the button players can go backwards from the sorting view to the overview.

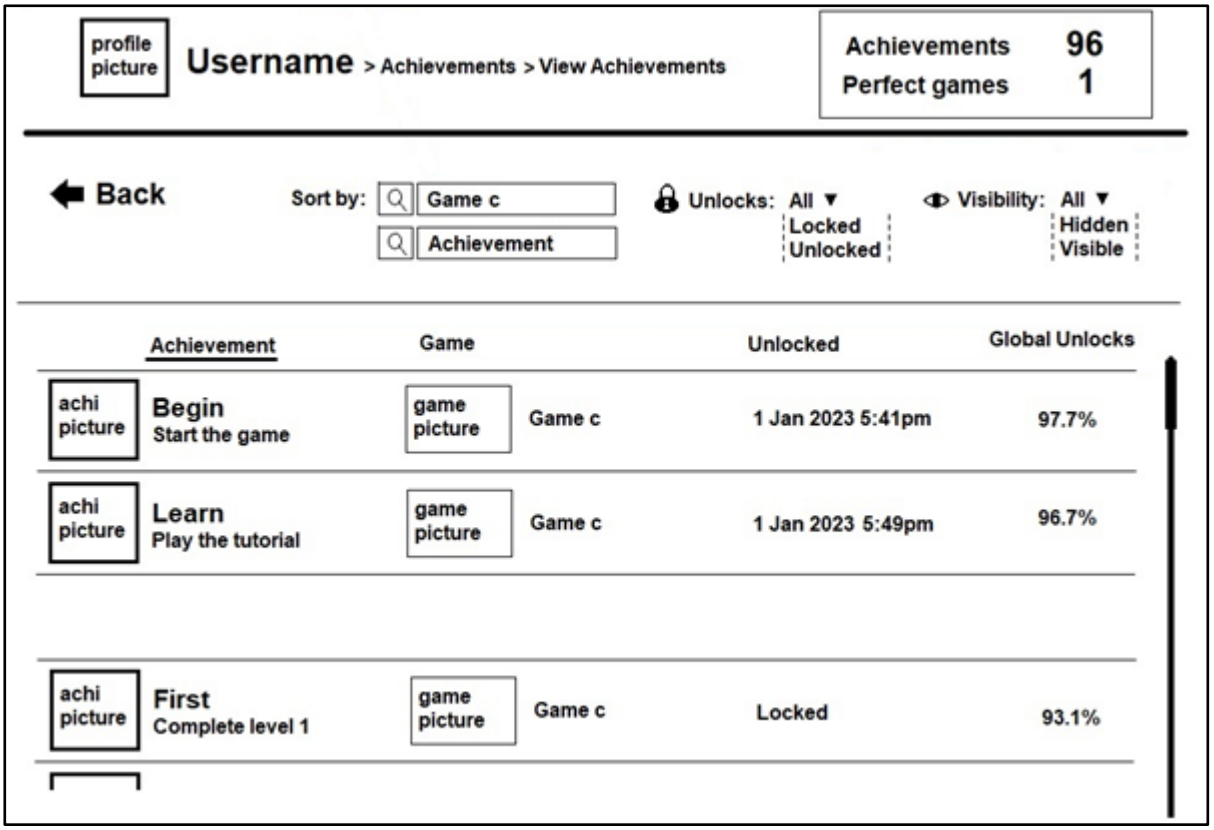

Figure 28: The sorting view of the designed achievement environment. Note how the achievements are sorted by "Game c" and "Achievement" which sorts them alphabetically.

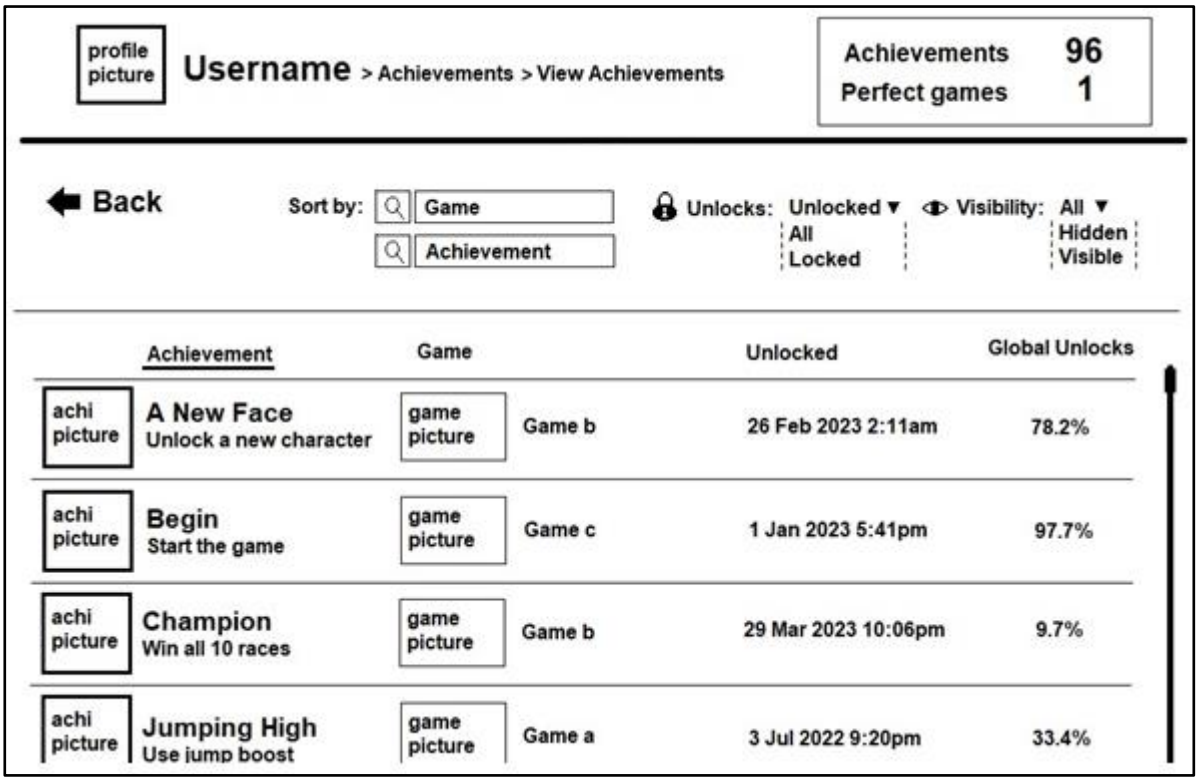

Figure 29: The sorting view of the designed achievement environment. Note how the achievements are sorted by "Unlocked" and "Achievement" which sorts them alphabetically.

Moving forward from the sketches, next we will inspect the final implementation of the designed achievement environment (Figures 30, 31, and 32). The application is called "Achievement Viewer" (Virtanen & Talja, 2023). It is much better looking and more polished than the sketches, but it still resembles the designs on the sketches. The biggest change to the original designs is the achievement completion percentage of each game. The traffic light colours from red to orange to yellow to green, was originally Julius' idea but we developed it together little bit further to make it clearer.

Figure 30: Main view of Achievement Viewer where players can see their games and then view achievements in more detail.

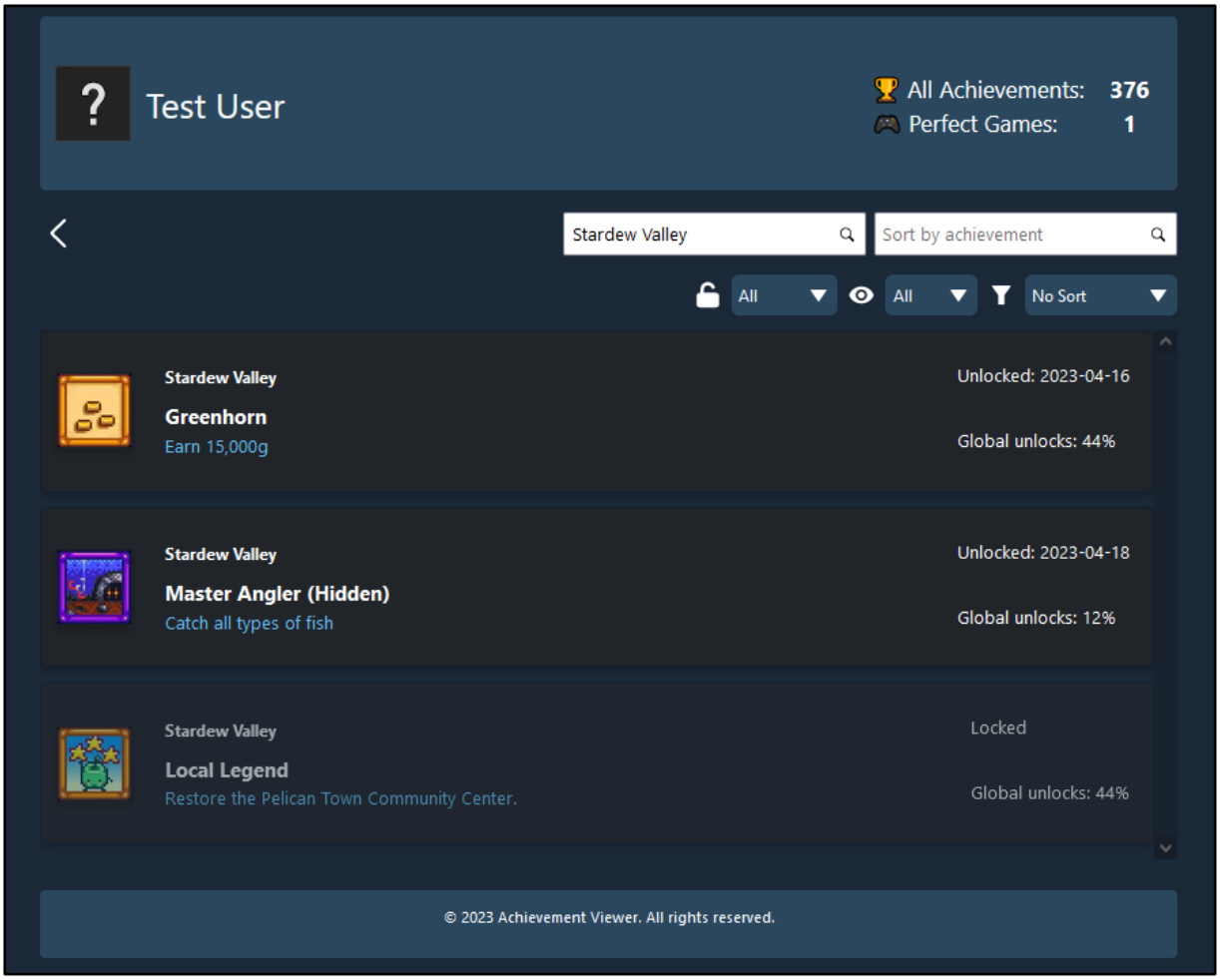

Figure 31: The player clicked Stardew Valley in the game list and now sees the achievements of Stardew Valley, since the game has been automatically filled in the "Sort by game" field. They can continue sorting with the other ways to sort.

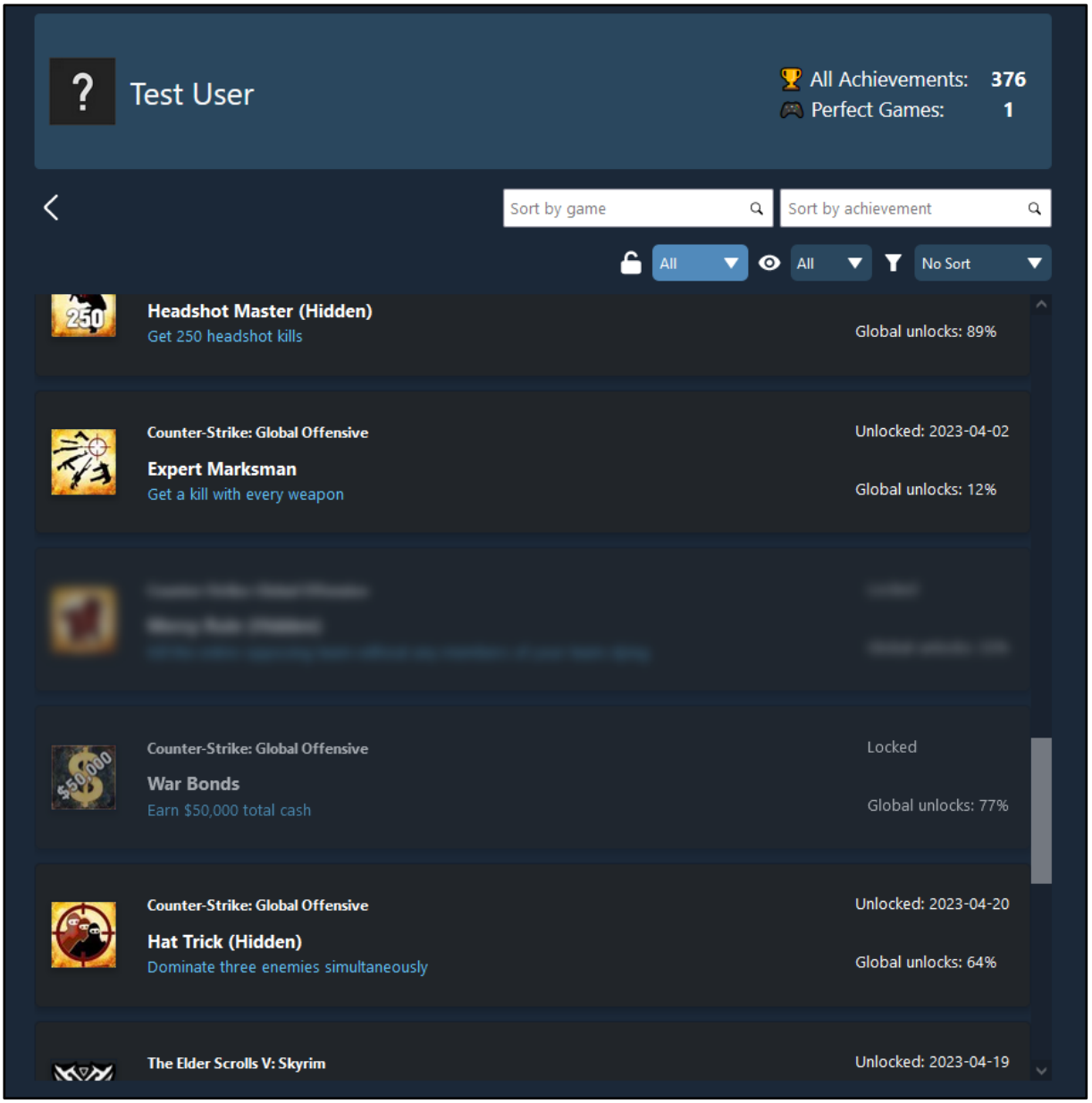

Figure 32: Clicking "View All Achievements" button brings the player to this same sorting view as seen in Figure 31. By default, the view would show only unlocked achievements, but the unlocked/locked sorting has been set to "All". Now we see every achievement, and we can see how hidden achievement differs from locked achievement, and how unlocked achievement differs from both of them. Hidden achievement is blurred thoroughly so players cannot see its signifying elements, locked achievement is more greyed out compared to unlocked achievement which have unlock time displayed and also more vivid colour.

6.3 Results

All in all, the survey gave answers that were at least somewhat expected. To answer the first study scope question about: *How do players react to achievement, and what do they think about collecting achievements?* Some players react to achievements and collecting them in a positive,

neutral, or negative way as it has been already stated in Chapter 4. This was proven in the survey since most statements had strongly disagree and strongly agree answers in them, not one statement had all participants in neutral and either disagree or agree side. The general opinion of the whole research group is hard to define, but while examining single participant's answers it was a lot easier to define whether they liked achievements or not. Either way, no other correlations or interesting points were found in the data than those which were written in Section 6.1.1.

The second scope question of the study was: *What do player think about achievement environments, and how would they like to view and sort their achievements?* Most participants are interested in seeing and sorting their achievements and many thought the achievement environments are a useful feature in gaming platform. Achievement Viewer fulfills its purpose as showcasing the designed achievement environment to view and sort one's achievements. The sorting works as intended and the ways to sort are the ones deemed important and wanted by the participants of the survey and I as the designer. The application has more possibilities to be more extensive and even full stack program which could use databases and servers to validate a player since the application also has a login screen, for example.

Few reflections about the survey could be made. First, many participants were people close to me, and that can affect the way they answered the questions. Second, as seen in Chapter 5 while showcasing Steam, that platform does not have an accessible way to check one's achievements, so I should have written a note about it into the survey. This would have helped couple of participants since they could not find the exact number of their total achievements in Steam.

7 Conclusion

In this thesis, we started our research from video games and understanding what motivates players to play video games. Main motivations for playing video games were entertainment and to relax, but we also learned that some motivations, such as social interaction, learning, and challenges, were not only motivations but benefits. Motivations combined with players having their own preferences and experiences in gaming create different ways in which players play video games. Challenges, such as speedrunning, change the playstyles of players and often make them replay the game. Video game achievements can have the same effect.

We examined achievements and video game achievements to try and find their differences and definitions. We went through the three types of video game achievements, player-defined, game-defined, and platform-defined. In addition, we focused on the design of video game achievements, and learned about how achievements are completed too. We addressed and discussed the effects of video game achievements on players and development of video games.

We have discussed and answered the research questions that were presented in Introduction.

1. How do video game achievements affect the gaming experience?
2. How are video game achievements displayed in gaming platforms? Could they be displayed and viewed better?

Main point for the first question is how players themselves approach video game achievements, while some players enjoy achievements in a casual way, others do it in a completist way, and there are also players who do not like achievements at all. Achievements in video games often give players feelings of completion and accomplishment when they achieve the achievements, and players also gain social interaction and competitiveness if they compete in trying to get more achievements than the other players, for example.

The second research question was mostly answered in Chapters 5 where we had a showcase of Steam with its achievement environments and UIs. The achievements were displayed in multiple important parts of the UI, for example, in the game Library and Store. However, as mentioned in Section 5.1, there is a fault in Steam regarding achievements, which is that there

is no easily accessible way to see one's own total number of achievements. For players who enjoy colleting achievements there is often a want and a need to track and view them, but gaming platform do not offer good ways to sort achievements in more detail. For this reason, I conducted a small study with a survey to ask opinions about achievements and also achievement environments and ways to sort and view one's achievements. With the results of the survey, I designed an achievement environment where players can view and sort achievements, while Julius, developed and implemented my designs into a functional front-end application. Achievement Viewer (Virtanen & Talja, 2023) was created as a result of the study and this thesis.

7.1 Future work

Overall, on a general level, video game achievements have been researched good amount in the past decade and more. However, couple of aspects could be researched and examined more, and they are video game development and achievements and also achievement environments in general or achievement environments of specific gaming platform. Concerning my work, it would be interesting to see and research the achievement environment I designed. Another survey or interview with the same participants would be good to scope if the design is good or bad.

References

Aabom, H. (2014). *Exploring the intrinsic nature of video game achievements*. Master thesis. Aalborg University Copenhagen.

Anderson, C. A., & Warburton, W. A. (2012). The impact of violent video games: An overview. In W. Warburton & D. Braunstein (eds), *Growing up fast and furious: Reviewing the impacts of violent and sexualised media on children* (pp.56-84). The Federation Press.

Anderson, P. (2018, September 9). PS4 Spider-Man: Avengers Tower Location. *PwrDown*. https://www.pwrdown.com/gaming/ps4-spider-man-avengers-tower-location/

Aoki, T. (2020, October 7). Upcoming Trophy levelling changes detailed. *PlayStation.Blog*. https://blog.playstation.com/2020/10/07/upcoming-trophy-levelling-changes-detailed/

Bailey, E., & Miyata, K. (2019). Improving video game project scope decisions with data: An analysis of achievements and game completion rates. *Entertainment Computing*, 31, 100299. DOI: 10.1016/j.entcom.2019.100299

Bartle, R. A. (1996). Hearts, Clubs, Diamonds, Spades: Players Who Suit MUDS. *Journal of MUD Research*, 1, 19.

Bartle, R. A. (2003). *Designing Virtual Worlds*. New Riders.

Bycer, J. (2013, August 2). Debating Achievements. *Game Developer*. https://www.gamedeveloper.com/design/debating-achievements

Cruz, C., Hanus, M. D., & Fox, J. (2014). The need to achieve: Players' perceptions and uses of extrinsic meta-game reward systems for video game consoles. *Computers in Human Behavior*, 71, 516-524. DOI: 10.1016/j.chb.2015.08.017

Dictionary (2022a). Based on the Random House unabridged dictionary. Word: achievement. https://www.dictionary.com/browse/achievement

Dictionary (2022b). Based on the Random House unabridged dictionary. Word: accomplish. https://www.dictionary.com/browse/accomplish

Donnellan, J. (2022, August 12). Marvel's Spider-Man: How To Find The Avengers Tower. *Cultured Vultures*. https://culturedvultures.com/marvels-spider-man-find-avengers-tower/

Entertainment Software Association (2022). *2022 Essential Facts About the Video Game Industry*. https://www.theesa.com/resource/2022-essential-facts-about-the-video-game-industry/

Fraternali, P., & Galli, L. (2014). Achievement Systems Explained. In Y. Baek, R. Ko & T. Marsh (eds), *Trends and Applications of Serious Gaming and Social Media* (pp.25-50). Springer. DOI: 10.1007/978-981-4560-26-9_3

Gibbed, R. (2008). *Steam Achievement Manager*. GitHub software. https://github.com/gibbed/SteamAchievementManager

Groß, M., Zühlke, D., & Naujoks, B. (2022). Automating Speedrun Routing: Overview and Vision. In J. L. Jiménez Laredo, J. I. Hidalgo & K. O. Babaagba (eds), *Applications of Evolutionary Computation* (pp.471-486). Springer, Cham.

Hamari, J., & Eranti, V. (2011). *Framework for Designing and Evaluating Game Achievements*. Proceedings of DiGRA 2011 Conference: Think Design Play.

Hay, J. (2020). Fully Optimized: The (Post)human Art of Speedrunning. *Journal of Posthuman Studies*, 4, 1, pp.5-24. DOI: 10.5325/jpoststud.4.1.0005

Hilliard, K. (2013). Activision Badges – The Original Gaming Achievement. *Game Informer*. https://www.gameinformer.com/b/features/archive/2013/10/26/activision-badges-the-original-gaming-achievement.aspx

International Software Federation of Europe (2010). *Video Gamers in Europe 2010*. https://www.isfe.eu/wp-content/uploads/2018/11/isfe_final_combined.pdf

Jakobsson, M. (2011). The Achievement Machine: Understanding Xbox 360 Achievements in Gaming Practices. *Game Studies, 11*.
https://gamestudies.org/1101/articles/jakobsson?report=reader

Lafond, M. (2018). The complexity of speedrunning video games. In H. Ito, S. Leonardi, L. Pagli & G. Prencipe (eds), *Fun with Algorithms* (pp.27:1-27:19). Schloss Dagstuhl – Leibniz-Zentrum für Informatik.

Montola, M., Nummenmaa, T., Lucero, A., Boberg, M., & Korhonen, H. (2009). *Applying game achievement systems to enhance user experience in a photo sharing service*. MindTrek '09: Proceedings of the 13th International MindTrek Conference: Everyday Life in the Ubiquitous Era, 94-97. DOI: 10.1145/1621841.1621859

Pitic, A. E., & Pitic A. A. E. (2022). The Positive Effects of Video Games on the Human Mind. *International Journal of Advanced Statistics and IT&C for Economics and Life Sciences*, 12(2), pp.24-31. DOI: 10.2478/ijasitels-2022-0004

Przybylski, A. K., Rigby, C. S., & Ryan, R. M. (2010). A motivational model of video game engagement. *Review of General Psychology*, 14(2), pp.154-166. DOI: 10.1037/a0019440

Reid, G. (2012). Motivation in video games: a literature review. *The Computer Games Journal*, 1(2), pp.70-81. DOI: 10.1007/BF03395967

Reiss, S. (2004). Multifaceted Nature of Intrinsic Motivation: The Theory of 16 Basic Desires. *Review of General Psychology*, 8, 3, pp.179-193. DOI: 10.1037/1089-2680.8.3.179

Russoniello, C. V., O'Brien, K., & Parks, J. M. (2009). The effectiveness of casual video games in improving mood and decreasing stress. *Journal of Cyber Therapy and Rehabilitation*, 2, pp.53-66.

Sherry, J. L., Greenberg, B. S., Lucas, K., & Lachlan, K. (2006). Video game uses and gratifications as predictors of use and game preference. In P. Vorderer & J. Bryant (eds), *Playing Video Games: Motives, Responses, and Consequences* (pp.213-224). Routledge.

Turner, J. (2021). *Rags to Riches in The Sims 4 Cottage Living*. YouTube Playlist. https://www.youtube.com/playlist?list=PLm7eMVoztWXeAYm_rflIAa3Fv9_7bg7RY

Virtanen, J., & Talja, A. (2023). *Achievement Viewer*. Application. https://achievement-viewer.vercel.app/MainView

Wang, X., Abdelhamid, M., & Sanders, G. L. (2021). Exploring the effects of psychological ownership, gaming motivations, and primary/secondary control on online game addiction. *Decision Support Systems*, 114, 113512. DOI: 10.1016/j.dss.2021.113512

Wijman, T. (2019). The Global Games Market Will Generate $152.1 Billion in 2019 as the U.S. Overtakes China as the Biggest Market. *Newzoo*. https://newzoo.com/resources/blog/the-global-games-market-will-generate-152-1-billion-in-2019-as-the-u-s-overtakes-china-as-the-biggest-market

World Health Organization (2020). *Addictive behaviours: Gaming disorder*. https://www.who.int/news-room/questions-and-answers/item/addictive-behaviours-gaming-disorder

Yee, N. (2005). *Motivations of Play in MMORPGs*. Proceedings of DiGRA 2005 Conference: Changing Views – Worlds in Play.

Appendices

Appendix A – Survey

Part 1

1.	How old are you?	
	○ Under 15 years old ○ 15 – 24 years old ○ 25 – 34 years old ○ 35 – 44 years old ○ 45 – 54 years old ○ Over 55 years old	
2.	How many years have you played video games?	
	○ 0 – 4 years ○ 5 – 9 years ○ 10 – 14 years ○ 15 – 19 years ○ 20 – 24 years ○ 25+ years	
3.	On average, how many hours do you play video games in a week?	
	○ 0 – 10 years ○ 11 – 20 years ○ 21 – 30 years ○ 31 – 40 years ○ 41 – 50 years ○ 50+ years	
4.	Select one or both of the following gaming platforms (Steam and/or PlayStation) based on your gaming preferences, and write your answers for the following three questions: 1. How many years have you used the platform to play video games? 2. How many games do you have in the platform? 3. How many video game achievements do you have in the platform? Note: answer as accurately as you can!	
	a)	Steam
	b)	PlayStation
5.	How many "Perfect games" do you have on the gaming platform(s) you selected in Question 4? Note: Perfect game means having all the achievements of the game.	

Part 2

The option scale is following:
1 – Strongly disagree
2 – Disagree
3 – Neutral
4 – Agree
5 – Strongly agree

6.	I would consider replaying a good game to get more achievements.
7.	I enjoy it when I receive an achievement while playing a game.
8.	After receiving an achievement, I want to check it immediately.
9.	I like to obtain all the achievements of a video game or at least as many as I can.
10.	I am more likely to buy a video game if it has achievements.
11.	I think achievements can make a game more re-playable.
12.	Seeing a notice of obtaining an achievement while playing makes me lose focus on the game.
13.	I am satisfied when I finish a game and I may have few of the game's achievements.
14.	I am interested in seeing all of my achievements in a gaming platform.
15.	I compare my own and my friends' achievements.
16.	I am interested in seeing what achievements I unlocked after finishing a game session.
17.	After finishing a game, I sometimes want to play it more for exploration.
18.	Collecting all of the achievements of a video game is a big achievement in my opinion.
19.	I rarely pay attention to the achievements I receive while playing a game.
20.	I like to share and show my friends what achievements I have achieved.
21.	A video game is more appealing to play when it has achievements which I can try to collect.
22.	I have replayed a video game to get an achievement I did not obtain in the first play-through.
23.	I usually check the achievements of the game before I start to play it.
24.	I have tried to achieve one or more specific achievements of a video game.
25.	I enjoy achieving a more difficult achievement compared to achieving an easier achievement.
26.	I do not want to focus on the achievements, I just want to play the video games.
27.	I often check my account's achievements in gaming platforms.
28.	I rarely play video games again after I have completed them once.
29.	I would like to have a separate achievement environment on gaming platforms.
30.	Before buying a video game in a gaming platform, I check if the game has achievements.
31.	I pay attention to the design of the achievements, for example their icon or name.
32.	It is interesting to see what achievements my friends have collected.
33.	I sometimes focus more on achievements than the video game while playing.
34.	I am interested in my achievement statistics, for example the unlock time or level of the achievements.

35.	After finishing a game, I sometimes want to play it more to collect achievements.
36.	I appreciate when the game's achievements have some special design elements, for example the achievements' names have puns or references to the game.
37.	I enjoy playing multiplayer video games and trying to collect achievements with my friends or other players.
38.	I think it is useful feature for gaming platforms to have an achievement environment.
39.	I rarely focus enough on achievements to notice their design elements.
40.	I would like to sort and view only my Perfect Games on a gaming platform.
41.	I would like to have a section in the achievement environment where I could compare my own and my friends' achievements.
42.	I am interested in sorting and viewing some of my video game achievements.

The option scale is following:
1 – Not at all (important and wanted)
2 – Slightly
3 – Moderately
4 – Very
5 – Extremely (important and wanted)

43.	Considering sorting achievements in an achievement environment, which of the following ways would you like to sort your achievement:	
	a)	By level or rarity (you would see only bronze, silver or gold level achievements)
	b)	By unlocked / locked (you would see only achievements you have or have not achieved)
	c)	By global unlock percentage (you would see a percentage of how many players of the game have unlocked each of its achievements)
	d)	By game (you would see only achievements of specific games you select)
	e)	By visibility (you would see only hidden or visible achievements)
	f)	By some other way (write your own answer)

44.	Do you have any other comments about video game achievements?
45.	What did you think about this survey? All feedback and comments are welcome!

Appendix B – Survey results (statement questions)

The option scale is following:
1 – Strongly disagree
2 – Disagree
3 – Neutral
4 – Agree
5 – Strongly agree

Q	1	2	3	4	5
6.	4 (8,3 %)	7 (14,6 %)	11 (22,9 %)	9 (18,8 %)	17 (35,4 %)
7.	0 (0 %)	3 (6,3 %)	9 (18,8 %)	13 (27,1 %)	23 (47,9 %)
8.	9 (18,8 %)	9 (18,8 %)	9 (18,8 %)	13 (27,1 %)	8 (16,7 %)
9.	8 (16,7 %)	7 (14,6 %)	4 (8,3 %)	13 (27,1 %)	16 (33,3 %)
10.	15 (31,3 %)	4 (8,3 %)	15 (31,3 %)	7 (14,6 %)	7 (14,6 %)
11.	3 (6,3 %)	7 (14,6 %)	6 (12,5 %)	15 (31,3 %)	17 (35,4 %)
12.	7 (14,6 %)	23 (47,9 %)	8 (16,7 %)	7 (14,6 %)	3 (6,3 %)
13.	2 (4,2 %)	7 (14,6 %)	13 (27,1 %)	18 (37,5 %)	8 (16,7 %)
14.	4 (8,3 %)	6 (12,5 %)	7 (14,6 %)	11 (22,9 %)	20 (41,7 %)
15.	16 (33,3 %)	6 (12,5 %)	4 (8,3 %)	12 (25 %)	10 (20,8 %)
16.	4 (8,3 %)	8 (16,7 %)	8 (16,7 %)	11 (22,9 %)	17 (35,4 %)
17.	3 (6,3 %)	2 (4,2 %)	7 (14,6 %)	23 (47,9 %)	13 (27,1 %)
18.	4 (8,3 %)	2 (4,2 %)	8 (16,7 %)	13 (27,1 %)	21 (43,8 %)
19.	9 (18,8 %)	18 (37,5 %)	6 (12,5 %)	9 (18,8 %)	6 (12,5 %)
20.	16 (33,3 %)	10 (20,8 %)	9 (18,8 %)	8 (16,7 %)	5 (10,4 %)
21.	9 (18,8 %)	7 (14,6 %)	6 (12,5 %)	13 (27,1 %)	13 (27,1 %)
22.	8 (16,7 %)	5 (10,4 %)	3 (6,3 %)	10 (20,8 %)	22 (45,8 %)
23.	22 (45,8 %)	5 (10,4 %)	8 (16,7 %)	5 (10,4 %)	8 (16,7 %)
24.	1 (2,1 %)	2 (4,2 %)	4 (8,3 %)	14 (29,2 %)	27 (56,3 %)
25.	0 (0 %)	9 (18,8 %)	9 (18,8 %)	16 (33,3 %)	14 (29,2 %)
26.	2 (4,2 %)	9 (18,8 %)	11 (22,9 %)	7 (14,6 %)	19 (39,6 %)
27.	9 (18,8 %)	12 (25 %)	4 (8,3 %)	13 (27,1 %)	10 (20,8 %)
28.	4 (8,3 %)	11 (22,9 %)	11 (22,9 %)	17 (35,4 %)	5 (10,4 %)
29.	6 (12,5 %)	6 (12,5 %)	21 (43,8 %)	9 (18,8 %)	6 (12,5 %)
30.	21 (43,8 %)	9 (18,8 %)	2 (4,2 %)	6 (12,5 %)	10 (20,8 %)
31.	9 (18,8 %)	5 (10,4 %)	4 (8,3 %)	16 (33,3 %)	14 (29,2 %)
32.	11 (22,9 %)	6 (12,5 %)	8 (16,7 %)	15 (31,3 %)	8 (16,7 %)
33.	18 (37,5 %)	13 (27,1 %)	6 (12,5 %)	9 (18,8 %)	2 (4,2 %)
34.	13 (27,1 %)	6 (12,5 %)	9 (18,8 %)	14 (29,2 %)	6 (12,5 %)
35.	7 (14,6 %)	6 (12,5 %)	6 (12,5 %)	14 (29,2 %)	15 (31,3 %)
36.	1 (2,1 %)	4 (8,3 %)	5 (10,4 %)	10 (20,8 %)	28 (58,3 %)
37.	10 (20,8 %)	10 (20,8 %)	10 (20,8 %)	10 (20,8 %)	8 (16,7 %)

38.	2 (4,2 %)	6 (12,5 %)	8 (16,7 %)	16 (33,3 %)	16 (33,3 %)
39.	7 (14,6 %)	21 (43,8 %)	9 (18,8 %)	6 (12,5 %)	5 (10,4 %)
40.	10 (20,8 %)	9 (18,8 %)	10 (20,8 %)	12 (25 %)	7 (14,6 %)
41.	8 (16,7 %)	6 (12,5 %)	12 (25 %)	12 (25 %)	10 (20,8 %)
42.	6 (12,5 %)	5 (10,4 %)	9 (18,8 %)	15 (31,3 %)	13 (27,1 %)

The option scale is following:
1 – Not at all (important and wanted)
2 – Slightly
3 – Moderately
4 – Very
5 – Extremely (important and wanted)

Q		1	2	3	4	5
43.	a)	2 (4,2 %)	3 (6,3 %)	12 (25 %)	17 (35,4 %)	14 (29,2 %)
	b)	1 (2,1 %)	3 (6,3 %)	7 (14,6 %)	16 (33,3 %)	21 (43,8 %)
	c)	4 (8,3 %)	2 (4,2 %)	7 (14,6 %)	15 (31,3 %)	20 (41,7 %)
	d)	3 (6,3 %)	6 (12,5 %)	8 (16,7 %)	13 (27,1 %)	18 (37,5 %)
	e)	7 (14,6 %)	10 (20,8 %)	16 (33,3 %)	9 (18,8 %)	6 (12,5 %)