UiA University of Agder

Master

Adaptive evaluation tool for eSports athletes

A mixed methods design study on how eSports athletes reflect on the development of their skills.

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Abstract

ESports has evolved at an exponential rate over the past two decades, and is constantly growing. While a lot of research has been conducted on various aspects of the recent phenomenon, there is still a limited amount of information and no comprehensive framework on how eSports athletes should train. Thus, the purpose of this thesis has been to better understand how eSports athletes reflect on their skills, and how third-party software impacts eSports athletes in improving their skills.

The research questions involve how eSports athletes reflect on their skills, how third-party software make eSports athletes better, and to what extent a third-party software impact eSports athletes improvement. Therefore, the theoretical background was comprised of games, skills, and motivation. The theoretical background includes digital games, eSports, eSports skills, and motivational theories such as Two-factor theory, Self-determination theory, and Extrinsic- and Intrinsic motivation. I have used a hermeneutical approach with a mixed methods design comprised of semi-structured interviews and a questionnaire. First, a total of eight semi-structured interviews were conducted, followed up by a questionnaire developed to generalize and reinforce the qualitative data.

The findings from the research show both paradigms and differences in how eSports athletes reflect based on various factors. The eSports athletes reflect differently based on which game genre they play in, and what skill level they are playing on. Although there are paradigms present that slightly moves in favor of certain groups based on their skill level and game genre, there are still variation in how each individual think within the same groups. Moreover, in terms of third-party software, indicators show that FPS-players are more inclined to utilize a third-party software that are made for improving mechanical skills, while MOBA-players are more inclined to utilize third-party software that are made for data tracking, statistics, and data analysis.

Keywords: eSports, third-party software, skills, motivation

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Chapter 1

Introduction

Over the years eSports have endured various changes and constantly evolving, and so has the definition of eSports itself, but how does eSports athletes train to get better? According to Freeman and Wohn (2017) eSports is defined as "an area of sports activities in which people develop and train mental or physical abilities in the use of information and communication technologies". The definition has been developed and compared to traditional sports and adapted progressively in terms of the digitization of today. Over the past two decades, the term eSports has evolved at an exponential rate and is currently a still increasing billion-dollar industry (Rogers, 2019). Additionally, educational institutions have begun implementing eSports in their curriculum, and even as their own degrees, as well as offering scholarships in higher education. Additionally, very similar to traditional sports, eSports athletes are now getting paid by not only sponsors, but they are signing professional contracts with already well established organizations. However, this is still at an early stage and is expected to continue growing. Because eSports is a very recent phenomenon in time, the research and developmental stages around it have yet a lot to cover. There are limited resources on how eSports athletes train, let alone using third-party software tools to enhance their mechanical skills. Thus, this thesis will focus on how eSports athletes reflect on skills and to what extent an third-party software impact eSports athletes improvement.

1.1 Background

Just like traditional sports, eSports is comprised of distinct game types that have different objectives, rules, and mechanics. In traditional sports athletes train differently dependent on the type of sport. Similarly, an eSports athlete trains dependant on game type and objectives. Athletes are required to constantly train to be able to both achieve their best levels of performance, and it is just as important to maintain them (Rogers, 2019). Further, he addressed a study on the structure of performance and training in eSports. The conclusion was that based on the game, a respective competence profile should be considered in terms of training methods. Although, there are several generic models of sports performance, there are no official performance models for eSports training. Furthermore, when it comes to eSports, various competence models have been developed to address skills that are applicable towards eSports-related games. Because these models are not finalized, they can be used as a way to determine which approach to use in terms of methods and identification.

While a lot of video games have their built-in modes for practice and training, they do not always provide the player with optimal training in terms of accuracy, precision, and speed. In 2021 a research group tested and evaluated the shooting accuracy of Valorant players by using an third-party software called Aim Labs (Roldan & Prasetyo, 2021). Valorant is a free-to-play, first-person tactical hero game, developed by Riot Games. Aim Lab is a software currently used by over 25 million people according to their website (“AimLab,”

n.d.). The software allows users to train on specific tasks to improve their skills, as well as detailed reports and statistics they can analyze for further improvements. There are a lot of factors that need to be on point in eSports to succeed, but one of the most important ones is accuracy, especially in FPS games. The research group conducted the research on six participants aged between 18-28 and performed six minutes of training exercises every day for 7 days. The results showed that four of the six participants showed improvements in both precision and speed, but remained neutral in the other skills the software tracks. Lastly, the research team concluded with Aim Labs being an acceptable solution for a FPS training software.

1.2 Research questions

Because there is limited research on eSports athletes' skills and how they train to get better, I want to understand how they reflect upon their own skills and if utilization of an external tool could impact the improvement of their mechanical skills. There are several tools used to solely practice mechanical skills such as precision, speed, and accuracy, which could play a big part in their mechanical development. Based on this, the research questions are split into three. The first research question is about individual reflection, the second research question is about how a third-party software can make eSports athletes better, and the third research question wants to figure out to what extent a third-party software impact eSports athletes in improving their skills.

1. "How do eSports athletes reflect on their skills?".
2. "How does a third-party software make eSports athletes better?".
3. "To what extent does a third-party software impact eSports athletes in improving their skills?".

To better understand how an third-party software makes eSports athletes better, the research methods have been broken down into quantitative and qualitative segments. The qualitative data gathering emphasizes how eSports athletes reflects on their own skills and their familiarity with third-party software. Moreover, the quantitative data gathering focuses on generalizing the points, validate the findings, and the extent the third-party software impacts an eSports athlete's improvement.

1.3 Limitations and challenges

Before landing on the current topic, looking into cognitive skills in eSports seemed like an interesting area of research. However, I was recommended to focus on mechanical skills as it is a smaller scope, easier to measure, and better suited for one person in terms of workload. Moreover, as eSports is a very recent phenomenon, comprehensive literature is somewhat limited. There are a lot of published research, both empirical and theoretical, but it was an tedious process in finding relevant articles to fit the scope of this thesis.

When the interviews had been conducted, an AI-script was used to transcribe the interviews. First, the script refused to run due to technical difficulties. The script would first run after five days of troubleshooting and testing with the help of peers, thanks to my supervisor. Further, the first three transcriptions were perfectly fine, but the last five transcriptions was printed in either Swedish or Danish due to distinct dialects of both me and the interviewees.

Lastly, although i had been given access to utilize the students from the Academic eSports at the University of Agder, not as many responded to the questionnaire as i had hoped. It was expected that not everyone would take time to participate, mostly due to their own work loads in school etc. I was told that their classes were partially split due to different assignments and tasks, which made it difficult to track them down. Moreover, as i was given access to their Discord-server and published the questionnaire there, it is probably easy to overlook or forget it if they read the message while doing something else.

1.4 The structure

Chapter 1 starts off with an introduction to eSports and addresses the background for the thesis. Next, the research questions are presented and justified. Chapter 2 provides the theoretical basis for the thesis and are comprised of three main sections; Games, Motivation, and Skills. In the first section the term "Game" will be presented, followed up by the term "Digital Game", and then "eSports". The second section will introduce the definition of motivation, Self-Determination Theory, and extrinsic- and intrinsic motivation. In the third and last section the term "Skills" will be presented, as well as defining "eSports skills". Chapter 3 will present the methodological approaches used in the research. First, the research design is explained, followed up by presenting the mixed methods design approach, hermeneutics, and the analysis. Chapter 4 will first present the results from the semi-structured interviews, and then the questionnaire. In chapter 5 the results will be discussed and linked to the theoretical background from chapter 2. Chapter 6 draws conclusions based on the results, discussion, and the theory.

Chapter 2

Theory

In this chapter the theoretical background for this thesis will be presented. The theory is fundamental in the process of answering the research questions, and the results will be supported by the theory. the research questions are based on how eSports athletes reflect on their individual skills, their use of third-party software, and if third-party software is important for their skill improvement. The theory chapter will provide insight and examples regarding games, skills, and motivational theories. In the first section I will present the term "Game" and its subtopics to better understand the necessary components of a game. Furthermore, the differences and similarities between digital and non-digital games will be declared. Additionally, eSports theory will be presented to get a comprehensive understanding of the topic. The second chapter will cover motivational theories to gain a more thorough understanding of motivation, and how it impacts an esports athelete skills. The last chapter will cover skill as a definition before moving on to what skills are in terms of eSports.

2.1 Games

The term "Game" has received various definitions since all the way back to the 1930's, however Stenros (2017) states that in the 1970's the majority was able to agree on the following definition; "any contest (play) among adversaries (players) operating under constrains (rules) for an objective (winning, victory pay-off)". Another example of a definition is; "A game is a system in which players engage in artificial conflict, defined by rules, that results in a quantifiable outcome" (Salen & Zimmerman, 2004, p. 80). While there are several ways to define what a game is, most of the definitions essentially carry the same meaning. This chapter will follow the latter definition and break down the components of the definition to fully understand what games are comprised of. All games are essentially systemic (Salen & Zimmerman, 2004, p. 50). A system can be explained as a group of interacting, interrelated, or interdependent elements forming a complex whole, and are fundamental in the sense that all games can be understood as systems. An important part of a game is its players, where one or more are actively playing. When the players interact with the system they experience what is referred to as the play of the game. Further, the conflict of a game can be defined in many ways, but essentially they can either social conflicts with other players or individual conflicts with the game system. The artificiality is simply described as the boundary from the game to real life.

Salen and Zimmerman (2004) talks about the distinction between informal- and formal games. Informal games are simply explained as undirected play. However, formal games are explained as a twofold structure based on Ends and Means where Ends is a contest to achieve the object, and Means has a distinct set of equipment and "rules by which the equipment is manipulated to produce a winning situation. Further, Stenros (2017) did a review of over 60 articles and declared ten points of interest on what defines a game, be-

ing; Rules, purpose and function, artifact or activity, separate yet connected, the role of the player, (un)productive, competition and conflict, goals and end conditions, construction of the category, and coherence. The importance of each point varies, but the most agreed upon definition is the rules of the game. Salen and Zimmerman (2004, p. 117) explains that "Rules are the formal structure of a game, the fixed set of abstract guidelines describing how a game system functions".

2.1.1 Digital Games

The definition of a game as explained in section 2.1 is global and applies for all types of games (Salen & Zimmerman, 2004, p. 86). The definition was created before the existence of computer games and is viable for both digital and non-digital games. Digital games appear on several types of platforms, such as computers, game consoles, devices, and machines. Additionally, computers themselves only make up a part of a system as explained in section 2.1, and does not affect how a system is defined.

There are four exclusive advantages that digital games can provide that makes them unique (Salen & Zimmerman, 2004, p. 87-89). The first advantage is the low latency of interactive feedback. The reaction time of a computer can work at incredible speeds and offer almost immediate feedback of the input to the user. However, even though digital platforms are explained as powerful, they are relatively limited based on the keyboard and mouse inputs, and screen and audio outputs. This means that the user has a set amount of interactive means to do a specific action, and not free movement controlled by the human body. The second advantage is the information manipulation. Digital games are comprised of text, graphical variations, and audio outputs. Furthermore, digital games considers the logic, mechanisms, and its memory as information. A noticeable distinction between analog games and digital games is that at least one participant is required to understand the rules in an analog game. However, it is common in digital games that the player(s) pick up on the rules simultaneously while exploring and experiencing the game. The third advantage is the automated complex systems. Essentially, digital games have complex functionalities that can facilitate events that otherwise would be too difficult for an analog game. In other words, digital games can enable the game to continue without player input, while analog games would require physical actions to move on to the next step. The fourth and final advantage is the networked communication. Not all digital games have integrated communication systems, but most have some kind of ability to communicate with other players. However, communication between players can be executed through more than just text, such as voice, video, or virtual game spaces. These four traits are explained to comprehend the complex potentials viable through digital games.

2.1.2 eSports

ESports, which is short for Electronic Sports, is defined as competitive video gaming that is facilitated by electronic systems (Dykstra et al., 2021). As several hundreds of millions of players and spectators contribute to the growing entertainment stage, it has transformed from a leisure activity to an organizational profession. Broadcasting eSports have transformed into the fastest growing form of new media in the past decade, and the competitive playing are usually split into various leagues and tournaments with sponsors and advertising (Hamari & Sjöblom, 2017). Moreover, because there is a controversy regarding whether eSports can be called a sport, Hamari and Sjöblom (2017) argues that eSports athletes utilize physical space to perform activities that is conveyed into a virtual space. Thus, it is suggested that eSports is a form of sports where both the input and output is transmitted by human-computer interfaces, while the main features are facilitated by the electronic systems.

2.2 Motivation

Pardee (1990) defines motivation as an internal drive that pushes the individual towards satisfying their basic needs. The term "motivation" is an augment of the word "motive", which is presented as the reasoning behind certain actions or as the proclivity for specific behavior. Pardee (1990) published a critical review of motivational theories from Maslow's Hierarchy of needs, Herzberg's Motivation/Hygiene Theory, and McClelland Need for Achievement Theory. According to the critical review, Maslow has stated that only the unsatisfied needs provides motivation, which is explained because if a need is already satisfied, it does not create the eager necessary for motivation. There have been many takes on how motivation is described, but essentially the majority of psychologists thinks that every kind of motivation is ultimately originated from at least one unsatisfied need.

Frederick Herzberg is an American psychologist who is mostly known for his two-factor theory, also called the motivation-hygiene theory (Alshmemri et al., 2017). The two-factor theory is a two-folded distinction between hygiene factors and motivation factors, and which effect they have on job satisfaction. The motivation factors are considered to be the most important because it is based on individual growth and self-actualization, as compared to the hygiene factors which are based on external factors. Alshmemri et al. (2017) have visualized the summary of the factors as shown in table 2.1.

Motivation Factors	**Hygiene Factors**
Advancement	Interpersonal relationship
Work itself	Salary
Possibility of growth	Policies and administration
Responsibility	Supervision
Recognition	Working conditions
Achievement	

Table 2.1: Factors of Herzberg's theory (Alshmemri et al., 2017)

The motivation factors are also referred to as intrinsic factors, which is explained below. In addition to the statement in table 2.1, these intrinsic factors are valued higher than the hygiene factors because they provide the individual with positive attitudes towards the job. Herzberg initially developed the theory towards the workplace, but is applicable in situations where it is possible. Further, to fully understand why the six motivation factors are relevant, their effects will be explained briefly.

Advancement is defined as the positive status or position of an individual in the workplace. However, if the status is negative or even neutral, it is supposedly the opposite.

The work itself is about what the tasks themselves contain. It is explained as the level of satisfaction based on the difficulty of a task, or to what extent it is actually interesting.

Possibility for growth is not considered to be based on salary and status, but rather the possibility to receive personal growth, promotions, and constructing more professional knowledge on a higher level with a new environment.

Responsibility is the situations where the individual is given trust and freedom to operate by themselves, as well as having the feeling of authority. Although, if there are considerable gaps between the responsibility and authority, dissatisfaction may take presence.

Recognition is explained as when individuals get acknowledged for their work in form of intrinsic or extrinsic rewards. The positive recognition can come from either reaching certain milestones or by delivering quality results.

Achievement occurs when the individual achieves something positive, such as executing tasks as expected or above. This could be measured in time-based tasks, completing specific cases or tasks, or simply providing good results.

2.2.1 Self-determination theory

The self-determination theory (SDT) is a macro theory that focuses on various forms of motivation to predict results of performance and psychological health (Ryan & Deci, 2022). The theory is explained as the knowledge of distinguishing between autonomous motivations and controlled motivations. In this case, the autonomous motivations revolves around individual awareness and choice, which means the individual is not affected by external factors. The controlled motivation however is when the individual is affected by external factors such as rewards or being afraid of punishment. Furthermore, two important aspects of the SDT is intrinsic and extrinsic motivation.

Reiss (2012) states that intrinsic motivation is presented as a motive for an individual to do something for for its own gain. Intrinsic motivation is also explained as engaging in an activity that is rewarding in itself, and not being desired for its rewards (Fishbach & Woolley, 2022). It is assumed that when an individual is intrinsically motivated they usually feel eager, interested, curios, or joy while performing the respective tasks. Additionally, intrinsic motivation can be that the individual brings enthusiasm to stay on their task without showing signs of wanting to quit. Figure 2.1 visualizes a summary of empirical propositions and definitions of what causes intrinsic motivation, what increases intrinsic motivation, and lastly, biases and misconceptions.

	Phenomenon	Definition
Causes of intrinsic motivation (IM)	Unique activity-goal association	If an activity achieves fewer goals, and those goals are mainly only achieved by this activity, IM increases.
	Repeated activity-goal pairing	If an activity frequently achieves a goal, IM increases.
	Fit between the activity and the goal	When the goal and the activity are similar, IM increases.
	Proximity of the activity and the goal	An activity that achieves a goal earlier increases IM.
Increasing IM and persistence	Factoring intrinsic motivation into choice	Choosing an activity for the immediate benefits it provides increases IM.
	Bringing in immediate benefits	Adding immediate benefits to an activity lacking them increases IM.
	Attentional focus on immediate benefits	Thinking about the immediate benefits inherent to an activity increases IM.
Biases and misconceptions	Falsely believing others care less about IM	People think others care less about IM than they themselves do.
	Falsely believing the future self will care less about IM	People think that their future self will care less about IM than their current self.
	Taking advantage of intrinsically motivated employees	People believe it is more ethical to take advantage of intrinsically motivated employees.
	Cultural boundaries	Cultural differences moderate managers' expectations and cause of IM.

Figure 2.1: Summary of empirical propositions and definitions (Fishbach & Woolley, 2022)

Extrinsic motivation however is presented as a motive for doing something that is inclined by an external factor, such as money. Moreover, Reiss (2012) also states that based on the

self-determination theory, an extrinsic motive can undermine an intrinsic interest. Additionally, Calder and Staw (1975) explains extrinsic motivation as achieving a satisfied objective regardless of how the activity itself is. Intrinsic motivation is seen as a major part of motivation, but is not always a part of the majority of the activities individuals actually do (Ryan & Deci, 2000).

2.3 Skills

The Oxford Library defines skill as "the ability to do something well" (Oxford Learner's Dictionaries, n.d.). However, there are several different types of skills, Bridges (1993) assessed the differences and common factors between transferable, generic, core, and cross-curricular skills. The skills are presented as somewhat loose terms and often used interchangeably. The transferable skills is an interesting term that is used when you posess a set of skills that are applicable in another context. In education, Bridges (1993) states that the students learn skills and approaches that they later on can apply in relevant situations. However, a reason for why some of the terms are used interchangeably is that a training agency defined transferable skills as generic capabilities that are applicable to a distinct range of tasks.

2.3.1 eSports skills

In order to be an eSports athlete, one must have three sets of skills; Mechanical skills, awareness skills, and cognitive skills (Fletcher & James, 2021). Figure 2.2 shows an example from Fletcher and James (2021) that visualizes the relation of the three skills and their rank from selected Dota 2 players. Dota 2 is a Multiplayer Online Battle Arena (MOBA) game that consists of two teams with five players on each team. The objective of the game is to destroy the enemy team's "Ancient" while protecting your own. Mechanical skills alone can take a player far, however to reach an expert level it is necessary to master the awareness- and cognitive skills as well. The curve shows how all three of the skills are constantly growing, and due to the dynamics of a game allowing for constant improvement and adaptation.

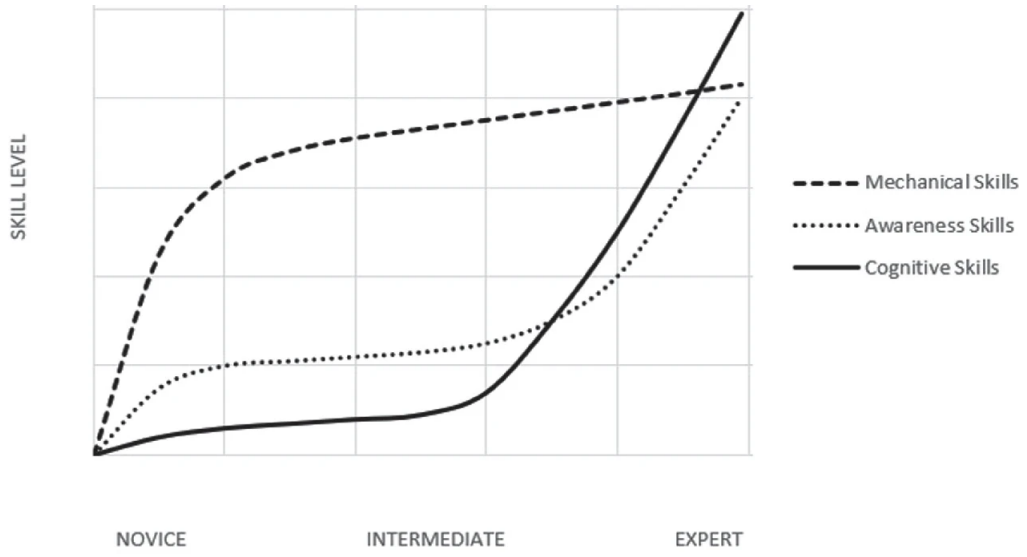


Figure 2.2: Skill level (Fletcher & James, 2021)

The literature regarding eSports is steadily increasing, yet there is still limited information and no public comprehensive framework on how eSports athletes are supposed to train (Nagorsky & Wiemeyer, 2020). Traditional sports have years of research and developed

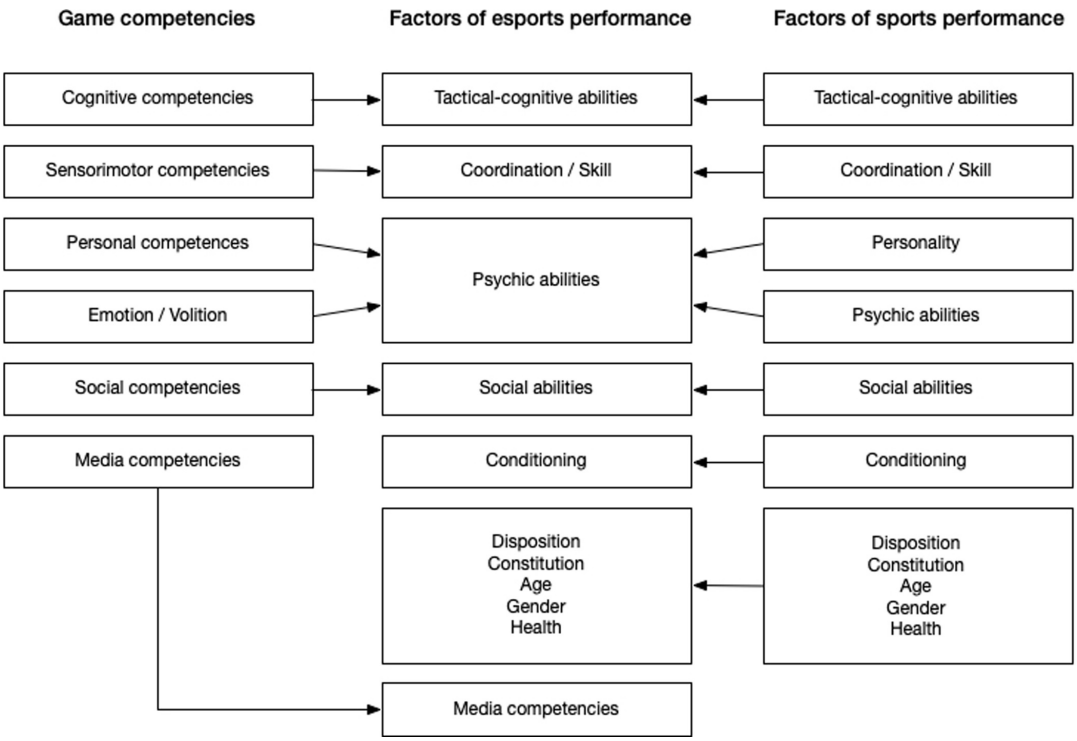


Figure 2.3: eSports performance model (Nagorsky & Wiemeyer, 2020)

models for efficient training, while eSports have received some recognition for some parallels. Studies have been conducted where eSports athletes and traditional athletes are compared in various tasks to distinguish their differences and similarities. Bickmann et al. (2021) conducted a study to test reaction times between professional eSports athletes, non-professional athletes, and traditional sports athletes, and the results suggested that they all improve their reaction abilities somewhat similar. However, for both sports and eSports, there are varieties in their performance profiles depending on which sport or video game is played. Figure 2.3 visualizes how the factors of eSports performance draw parallels from both game competencies and sports performance. Thus, breaking down the three different skills and getting a better understanding of their contributing factors to an eSports athlete's performance may help take necessary measures.

Awareness skills

The awareness skills are explained as the understanding of a player's place, position, and actions in the virtual world, and how these factors are intertwined with both their own and the enemy team (Fletcher & James, 2021). Thus, the aforementioned factors determine to what extent a player are aware of in-game indicators like cooldown timers, the positioning of characters, time stamps, and statistics that can be measured in general.

Cognitive skills

The cognitive skills are a little more complex compared to the awareness skills and is the skill that distinguishes most professional players from the rest (Fletcher & James, 2021). Ultimately, cognitive skills are about learning and utilizing that learning to counter the enemy team's play style. In most MOBA games, there are constant changes that make certain characters, itemization, and play styles better than others for a period of time until the next update takes place. Thus, players who master their cognitive skills are able to use the acquired learning, either before or during a game, to counter the enemy team's play style. In professional games, we can often see players proficient in a lot of areas, and the

gameplay is fast-paced. However, because most teams form tactics before the game, it is inevitable that the opposing team has done the same thing. Therefore, it is crucial that the team is able to adapt and create new counter-strategies in a very short amount of time.

Mechanical skills

Fletcher and James (2021) explains that the mechanical skills vary from game to game, and some mechanical skills used in their example from Dota 2 are movement, camera control, abilities, and item usage. Moreover, Bickmann et al. (2021) suggests that different game genres require different reaction times and the type of skills within the game may react in distinct ways with each other. Essentially, your mechanical skills determine how well you are able to do what you want to do. Moreover, mechanical skills have two aspects, being the physical world where the player performs physical interactions, and the virtual world in which the physical interactions result in virtual actions. Moreover, improving your mechanical skills allows for increased eye-to-hand coordination (reaction time from visual discovery to physical action) and hand dexterity. These mechanical abilities are important not only to master current scenarios but adapt to new, unpredictable situations (Nagorsky & Wiemeyer, 2020).

Chapter 3

Methodology

This chapter will review the methodological approaches used to answer the research questions in this thesis. The research questions will be answered using a hermeneutical approach and a mixed methods design. First, the research design will present the design of the used methods, and what mixed methods are. The qualitative approaches used will be broken down to justify the chosen methods, as well as hermeneutics. The quantitative methods have been developed based on the qualitative results and will be explained accordingly. Further, an analysis will explain how the results from the qualitative analysis are compared and weighed up against the quantitative results to generalize the points. Lastly, reliability and validity are explained.

3.1 Research design

The research is based on how eSports athletes reflect on their skills, and how to what extent a third-party software could impact eSports athletes in improving their skills. The approach used to address this issue is a mix of qualitative- and quantitative data collection methods, also referred to as a mixed methods design.

For this thesis, I have received the privilege of utilizing students from UiA's Academic eSports bachelor's degree. Many of the students have experience with eSports organizations, play professionally, or have played professionally previously. The qualitative approach used was semi-structured interviews, and a total of eight students participated. When the interviews were analyzed, a survey was developed based on the analysis and used as the quantitative approach to generalize the points made. The results from both the qualitative analysis and the quantitative analysis were used to reinforce each other to increase the reliability.

3.2 Mixed methods

According to Hanson et al. (2005), mixed methods were originally used back in 1959 when the researchers Campbell and Fisk used a combination of quantitative and qualitative research, also referred to as a convergence of the qualitative- and quantitative methods, to further validate the findings in a psychology study. Mixed methods were invented due to possible limitations and biased opinions, and each method could either strengthen the other or discover results the other method did not find. Additionally, this method can contribute to either the verification or cancellation of the research questions.

There are several strategies on how to use mixed methods, such as the convergent parallel design, explanatory sequential design, and exploratory sequential design (Nova Southeastern University, n.d.). For this study, the exploratory sequential mixed methods approach has been chosen to reinforce and generalize the qualitative findings with a quantitative method.

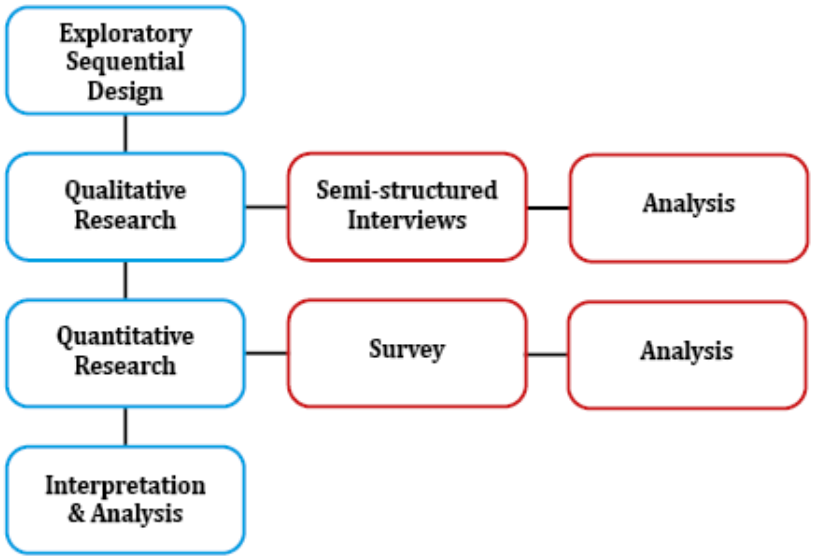


Figure 3.1: Mixed methods design visualization

By using this strategy, the findings from the semi-structured interview will define the quantitative questions in the survey. The visualization of the strategy is shown in figure 3.1.

3.3 Qualitative approach

This section will provide a detailed description of how the qualitative data was gathered, how the data was analyzed, and why the specific methods were used. Reality is a complex issue in constant change and each individual has their own distinct perceptions in a research case (Nilsen, 2012, p. 25). Thus, all included parties have their own interpretation of reality. When working on a qualitative research case, the researcher is interested in retrieving the subjective point of view, which Nilsen (2012) claims will provide some answers, but not the answer.

3.3.1 Hermeneutics

Nilsen (2012, p. 71) categorizes hermeneutics into three definitions: expression, interpretation, and translation. The three definitions establish what is called the hermeneutic circle, and represent work that has understanding as its objective. Further, (Nilsen, 2012, p. 71-72) explains that when we face something we cannot fully understand, we automatically want to interpret it and find an underlying meaning. Additionally, interpretation is an attempt to comprehend or make sense out of a research subject that could superficially present itself as unclear, chaotic, complex, incomprehensible, or contradictory to itself. Some of the interviews were conducted in English, and some interviews were conducted in Norwegian. It became somewhat clear that translating some of the questions from English to Norwegian, it was easier to lose track over what the question was originally intended for.

Moreover, the hermeneutic circle explains that all kinds of interpretation are comprised of constant movements between the entirety and its parts, between what is being interpreted

and its context, and between what is being interpreted and our understanding (Nilsen, 2012, p. 73). The hermeneutic circle is an iterative process and requires the researcher to go over the content several times to increase the interpretative understanding (Boell & Cecez-Kecmanovic, 2010). The circle is iterative because it is the parts combined that create the whole, meaning that if one part changes, the whole understanding can change. After the eight interviews were transcribed, hermeneutics came through as a useful tool in terms of interpretation, perception, and the analysis. Analyzing the interviews was an iterative process that required reading over the same answers several times to get a comprehensive overview of the answers, mostly because the answers was so distinct from each other. Each answer needed its own interpretation, and most importantly, each participant sometimes gave totally different answers based on how they interpreted the questions.

3.3.2 Interview guide

An interview guide is presented as a framework for the interview, and will provide the interviewees with the context of the interview both before and after, also called briefing and debriefing (Kvale, 1997, p. 75-77). The purpose of the interview guide is to ensure quality, consistency, and safety for everyone involved. The interviewees should also be informed about the topics beforehand to prevent them from getting caught off guard, which will maintain more natural dynamics of the conversation. Thus, the conversation should consist of an emphasis on keeping the relevancy as well as the dynamics to keep the conversation as natural as possible while still retrieving relevant information.

Order	**Aspects**
Introduction	• Welcoming the interviewee • explaining the purpose of the interview • explaining their rights, the process, and asking for consent
Question set 1	Retrieve general information (Games, rank, professional).
Question set 2	Perception, interpretation, and importance of mechanical skills.
Question set 3	• Personal mechanical skills, and its impact in the game. • Previous games and the transferal of mechanical skills.
Question set 4	• third-party software and current/previous use of them. • Aspects of third-party software.
Rounding up	Wrapping up and asking if they have any more questions.

Table 3.1: Overview of the interview guide

The interview guide is comprised of four question sets, and an overview (table 3.1). Each question set has primarily two questions and a few follow-up questions as backup. The question sets are set in a specific order to gradually ease the participant into the topic. The first questions is about getting information about the participant's gaming history and what level they have played at. The first backup questions were made to retrieve more specific information about their experiences if relevant. Next, the second question set tries to find out how they would describe their own skills in their respective games and how important they find them. Some participants found these questions overwhelming, so the backup questions guided them toward specific skills in various scenarios. Further, the third question set is based on the participant's interpretation of their own mechanical skill level, and what could have contributed to getting them to where they are at the moment. In this case, the backup

questions helps them to think about to what extent increased skill levels makes gaming more engaging, motivating, or fun. Lastly, the fourth and final question set is solely about third-party software. The participants were asked if they were familiar with any software, and whether they have tried any. Moreover, the last question makes the participants reflect on whether they would like a personalized tool, and if so, how they would expect it to be.

3.3.3 Pilot interviews

When the interview guide was finalized and approved by Sikt, the Norwegian agency for shared services in education and research, a peer was invited to assist in conducting pilot interviews. The pilot interviews turned out to be very useful in terms of quality insurance and time estimation. Before initiating the interview, all the recording devices refused to recognize the SD cards, and a proper microphone from the interaction lab, Røde NT-USB, was used. Thus, instead of storing the data on an SD card and transferring the recordings to UiA's OneDrive server, the recordings were directly transferred from Audacity to the server. Audacity is an open-source audio software used to record and edit audio and was used to record and convert the data from the interviews. The pilot interviews were conducted in the interaction lab at UiA due to its capacity and minimal background noise, and the setup was comprised of a table, two chairs, a laptop, and a microphone. Initially, the interviews were supposed to be conducted in a group room, but that would disrupt the feeling of a natural environment. However, the final interviews were conducted in the editing rooms in the Multimedia studio due to the convenience of booking the rooms and the noise suppression elements on the walls.

The pilot interview itself took seven minutes and 24 seconds while the test candidate could not answer two of the questions. The audio recording lasted for six minutes and 44 seconds, not including the introduction prior to consent. The test candidate was very positive about the interview and gave constructive feedback on a few of the questions which were immediately altered. Additionally, conducting the pilot interviews provided a lot of confidence and direction.

Before starting the interviews, the participants received an information letter with a consent form inspired by the template developed by Sikt. The information letter takes the participants through the purpose of the interview, their rights, and general information on how to proceed if they have any further questions or wish to withdraw. The information letter has been developed and handed to the interviewees before the interview itself to provide them with safety and ensure professionalism.

3.3.4 Interviews

Interviews as a qualitative research method work as a conversation with a defined structure (Kvale, 1997, p. 21-22). The purpose of this method is to direct the conversation deeper to extract more specific, contextual information, as compared to a regular conversation. Semi-structured interviews were utilized as the qualitative approach for this thesis. A total of 8 students volunteered to participate after I published a post on their Discord channel, which is mainly used for school-related work. The interviewees were first greeted and introduced to the process and their rights, before signing a consent form. All participants agreed to be audio recorded. The length of each interview varied greatly from approximately 10-40 minutes each. The Academic eSports students have various backgrounds, which led to the interviews being conducted in both Norwegian and English.

The interviews were conducted over approximately one week, and the respondents approached with a great variety of experiences and inputs on the topics. After each interview, the audio clip was immediately saved, exported as a WAV file, and securely stored in UiA's OneDrive server. However, Audacity did not properly record the last participant, which resulted in a mutual agreement on manually taking notes during the interview. It became clear that manually taking notes disrupts the dynamic flow of the conversation, but the participant showed great understanding and cooperated.

When all the interviews were complete, exported, and secured, the audio files were transcribed by using an AI called Whisper by OpenAI ("Whisper," n.d.). Whisper is an AI-trained system that provides incredible accuracy in speech recognition, which eventually was automatically printed into text. Because of some distinct Norwegian dialects, the script recognized the language as Swedish in three of the interviews. However, the Swedish text did not impose any problems because of the similarity.

3.4 Quantitative approach

Quantitative research is an important part of modern research, and is often used to generalize the results of a qualitative study to a broader audience beyond the original target group (Holton & Burnett, 2005). In this mixed method approach, the quantitative data will contribute to generalize the results from the semi-structured interviews conducted prior. Thus, a questionnaire was developed in SurveyXact that was comprised of five multiple choice sections, and a text field for reflection which will be presented below. A total of 35 participants completed the survey, which makes a total of over four times the participants from the semi-structured interviews. Although it is desired to have as many as possible to generalize the qualitative results, 35 participants yields a reasonable overview.

3.4.1 Questionnaire

SurveyXact is the leading tool in Scandinavia for creating questionnaire-based surveys ("SurveyXact," n.d.). The tool organizes the data and allows for a simple overview in terms of statistics, participants, and more. Moreover, SurveyXact has integrated functions that efficiently allows the user to present the data in various forms, such as diagrams and lists. The objective of the questionnaire was to generalize and reinforce the most interesting points withdrawn from the qualitative results. Thus, the questionnaire was comprised of five multiple choice questions that was made based on the interviews, and was intended to increase the numbers regarding the opinions on third-party software of mechanical skills development. The sixth and final question opened for free text, and asked the participants to reflect on personal improvement.

To be able to generalize the points from the qualitative study, the questions are as following; 1) What game genre do you play? 2) What level are you playing on? 3) How often do you use third-party software to improve your mechanical skills? 4) Do you find third-party software useful in improving mechanical skills? 5) Which skill set do you find the most important? 6) When you get better at the game in any aspect, do you notice which improvements have been made? If so, what?

The questions have similarly to the semi-structured interviews been developed to start with generic questions that further builds up to more specific questions. It is necessary to know the genre of the participants to figure out which ones are utilizing third-party software. Moreover, the skill levels they are playing on can help determine if there is a paradigm to the in-depth interviews. The third and fourth question have been made to simply determine

if they utilize any kind of software, and to what extent they find it useful. The fifth question was developed with only two answers, being awareness skills or mechanical skills, so the participants had to choose which one they felt was more important. It became known in the semi-structured interviews that both are important, but this way can help determine which one is the most important to a wider audience. The sixth question did not have multiple choice and the intention was to figure out to what extent the participants are aware of their progress, although it can sometimes be hard to point to specific areas of improvement.

3.5 Analysis

In this chapter, I will present the analysis. First I will present NVivo, the analysis tool used to organize and code the results from the semi-structured interviews. Next, I will describe the selection of people gathered for the qualitative data collection. The strategy used used for coding and analysing the interviews will be briefly presented before talking about reliability and validity.

3.5.1 NVivo

NVivo is a qualitative analysis software created by Lumivero. The software allows its users to organize, code, interpret, collaborate, and share their data. The University of Agder has arranged for its students with free access through AppsAnywhere, and is the chosen software for this analysis. The software is carefully developed and has the ability to handle considerable amounts of various data. Qualitative data is usually different from each other and hard to compare, NVivo offers the ability to organize cases and coding without having several tabs open that cause chaos and disorganization. Nilsen (2012, p. 121) states that using NVivo changed her working days as a researcher, as she was manually coding her data previously. Moreover, she has shared her experiences and created a mini-guide with explanations on 15 pages (p. 120-135).

3.5.2 Selection

The participants used in the qualitative data collection are primarily the Academic eSports students, but not everyone is currently a professional eSports athlete. The goal is to register the skill level the participants play at, whether or not they have used an third-party software to achieve their current level, and if the software has had any impact. For the interviews, most participants has either played professionally, semi-professionally, or at a high level in their respective games.

The qualitative data collection method however does not require high skill levels. The purpose of utilizing this mixed method design is that the quantitative method is supposed to generalize the points provided from the qualitative method, which is strengthened by having a wider variety of skill levels. However, the participants are primarily from the Academic eSports class due to their knowledge of the concepts.

3.5.3 Strategy

With help from AI Whisper and NVivo, the time consumption of transcribing, organizing, and analysing the interviews was cut significantly, allowing for more a more thorough analysis. Nilsen (2012, p. 121) supports the statement that using more time on analyzing the data also increases the quality of the research. Upon completion of transcription, the AI provided the results as a single chunk of text without paragraphs, which I had to insert manually. The first step of the analysis was to code and categorize the data from each participant.

Nilsen (2012, p. 78) explains coding as a way for the researcher to organize their thoughts about the research data, which later on is used to see connections between each other, and then categorized. When the thoughts were connected and coded, they were categorized into relevant topics to the research questions. Each participant had distinct answers, and required an iterative process of analyzing before drawing parallels.

3.5.4 Reliability and validity

Quantitative research usually consists of testing and close-ended questionnaires, while qualitative research usually uses interviews, observations, and open-ended questionnaires to analyze and interpret the gathered data (Zohrabi, 2013, p. 254). However, mixed methods data collection is usually comprised of numerical data, interviews, and observations. Zohrabi (2013) emphasizes the importance of utilizing relevant, quality instruments in a mixed method design as they could support each other to boost the validity and dependability of the collected data.

Validity is considered the trustworthiness, utility, and dependability of the data, and determines to what extent the research is believable or true (Zohrabi, 2013, p. 258). The reliability of research data is considered to be the consistency, dependability, and replicability (Zohrabi, 2013, p. 259). Retrieving data in qualitative research is seen as a more tedious process as the data is collected in a subjective manner, as compared to its quantitative counterpart where the data usually is collected in a numerical form. Moreover, Kvale (1997, p. 164) describes reliability as the consistency of the research findings, and is a part of the interviews, transcriptions, and the analysis. Further, Kvale (1997, p. 97) highlights the fact that just changing a single word in an interview question could change the outcome. Although various question formulations could alter the answers, it is important to understand that it also could be a necessary part of retrieving valuable answers the interviewee may hold back. In this study the qualitative data gathering method used was semi-structured interviews, and the questions were formed carefully to try to keep the interview as consistent and exact as possible. Furthermore, after the qualitative analysis, the quantitative data gathering method chosen was a questionnaire that was carefully formed based on the input from the semi-structured interviews.

Chapter 4

Results

In this chapter the results from the data gathering will be presented. First, the results from the semi-structured interviews will be assessed, and then the qualitative data. The results will then be converged with the mixed methods design as explained in chapter 3.2 to reinforce each other, and answer the research questions. The objective of the thesis is to understand how eSports athletes reflect on their skills and how a third-party software impact eSports athletes in improving their skills, and the results will be based on that objective. The research questions used to work towards this is as mentioned in chapter 1:

1. "How does a third-party software make eSports athletes better?".
2. "How do eSports athletes reflect on their skills?".
3. "To what extent does a third-party software impact eSports athletes in improving their skills?".

4.1 Semi-structured interviews

The objective of the qualitative data gathering is to better understand how eSports athletes reflect on their skills. The participants have history and experience in different games, which limits the possibility to measure the some of the results in raw data. However, to get the grasp of each participant's answers, this section is split up into segments that accumulates the essence. The questions asked was intentionally put as somewhat open to fully receive each participant's subjective interpretation. Thus, the follow-up questions were created to guide them if the questions appeared too overwhelming. A total of eight participants were interviewed.

4.1.1 Question set 1

The first section of the interview guide is based on more general guidelines and is developed to find basic information about the participant's gaming history. It was important to clarify which game(s) the participant was currently playing, what game type is the preferred one, and which games have been played before to potentially see paradigms based on game types. There are recurring patterns in which games are played, but still a clear variety as shown in table 3.1. Some of the participants were playing more than one game, either competitively or simply for fun, although mainly focusing on one game competitively.

The second question from question set 1 asked about which skill level the participants were playing on. This could not be measured in raw data because each game have distinct ranking systems which makes it hard to compare with each other. As not all of the participants have played in a professional organization, they have played at high levels in their respective games. However, as a backup, the participants were asked whether or not they have played

Game	Amount	Game Type	Amount
League of Legends	3	MOBA	2
Overwatch	3	FPS	6
Counter Strike	2	Rythmic Games	1
Rocket League	1		
Valorant	2		
Step maniacs	1		

Table 4.1: Preferred games and game types of the participants.

in an organization. In this case, playing in an organization is stretched from playing with the school team and/or hobby teams to professional teams on the top levels. The Academic eSports students have assembled their own teams that is participating in various tournaments. Although, some have either played or are currently playing in a professional organization or on the national team. Moreover, it was deemed rather difficult by some of the participants to maintain top levels while studying. Thus, each of the eight participants have played or are currently playing in some kind of organization or established team, while one even had a personal aim-coach. The overview can be seen in table 4.1. The next question set moves on to skill-related questions, and the results from question set 1 contributed to test the validity of their reflections, due to experience and game-knowledge.

4.1.2 Question set 2

In question set 2 the emphasis was on letting the participants describe their skills without any given context. Three participants was not fully prepared for the question as it could be somewhat comprehensive, but received some assistance through the follow-up questions. Some skills are game-specific, and are not transferable with other games. However, some of the most important skills that occurred among the majority of the participants that could be found in both MOBA's and FPS-games was map awareness and positioning. The most talked about skills that were mentioned in the various games are listed in table 4.2.

MOBA	FPS	Rocket League	Rythmic games
Map awareness	Aim	Boost management	Foot coordination
Wave management	Coordination	Speed adjustment	Hand coordination
Positioning	Speed		Pro-activity
Decision making	Precision		Positioning
Itemization	Movement		Reaction-time
Game knowledge	Decision making		

Table 4.2: Important skills from the different game types.

Further, question set 2 was wrapped up by asking how important they think mechanical skills are. The MOBA-players all agreed on the fact that mechanical skills are important, but believed that awareness skills were of bigger importance. One participant talked about how mechanical skills simply does not matter that much if the character is out of position. Another participant mentions that mechanical skills are very important and necessary to play on higher levels, but awareness and cognitive skills are essential to read the game and understand where both your own team and the enemy team is. They made an example of a famous streamer that managed to achieve the highest rank in League of Legends by simply utilizing strategies that did not depend too much on mechanical perfection.

The FPS-players were somewhat similar in their opinions as the MOBA-players. Good mechanical skills is necessary to play on higher levels, but it is just as important to have good

awareness- and cognitive skills. The objective in most FPS-games is shooting the opponents and often neutralize a given objective. Moreover, two of the participants emphasizes that it is important to master a combination of the three different skills to be able to maintain a high level, as you cannot solely rely on only one of the objectives. Further, it is stated that having good mechanics in FPS-games require good eye-to-hand coordination as you most of the time need to keep simultaneous control of both the movement and actions on the keyboard and overview and actions on the mouse. One participant also stated that people who have been playing FPS-games their entire life usually possess naturally good mechanical skills in terms of aim, and may not benefit too much from a third-party software.

4.1.3 Question set 3

In the third question set the participants were first asked how they would describe their own mechanical skill level. The three MOBA-players thought it was a hard question to answer as there are no precise way to answer that question. However, based on their respective ranks, they all perceived themselves as average or above. One participant explained how mechanical skills varies from rank to rank, as some people can achieve a distinct rank by excelling in for example strategic skills. Moreover, a participant pointed out that to be able to execute certain strategic moves, it is important to have the necessary mechanical skill level to complete the action successfully. Otherwise, the strategic move may end in failure.

One of the FPS-players talks about how his mechanical skills are average, and is focusing on a role within the team that requires awareness skills. Instead of only focusing on taking down the enemies, his job is to detect their positions and assemble new strategies based on their locations. Another participant thinks that his mechanical level was above average, but never managed to reach the top level among the professional players.

The Rocket League player states that they have received recognition for his mechanical skill level, as they have achieved top 1% in about half the time it usually takes players to get there. However, they also claim that it is nowhere near to where it could be, but makes up for it with good mental health from physical activities like tennis. Some of the combinations performed in Rocket League may require pressing up to five or six buttons simultaneously, The follow-up question to the first question was asked regardless of how it was answered, and tried to find out if the game became more engaging, fun, or motivating when their mechanical skills improved. The answers provided by the participants were not game-specific and all the participants agreed to the question. One participants pointed out that the satisfaction of winning created a motivation to get even better. Further, one participant created milestones which could be levels or accomplishments to work towards, and when the milestone had been achieved, another milestone was created. Moreover, a participant stated that when you have worked towards a complicated combination or some advanced mechanic over a longer period of time, the satisfaction makes you want to perfect even more combinations. Several of the participants had the same opinion on the fact that when you have practiced on something for a long period of time, it motivates them to keep learning new moves or get even more consistent on the ones they have already accomplished.

The last question of question set 3 asked whether the participants thought any previous games could have contributed to their current mechanical skill level. The answers was very individual, and some thought that they not only helped with the mechanical skills. The Rocket League player have played a lot of Grand Theft Auto (GTA) beforehand. In GTA you have the ability to drive cars and fly various air crafts, and that has improved his feeling of aerial control. This is mostly due to the physics utilized in both GTA and Rocket League, as well as the ability to control multiple buttons simultaneously. Moreover, one of the MOBA-players had played Tarkov, a multiplayer tactical first-person shooter game, that

helped him be less aggressive, make quick and correct decisions, play around his enemies, trigger discipline, movement, and get an overall feel of FPS-games. The skills they learned from Tarkov didn't directly transfer to League of Legends, but had a lot of aspects that have made him a better player. Another MOBA-player mentioned that they have played various FPS-games on PlayStation before, which did not specifically give him anything as a controller is quite different to using a keyboard and a mouse. Lastly, one of the FPS-players mentioned that even though they have played games like Battlefield before starting with Counter Strike, it did not improve his mechanical skills. They clarified that it was somewhat difficult to figure out whether or not it had an impact, and said that they believe most of their current skills came from just playing a lot Counter Strike itself.

4.1.4 Question set 4

The last question set revolves around third-party software, and what impact it has on mechanical skills. The first question simply asked whether or not they were familiar with any software. The follow-up questions asked whether they have tried any, if they were useful, and if they currently use one. One of the MOBA-players mentioned six different software, being Kovaak's, AimLab, Ozirion, Porofessor, Blitz, and OP.GG, as well as the built-in practice tool and the replay options. However, some of them does only offer statistics and data tracking. They also explain that they currently use Porofessor, which gives in-game timers and tracking of various statistics that eases the gameplay.

Moreover, the FPS-players had more experience with software that provides exercises for aim and precision like AimLab and Kovaak's. One participant says they have a total of around 800-900 hours in Kovaak's, and has invested a lot of time to get better. All of the other FPS-players have only tried either of the two software for shorter amounts of time, as they found that the practice-tools in Counter Strike provided enough training. One participant mentioned OSU, a free-to-play rhythm game, that is comprised of a map with various circles appearing around that you must click with a certain precision in time with the music. Thus, even though the game requires speed and precision, the participants did not feel like the skills acquired were transferable to Counter Strike.

4.1.5 Summary of qualitative results

The results from the semi-structured interviews shows a great variety in how eSports athletes reflect on their skills, and their thoughts on third-party software. The participants extend from semi-high rankings to professional levels, and they have all played in some kind of organization or team. In terms of skills, there were mostly game-specific factors. The MOBA-skills mostly revolves around factors regarding the map, positioning, and game knowledge. However, the FPS-skills was more about coordination, movement, aim, and precision. Mechanical skills in MOBA-games does not appear to be as important as strategy and awareness skills. Further, even though FPS-games requires strategy and awareness, they rely more on mechanical execution.

Third-party software in MOBA's appears to revolve more around data tracking and statistics, as compared to FPS-games where the software is more about precision and aim. The MOBA-players are using the software more consistently, as they are often implemented into their game in real-time while playing. The FPS-players had mixed opinions on how effective the software was, as their respective games usually have built-in practice tools/maps with enough variation to satisfy their needs for practice.

4.2 Questionnaire

In this section the quantitative data from the questionnaire will be presented. The questionnaire was published in the discord server of the Academic eSports students, as well as three other discord servers with various gaming experiences. The participants showed great variety in which genre they were playing in and which skill level they were playing on. The goal of the questionnaire is to generalize the points from the semi-structured interviews, and detect paradigms between the questions.

4.2.1 Question 1

The first question was multiple choice, meaning that all three options could be checked off. In table 4.1 the distribution of game genres are visualized. Thus, of the 35 participants, 38% plays MOBA's, 38% plays FPS-games, and 24% plays other types of games. Furthermore, as the first question was multiple choice, some of the participants checked off more than one box. There were a total of 27 respondents that checked off MOBA, 27 respondents checked off FPS, and 17 respondents checked off other. Out of the three professional players, all checked off FPS-games, while two also checked off MOBA. Eight of the experienced players had checked off other, 7 checked off FPS, and 5 checked off MOBA.

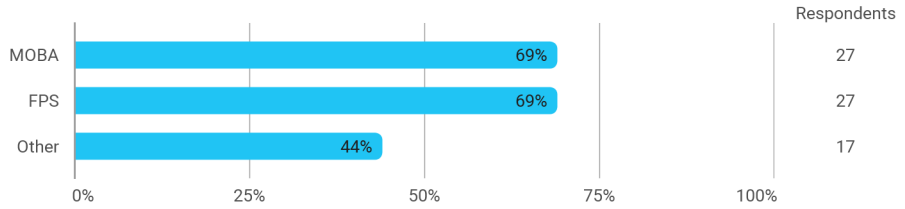


Figure 4.1: An overview of game genres from the respondents.

4.2.2 Question 2

In question two the respondents was asked which level they were playing on. Although, as mentioned in chapter 4.1.1 it is difficult to measure players on their rank as it is distinct to its respective game. Based on this, the options given to the participants were; Novice, intermediate, experienced (high level), or professional. These four categories are a common way to gauge difficulty in various video games, and explains somewhat precisely on a global level where players could place themselves based on experience and skill. As shown in figure 4.2, the majority of the respondents have placed themselves within the middle. A total of four respondents placed themselves as novice and three respondents placed themselves as professional, while 20 respondents placed themselves as intermediate and 12 respondents as experienced.

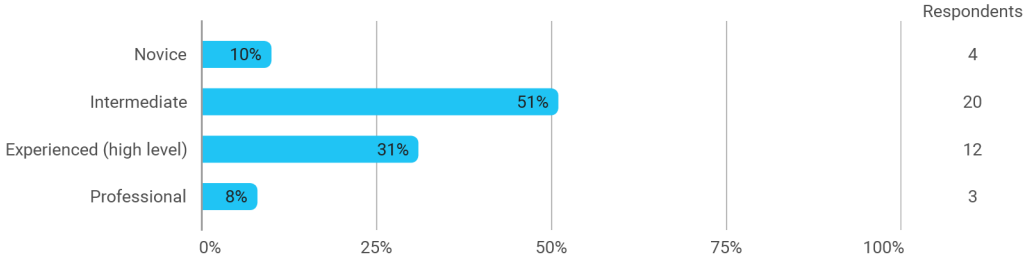


Figure 4.2: Skill level of the respondents.

4.2.3 Question 3

In question three the respondents was asked how often they use third-party software to improve their mechanical skills. They were presented with four options; Never, little, regularly, and often. As shown in figure 4.3, 54% of the respondents never use third-party software to improve their mechanical skills. A total of 8% use it often, and another 8% use it regularly, while the remaining 31% use it a little. It is clearly shown that the majority of the respondents does not use any software at all. There are clear distinctions between how popular utilizing a third-party software is among the respondents. However, the data shows that all three of the professional players use third-party software often to further improve their mechanical skills, while the experienced players were mixed in never to little.

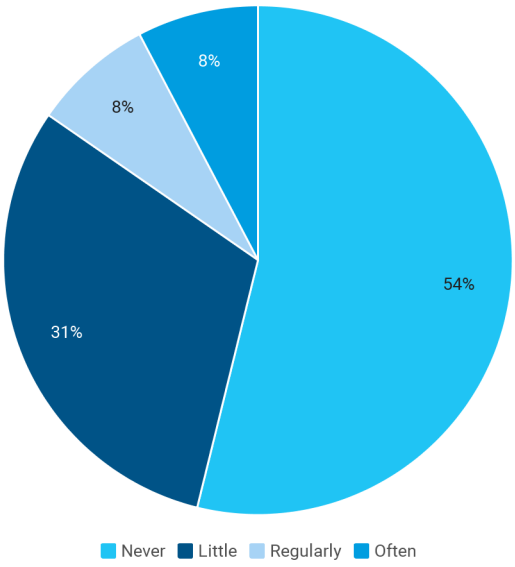


Figure 4.3: How often the respondents use third-party software to improve their mechanical skills.

4.2.4 Question 4

Further, the fourth question asked the respondents whether they found a third-party software useful in improving their mechanical skills. In table 4.4 the differences between each group is not is not too big. First, a total of 15% believes that a third-party software is not useful at all, while 26% thinks it is only a little useful. The majority of the respondents believes that it is somewhat useful at 38%, and the remaining 21% prefers to use the built-in training modes of their respective games. It was shown in the semi-structured interviews that in certain games the built-in custom maps satisfies their needs in terms of practice, but mostly in FPS-games. Lastly, all three of the professional players checked off that third-party software is somewhat useful. The majority of the experienced players checked off "somewhat", while the rest finds it a little useful or stick to in-game training.

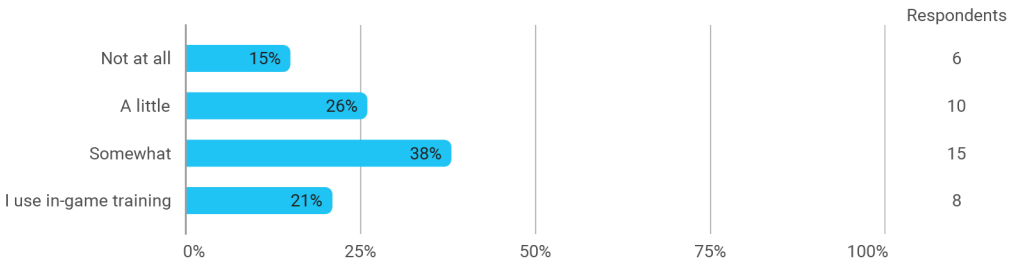


Figure 4.4: To what extent the respondents find third-party software useful.

4.2.5 Question 5

In the fifth question the respondents was asked which skill set they find the most important. They were presented with two options; Mechanical skills, and awareness skills. It was originally intended to include a third option, the cognitive skills, but it would be too complex to explain and compare to the other two options. Thus, the majority of the respondents find awareness skills to be more important with 59%, while mechanical skills got the remaining 41%. Of the three professional players, two of them believes that mechanical skills are more important than awareness skills. Figure 4.5 shows the distribution.

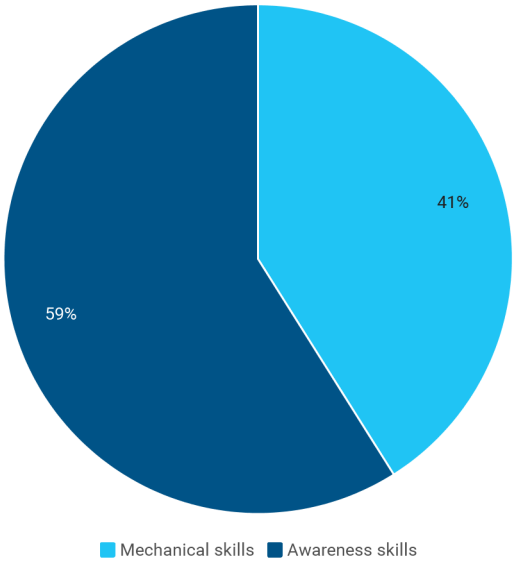


Figure 4.5: The skills the respondents found most important.

4.2.6 Question 6

The sixth and final answer was "When you get better at the game in any aspect, do you notice which improvements have been made? If so, what?". This was a text-based question, and required the respondents to reflect on their own improvement. The responses was very distinct, and a total of 8 participants ended up with a blank answer. It is currently unknown why these respondents chose to answer blank. This section will be split up based on the respondents ranks to distinguish between their reflections on various levels.

Professional players

Out of the three respondents that checked off as professional, the first did not write anything in the text field. However, the second one mentioned that improvements could be seen in some aspects, such as "spraypatterns" and smokes, or mechanical executes in MOBA's. This indicates that the respondent plays both MOBA's and FPS-games. The third respondent notices which improvements have been made and states that it really depends on what they are trying to improve, while it usually is very similar. First, they analyses their gameplay, find the mistake, fix the mistake, and analyses the gameplay to see if it has been improved. If the mistake has been improved, they move on to finding new mistakes and repeats the process. Further, it really depends on what they feel is lacking, and then specifically looks for mistakes in that area.

Experiences players

Of the 12 respondents that checked off as experienced, there were only one respondent who answered blank. The first respondent talks about how they study replays in order to be more prepared and react faster. In terms of mechanical skills, it is more long term consistent practice to see improvement. Lastly, they mention that awareness and knowledge will not get you anywhere without mechanical skills in FPS-games. Four of the participants answered shortly with increased awareness, aim, mechanically, and mouse awareness.

One participant talks about how spending a lot of time in Counter Strike gets you used to the timing of various aspects. While playing in high level games, most of the players already have good mechanical skills, and it is the awareness skills that makes a difference to further improve. Another respondent talks about a similar aspect, being the map- and general awareness. When you get to know the layout of a map, it becomes easier to know where to place your aim and be more consistent. It becomes easier to read the probability of the enemy team and determine the usual places where they will emerge from. Lastly, the sound design plays a big part in high level games as well. As the sound design is distinct from game to game it takes time to dinstinguish the various sound effects. When the player masters those sound effects, it becomes easier to quickly respond in a more suitable action based on the sound, such as different types of grenades and weapons.

Intermediate players

Out of the 20 respondents that checked off as intermediate, there were a total of five players answered blank. About ten of the intermediate players talks about small changes, such as reflexes, game sense, mechanical skills, increased response time, and awareness. However, one respondent states that during his time as a passionate gamer they have noticed massive improvements in controlling the recoil in FPS-games and taking advantage of cover when in combat. Similar to the experienced players, they also mention that they have improved in detecting the area for enemies. Additionally, due to a lot of time spent gaming, they have noticed themselves being more calm in stressful situations.

Another respondent talks about making new routines and better decision making. Although, it could sometimes be hard because you often notice those flaws in the moment and forget them after the game. The last participant also talks about crucial decision making as a big improvement in terms of game knowledge. Further, they finished off talking about the gaming experiences as more rewarding than mechanical skills, as awareness is much more difficult and has a higher learning curve compared to mechanical skills.

Novice players

The four novice players are a little more distinguished compared to the three other skill levels. There was two respondents who filled the text field as blank. Thus, the first respondent talks about how they do not notice any specific improvements in the moment, but more in the long run. Usually the improvements is measured in how far they have come since the start. The second respondent simply states that they are usually too casual to notice improvements, and writes it off as luck.

4.2.7 Summary of the quantitative results

The results of the quantitative data shows great distinctions between the skill levels, and how the respondents reflect on their improvements. First, question 1 shows how several respondents checked off on more than one game genre. The majority of the respondents placed themselves as intermediate or experienced players. All three of the professional players uses

third-party software often, and find it somewhat useful. Moreover, the professional players checked off FPS-games as their genre, while also saying that mechanical skills are more important than awareness skills. While 59% of the respondents believes that awareness skills are more important, it is the majority of the intermediate- and experienced players that supports the statement. All four of the novice players checked off mechanical skills as more important.

The professional players emphasizes replays of their games to analyse their mistakes, and are more aware of the specifics in terms of mistakes. The experienced- and intermediate players are more concerned with mechanical issues, map awareness, and decision making. The novice players are not as concerned with specific issues, but rather long term improvements based on where they started.

Chapter 5

Discussion

The goals of this study was to understand how eSports athletes reflect on their skills and the impact of third-party software in improving their skills. The research questions I have been working with are:

1. "How do eSports athletes reflect on their skills?".
2. "How does a third-party software make eSports athletes better?".
3. "To what extent does a third-party software impact eSports athletes in improving their skills?".

The results from this research have provided insight into the eSports athletes reflections on the development of their skills, and third-party software. The first research question will be discussed individually, while the second research question will be discussed in conjunction with the third research question. This approach has been chosen due to the interconnected nature of both research questions, as they pertain to a shared topic and their outcomes are related to each other.

5.0.1 Research question 1

The results from the semi-structured interviews and the questionnaire indicates that there is a distinction between MOBA-players and FPS-players in terms of reflecting upon their individual skills due to game-specific factors. This distinction arises from various factors inherent to each respective gaming genre. Some of the factors presented in table 5.1 are transferable between the various games, but are emphasized in their respective games. When the eSports athletes were asked which skills they found the most important, a pattern of mechanical skill types reoccurred for each game. The table developed in chapter 4.1.2 will be shown again for reference.

MOBA	**FPS**	**Rocket League**	**Rythmic games**
Map awareness	Aim	Boost management	Foot coordination
Wave management	Coordination	Speed adjustment	Hand coordination
Positioning	Speed		Pro-activity
Decision making	Precision		Positioning
Itemization	Movement		Reaction-time
Game knowledge	Decision making		

Table 5.1: Important skills from the different game types.

Fletcher and James (2021) said that an eSports athlete requires three sets of skills; Mechanical skills, awareness skills, and cognitive skills. The participants from the semi-structured interviews immediately understood what the different skills meant without any explanation,

regardless of which genre they were playing. Based on the results, it appears that all of the three skills plays a role in both MOBA's and FPS-games. Nevertheless, a distinction was observed in that the MOBA-players were emphasizing the awareness-related skills, which is explained as understanding both their own and the enemies place, position, and actions in the game. Thus, the MOBA-players believe that having good awareness skills are more important compared to mechanical skills to be a better player. Meanwhile, the FPS-players were more inclined to prioritize the mechanical aspects of the game, which determines how well they are able to do what they want to do. Hence, the FPS-players value mechanical skills more than awareness skills in terms of being a proficient player.

Further, the quantitative results shows that in addition to eSports athletes reflecting differently based on their game genre, their skill level also impacts how they reflect on their improvement. The high level players demonstrate a very thorough approach in analysing their actions in terms of enhancing their gameplay. The findings demonstrate that high level players comprehensively identity, examine, and review their mistakes, and strive to produce a solution to them, review their mistakes, and produce a solution to their problem. In contrast, lower skill level players did not demonstrate the same comprehensive self reflection, and are more satisfied with enjoying the game in the presence. One of the lower skill level players spoke about their performance as being more lucky than skillful, and attributed this to their casual playstyle. According to Pardee (1990) motivation can be the internal drive that pushes the individual towards satisfying their basic needs. It appears that the lower level players does not have a distinct motive to get better. Conversely, higher skill level players have a motive to master various combinations or learn new techniques to further improve their skills. These players appear to be driven by autonomous motivations from self-determination theory by Ryan and Deci (2022) where they are motivated by individual awareness and choice. Additionally, the higher level players are more inclined to keep practicing their skills to maintain a high skill level. (Reiss, 2012) talks about how intrinsic motivation is a motive for an individual to do something for its own gain. There was a consensus among the participants of the semi-structured interviews that the games they played were more enjoyable or engaging when they felt an improvement in their mechanical skills. There appears to be a clear paradigm where high skill level players are intrinsically motivated to improve for their own benefit, and that extrinsic factors do not affect motivation.

Frederick Herzerg's two-factor theory is comprised of two segments; The motivation factors and the hygiene factors. The motivation factors are based on individual growth and self-actualization, which are seen as intrinsic factors. Parallels can be drawn from the motivation factors "advancement", "the work itself", "possibility for growth", and "achievement" when the eSports athletes talk about how they not only want to learn new techniques and combinations, but practice the those they already knows to increase their consistency and execution abilities. Moreover, the "recognition" motivation factor talks about how the individuals get acknowledged for their work in form of intrinsic or extrinsic rewards, and can be connected to how the game gets more engaging or fun when their skills improve.

5.0.2 Research question 2 & 3

Just like how there is a distinction between how MOBA-players and FPS-players reflect on the development of their skills, there are differences between how the players of these two genres utilize third-party software to improve their skills. In the semi-structured interviews I learned that MOBA-players are more inclined to utilize third-party software that provides real time data tracking, game analysis, and statistics to track patterns and make improvements based on the data in general. Moreover, FPS-players are more focused on utilizing third-party software that emphasizes mechanical aspects like like aim, speed, and precision to improve mechanical executions. Additionally, as the MOBA-players are more involved

in the awareness aspects of their games, the popular third-party software they use appears more relevant to their improvement as they do not rely on mechanical executions on the same level as FPS-games. Similarly, the FPS-players are more involved with the third-party software that emphasizes mechanical aspects, as having better mechanical skills is necessary to execute their strategies and tactics sufficiently.

It appears that the deciding factors of utilizing third-party software for skill improvement varies on a individual basis. Previous research by Nagorsky and Wiemeyer (2020) illustrates that there is limited information on how eSports athletes train with no clear, comprehensive framework that eSports athletes can rely on. As mentioned in the semi-structured interviews, one FPS-player had spent between 800-900 hours in "Kovaak's" and found it very useful. At the same time, other FPS-players believed the in-game training solution via custom maps provided better training. Furthermore, as mentioned in the question set 4 from the semi-structured interviews, one of the eSports athletes states that they do not believe the skills acquired in the third-party software are transferable to the game itself.

I have discussed the distinctions between MOBA-players and FPS-players and received insight into the paradigms of how a third-party software makes eSports athletes better and how eSports athletes reflect on the development of their skills. Two of the participants talks about how they tried both AimLabs and Kovaak's, but did not experience any improvement in their mechanical skills. One participant mentioned that they felt no effect on their skills from third-party software due to not taking recoil, mouse sensitivity, and Field Of View (FOV) settings into consideration. It appears that some of the third-party software does not offer sufficient dynamic variation for some people to perceive the training as transferable.

It became clear in the quantitative results that the higher level players are more likely to use a third-party software often to finesse their skills, while lower level players usually are too casual to bother spending extra effort in increasing their skills. Therefore, the the lower leveled players does not appear intrinsically motivated enough to put in the effort in addition to the actual gameplay to further improve their mechanical skills. The mixed methods design have been useful in terms of determining the distinct results, as the quantitative results showed that just because the professional- and experienced players are more likely to utilize these tools, it does not apply to the same extent for the novice- and intermediate players. Moreover, there are distinguishable opinions on the same skills levels that does not contribute to a unilateral conclusion.

Chapter 6

Conclusion and future work

This chapter will draw a final conclusion based on the discussion, and present recommendations for future work.

In the first research question, "How do eSports athletes reflect on their skills?", it was enlightened that game-specific factors, skill level, and game genres are a crucial distinction in how eSports athletes reflect on their skills. The higher level players are aware of what the various eSports skills are comprised of, how the skills affect their gameplay, and how they are relevant to the respective games. How eSports athletes reflect on their skills can be clearly distinguished based on their skill level. Motivation can be seen as a motive for why the high level players are more thorough in reflecting on their gameplay, while the lower level players are not as inclined to improve the smaller details.

The second and third research questions were "How does a third-party software make eSports athletes better?", and "To what extent does a third-party software impact eSports athletes in improving their skills?". Just like the first research question, there is a distinction between how MOBA-players and FPS-players utilize third-party software to improve their skills. MOBA-players are more inclined to utilize third-party software that revolves around real time data tracking, statistics, and game analysis. The FPS-players are more inclined to utilize third-party software that revolves around mechanical aspects to solidify their mechanical executions, such as aim, precision, and speed. Thus, it became clear that there are individual differences that does not present a unilateral conclusion.

The mixed methods design helped enlighten these aspects by showing how that not only does MOBA-players lean more towards the awareness aspects of their games and the FPS-players lean more towards the mechanical aspects of their games, but their skill levels also impact which skill area they find more important.

6.1 Conclusion

Throughout the study I have utilized semi-structured interviews and a questionnaire as data gathering tools in this mixed methods design on how eSports athletes reflect on their skills and how third-party software impact eSports athletes in improving their skills. The objective was to better understand the factors of the various aspects of an eSports athlete's reflections, and what factors the eSports athletes consider when utilizing a third-party software. A total of 8 eSports athletes were interviewed, and a total of 35 respondents participated in the questionnaire, which have been intertwined to either verify or cancel each other.

The results shows that eSports athletes reflect differently on their skills based on their skill level, and what game genre they play in. Because there are a considerable amount of differences not only between the game genres and skill levels, there are different opinions between those who play the same games and those who play at the same skill levels. Although there are clear paradigms present that slightly moves in favor of certain groups based on their skill level and game genre, there are still variation in how each individual think within the same groups.

In terms of third-party software, indicators show that FPS-players are more inclined to utilize a third-party software that are made for improving mechanical skills, and MOBA-players are more inclined to utilize third-party software that are made for data tracking, statistics, and data analysis. It appears that both FPS-players and MOBA-players could benefit greatly from a third-party software made for improving mechanical skills, but the existing software are not optimal for the game genre to fit all.

6.2 Future work

As eSports in general is a wide scope, I believe that future work should narrow down the scope to only one genre, or one game type. Evaluating third-party software based on various different backgrounds is difficult, and I suggest that future research assess third-party software with only one game genre in more depth. Additionally, eSports athletes' skill levels should taken that consideration when evaluating the game genre, as well as their motivation behind improving their skills.

Finally, as this thesis is written by only one person with limited time, future work should emphasize bigger target groups. It has been very interesting to see how people with different gaming backgrounds and skill levels reflect on their skills, and their perceptions of third-party software. However, it would be even more interesting to see more in-depth evaluations of how some eSports athletes choose to use certain third-party software, and some prefer the in-game training modes.

Appendix A

Semi-structured interviews

Question set 1

Question(s)	Follow-up question(s)
What game(s) are you currently playing?	• Why do you play the game(s)? • What's your favorite game type? I.E. MOBA, FPS
What skill level are you playing on?	• What is your current rank, and what is your all-time best rank? • Have you ever played professionally in an organization? • If possible, what position or role do you play in a team?

Question set 2

Question(s)	Follow-up question(s)
How would you describe your skills in the game you're playing?	• Could you provide an example of mechanical skills in the game you're playing? • Could you explain what skills are important to you when you're playing?
How important do you think mechanical skills are?	• Do you feel like mechanical skills alone could make a difference, or are there other aspects that could make a more important difference?

Question set 3

Question(s)	Follow-up question(s)
How would you describe your mechanical skill level?	• How would you describe your mechanical skills? • When your mechanical skills improve, do you feel like the game is more engaging/fun/motivating? Why?
Are there any previous games you have played that have developed your mechanical skills?	• Which games do you feel have contributed most to improving your mechanical skills? • How do you think personally these games have influenced your mechanical skills?

Question set 4

Question(s)	Follow-up question(s)
Are you familiar with any external software to enhance your mechanical skills?	• Have you tried any of them? • If yes, did you find it useful? • Do you currently use it, and if yes, how often? • Which elements did you like in particular, and why?
Do you think a tool personalized for you could help improve your mechanics?	• If you had your own program, how would you expect it to be? • Are there any elements in particular you would like to see?

Finishing up

Thank you for your time. Before we finish, is there anything you would like to add, or comment on?

Appendix B

Questionnaire

What game genre do you play?

- [ ] MOBA
- [ ] FPS
- [ ] Other

What level are you playing on?

- ◯ Novice
- ◯ Intermediate
- ◯ Experienced (high level)
- ◯ Professional

How often do you use third-party software to train improve my mechanical skills? (I.E. AimLab, Kovaak's)

- ◯ Never
- ◯ Little
- ◯ Regularly
- ◯ Often

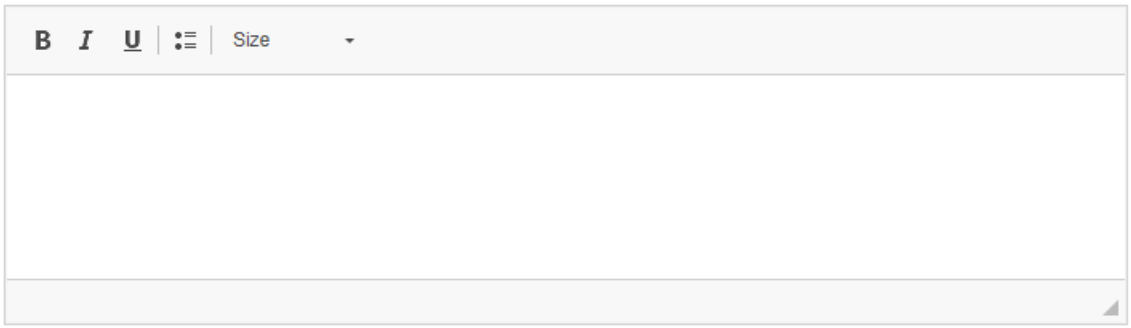
Do you find third-party software useful in improving mechanical skills?

- ◯ Not at all
- ◯ A little
- ◯ Somewhat
- ◯ I use in-game training

Which skill set do you find the most important?

- ◯ Mechanical skills
- ◯ Awareness skills

When you get better at the game in any aspect, do you notice which improvements have been made? If so, what?



Appendix C

Interview guide

Overview

Order	Aspects
Introduction	- Welcoming the interviewee. - Explaining the purpose of the interview. - Explaining their rights, the process, and asking for consent.
Question set 1	- Retrieve general information (Games, rank, pro).
Question set 2	- Perception, interpretation, and importance of mechanical skills.
Question set 3	- Personal mechanical skills, and its impact in the game. - Previous games and the transferal of mechanical skills.
Question set 4	- External software and current/previous use of them. - Aspects of external software.
Rounding up	- Wrapping up and asking if they have any more questions.

Appendix D

Information letter

Are you interested in taking part in the research project

***"Adaptive evaluation tool for eSport athletes"*?**

Purpose of the project
You are invited to participate in a research project where the main purpose is to get a better insight into eSports athletes' opinions and experiences about external software applications to increase their mechanical skills in video games. It is important to understand that this is fully based on your experiences and interpretations, and that no answers are wrong.

Which institution is responsible for the research project?
University of Agder is responsible for the project.

Why are you being asked to participate?
For this project it is beneficial to gather participants that have a decent amount of relation to gaming and/or eSports in general. Therefore, I have chosen to approach students from Academic eSports at the University of Agder as they most likely have relevant experiences and knowledge about the topic.

What does participation involve for you?
If you choose to participate, I will conduct a semi-structured interview about mechanical skills in games. There will be four question sets regarding various aspects of mechanical skills and your thoughts and experiences regarding that topic. The interview should take approximately 10 minutes, depending on the answers given. The interview will be audio recorded electronically with your consent.

Participation is voluntary
Participation in the project is voluntary. If you chose to participate, you can withdraw your consent at any time without giving a reason. All information about you will then be made anonymous. There will be no negative consequences for you if you chose not to participate or later decide to withdraw.

Your personal privacy – how we will store and use your personal data
We will only use your personal data for the purpose(s) specified here and we will process your personal data in accordance with data protection legislation (the GDPR).

- Anything you share will be securely stored on UiA's OneDrive server and is only accessible by myself, and I will make sure that the information used in the report will not identify you. When the information has fulfilled its purpose, it will be permanently erased.
- The microphone used to record will be directly connected to the computer and the recordings will be processed in Audacity (audio software) and transferred to UiA's OneDrive server for storage. When the recordings are securely stored, the Audacity files will be instantaneously deleted from the software.
- In the finished report, you will not be recognizable as you will be anonymous.

What will happen to your personal data at the end of the research project?
The planned end date of the project is 8th of June. When the project is done, all collected data will be permanently destroyed, both the recordings and the transcriptions.

Your rights

So long as you can be identified in the collected data, you have the right to:

- access the personal data that is being processed about you
- request that your personal data is deleted
- request that incorrect personal data about you is corrected/rectified
- receive a copy of your personal data (data portability), and
- send a complaint to the Norwegian Data Protection Authority regarding the processing of your personal data

What gives us the right to process your personal data?

We will process your personal data based on your consent.

Based on an agreement with University of Agder, The Data Protection Services of Sikt – Norwegian Agency for Shared Services in Education and Research has assessed that the processing of personal data in this project meets requirements in data protection legislation.

Where can I find out more?

If you have questions about the project, or want to exercise your rights, contact:

- University of Agder via Rune Andersen.
  - Email: rune.andersen@uia.no
  - Phone: +47 37 23 33 79
- Elias Bakke
  - Email: eliasba@uia.no
  - Phone: +47 90 23 40 48
- Our Data Protection Officer: Trond Hauso.

If you have questions about how data protection has been assessed in this project by Sikt, contact:

- email: (personverntjenester@sikt.no) or by telephone: +47 73 98 40 40.

Yours sincerely,

Project Leader/Student: *Elias Bakke*.
Supervisor(s): *Rune Andersen, Christian Robere Simonsen*.

Consent form

I have received and understood information about the project "Adaptive evaluation tool for eSports athletes" and have been given the opportunity to ask questions. I give consent:

☐ to participate in this interview

I give consent for my personal data to be processed until the end of the project.

(Signed by participant, date)

Appendix E

Approval by Sikt

Vurdering av behandling av personopplysninger

Skriv ut | 23.02.2023

Referansenummer
969084

Vurderingstype
Automatisk

Dato
23.02.2023

Prosjekttittel
Adaptive evaluation tool for eSport athletes

Behandlingsansvarlig institusjon
Universitetet i Agder / Fakultet for teknologi og realfag / Institutt for informasjons- og kommunikasjonsteknologi

Prosjektansvarlig
Rune Andersen

Student
Elias Bakke

Prosjektperiode
30.10.2022 - 08.06.2023

Kategorier personopplysninger
Alminnelige

Lovlig grunnlag
Samtykke (Personvernforordningen art. 6 nr. 1 bokstav a)

Behandlingen av personopplysningene er lovlig så fremt den gjennomføres som oppgitt i meldeskjemaet. Det lovlige grunnlaget gjelder til 08.06.2023.

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