

**Video Game Livestream Spectator:
Motivations and Behaviours**

by

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THESIS EXAMINATION INFORMATION

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The above committee determined that the thesis is acceptable in form and content and that a satisfactory knowledge of the field covered by the thesis was demonstrated by the candidate during an oral examination. A signed copy of the Certificate of Approval is available from the School of Graduate and Postdoctoral Studies.

ABSTRACT

In recent years, video game livestreams have seen tremendous growth, resulting gaps of knowledge regarding studies on the motivations and behaviours of livestream spectators. This thesis presents two studies that intend to investigate livestream spectators' motivations and behaviours to add knowledge regarding livestream spectators. The first study investigates if gamification typology framework can be used to determine and categorize livestream spectators based on their preference in interactive features. Initial results highlight hints of possible trends in preferences of spectators depending on their gamification user type. The second study uses an exploratory approach adopted to gain a better understanding of the behaviours and motivations of esports tournament spectators. The result of this study showed that spectators value the quality of the gameplay during tournament matches. Spectators are more likely to support teams or players that provide suspense by taking risks and trying strategies that are unconventional.

KEYWORDS: livestream; spectator; esports; user experience research

AUTHOR'S DECLARATION

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Wen Bo Yu

STATEMENT OF CONTRIBUTIONS

The study and result present in chapter 3 was accepted and published as an *Extended Abstract* paper at CHIPLAY 2020. The lead researcher for this paper was W. Yu, and J. Robb. The study was designed and conducted by J. Robb, and analyzed, transcribed, and reported by W. Yu with P. Mirza-Babaei as the supervisor.

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ACRONYMS

HCI	Human-Computer Interaction
UCD	User Centered Design
MUD	Multi-User Dungeons
SESD	Scale for Esports Spectator Demand
UG	Uses and Gratification Framework
GUR	Games User Research
UX	User Experience
DGD	Demographic Game Design models
AGDQ	Awesome Games Done Quick
MBTI	Myers-Briggs Type Indicator
OIT	Organismic Intrinsic Motivation
SDT	Self-Determination Theory

Chapter 1.

INTRODUCTION

Chapter 1 Introduction

1.1 Overview

This thesis is motivated by exploring the spectators of video game livestreams. Specifically, if a typology framework is feasible in the field of video game livestreams. Since the early 2010s, livestreams have become a popular form of entertainment with tremendous growth over the years [15,24]. Livestreams sit at an interesting position in terms of home entertainment. It is not a pure passive experience like watching television broadcasts and does not purely depend on interactions like playing video games. Livestreams offer viewers the flexibility with how much they can interact with other viewers or the host. This can be viewed as a simulation of watching sports games in person. While some viewers can passively enjoy the atmosphere of the game, others can actively participate in activities such as chatting with others about their favorite team or arguing with fans of the opposing team. These real-life experiences can be expensive depending on the game and the rarity of the event. Oftentimes, these are also accompanied with other hassles such as finding parking, travelling to the event venue with heavy traffic, and queuing up to use the public restrooms. Livestreams, on the other hand, can deliver the same sense of community previously mentioned to viewers at home while eliminating many of the hassles.

Since livestreams took off as a platform, it has attracted many viewers and content creators with its unique set of interactive features. Many video games players can find enjoyment in watching others play games rather than playing themselves [21]. Furthermore, non-gamers can discover an interest in video games through this act of spectating others play and have fun. They would then be inspired to try the game themselves [31]. There are some studies attempting to understand the motivations on why people watch livestream content [11,39,43,47], however, research efforts in esports livestream spectatorship is still uncommon. It seems that many related studies fail to consider the immersive and interactive nature of livestreams [20,29,37,47]. This thesis attempts to contribute to the investigation of motivations behind livestream spectators and if the spectators can be categorized typologically.

1.1.1 Esports and Livestreams

The term ‘esports’ is a portmanteau of the words “electronic” and “sports”. It is used to describe competitive video games. Esports livestream is like cable TV sports channels. Traditionally, there are two ways of consuming live sports games: watching in person or watching on television. Before television was a household appliance, the only way to watch a live game was to be there in person. The popularity of television changed how the majority of the viewers would watch sports. It was more economical than the price of the tickets and transportation as well as having the comfort of their own home. Over time, the population of television viewers exceeded the population of live viewers. Similarly, with advancements in computer and internet technologies, esports games and watching livestreams are increasingly more accessible than ever before [15]. Many esports titles designed to be free-to-play, optimized to run on low computer hardware specification with easy signup process. Esports livestream are easier to access thanks to typically free to view and not paid subscriptions or access models, not limited like traditional sports channels.

While most games were not intended to be competitive or expected to reach the same popularity levels as traditional sports, they have always included competitive elements such as a scoreboard. One of the very first video games that was developed purely for entertainment was *Tennis for Two* by William Higginbotham. It was one of the first competitive games and drew local audiences to watch [53]. As more games are developed and video games become more accessible through video game consoles, personal computers, and arcades, more people are discovering the competitive side of video games. Through the early history of video games, there have been many large esports tournaments, but nothing was publicized and stuck around like professional sports leagues. One of the earliest large scale video game competitions that gathered significant public attention was the *Space Invaders Championship* held by Atari in 1980 [59]. This competition attracted thousands of competitors and the attention of newspaper publishers. During the 1990s, the media finally saw the potential in esports with various television shows surrounding it [7]. These shows, however, are often targeted at children and showcased children competing against each other.

Fast forward to today, esports are watched by larger audiences with international events attracting more than 100 million viewers concurrently [52]. Titles such as *League of*

Legends [60], *Overwatch* [61], and *Counter-Strike: Global Operation* [62] are designed from the ground up with organized competition in mind. And organizations such as ESL (Electronic Sports League), not only have global presence, franchised teams, but also super star players that match the popularity of athletic super stars [7,20,44]. Similarly, the economical potential of esports is significant. As of 2020, the total global revenue generated by esports has just reached over \$1 billion US Dollars and its growth is predicted to continue through the decade [3]. Livestreaming and esports is no longer a niche hobby. With this change, games have become a significant part of many peoples lives with livestreaming and online media in general becoming a more mainstream concept[1,63].

1.1.2 What Is Typology

Typologies are organized systems of types and a tool that is used in many fields of science [12]. It is an important analytical tool for computer science researchers. Collie et al. [12] in their work on how to best utilize typologies described the importance of typologies: “*(Typologies) make crucial contributions to diverse analytic tasks: forming and refining concepts, drawing out underlying dimensions, creating categories for classification and measurement, and sorting cases.*”.

Typologies are used in many fields outside of computer science as well as daily life to provide essential information on how to interact or process items. For example, a grocery typology system can be utilized to instruct users on how to store different items based on their decay characteristics. Processed food such as bread and cookies can be stored at room temperature when sealed. Raw food such as meats and vegetables should be refrigerated. *By developing a typology system, valuable time can be saved by designing an effective system using the characteristic, historical and experience data of the product.*

Within the field of science, one of the most famous typologies is often called the *tree of life*, a classification of all living things based on each living organism's common characteristics. This typology helps scientists identify new and existing living organisms. One of the potential uses could be to determine how to best take care of an organism. For example, if a newly discovered organism has characteristics such as gills and fins, then it is most likely an aquatic creature and would likely be handled accordingly. Typologies are

used in many fields of research and are particularly valuable and commonly used in the field of computer science.

1.1.3 Typology in Human-Computer Interaction

HCI is the acronym for Human-Computer Interaction. It is a multidisciplinary field that includes computer science, human factor engineering, and cognitive science. Practitioners of HCI focus on the design of computer technology and interactions between the human user and computer systems. Initial studies in HCI focused on the usability of desktop computers as they became more accessible to the general public. With the fast advancement of technology in the recent decades such as the Internet and mobile devices, however, practitioners of HCI would continuously include more fields. As technology influences more fields, more and more are included into HCI. Currently, topics such as collaboration, connections, emotion, communication, mobile devices, gestures and natural computing, sensors, embedded and wearable computing, sustainability, big data, social and collaborative computing, accessibility, as well as games are focused within HCI [28]. While initial HCI studies focused on individual and general user behaviours, it has grown to include accessibility for niche users of all cognitive and physical capabilities [64]. This allows researchers to better study and design features that not only accommodate but also enhance the user experience of all user types regardless of their population significance.

One of the main design principles that is widely adopted as part of HCI is UCD (User Centered Design) [45]. The idea behind the UCD process is to have an explicit understanding of the user, the tasks, and the environment where the technology will be used. It is also an iterative process that includes the user throughout the design and development process. The initial processes of UCD requires the designers to identify the user and determine what they will be using the product for and the conditions the product will be used in. The result of this research can be summarized using *Personas*.

Personas are consolidations of all the information of the initial user research. Its purpose is to create a reliable and realistic reference to represent the target or segment of the audience. One of the main benefits is to help designers and developers focus on the decision-making process surrounding different components of the product [45]. Where personas focus on the practical presentation of the users with scenarios and some

storytelling, *typologies* are frequently used, and they typically focus on the motivation and behavior of users.

Typologies are frequently used in the field of HCI. It is especially used in interactive video games such as one of the earliest typology systems made for MUDs (Multi-User Dungeons) by Bartle [4]. Multi-User Dungeons are early renditions of online role-playing games. They were inspired by classic tabletop games such as *Dungeons and Dragons*. Combined with the accessibility of personal computers and the internet, MUDs enabled players to interact with other players in role playing scenarios. Earlier MUDs were typically text based with simple graphics that are constructed using text characters. One of the unique features of MUDs is the ability for players to interact with other players as well as the game world through internet connections. Overtime, virtual communities were formed by the players. Bartle's work documented the discussion of why people like MUDs. The discussions were between highly experienced players through various forums within the course of several months. The result of the discussion was essentially a typology system that detailed not only the major player types but also the design and game balancing implications based on the user types of motivations and behaviours [4].

The MUDs typology system caught on and many game developers have used it as heuristic design guidelines up to today. This typology system served as the foundation to many modern versions, which have been adopted for video games of all types as well as gamified applications [11,27,32,35,50]. Similar to games typology systems, the intent here is to forward the research in understanding livestream spectator motivations, behaviours, and preferences. This could potentially help designers in designing games that are more entertaining to spectators and improve the purposefulness of interactions between the player and the spectator.

While there is no dedicated work done on esports spectator typology, there has been a study that has outlined esports spectator taxonomy in attempts to better understand spectators [11]. Cheung and Huang [11] conducted a study attempt to gain a better understanding of what people like about watching esports. They focused on one of the most popular esports series at the time *StarCraft* [65]. Through collected footage of the crowd watching the tournament, online comments, as well publicly available reaction and

comments about the tournament, they were able to analyze and summarize their findings into 9 spectator personas along with theories as to why people enjoy watching esports. Another notable work was done by Tondello et al. [50] about the typology of gamification users. Their work took inspiration from video game typologies and expanded their design implication for applications that have integrated gamification features. These studies have had tremendous contributions to how video game designers view their players and are a fundamental part of game design. Based on our knowledge, however, there are no definitive guidelines for livestream spectators. In this thesis, we intend to further research in this area of work.

1.2 Thesis Problem

Video games are inherently designed to be interactive with the player. Players, however, are not the only ones that can influence or be influenced by video games. Spectators are often passive users, but with the evolution of esports as well as livestreaming, newer platforms as well as live events are attempting to enable spectators to interact and influence with the game and the event [22]. One can argue that spectator does have a significant influence on livestream and esports like that of traditional sports. Large spectating crowds can generate attention to the game, which will directly affect the economical benefits of the game such as sales, advertising, as well as the experience for the players as well [16]. Livestream and esports are currently not well researched both commercially and in academia due to the relatively short time that they have existed. Current research for online spectatorship and esports encompass many fields of research, including but not limited to marketing, entertainment, sports management, HCI, psychology, and sociology [2,10,20,24,26,30,31,37,39,47]. This section explores some common themes of research in previous work, their results, limitations, and discusses arguments for the thesis problem of why livestream spectator typology is necessary.

1.2.1 User Behaviour

Practitioners and researchers of business and sport are becoming aware of the economical benefits of esports and livestream, and in recent years published numerous works related to spectatorship [37–39,47]. Qian et al. [38] has conducted qualitative studies

to explore and evaluate the dimensions and consequences of esports online spectator demand and as a result they have developed a foundation for Scale for esports Spectator Demand (SESD). The authors argue that many previous studies conducted in the field of computer science and sports management have only attempted to identify their internal needs that lead to consumptions. However, key attributes(features) of esports as a media product should also be considered.

Eight attributes are considered based on their number of occurrences in the dataset and they are described by the authors as follows.

- *Chat room*: The extent to which spectatorship is affected by chat room as manifested by its ability to generate memes, facilitate interaction, and enhance camaraderie.
- *Streamer traits*: The extent to which spectatorship is affected by streamers who are expected to be entertaining and interactive.
- *Commentary features*: The extent to which spectatorship is affected by commentaries which are expected to be informative and insightful.
- *Player characteristics*: The extent to which spectatorship is affected by professional esports players' skills. Play styles, personal traits.
- *Event attractiveness*: The extent to which spectatorship is affected by the appeal of the esports events.
- *Virtual rewards*: The extent to which spectatorship is affected by in-game rewards.
- *Stream quality*: The extent to which spectatorship is addicted by audio quality, stream resolution, and stream connection.
- *Schedule convenience*: The extent to which spectatorship is affected by stream schedule.

This study succeeded at discovering the most popular attributes of Livestream that attracted spectators. Qian et al. discussed the result and implications of each of the eight attributes. While their design recommendations are sound in the context of increasing demand, there are arguments that can be made that these recommendations are too generalized and do not consider the effect of different user types. The recommendations are theoretical, and their effectiveness can be further studied. However, to the best of our

knowledge, there is currently no definitive research that has attempted to develop a livestream spectator typology, which would have enabled Qian et al. to study the demand of each attribute based on individual user type. Evidently, Qian et al discussed this limitation and encouraged further research with individuals in mind [38]. *“If individuals demonstrate a strong demand in a certain domain, but the service provided does not meet consumers’ needs and wants, then these unfulfilled desires might hold back their consumption. As such, future study is encouraged to utilize actual behavioral variables to evaluate and verify the impact of demand factors on relevant consumption behaviors.”*

Another common limitation of user behaviour works similar to those mentioned above is that they refer to behaviours as to what features people use. It does not look at the usage behaviours of the individuals features, such as the duration of feature use compared to the overall duration of livestream watch time. How do users use a particular feature? What are the conditions that induced or encouraged user to user particular features? What do they aim to accomplish or expect to receive when using a particular feature? These are important questions that could be further explored. In this thesis, behaviors are defined as how the user utilizes a particular features or livestream itself, by length of use, goal of user, or similar metrics.

1.2.2 Spectator Motivation

Spectator motivation is an obvious point of research when discussing livestream and esports spectators. In recent years there have been numerous studies that have all attempted to study spectator motivation [29,37,39,43,47]. Pizzo et al. compared spectator motives between esports and traditional Sports. Using Attendance Frequency as the independent variable, and the motives as the dependent variable (*interest in [sport], vicarious achievement, excitement, interest in a favorite player, aesthetics, social opportunities, drama, role models, entertainment value, wholesome environment, opportunity for family bonding, acquisition of knowledge, player skill, player attractiveness, and player aggression*). They hypothesized that traditional sports and esports have the same sport consumption motive patterns. The results verify that sport and esports have similar sport consumption motives. However, there are Key limitations to the results as well.

One of the key limitations is they used a list of motives that was built for sport first. One can argue that this did not consider motives that are unique to esports. Evidently, the authors noted in their limitations that *“future research that would consider other motives that are distinct to specific esports Spectators.”* Another limitation stated by the authors mentioned is they think *“Qualitative or mixed-methods approaches could offer additional insight into the eSport spectator experience and identify additional motives that drive eSport consumption.”* This statement not only supports their earlier limitations but also mentioned that qualitative or mixed-methods research is needed. This verified that other researchers also acknowledge that there is a gap in the knowledge for esports spectator motivations.

Sjoblom and Hamari [47] conducted an empirical study on the motivations of Twitch users and why do people watch others play video games. They used the UG (Uses and Gratification framework) which is often used in media theoretical studies. UG notes five types of motivational needs: cognitive, affective, personal integrative, social integrative, and tension release. And how they would affect the consumption of hours watched, streamers watched, streamers followed, and subscription. While they were able to find positive relationships between the hours watched versus the UG motivations they have mentioned that one of their limitations is the number of variables that some streamed content can have. The authors expressed the difficulty to consider all variables in the livestream speciation experience. *“Game genres are inherently different, as some games are highly competitive, while others offer more of a free-form playing experience. We believe this not only impacts on the playing experience but is also reflected in the viewing experience.”*

1.2.3 The Problem

One problem that is persistent with all the studies reviewed in this section is they are all quantitative studies. For example, using variables such as watch time to measure and attempt to quantify spectator motivations and demands [37,47]. However, using the same example, the time a spectator spends watching livestream or esports does not reflect on the quality of their experience. Time spent watching livestream could be impacted by many other factors other than motivation. Such as availability for leisure time, format of the

livestream, schedule alignment between the spectator and their preferred stream host. While possible, the difficulty to perform quantitative research on spectator motivations when taking all factors into account may be extreme. And qualitative study may be better suited. Another notable limitation in these studies is that they are using or adopting their list of motivation from traditional sports management and media consumption studies. They do not take into consideration the unique interaction features offered in livestreams, which may enable entirely different experiences than traditional sports. One can also argue that video game player motivations or HCI motivation should also be considered in the studies of spectator motivations. Considering that livestream spectator does not only include esports spectators but also various other contents.

An argument can be made that there is still a lack of research in livestream spectator motivations and behaviours. At the same time, there is currently no motivation framework that is generally accepted by the research community in the field of livestreaming, that is similar to other fields of study such as those that were used in Pizzo et al. [37] and Sjoblom and Hamari's [47] work. Assuming Livestream spectators have different personalities that can be categorized based on their livestream consumption and behaviours and motivations, a livestream typology framework could potentially fulfill this gap in knowledge. If realized, this framework would provide similar function to video game typologies and future researchers and designers of livestream features a clear set of spectator motivations, behaviours, and provide design recommendations accordingly.

In this thesis two studies were conducted to study these problems. The first study is based on studying if livestream spectators' personality can be observed through their preferences towards different livestream interaction features. If so, could an existing typology of similar applications such as gamification applications be used to measure their personalities. The second study further explores spectator motivations and behaviours. Assuming not all user motivations can be observed based on their interaction's behaviours, we should see different motivations from passive spectators.

1.3 Outline of The Thesis

Chapter 2 covers related works about the field of HCI, relevant literature in typology livestreams. The importance of games user experience, why role typology plays as part of

the user experience research process and its implications on game design. We will also cover related work such as player behaviour theories like self determination theory. This will help us understand and better analyze our data during our research.

Chapters 3 and 4 will cover the two studies that were conducted. Both will discuss the motivations behind the study, the methodologies used, and the results of the study. The first study is conducted to connect relevant works within related fields to examine if previous work could be combined to construct a possible livestream typology framework. The result of this study discusses the finds and if there are any merits to it. The second study focuses on exploratory research. The goal of the study is to explore more particularly esports Livestream spectator motivation. We will discuss the result of the study by looking at some of the identified trends.

Chapter 5 concludes this thesis with a highlight of the main contributions and future work.

Chapter 2.

RELATED WORKS

Chapter 2 Related Work

2.1 Introduction

This chapter is intended to explore some background literature that this thesis is contributing to. We will get a basic understanding of HCI (Human Computer Interaction), and the subfield of GUR (Games User Research). Over the last two decades, video games have exploded in popularity, along with esports and Livestreaming. Playing video games is no longer a niche hobby. Adults of all ages and genders are playing video games thanks to the technological advancements in the last few decades. For example, early video games can only be played in dedicated Arcades, or expensive home video game consoles with only a few costly titles to choose from. Nowadays, most computer devices are able to support video games and users can choose between countless titles from a relatively lower cost to free options. With more users and consumers than ever before, there is a need to understand the spectators through their behaviours and their motivations.

The first two sections (2.2, 2.3) explore HCI and GUR to provide an overview of the field to which this thesis contributes to. The next section (2.4) reviews important literature relating to player behaviours theories. This provides essential information that is necessary to understand how people are motivated and why they might behave a certain way. The following section (2.5) explores previous research on typology in the related field of video games and gamification. Section 2.6 explores relevant literature in the space of livestreaming and interactive features.

2.2 Human-Computer Interaction

Human Computer Interaction is the study of how humans interact with computers. It is a multidisciplinary field that has been a subject of interest since the late 1970s, accompanying it is the rising popularity of personal computers and personal electronic devices. What used to be a field where the target audience was mainly professionals computer operators, practitioners of HCI has to now factor in the everyday person. The goal of HCI has since transformed into *“Make all interactions with computers easy and efficient*

for broad groups of users at different skill levels.” [66]. To achieve this, researchers observe and study the way people interact with computers and software. Based on the finding, improvements to the usability, reliability, functionality, and comfort of the product can be made.

Many of today’s modern technology was the product of HCI innovation and research. In today’s world, interactive interfaces are everywhere such as the touch screens on our phones, the keyboards and mouse we use everyday. Many of the technologies that people interact with everyday were all once breakthrough HCI innovations that were the foundations of some of the most famous companies in the world. For example, graphic interfaces were the product of years of research and development that were initialized by Stanford Research Laboratory and Massachusetts Institute of Technology. This technology would eventually become huge successes through Apple Macintosh computers and Microsoft Windows 95 [67]. Graphical video games were invented by Slg Russel at MIT along with the invention of the first computer joystick that would inspire future generations to create vase, living worlds that are only limited to what people can imagine. It gave rise to many major gaming companies such as Atari, Blizzard Entertainment, Nintendo, and many others that are now common household names [67].

2.2.1 Video games

Video games are one of the most popular contents on most streaming platforms. To give context on why this thesis focuses on video game livestream, a basic understanding of why people play video games should be established. Historically video games single players focused on genres such as Role-Play game (RPG), puzzle games, and sports simulations, but over the decade, with the advancement of computer technology and internet, multiplayer games are becoming popular.

Role-play games is one of the most popular genres of video games and they focused on story telling, where the players could control a particular character in the game that typically would go on an adventure. The game progresses similar to novels or fairy tales, going through phrases that would establish a story, overcome challenges and growth. The main difference between video games and other more traditional entertainment such as movies or written books is the player is able to make their own decisions on how to

overcome those challenges and explore the environment. While this type of game is still popular to many users, the social aspect has become a big part of modern-day games. Online Role-Playing games utilizes the internet to connect players and enable them to interact with not only the game environment but also other players as well, bringing an additional dimension to the games. Livestream brings an additional aspect of Role-Playing games, by enabling players to watch other players play. The entertainment value is shifted from experiencing the games by themselves to watching how others, the stream hosts, would approach the story, their decision making, and reactions to the story.

Esports games bring an additional dynamic to video games by enabling players to not only play with each other, but to also compete against each other. Where traditional multiplayer Role-Playing games focus on completing the story together or accomplishing tasks together, esports titles focus on skilled play. Players went from killing dragons together to killing each other. Entities in the traditional story-based games are programmed to behave in a certain way, and once the players have learned their behaviour, the challenge disappears. Real players, on the other hand, behave differently from player to player and smart players learn and evolve with experience. So, while a player is able to win against a particular player in one encounter, it is not guaranteed that this would happen again or with a different player. The excitement of the games shifts to being playing better than other players rather than experiencing the story/adventure. The value of livestream esports games has also shifted from watching other players experiencing the game to watching how good other players are at playing the game. Streamers can attract an audience by displaying their skills, and the audience would come to admire and learn how skillful players play.

2.2.2 Games Research in HCI

In the work by Carter et al. [9], their research group was able to establish four distinct research paradigms. Using a process of open and axial coding, the authors identified a number of discrete research domains of PCI (Player Computer Interaction). They then conceptualized them into four paradigms of games research: *Operative*, *epistemological*, *ontological*, and *practice*. Carter et al. describes the four paradigms below. Video game spectators related research can be fitted into all these categories and contribute significantly to Both HCI and PCI.

- **Operative games research** leverages knowledge gained from the study of games or play to exert control upon the world, such as encouraging exercise or learning. Gamification has gained significant attention and traction since the last few decades of HCI and is starting to receive special attention from the scientific community [48]. While livestream interactions can be argued to adopt many gamification techniques, the rise in video game livestreaming spectators could also be studied as to why players prefer to watch rather than play. Such research could provide insight to how to make educational livestream or passively consumed contents such as videos more effective.
- **Epistemological games research** uses games as a vehicle for understanding the use of all technologies, rather than only in the context of the unique modes of interactions or affordances of games and play, such as virtual embodiment or interfaces. While livestreaming services were enabled with previously existing technologies, the rising popularity of livestreaming has presented some interesting technical challenges and given rise to dedicated technology such as broadcasting software, and video streaming optimization techniques [19,46]. Similarly, by trying to understand livestream spectators, unique interactions could be developed in the future to meet specific needs that have yet to be presented.
- **Ontological games research** concerns itself with the design and understanding of the ontology of games including rules, aesthetic, interfaces, fiction, and game design patterns. Perhaps one of the largest categories of research, utilizes game analytics to set best practices for telemetry, data mining but also user research [34]. The works presented in this thesis also attempts at contributing into this area of research by studying how video game spectators behave and are motivated. Based on the results, hopefully best practices can be set for future developers to enhance the spectator's experience.
- **Practice games research** concerns itself with the emergent practices and experiences that occur because of interaction with games or toys, or when interacting with technology with a lusory attitude. This thesis and the included studies is most closely related to practice games research which is related to studies such as user experience, interaction, spectatorship, and behaviour.

- These paradigms hope to help HCI researchers better conceptualize their findings. At the same time, the field of games research like HCI, are very much a multidisciplinary field, and by offering users distinct research paradigms, they hope to help researchers distinguish their work as well as help researchers to unite their contributions under one collection.

2.3 Games User Experience (UX)

User experience is defined as encompassing all aspects of the end-user's interaction with the company, its service, and its product [18]. The purpose of experience is to find and meet the precise needs of the customer and minimize the user's frustration. As a result, effective user experience translates into simplicity and elegant design that the user enjoys owning and using. User experience is not just about giving what the user wants; there is no defined list of features to be implemented. To create effective user experiences requires tight integration and an iterative process that involves all disciplines of a particular product, whether it is engineering, industrial and interface design, or marketing.

While user experience is applicable to all industries and products, the video game industry has seen a tremendous growth in the need of user experience experts [14]. Video games are unique when compared to other forms of entertainment. While both video games and films can be used to deliver a story, films offer an entirely passive experience, whereas video games typically offer an interactive experience. This is where UX comes into play, bringing with it the question of how to design the user experience in video games so that players are immersed in the world and story. It does not take much frustration to break that immersion for players. Simple things such as fluidity in the movement of the game to the interaction with NPCs (None Playable Characters), if not done properly, can break that immersion and thus dramatically reduce the overall user experience for players [14].

2.3.1 User Centered Design (UCD)

UCD is a process that is defined as “the phases throughout a design and development life-cycle all while focusing on gaining a deep understanding of who will be using the product [58]”. This process was not always a standard procedure for game studios,

and has only recently been mass adopted by developers in the last decade [14]. In productivity software, the UX goals are typically straightforward and simple unlike in video games where some of the designs are complex and challenging. This poses UX problems that are unique to video games such as how to test designs that are intended to be challenging and causing frustration.

The process starts by understanding our users and their motivations and behaviours. The level of challenge and frustration that video games impose stands on a fine line between delivering a good experience and bad experience and it is based entirely on the motivations of the target user. Some users may find particular types of challenges to be encouraging and fun while other types of users may not enjoy it, and it becomes a pain point for them to continue to play. The contribution of the thesis intends to provide additional design guidelines that can be used during the process of UCD when designing gaming with different spectator's motivations and behaviour in mind.

2.3.2 Persona and Typology

Persona is a tool that is used to document and learn about the users. It provides the design and development team with descriptions of how the user uses a product or service. It includes demographic information, user goals, needs, background, and experience [57]. This information is then put together to create a fictional persona with particular product use scenarios that can represent a portion or all of the user population. Typically, personas are tools used by designers to identify their target audience during the conceptualization process specific to the project.

Typologies are frameworks that describe different types of use at a high level [68]. Typologies are constructed by user researchers to describe user motivations, behaviours, and interactions. Typologies are not application or game genre specific. It encompasses all users that would participate in the game now or in the future. Furthermore, typology includes recommendations to designers about the type of experience that is required in application features to fulfill the intrinsic and extrinsic needs of different types of users. Typologies are guidelines that help designers decide what features need to be included for the application during the conceptualization process and how to refine features during the designing process. Typologies are also often used as heuristic evaluation tools for games.

It can serve as a checklist of features to include in their games in order to meet the motivational needs of all user types.

There are many different streaming platforms and the content being streamed varies greatly based on the hosts targeting different personas. The work present in this thesis focused on livestreaming spectators as a whole, regardless of the content. At the time of the study, there is little work done to explore typology frameworks in this area.

In this section, the notion of typology is introduced and its place in games user research. The later sections will take a deeper dive into the typology in games and related fields, but in preparation for that section, a basic understanding of player behaviour theories needs to be established.

2.4 Players Behaviour Theories

In this section, related literature on player behaviour theories are reviewed to help develop a better understanding of how players think. This aids with the understanding of what typology plays in user research and game development. It is also essential to understand the impact of our work, and some fundamentals theories of user typology and player taxonomy. Self determination gives us insights on what motivates players. Then, literature of early player typology will be reviewed. This will also include some gaming typologies that are later adopted for gamification which closely relates to our work on livestream interaction.

2.4.1 Self Determination Theory

To understand the motivations of the user, it is essential for any interactive application to offer a great user experience. Ryan et al. [41] states that “to be motivated means *to be moved* by something”. As game user researchers, seeking to understand what compels users to play is important. Self-Determination Theory (SDT) was developed by Ran and Deci in 1985 and explains the difference between types of motivations [13]. Each of the different types of motivation is distinguished by different reasons and goals. The most basic differences are intrinsic and extrinsic motivations. The authors referred to *Intrinsic motivations* as doing something because it is inherently interesting or enjoyable to the user. *Extrinsic motivations*, on the other hand, is referred to as doing something because

it leads to a separable outcome. To understand the users, we must first learn how to identify their motivations.

2.4.2 Intrinsic and Extrinsic Motivations

Users typically have goals and things they wish to accomplish when they are using applications. When it comes to games and related applications, however, those goals and objectives are not always clear. One may think that the main motivation to watch livestreams is to be entertained. While that is mostly true, the concept of “being entertained” is a broad term, achieving entertainment varies from person to person. Depending on the content streamed and the interactions that are available, it enables different types of spectators to achieve different feelings. To understand what the spectators wish to achieve is to find their motivations. Here, we study intrinsic motivation to understand what spectators want to do, and extrinsic motivations to understand what spectators are willing to do.

Intrinsic motivation is defined as doing an activity for its inherent satisfaction rather than for some separable consequence [41]. When a person is intrinsically motivated, they are moved by things that they perceive as a positive experience to them even if there is no external reward or pressure. On a psychological needs point of view, Ryan and Deci note that competence, autonomy, and relatedness contribute to intrinsic motivation. To achieve the highest level of intrinsic motivation, a strong feeling of competence needs to be supplemented by a sense of autonomy. Tangible rewards can undermine intrinsic motivation. Things such as threats, directives and deadlines diminish one’s intrinsic values and motivations. To enhance one’s intrinsic motivations, users should be provided with opportunities of autonomy. It is important to note that intrinsic motivation only works under circumstances where the activity itself holds intrinsic value for the individual [41].

Intrinsic motivation can be observed in livestream spectators as well. Spectators sometimes participate in actions even if they are not promised to be rewarded. For example, some spectators will donate to livestream hosts they enjoy watching purely to support their career as livestream hosts. On another note, others may watch livestreams solely to learn more about a game, new strategies, meta plays. These spectator’s intrinsic motivation is to seek

knowledge from the content that is streamed and see no entertainment value from the stream itself.

Ryan and Deci describe intrinsic motivation as important, however, most human activities are not intrinsically motivated. Most human activities are motivated by the potential to attain some separable outcome. This contrasts with intrinsic motivation which is doing activities purely for enjoyment of the activity itself rather than its instrumental value. There is also a sub theory of SDT called organismic intrinsic motivation (OIT). OIT describes different forms of extrinsic motivation: amotivation, external regulation, introjected regulation, identification and integrated regulation.

The OITs are described by Ryan and Deci as the following:

- *Amotivation* is the state of lacking an intention to act. When motivated, a person's behavior lacks intentionality and sense of personal causation.
- *External Regulation* is behaviour that is performed to satisfy an external demand or obtain an externally imposed reward. Individuals typically experience externally regulated behaviour as controlled or alienated, or their actions have an external perceived locus of causality.
- *Introjected Regulation* describes a type of internal regulation that is restrictive because people perform such actions with the feeling of pressure to avoid guilt, anxiety, or to attain personal enhancements or pride.
- *Identification* describes people who have identified with the personal importance of a behavior and have thus accepted its regulation as his or her own. For example, a boy who memorizes spelling lists because he sees it as relevant to writing, which he values as a life goal, has identified with the value of this learning activity.
- *Integrated regulation* is when identified regulations have been fully assimilated to the self. This occurs through self-examination and bringing new regulations into congruence with one's other values and needs.

2.5 Video Game Typology

In this section, we will review two pieces of literature. The first literature describes early typology works done on video games. The second literature is a modern typology

literature that is intended for gamification applications adopting elements of game design. These works offer insights on how typology work started in the field of GUR and what can be learned to and adopted for this thesis.

2.5.1 Player Typology

MUD (Multi User Dungeons) are text based versions of the modern equivalent of MMORPGs (Mass Multiplayer Online Role Play Games). Bartle documented the forming of one of the earliest game taxonomies [4]. This work started as a heated discussion between high level players of a MUD and was sparked by the question, “What do people want out of a MUD?” The result of the discussion was organized, and the result was the first game typology framework. This typology does not represent players of all games and are further improved by later work that are more inclusive. It is important to acknowledge it laid out an important foundation for later work.

Bartle documented this work in three main sections. The first section explains the taxonomy. The second section explained their interests, which are their intrinsic motivations. Lastly, the third section explains and offers design recommendations. This work enabled game developers to not only have a better understanding of the players but provided a guideline to design and balance their game.

Bartle’s work concluded that there were four types of players of MUD:

- **Achievers** regard point-gathering and raising in levels as their main goals, and all other goals are secondary to it.

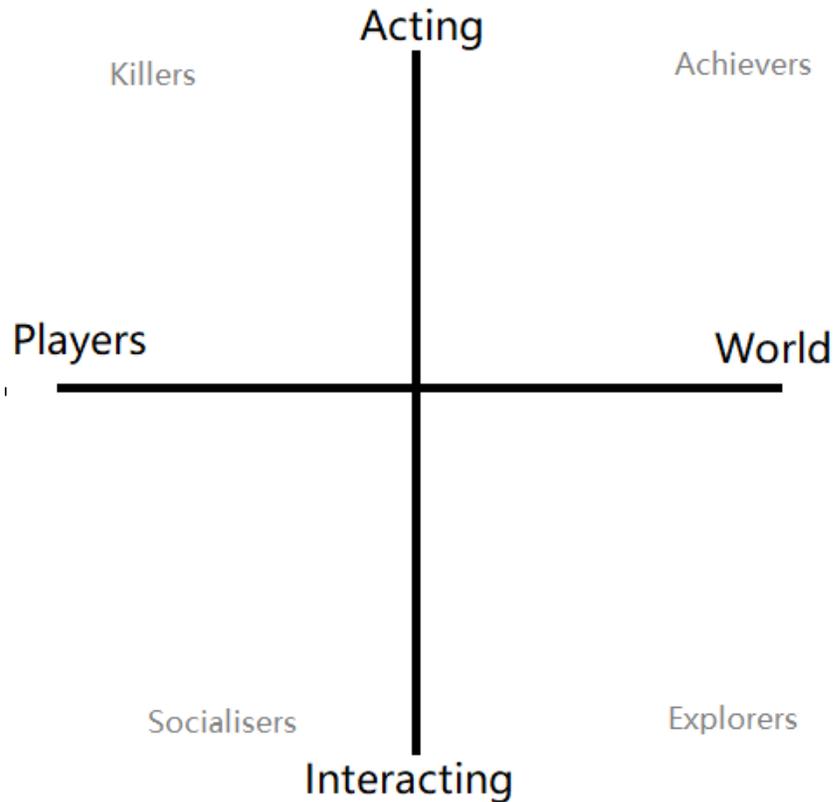


Figure 1. Bartle’s user personas for MUD games.
 Recreated based on [4]

- **Explorers** delight in having the game expose its internal machinations to them. They try to progressive esoteric actions in the wild by going to out of the way places, looking for interesting features (including bugs), and figure out how things work.
- **Socialisers** are interested in people and what they have to say. The game is merely a backdrop. It is a common ground where things happen to players. Inter-player relationships are important such as empathizing with people, sympathizing, joking, entertaining, and listening. To these types of players, observing other people playing can be rewarding—seeing them grow as individuals and maturing over time.
- **Killers** get their kicks from imposing themselves on others. This may be “nice”, such as helping others, but few people practice such an approach because the reward of appreciation is not substantial. Much more commonly, people attack other players with a view to killing off their character. They find joy in causing distress and the more they cause, the more they find it joyful. [4]

The work discussed the importance of maintaining a balance between the players. Too many of one player of one type will cause chain reactions that could affect other players that could be devastating to the game. To help developers maintain that balance, Bartle documented what each player types find interesting in the game. His work suggests conducting user research using methods such as short questionnaires to gauge user interests. This will help developers to identify imbalances in the game equilibrium. In doing so, they can then look into the features that can be implemented to address the issues identified.

Based on the information gathered by the developers about the interests of their players, they can identify whether the number of one player type population is abnormal. If that is the case, a list of suggestions were made based on how to change game elements such as the *interaction* with the game, the *game world* itself, the *players* commanding ability, and *acting* opportunity with other players. Each suggestion outlines what happens if those features are overly implemented and what would happen if too little are implemented. Then a list of actionable tasks and features can be followed to take action to facilitate each player type's needs.

2.5.2 Gamification Typology

Bartle's player typology is popularly used in gamification of other interactive applications, but one of the downsides is that it was meant for MUDs and is not generalized to be used for other game genres, or design applications. Marczewski addressed this problem by developing the Gamification User Type Hexad framework [32] which is based on human motivation and experienced practical design. His design recommendations are more generalized, and it accommodates different game genres as well as serious applications.

Before going into further detail about Marczewski's work on gamification typology, it is important to note that since Bartle's work, there have been many attempts to create variations of games typologies systems. Yee [54,55] was able to identify three main components of player motivation from Bartle's player type: achievement, social, and immersion. Yee's work is an advancement and modernization of Bartle's work, but it also has similar limitations as it is specific to the MMORPG genre. There are typology systems with a wider perspective such as the first Demographic Game Design models (DGD1) [5].

The DGD adopts the Myers-Briggs Type Indicator (MBTI [69]) [61] to games. The BrainHex model [35] was developed with consideration of previous typologies as well as neurobiological research. It introduced seven user archetypes including: achiever, conqueror, mastermind, daredevil, socialiser, survivor, and seeker. Their work showed promise and was used in some HCI studies [6,36].

A key similarity between DGD, BrainHex, and similar typologies is that they are often used as recommendation tools in game systems specifically for game design. As such, these works have limited applications outside of game systems. Marczewski’s Hexad model is based on the user’s intrinsic and extrinsic motivations as defined by SDT [13], opposed to developing a model based on observational behaviours. The following summarizes each of the user types as well as their design suggestions by Marczewski and Trondell et al in their work on developing empirical validation process and accompanying game design suggestions [50]:

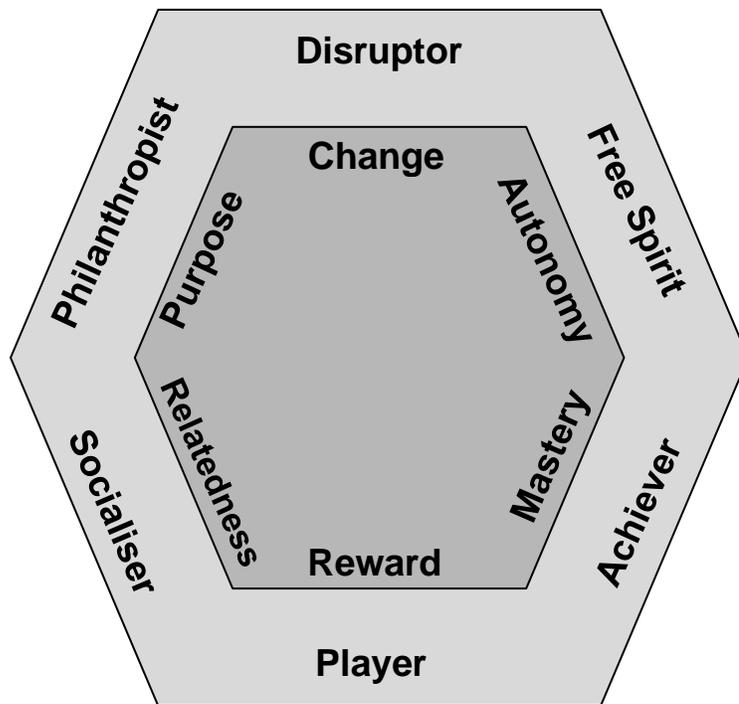


Figure 2. Marczewski’s User Type Hexad

Recreated based on [50]

- **Philanthropists** are motivated by *purpose*. They are altruistic and willing to give without expecting a reward.
 - *Suggested design elements*: collection and trading, gifting, knowledge sharing, and administrative roles.
- **Socialisers** are motivated by *relatedness*. They want to interact with others and create social connections.
 - *Suggested design elements*: guilds or teams, social networks, social comparison, social competition, and social discovery.
- **Free Spirits** are motivated by *autonomy*, meaning freedom to express themselves and act without external control. They like to create and explore within a system.
 - *Suggested design elements*: exploratory tasks, nonlinear gameplay, Easter eggs, unlockable content, creativity tools, and customization.
- **Achievers** are motivated by *competence*. They seek to progress within a system by completing tasks or prove themselves by tackling difficult challenges.
 - *Suggested design elements*: challenges, certificates, learning new skills, quests, levels or progression, and epic challenges (or “boss battles”).
- **Players** are motivated by *extrinsic rewards*. They will do whatever to earn a reward within a system, independently of the type of the activity.
 - *Suggested design elements*: points, rewards or prizes, leaderboards, badges or achievements, virtual economy, and lotteries or games of chance.
- **Disruptors** are motivated by the triggering of *change*. They tend to disrupt the system either directly or through others to force negative or positive changes. They like to test the system’s boundaries and try to push further. Although disruption can sometimes be negative (e.g., cheaters or griefers), this is not always the case because disruptors can also work to improve the system.
 - *Suggested design elements*: innovation platforms, voting mechanisms, development tools, anonymity, and anarchic gameplay.

It is important to note that while some underlying motivations between the different user types are related, their focuses are different. Achievers and Players are motivated by achievement, players however, focus on extrinsic rewards whereas achievers focus on

competence, an intrinsic reward. Socialisers and philanthropists are motivated by interaction with others, socialisers however, focus on the interaction itself whereas philanthropists interact to help other users. Disruptors and free spirits are motivated by autonomy and creativity, disruptors however, seek to go beyond the rules and boundaries set by the system whereas free spirits will stay within the system.

It is also important to note that while these motivations are present as user types, they are clustered and there are overlaps. This means that individuals are almost always motivated by more than one motivation. More often than not, everyone is motivated by all types, but their player types are their dominant motivation or principal tendency.

2.6 Livestream

Here we will explore some of the key aspects of livestreaming. To start our research process, understanding our target audience and their behaviours and motivations is essential. The first section will explore literature related to spectatorship and behaviours. The second section will cover literature related to spectator interactions.

2.6.1 Spectatorship

What makes livestreams different from traditional television broadcasts is the ability for the spectators to interact with the streams as well as other spectators. This enables a level of engagement that was not previously possible. It does, however, pose an interesting design challenge. It is suggested that when people get together, they behave differently based on the size of the crowd [8]. In large crowds, synchronized activities such as gestures cheering to support their favorite team highlights the importance of researching the intra-crowd interactions as well their effects [25]. esports and livestreamed content attracts audiences in massive size with numbers ranging in the millions for large tournaments. By understanding their spectatorship, designers can design features that can facilitate those interactions and behaviours.

Event Organizers recognize the potential in facilitating large crowd interactions and many are turning to third party organizations to specialize in such services to enhance spectator engagement. Jacucci et al. [23] conducted field research to see how they enhance spectators' experience with technology. They found that most users wish to have an active

role when spectating and showed trends that spectators would wish for coordination activities during events through mobile applications. Jacucci and their fellow researchers evaluated an application called CoMedia in two separate events in an attempt to integrate spectators into the event. The application allowed for users to view event information as well as coordinated activities and communicate with spectators that joined the event virtually. The authors showed that using this approach is better at supporting constant changing interest that occurs in large scale events [22]. This tells us that spectators like to participate and be integrated into the event.

Cheung and Huang [11] set out to have a better understanding of game spectators in their 2011 work, answering three fundamental questions about spectators:

1. *Who are the spectators and why do they spectate?*
2. *How do different stakeholders affect the spectator experience?*
3. *What makes spectating a game enjoyable?*

They chose one of the most popular esports series at the time: *StarCraft*, a real time strategy computer game by Blizzard Entertainment [65]. The game had one of the most mature esports scenes at the time with dedicated esports organizations, television channels, and a community that has grown since late 1990s. The game is popular around the world but was particularly popular in South Korea. By examining facial expressions of fans during tournaments from videos during tournaments, they constructed a set of personas for game spectators. From there, they built theoretical frameworks of the spectator ecosystem, the theory of information asymmetry, and design implications for future designers.

Their first question who the spectators are and why do they spectate resulted in a composition of nine personas. Cheung and Huang describe them as the following:

- *Bystanders* are the least engaged of the nine personas. They are then divided into two groups. One group are bystanders that have no information about the game. The second group are bystanders that are uninvested and might have “stumbled” upon the tournament. One of the common themes between the uninvested group of bystanders is that they used to play *StarCraft* many years ago.
- *The Curious* are those that find engagement only as long as there is more to learn.

- *The Inspired* use the spectating experience as a catalyst to inspire themselves to go back and start playing themselves. They wish to seek the same thrill they experienced while watching when they play as well.
- *The Pupil* learns from the games they just watched and wish to put it into practice. They wish to translate new knowledge they learnt from the game and try it out themselves right away.
- *The Unsatisfied* see the spectating experience as a weak alternative to playing the game. Eventually they would become inspired and start playing the game as well.
- *The Entertained* enjoys watching more than playing. They watch solely for entertainment. This is the most common story from the dataset studies.
- *The Assistant* acts as a second pair of eyes, giving the players reminders about what to do and alerting them about key events that they might have missed. A common story is spectating their significant other or relative playing the game.
- *The Commentators* are both spectators and performers. They shape the viewing experience for other spectators by providing information and comments about the game as it plays out. They could deliver entertainment through their own expression of the game (i.e., creating suspense) as well providing key information about the game that spectators might have not caught.
- *The Crowd* enjoys the experience of watching in a group, enjoying the reactions of others when something exciting happens and reacting along with everyone.

All the spectators affect the game differently, but they are all essential to what the authors describe as *The Spectator Ecosystem*. Everyone provides a different role in the spectating experience. This also establishes the emotional ties and information dependency between the different stakeholders. Players set a promise that their performances are not disappointing for the fans, and spectators would judge them based on their understanding of the game and the sportsmanship.

To explain why people find joy in spectating, Cheung and Huang introduced the concept of *information asymmetry*. They propose that spectators and players have different pieces of information about the game. Spectators see the position of all players, but concrete ideas of what players are planning can only be speculated and anticipated. Players, on the

other hand, do not have a full understanding of opposing players. As such, they constantly revise their next move based on the information discovered about their opponent which is unknown to spectators. This builds tension for those spectating as they see how the plans of all the players unfold and their reactions as the game progresses. The authors state that *“All information asymmetry is reduced and eliminated as the game progresses. But as the information is revealed, the spectator is entertained in the process. The revelation of this information, slowly teased out, creating suspense for the spectators and the players.”*

2.6.2 Interactions

A key difference between traditional sports broadcasting and livestreaming are the interactive features offered by the latter media. This provides spectators and hosts the ability to interact with each other: interchanging information, expressing opinions, and, in some cases, providing content and dictating the content of the stream. The following summarizes the work of Stahlk et al. [49] on livestream interaction and design implications.

2.6.2.1 Chat Input

Chat Input allows the spectators to communicate with other spectators and the stream host via written messages. The intent of chat interaction is mostly social, but it has also been used as a pseudo-polling mechanic. Hosts can ask questions and based on the frequency of various answers can decide on their action. During a 2014 event, this was taken to the extreme. Twitch Plays Pokémon explored what happens when thousands of spectators decide all the input commands of a game and act as a single player [40,70]. The experience was chaotic and created a joyful anarchy which allowed all the spectators to work together for a single goal. This proved to be an entertaining mechanic that can be implemented in future games that could potentially enable spectators to control limited elements of game scenarios while the host plays the game. Such mechanics could further enhance the spectator experience and encourage them to be more engaged.

2.6.2.2 Voting/Polling

Voting and polling mechanisms are used to gather community consensus. This is often used by streamers to decide on what to play next or choosing strategies for the next

step in a game. Such mechanics require little implementation, and compared to chat, they are also more effective at gathering consensus quickly. In one case study by Lessel et al. [30], they investigated the utility of voting and polling by designing an input aggregation tool for a card-based strategy game Hearthstone [71] to provide feedback on the hosts' game actions. They found that these interactions provided the spectators with a sense of influence to the game and therefore participated more during the livestream.

2.6.2.3 Affiliation

Affiliation refers to allowing spectators to declare allegiance or support to a particular party. This could be used to influence game content based on which party has more or less supporters.

2.6.2.4 Betting

Betting in-game or channel currency can be used to motivate spectators' engagements in fighting games. This provides spectators with chance-based appeal that can be described as gambling-lite. These types of systems can be embedded into in-game interfaces and communication with streaming platforms. An important note here is that such mechanics, similar to traditional sports bidding, can be easily facilitated in third party platforms which could present a design challenge.

2.6.2.5 Cheering and Donation Incentives

One of the interactive features of Twitch is that spectators are able to give livestream hosts “cheers”. Cheers are virtual tokens that spectators can purchase with real money, cheers can then be used to display special emoticons when watching streams [72]. This was introduced on Twitch to give players an easier way of donating to hosts without using external systems such as PayPal. Even then, most livestream hosts still have external donation features included in their streams. This enables spectators to directly support them. Many hosts offer on screen messages or callouts when donations are received as incentives for spectators. This feature is key for events such as Awesome Games Done Quick (AGDQ). AGDQ is a charity event that livestream a marathon of game speed runners. The organizer motivates spectators to donate by enabling them to name characters, decide in-game events based on when donation incentives are reached.

2.6.2.6 Commentary and Interviews

Similar to traditional sports, commentaries and interviews offer insights on player behaviours, game mechanics, and they are used as supplementary content [42]. They also provide a human perspective and help spectators connect with the host. Commentary and interviews are done differently depending on the format and the content.

For livestream, hosts would sometimes have personalities or “characters” they would adhere to when streaming and can be seen as a form of performance. As the host plays, they would share their thoughts, emotions, and game strategy. While in most cases, these commentaries are for entertainment, some hosts would provide educational commentary about the game with insight on tricks and strategies that would help spectators improve their own performance. In esports these contents encourage viewership as knowledge acquisition has been associated with positive viewing frequency [20].

A potential way of furthering interactions during commentaries is providing a means to submit questions for interviews or user commentaries to spectators. This can foster more genuine conversations and form more personal connections between spectators, hosts, and in the case of interviews also the players being interviewed.

2.6.2.7 Direct Viewer Participation/Lotteries

Direct viewer participation is referred to as spectators actively playing the game they are watching and interacting with the host in-game. *Upsilon Circuit (Robot Loves Kitty, n.d)* explores such interactions as a part of an RPG and game show. Players are selected in a lottery from the spectating audience to participate in the game. Other participation mechanics are also present such as allowing spectators to power up the players thus encouraging engagement of those waiting to play the game. The game attracted the gaming community and showed that game shows where games that actively integrate the audience in the game loop is possible. The game studio, however, ran into financial difficulties and the game was ultimately canceled [73].

2.6.2.8 Viewer-Created Content

Viewer-created content refers to having spectators submit content for the stream host to play while they are livestreaming. *Super Mario Maker* [74] is a sandbox platformer

game that allows players to construct their own level for others to play. Many streams of *Super Mario Maker* would feature levels submitted and suggested by the spectators. This type of interaction is typically slower but does provide spectators a more rewarding experience when their creation is featured and broadcasted to others. While not all games can facilitate such a system, when it does, it can be complemented with other interactive mechanics such as voting. This also ensures the participation of other spectators.

2.6.2.9 Content and Game Modifications

Content and game modifications enable the spectators to change elements of the game. Unlike viewer-created content, the content already exists in the game. An example of this is the ability to dispatch enemies to increase the game difficulty or send in game resources to assist the host. This type of crowdsourced decision-making temporarily gives the spectator some responsibility for small parts of the game and allows spectators to make meaningful contributions to the entertainment experience.

While there are many potential mechanics available for such interactions, it does pose a challenge to designers. If the spectator population is small, individual spectators could feel a lack of excitement due to the lack of participation and can lead to a sense of emptiness. On the other hand, if the spectator population is too large, individualism diminishes, and individual spectators could feel like their contribution is insignificant and their participation in the decision-making process is meaningless. It is important that designers keep a careful balance between the two extremes. Stahlke et al. suggest a possible solution to combat this effect. They suggest combining standard large-scale mechanics such as polling with lottery-based systems to form deeper interactions similar to content creation or direct participation. This enables small groups to have frequent opportunities to engage more deeply and large groups are encouraged to take their chance with momentarily being the center of attention.

It is important for any game that is designed with spectators in mind to facilitate both passive spectators as well as the live stream host. They thus need to fulfill three key requirements. The game should, first and foremost, be a rewarding experience for players and should be quality evaluated using conventional games user research. The game should also be designed in such a way that passive spectators that are unfamiliar with the

interactions of such games should not feel left out. Lastly, maintaining interactivity for those spectators that are actively participating in the live stream. If these requirements are met, a complete game experience that is designed with spectators in mind will demand the attention of all users, whether they are the player, passive spectator, or active spectator.

2.7 Related Work Conclusion

We have explored related literature about the field of HCI along with livestreaming. This process provided knowledge about how research is conducted in this field as well as what past researchers have accomplished. While game user typologies have been explored extensively by many researchers since the late 1980s [4,32,35,50], spectator typology research is still in its infancy. Cheung and Huang [11] explored this space and have outlined a foundation framework for what a potential typology for a spectator could be like. Their framework, however, has yet to be verified for other contents and games. Similarly, Stahlke et al. explored livestream interaction features and provided some insight and examples of how different types of interactions could be designed and implemented. The authors, however, did not discuss how those features would fulfill the needs of spectators based on their motivations.

There are still many questions in the field of livestreaming and spectators that could be asked and explored. For example, if livestream interaction features can be considered gamification features, can spectators that are actively participating in livestream be identified with gamification typologies? Will livestream spectators have different motivation based on the content they spectate? In the next chapter of this thesis, we attempt to explore some of these questions.

Chapter 3.
Study One:
Livestream Spectator Profiling

Chapter 3 Study One: Livestream Spectator Profiling

3.1 Introduction

In games user research, typology related research has matured in the last few decades, and there are frameworks that are well adopted by the gaming industry, and are regularly used as design guidelines [4,32]. In recent years, these typology systems have also been studied to be used in other fields in the process of gamification [50]. However, similar guidelines for livestream spectators are still being researched. The interactive nature of livestreams can be argued as also a gamification process that encourages user engagement to enhance their viewing experience. Thus, we wondered if similar typology can be directly used to profile livestream spectators? If so, are there connections to the types of interactive features that they may prefer?

3.2 Relevant Work

The study was initiated by first exploring the current state of the Livestreams space. What are the most popular services out there, the dominant content, and the most popular interactive features. The idea here is to have a good understanding of the field and use this information to identify potential relationships.

Livestream has transitioned from a novel form of media to mainstream over the last decade. One of the first and most popular streaming platforms is Twitch.tv. Based on *Twitchtracker* [75], a statistics tracking site for Twitch, the site had over 1.85 million average concurrent viewers in the first quarter of 2020, which is a 47% increase from 2019's overall average. At the same time, there is a similar increase in concurrent live streaming channels. Although these significant jumps in numbers may be due in part to the global stay-at-home initiative caused by the SARS-CoV2 (more commonly known as COVID-19) pandemic. Streaming has been steadily gaining popularity over the last few years already.

Some of the most popular content is video game live streams. Although many new forms of content such as social events, music, visual art, as well as scripted performance shows are quickly trending. Regardless of the content being streamed, we noticed that the interactions between the spectators and the host are typically similar. However, to help focus our study design, we decided to mostly focus on the most popular content being streamed, which is video games.

3.2.1 Interaction Features

The next stage of the study examines what defines Livestream and the popular interactive features that videogame spectators use the most. Livestreaming was once a novel form of media that has now been transformed into the mainstream [15]. We can think of Livestreaming as a combination of forms of media, viewing broadcast content and playing video games. Livestream is traditionally a passive form of entertainment, however, by enabling interactive features, it is able to engage spectators with other spectators as well as the host. Making the experience more interactive than traditional broadcasting such as television shows. However, the experience is generally not as interactive as playing games. Arguably, this mix of two media forms is what defines Livestreams and makes it unique compared to any other form of traditional entertainment.

We define Livestreaming by its ability to enable interactions between other spectators as well as the host, it is obvious that interactivity is an essential element. Active interaction should be able to enable a more immersive experience than traditional media [24]. Thus, we started to explore the interaction that is currently used by spectators as well as other potential interactive features that could potentially be offered in the future. Previous work was able to highlight various features that could improve the interactivity of the Livestream experience. In related works Stahlke et al's [49] work on livestream interactive features was discussed and summarized. They provide a detailed description of some of the most popular interactive features in use today and their design implications. The following is a quick summary of the interactive feature. We think their work provides a good foundation for us to examine what features spectators prefer.

1. *Expressing their opinion through **voting or polling***
2. *Declaring their **allegiance** to a particular player or team*

3. **Wagering** in-game or streaming channel-based currency (no monetary value) on an outcome
4. Spending money to **display special emoticons or an on-screen message**, or have the streamer react a certain way/read out a message during the livestream
5. People (may or may not be active players) providing **informed insight** on player behaviour/mechanics/the events in-game
6. **Directly interacting in the game world** with a streamer(s), potentially accessed by entering and winning a lottery
7. **Submitting original game content** (ex: levels) to streamers for them to play and broadcast
8. Having **indirect influence over elements of the game world**. (ex: spawning more enemies, sending in-game resources, changing the visual of the game. etc.)

Just as different players are naturally attracted to different features in games, we hypothesize that the same thinking can be applied to the design of interactive streaming experiences. In theory, spectators with different habits and personalities should also be attracted to specific features that will motivate them to participate in a livestream. This ideology has formed the main inspiration for our present work.

3.2.2 Player Typology

In the related work section, we reviewed literature in the space of user typology. Those research will be used to ground our survey in an existing typology model. While early typology work was driven by the need for game developers to understand their user's motivations as well as guidelines for design implications [4,51]. Later typology was developed to be grounded in player psychology [13,32,35]. Early typology such as Bartle's typology framework for MUD offered great insights to some of the design implications of understanding user typology. This framework was not applicable in other genres of games. Later work such as by Tondello et al. developed a typology framework that offered design implications based on the game genre as well as the user's goals.

For this study Tondello et al. The Hexad framework best fits our application [50]. This framework is developed for users of gamified applications. While the act of spectating

livestream is not gameplay, we think that interactive features can be argued as gamified. This is the most appropriate typology system we can use to profile live stream spectators. A full summarization of their work can be found in the related work section.

3.3 Participants

Video game development students were chosen as our target audience for this study's data collection. They are chosen based on their generally good understanding of game features as well as familiarity with consuming or broadcasting livestreams. An announcement was sent out to various classes seeking participation in the survey. Participants that agreed to participate were sent a Google Forms link to the survey which they can complete on their own. The participants are within the age range of 18-25 years old, with 90% of participants being male.

3.4 Methodology

The survey questionnaire is composed of three sections. The first section gathers general demographic information questions as well as used to verify that participants have general knowledge about the topic. We also want to ensure that the participants are active spectators. The second section consists of questions in the format of five-point Likert scales from the original gamification player typology framework by Tondello et al. [50] This section of work is used to determine the participant's user Hexad user typology. The last section asks the participant to rate their preference of livestream interaction features. The features in this section are the same ones from our previous work by Stahike et al. [49] At the end of the survey we also ask the participant if any of the interaction features are confusing, or if they have additional features that they frequently use but were not part of the survey. This enables us to improve future survey quality as well as gather information on new features that we are not familiar with.

3.5 Results and Discussion

After data collection it is then analyzed through expert analysis with fellow games and HCI researchers. The data is visualized using Likert graphs and interpreted graphically

to identify trends. The first step to examine each of the interactions and their appeal by each of the Hexad types. A brainstorming session was organized where fellow experts would discuss the result. Through speculation and theorizing about the patterns and discussion, relationships between each of the typologies and their preferred features were formed.

We gathered 50 participants in total for this study. Participants that ended up belonging to more than one Hexad type were excluded from the participant population. The majority of participants are between the ages of 18 to 25. 83% of the participants identified as male and 17% identified as female. Almost all our participants (90%) indicated that they are very familiar with playing video games and 70% have watched livestreams before.

3.5.1 Hexad Personality trends

Socializers (3/50 participants) displayed preference towards affiliation features. This makes sense as they like to be associated with others and are motivated by relatedness. They also have strong preference towards chat input features. This trend is also expected as the feature itself is designed to enable social interaction.

Many (50%) *Players* (11/50 participants) find affiliation appealing as well. We know that players are motivated by extrinsic rewards. We can speculate that affiliating with skillful players or teams that have high win rates could be the extrinsic reward that they are attracted to. A population of the players (36%) also find betting appealing to them. We think this is logical as betting has the potential to result in large rewards which are typically extrinsic. Another feature which players are attracted to was commentaries. We think the reasoning is that commentaries features can provide information on how they can maximize their own gain. It is also worth noting that participants in commentaries sometimes come with in-game rewards as well.

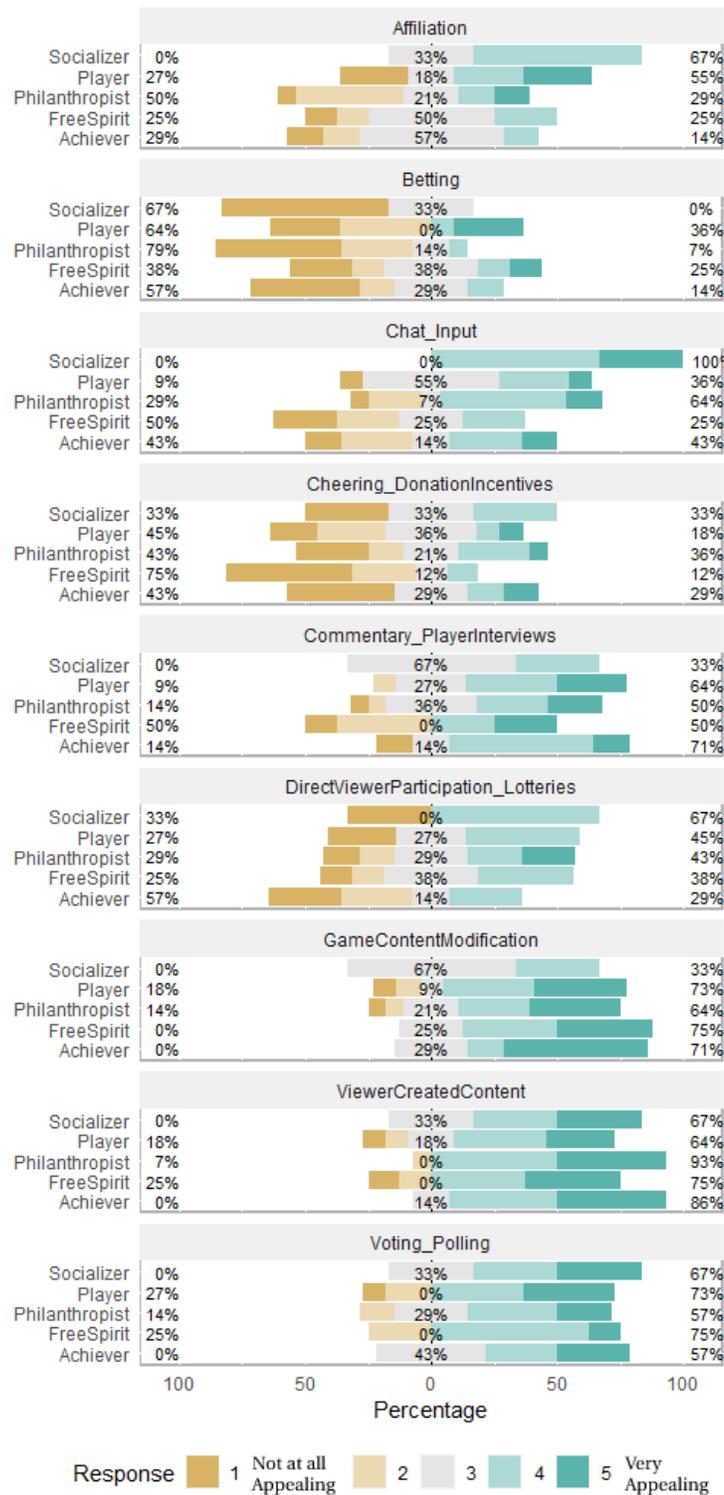


Figure 3. Spectator User Type's Interaction Preference

Philanthropists (14/50 participants) are generally motivated by purpose and meaning. This means that they enjoy helping others without expecting anything in return. The features they enjoy also reflect on that as well. They respond well to features such as cheering donations and viewer-created content. Philanthropists had the highest positive viewing on cheering donations at 36%. This makes sense to us since donations is a significant income source for many hosts, and spectators with philanthropic tendencies are more likely to support their favorite streamers. Many streams that are in their early careers also rely heavily on donations as they typically do not have many income sources such as sponsorships, twitch subscriptions. It is possible that philanthropists see it is their purpose to support the host they deem good. Viewer-created content is typically time consuming to make and submitted voluntarily. We think philanthropists will have a sense of purpose when they can see others enjoy the content they have created, and that is why they respond positively to such features.

Free Spirits (8/50 participants) are motivated by autonomy and self-expression. These qualities are embodied by the features which they found to be appealing. They responded positively to features that give them freedom for self-expression such as game content modification, voting, and polling. The ability to potentially affect events with their self-expression appeals to them and game content modification fits that perfectly. Where by using voting and polling features they are able to exercise their influences on subjects.

Achievers (17/50 participants) are motivated by mastery. They enjoy seeking knowledge, self-improvement, and overcoming challenges. Thus, features that will help them to improve themselves greatly appeal to them. Our data reflects on those traits as well. They prefer features such as commentaries and player interviews where new information is presented.

Disruptors (1/50 participants) are motivated by creating change. They wish to disrupt the system at play either positively or negatively, directly, or indirectly. However, only one of our participants showed any disruptive tendencies, with no significant data on their preference with livestream interaction features.

3.5.2 Other trends

While we have observed many trends based on the participants' Hexad type, there are also some trends that exist for the entire population. One of the overall trends shows the survey populations have a strong negative attitude towards interactions features that can be used for monetization and chance. This includes features such as *betting, donations incentives, and participation lottery*. One possible explanation of these trends could be the recent popularity of microtransactions in video games as well as loot box mechanics which many argue as a form of gambling. These monetization features experienced large-scale push back from players in recent times, and we think it is also reflected in our study. Another contributing factor could be based on the fact that most of the participants have a background or knowledge on the subject of how games and platforms monetize their service. This could have influenced their responses; these are currently highly debated issues within the community.

Another overall trend that we observed was the overwhelming preference for game content *modification, viewer-created content, and voting/polling*. All these are features that focus on letting the users express their opinion and work. We speculate that spectators find it appealing to enable direct interaction between the spectator and the host, as well as developing meaningful connections with the host. We think for the majority of the time when watching livestreams, the participants are consuming the content passively, and thus having the opportunity to express or share their feelings and thoughts fosters meaningful engagement.

The last overall trending that we observed was features such as *commentaries and players interviews* are well-received for almost all the participants. We speculate this trend exists because these features are common with traditional sports as well as esports streams. So, most participants are already familiar with these features and understand they most likely are here to stay. Thus, for many participants this may be beneficial or are indifferent to their existence.

3.6 Limitations and Future Work

One of the limitations was the diversity of participants. Almost all participants were game development students. Their general passion for games may have influenced some of their decisions. A good example was the general population's positive preference towards game content modification features as it is similar to works done in game development. In the future we intend to diversify our demographic including age, career path, location and gender. A possible venue could be online community forums.

We also understand that our sample size is not large enough to make strong claims and most of the conclusions are speculative. However, we believe this study is a great first step toward our goal and shows promising results. The results of this study revealed some key trends which could be used as foundation for future research.

Chapter 4.

Study Two:

**Esports Tournament Spectator
Motivations and Behaviour**

Chapter 4 Study Two: Esports Tournament Spectator Motivations and Behaviour

4.1 Introduction

The second study focused on further exploring livestream spectator motivations and behaviours. The initial stages of coming up with the survey focused on the conceptualization of the research goals. This was completed by reviewing past research literature. The ultimate goal of developing a typology system. In our past research, we evaluated to see if similar typology systems could be used for livestreams spectators. We compare the user's gamification typology to their livestream interactive feature preference. The result showed some hints to a possible correlation between their gamification user typology and their interactive feature preference. However, one of the limitations of this method was the typologies are confined with a generalized typology system that may not have considered the unique user of livestream spectators.

In order to avoid speculating on the potential behaviours and motivations based on past work [11], an exploratory approach was devised to collect independent data for analysis. For the study, we decided to have the participants tell us their behaviours and motivations by using questionnaires that encourage the participant to recall and reflect on their experiences of watching livestream esports tournaments. When the results were collected, thematic analysis was used to analyze all the answers. The statements provided by the participants were coded based on their sentiments, motivations, and behaviours. This enables us to quantify long answers and visualize them using graphs.

The result of the study showed that spectators prefer tournaments that are competitive, entertaining and feature players, teams, or regions that they support and show alliance with. Spectators find that tournaments that are competitive and when the results are unpredictable are more entertaining, than strong teams that are more likely to win. The majority of the participants also stated that having an alliance with a particular party (player, team, or region) is important to them. They are more likely to remember and be motivated to spectate a tournament if their supporting party is participating.

4.2 Study Parameters

Our goal is to construct a series of open-ended questionnaires which would enable the participants to fully express their experience, motivations, and behaviours of their livestream interaction experience. One of the challenges of doing exploratory research is to maintain scope. There are many different types of livestreams based on the content and audience. Here we discuss our decision on our study parameters.

Throughout various discussions, one of the most popular livestream contents, esports Tournament was decided to be the field of focus for this study. Livestreaming content can vary largely based on the target audience and time of day in which the host decides to host their streams. Casual livestreams have a large variety of content, format, and their target audience is highly targeted. However, official tournaments do not have these variations in content, format, and their audience is the player base of the game. To limit the number of variables that need to be considered in the study, esports tournaments content is arguably the best option.

There are many popular esports titles such as CounterStrike [62], League of Legends [60], Dota [76], etc. Given the different game mechanics, tournament, and competition format, focusing on one game in this study will further limit additional variables in the study. If the findings show promise, future research can be conducted to compare different esports titles' spectator's motivations and behaviours and the game title is an important factor. League of Legends is one of the most popular esports titles in the world at the time of the study [52]. In addition to the researcher's familiarity with League of Legends, it also has one of the largest active online communities [17]. This enables relatively easier access to participants.

To summarize this section, how study parameters were determined was discussed. To limit the amounts of variables research parameters were set to be focused on spectators of League of Legends esports tournaments. This is based on the popularity of the game, the consistency of the content and the active online communities that enable easy access to participants. These parameters allow us to gather reliable data for this exploratory study.

4.3 Participants

Utilizing social media as the source to reach participants, mainly through the League of Legend Subreddit [77], and twitter using #LeagueofLegends, #LoLesports. We reasoned that these are dedicated social media platforms for League of Legends players as well as those that actively participate in spectating livestream tournaments. This reduces the amount of filter required as all participants that agreed to participate in the survey would theoretically be familiar with the game as well the esports itself. Most participants are between the ages of 19 to 30. 85% of the participants play League of Legends at least once a week with 43% of the participants playing everyday. 90% of the participants would watch tournaments frequently with over 23% of the participants would watch every tournament when available. A total of 56 participants responded to the survey, however two participant's surveys were determined to be not serious, and their response was discarded.

4.4 Methodology

The questionnaire was designed to encourage users to think about their past experiences. The first section of the survey questionnaire is designed to guide users to think about their general viewing experience. This gives a baseline understanding of their motivations and behaviours while watching livestream esports tournaments. The second section encourages the participant to recall their most enjoyable experience while watching esports tournaments. The idea is to identify key experiences that can be used to help us understand user motivation for spectating livestream esports tournaments. The third and last section of the survey asks participants to describe their interaction behaviours with tournament livestreams. The intent here is to examine the significance of interaction features to the spectator experience.

4.5 Data Analysis process

After discussion with fellow researchers, a thematic analysis coding framework was devised. Utilizing the coding framework, each statement is tagged by a code word that best represents the sentiment of the statement. All statements were coded based on the following two rules.

1. Each statement should not include duplicates of the same tags. For example, if the participant mentions that they like supporting their favourite team and one particular player from a different team. We do not need to tag both statements as support.
2. When participants provide more than one statement to any question, we tag the statement that is the most relevant to the question. This is a response to some participants including exceptions in their responses, such as “This is usually what happens unless this happens then I would...”.

After all statements are coded, the resulting data is analyzed. The first step in analyzing the data is to formulate the data based on how they can be represented and presented. All the data were visualized to examine if obvious patterns are present. Each question was summarized by the total count of each statement tag. This method provides a summary of all the tags present per question. Following we take a close look at the data and what they could mean.

4.6 Results and Discussion

The results of the General spectating experience are presented first. Over 80% have stated that their general spectator experience is generally positive, with only around 6% of the participants stating that the experience is generally negative. Those that stated the experience as passive are around 13%. Given the success of the League of Legends esports, it is reasonable that most of the participants enjoy their time while watching tournaments.

General Spectating Experience

Participants reflection on their general spectating experience.

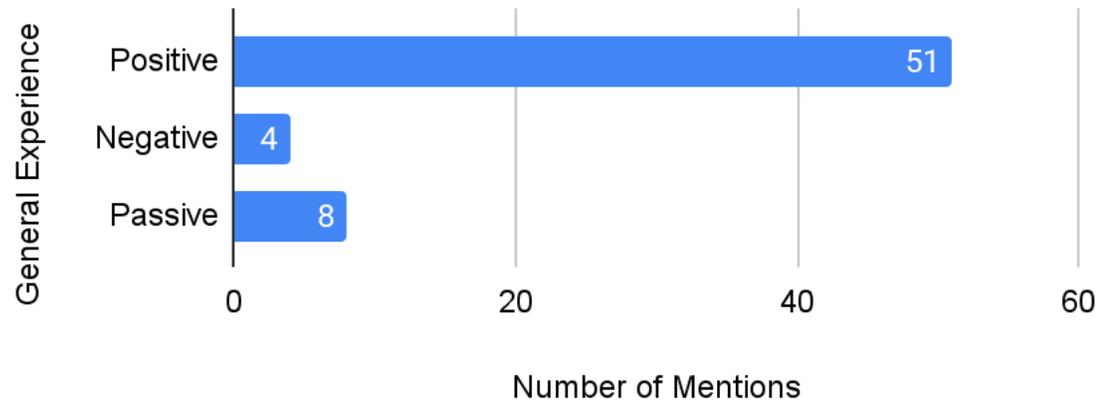


Figure 4. Participant sentiment towards their general spectating experience.

General Spectating Experience Tag Description

Statement Tag	Description
Positive	Participants reflected that their spectating experience was generally positive
Negative	Participants reflected that their spectating experience was generally Negative
Passive	Participants reflected that watching tournaments is a passive experience for them and they are usually doing something else.

General Spectator Experience by Type

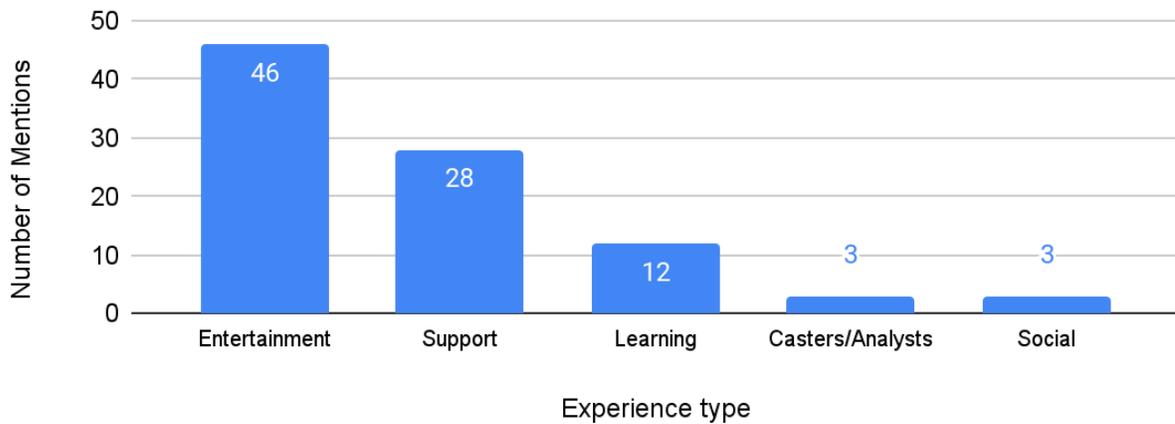


Figure 5. Participant’s General Spectating Experience by Type

General Spectating Experience by Type Tag Description

Statement Tag	Description
Entertainment	Participants state their general experience as being entertained by the tournaments they are watching.
Support	Participants state that generally, they are watching because they are there to support their favourite player, team or region.
Learning	Participants state that they are generally there to learn new strategies or to learn and improve their skills.
Caster/ Analysts	Participants state that they generally watch for the caster or analysts and they will decide to watch the match based on what is casting or providing the analysis.
Social	Participants state that their general experience is associated with their social circle. Watching tournaments is a type of social event for them, where they are watching with other people virtually or physically.

When asked about the general experience over half of the statements expressed as seeking entertainment. The majority (80%) have statements that mentioned seeking/being

entertained as one of their general experiences. Another major aspect of their general experience is there to support their favourite organization, players, or region. Around 20% of the participants also stated learning strategies as part of their general experience. When isolated these results make sense. Any sports spectating experience is a form of entertainment and esports are not different [20]. It is logical that the majority of the participants find their experience entertaining. Having and supporting their favourite players or teams are also common answers. Fandom as a motivation for spectating esports was not discussed in past research and our results here present an interesting point that could require further study. Further exploration of the importance of fandom in spectators' experience is warranted.

Number of participants based on the number of times they have mentioned statements reflecting on "Support"

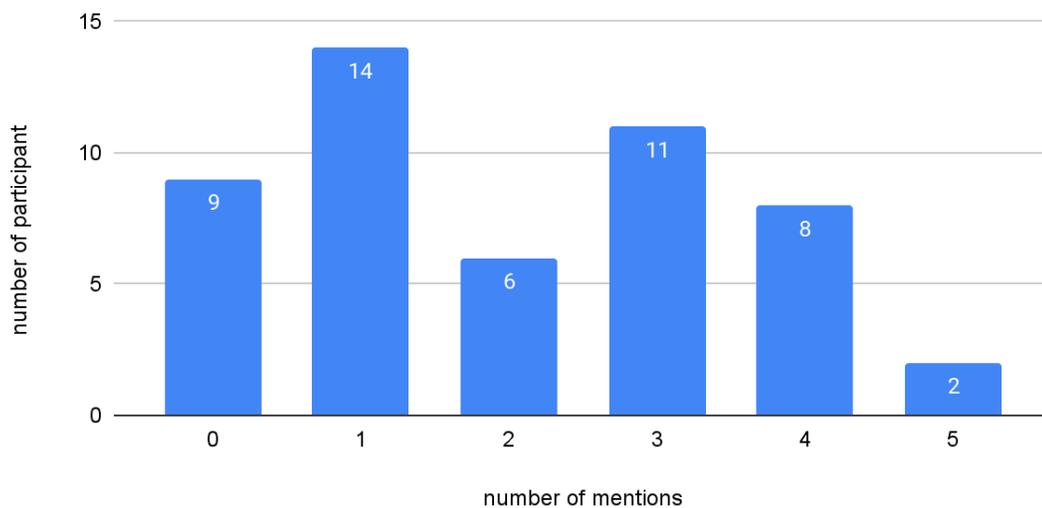


Figure 6. Number of Participants based on the number of times they have mentioned statements reflecting on “Support”

The figure above displays statements that had expressed support of a particular player, organization, or region across all questions. Over 80% of participants have mentioned at least one instance where their motivating factor for watching livestream tournaments or a key aspect of why they would watch a livestream tournament is to support a particular party. Looking at repeated mentions, that number is still at 50% of all

participants. In this case, an argument can be made that for most spectators having an alliance is a key motivation as to why they would watch livestreams.

This result demonstrates that similar to traditional support, spectators that continue to watch esports tournaments will ultimately develop an emotional investment in a particular party [33]. This is supported by the fact that 22 out of the 54 participants mentioned that supporting a particular party is one of their motivations to continue watching livestreams. One can speculate that to those spectators if they were to lose interest in that particular party and were not able to re-identify another party to support. The spectator could potentially lose interest in spectating the sport altogether. It is important then, for esports organizations to focus on developing and fostering emotional connections with fans. Additionally, forming strong bonds with the community should also help with viewership retention.

Key Elements of General Experience

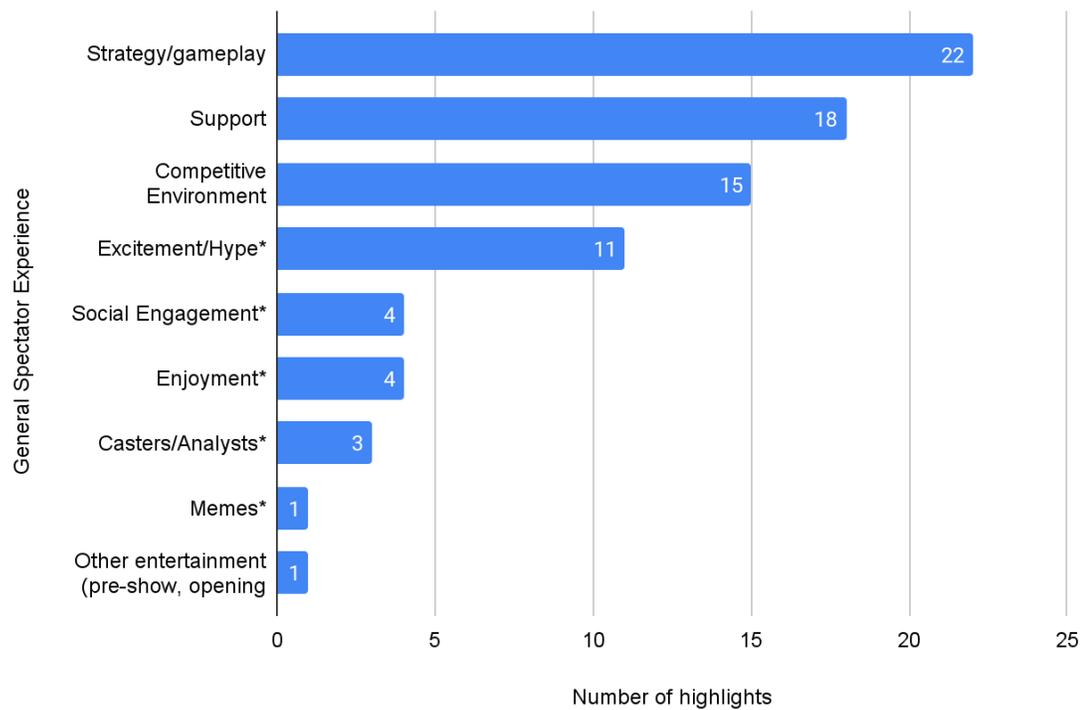


Figure 7. Key Elements of Participant’s General Experience

General Spectating Experience by Type Tag Description

Statement Tag	Description
Strategy/ gameplay	Participants state that when the gameplay is interesting to watch or when the players have been strategic with their gameplay. This includes plays that are high risk and high reward, counterplay, underdog prevailing, unconventional champion (in-game character) picks, clutch plays, etc.
Support	Participants state that it is important that their favourite player, team or region is playing, or they would only watch then they are part of the match.
Competitive Environment	Participants state that they think it is important that both teams that are playing are competitive with each other. They like when the results of the matches are unpredictable or defines their expectations.
*	Secondary or Tertiary statements that reflect on how the participant likes to feel (enjoyment, excitement/Hype), see (memes, other entertainment), or do (social engagement).

When asked about the most important key elements of their general livestream spectating experience. Based on 79 documented statements, the most mentioned statements are strategy/gameplay (28%), support (22%), competitive environment (19%), and excitement/hype (14%). Most participant's primary and secondary statements are one or a combination of the three top answers. An argument can be made that when a match is competitive it is typically the results of players performing well. In turn, the plays made by the players would also be exciting for the spectators to watch. The data that is present reflects on those points as well. A key takeaway is having talented and competitive players is a key element of why people like to watch LoL esports. This makes sense, similar to traditional sports and performance art, the players/artist's performance is a major aspect that attracts their audience. To some extent, professional players can be argued to also be performers.

This data suggests that a player’s performance could determine the popularity of a match as well as the team they are on. In theory, a strong team that consistently wins but is conservative with their performance may not excite spectators as much as compared to a team that might not be as consistent but are willing to try unexpected or new strategies. This confirms with the findings mentioned in Cheung and Huang’s study about StarCraft spectators. Cheung and Huang stated as part of their information asymmetry theory, a major draw for spectators to esports is the suspense of unknowing how the game will progress, and what the players will do next [11]. As a design implication, esports organizations should give players some degree of freedom during tournaments to be creative and ambitious with their strategy. It is possible that playing unconventionally or “off meta” provides entertainment value that could be more important to some spectators.

Most Enjoyable Spectating Experience

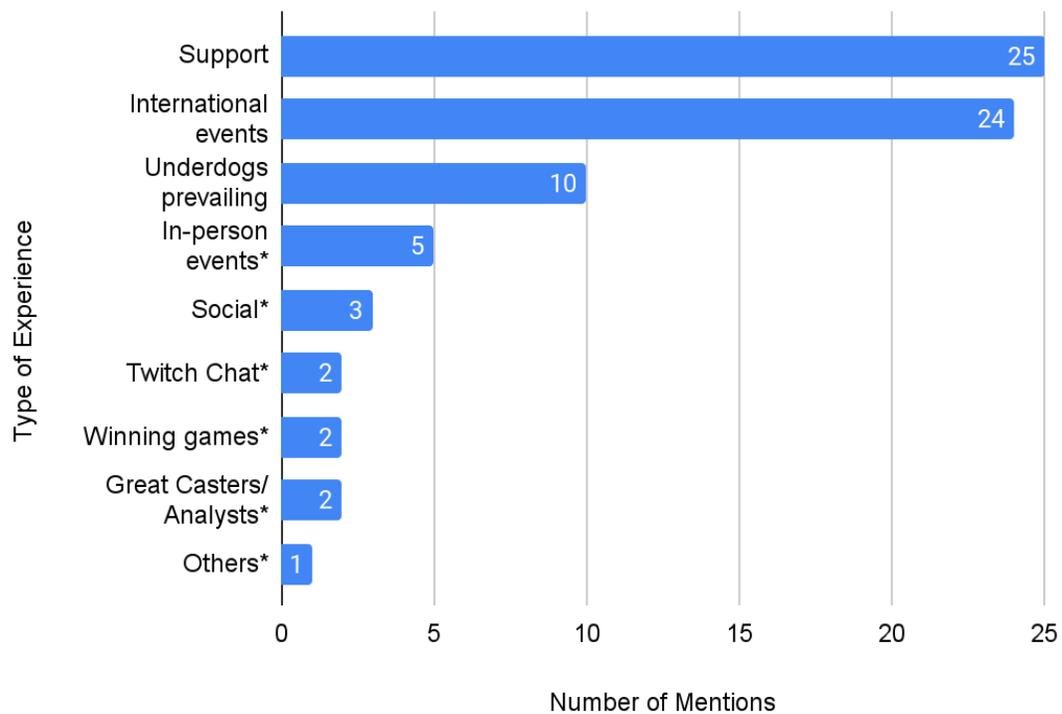


Figure 8. Most Enjoyable Spectating Experience

General Spectating Experience by Type Tag Description

Statement Tag	Description
Support	Participants state that some of their most enjoyable experiences are while watching their favourite players, teams, or regions is playing
International events	Participants state that some of their most enjoyable experiences are watching international tournaments such as MSI (Mid Season Invitational), World championship, etc.
Underdogs prevailing	Participants state that some of their most enjoyable experiences are when an unexpected party wins a game or a party performs better than expected.
*	Other or unique experiences that are typically secondary or tertiary statements.

When looking at the statements of the most enjoyable performance, a similar story emerges. Many spectators' most enjoyable experiences are during viewings of international events where the best players from around the world compete for the world title. This enables a competitive environment, exciting gameplay, and an opportunity for players to find new players or teams to support. Several statements expressed that those experiences helped them discover their fandom for a particular team or player. This data is consistent with the data presented in the key elements of their LoL esports tournaments spectating experience question.

One of the key takeaways from this is international events are important to help spectators to develop new alliances. The intense competition and exposure to players and teams from different regions of the world open up new opportunities for spectators to rediscover their fandom whether it is with their favourite party or an entirely new party. This experience should help with retaining or extending spectators viewership of the sport. In theory, hosting regular international tournaments should be a great way of expanding

viewership. If an esports title is not popular in a particular region, international events could serve as a way to attract new spectators locally or bring attention to international spectators.

Returning user motivation

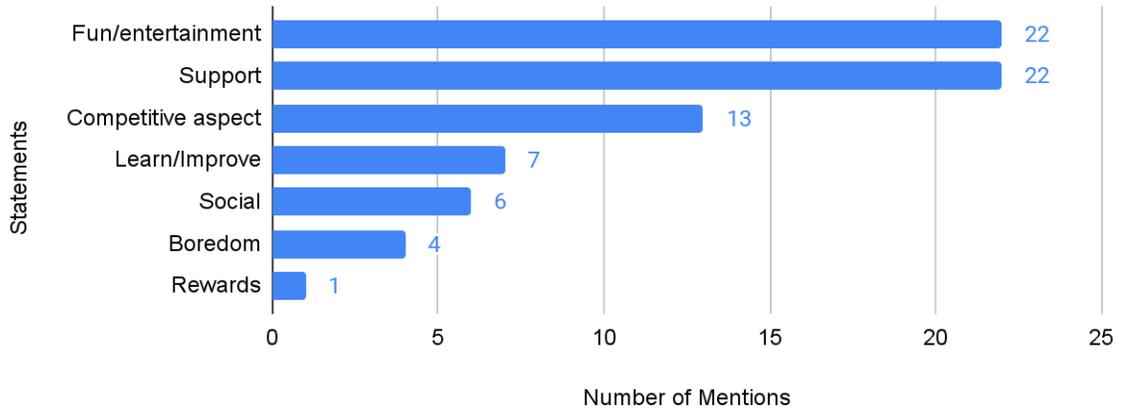


Figure 9. Returning User Motivation

General Spectating Experience by Type Tag Description

Statement Tag	Description
Fun/ Entertainment	Participants state the reason that they keep coming back to watch more livestream tournaments is because they think the gameplay, or the matches are entertaining.
Support	Participants state the reason that they keep coming back to watch more livestream tournaments is because they want to continue to support their favourite player, team, or region.
Competitive Aspects	Participant states the reason that they keep coming back to watch more livestream tournaments is because they like the competitive aspects of the game. They think it is impressive to watch professional players compete.
*	Other or unique experiences that are typically secondary or tertiary statements.

When surveyed about what motivates spectators to keep coming back to more livestream tournaments, the top three statements are consistent with the result of the general spectating experience and key elements that most players value when they are spectating

livestream tournaments. This data reinforces the results for the general spectating experience and provides a great summary of the overall results of this study. Esports organizations should foster competition, develop spectators' alliances with players, teams, and their region. It is also essential to give players the freedom to perform and be creative with their gameplay, many spectators like to see unexpected results or gameplay. While winning is important, spectators are more likely to support teams or players that surprise them with their performance. When surveyed about their interest in League of Legends esports, the most popular responses are like their returning motivation.

Interests in the Esports Scene or Culture

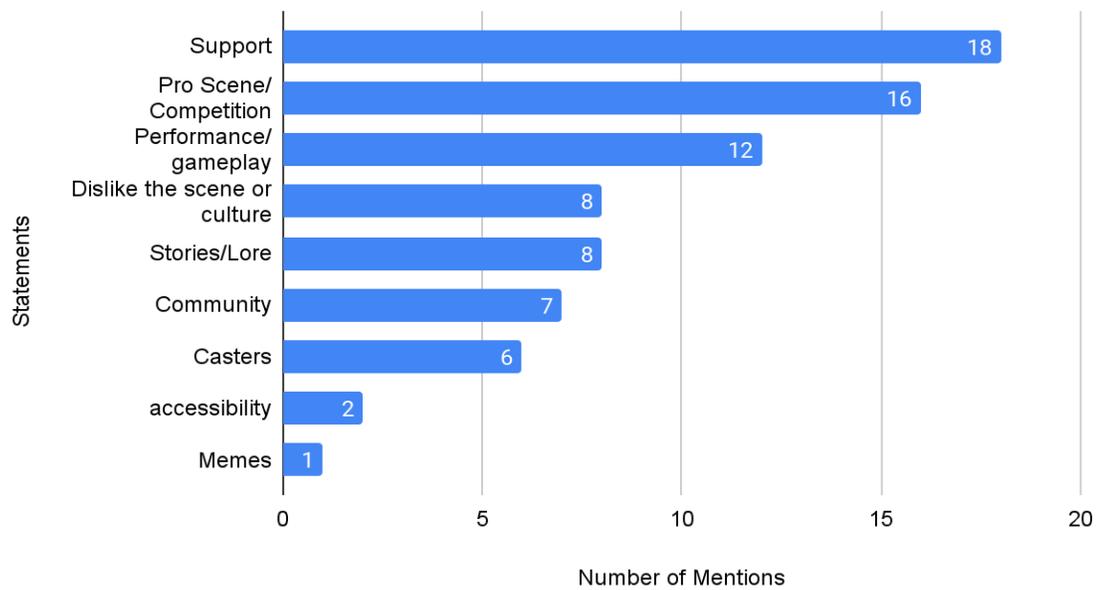


Figure 10. Interest in the esports Scene or Culture

4.7 Limitations and Future Work

The result of this study provided insights into what spectators value when they watch esports. However, there are still limitations to this work which could be further explored and studied in the future. One limitation is that study is currently focused on one esports title. While the result is promising, we need to confirm if our results can be replicated in other esports titles as well. I speculate that many esports organizations behave

similarly to traditional sports organizations, and spectators should also inherit similar behaviours and motivations.

Another limitation is due to the nature of explorative studies. Exploratory research requests participants to answer in a long and highly detailed format. As participation is voluntary, the majority of participants simply do not like to provide details as writing long answers is tedious. With the results of this study, hypotheses for future research can be formed. Potentially future studies could be multiple-choice based or using Likert scales. These changes may significantly reduce the time needed to complete the survey and require significantly less mental stress from the participant. This change may potentially also provide access to participants who would have been turned off by the tediousness of the current study. Another benefit of this approach is the resulting data collected should also be significantly easy to process compared to using a thematic analysis, which the data processing phase proved to be time consuming.

4.8 Conclusion

In this study, an exploratory approach was adopted to gain a better understanding of the behaviours and motivations of esports tournament spectators. The result of this study showed that spectators value the quality of the gameplay during tournament matches. According to the participants, players or teams that consistently win may not always be the most entertaining to watch. Spectators are more likely to support teams or players that provide suspense by taking risks and trying strategies that are unconventional. We confirmed Cheung and Huang's information asymmetry theory that unpredictability provides more entertaining value to spectators than a team that is always expected to perform well. Another major finding suggests most spectators have some alliance with either certain players, teams, or a particular region. We suspect that a participant's alliance is a strong indicator of their likelihood of watching a particular livestream tournament. It may also indicate their likelihood of returning to watch more tournaments. An argument can be made in which it is highly likely if a spectator were to lose their alliance with a particular party and were not able to associate with a new party quickly, they would abandon watching livestream tournaments for the particular esports title.

There are inherent limitations to exploratory studies, such as requiring participants to provide detailed answers on their own. This results in a tediousness for the participants and as a result to quickly complete the survey they would provide answers quickly and often lack details. Using the result of this study, future studies should be made as multiple-choice based to reduce the time required to complete the questionnaire as well as the tediousness of answering in full sentences. Another limitation of this study was in the pursuit to minimize the number of variables, demographics or the study was also limited to one esports title. This could have induced bias to our data, and it can not be representative of general esports spectators. In future studies spectators of other esports titles should be included as well. A comparison can be made to examine the behaviour and motivations of participants based on the esports title they follow, and if there are any significant differences.

Chapter 5.
DISCUSSION

Chapter 5 Discussion

This thesis showcased the studies that are intended to contribute to the field of livestreams spectator typology. Chapter 2 explored the history of HCI, and the importance of user typologies and their applications in game design and gamification applications. User motivation theories were explored to enable better understanding of how to group users based on their motivations and behaviors. Two studies were conducted using different methods to explore the motivation and interactive behaviour of livestream spectators. In the first study, a gamification typology was used to profile livestream spectators. Their livestream interaction feature preference was also surveyed. By comparing their feature preference and their typology, we find corresponding motivations in their live streaming behaviours. This proves that previous research can be used as a foundation for studying livestream spectators. The following study took an exploratory approach. Rather than asking spectators to rate their preference of different livestream spectating motivations, participants are asked to share their experience while watching esports tournaments. We hope that these studies further contribute to the discovery of a livestream spectator typology system in the future.

In this final chapter a summary of the discussion and contributions of each study is provided. The research question for each study and revisited and their contribution across the thesis is considered. Finally, future work in the field is discussed and suggested.

5.1 Thesis Discussion

In the pursuit of further research in typology for livestream spectators, research was conducted to form a better understanding of how spectators behave and what motivated them. In the first study we argue that the interactive nature of livestreams can be viewed as a gamification of traditional broadcasting. From that assumption two research questions arose. Can a gamification typology be used to classify livestream spectators? If so, what interactive features does each type of user prefer? Between the 50 participants, five types of users were identified, and their typology aligned with the features they prefer based on the motivations. *Philanthropists* are motivated by purpose and meaning and similarly they exhibited a preference for interactive features that help others without expectations. *Free*

Spirits are motivated by autonomy and self-expression, and they exhibited a preference for interactive features that comparatively offer the most self-expression. *Achievers* are motivated by mastery. And we did find that compared to other participants they showed a preference towards features that enable self improvement. Socializers are motivated by relatedness with others, and they showed the greatest preference towards chat input, which is the most sociable interaction. Amongst the 6 types of users we could not identify participants that showed distinctive *disruptive* tendencies. While some participants showed signs of disruptive preference, it is not their dominant tendencies. *Disruptors* are typically motivated to create change, similar to *Killers* in Bartle's MUD user, they do are a minority user type [4]. It is possible that our sample size is too small to have a representative population of disrupters. This is an area which can be improved on in future studies.

The first study concluded that gamification typology frameworks can be used to identify live streaming spectators, and their motivations match with the interactive feature sets of their preference. This demonstrates the robustness of Tondello et al's gamification typology [50]. At the same time Stahlke et al's working on livestream interaction design suggestions came to similar conclusions as to the spectators' motivations [49]. This study indicated that a typology framework for livestream should exist, however, further research is needed to design a typology that clearly describes the unique spectators of livestream broadcast.

After the first study was concluded, the implications of the first study were considered. One of the limitations of the first study is the constraints. It used existing literature of similar fields to examine the validity of the work that was set out to be accomplished. However, this study does not consider the existence of other user types outside of the Hexad user type. Gamification user types assume that all users are interacting with the system. While for most applications that go through the gamification process this is true, livestream presents unique interactions that typical applications do not have. One of the primary examples of such interaction is no interaction. A livestream user can passively consume content. They do not actively interact with the system; however, the content being displayed and effects of other active participants could affect their motivation and behaviour. Such behaviour was documented by Cheung and Huang in their research to better understand game spectators [11].

A second study was conducted using an exploratory approach. The premise of this study is to investigate the motivation of the spectators if they are not constrained by categorization of an existing typology. Using a questionnaire format, we asked participants open ended questions to recall past memorable experiences while they watched livestream esports tournaments. Based on the answers regarding their general experience, most enjoyable experience, and if they participated, their experience of using interactive features. One of the key discoveries of this study was the importance of supporting an alliance for spectators. Most participants have stated at least once in their response that their experience was impacted by a player, team or region which they were supporting. While it is logical to think most spectators would have an alliance (being a fan of) with some party involved in a tournament, there was no study to the best of our knowledge that has studied its significance. This study is able to provide data to suggest that fandom is a significant factor and motivation for spectators to watch esports tournaments.

Another finding of this study indicates that part of the entertainment comes from the suspense of the information asymmetry [11]. This was first described in Cheung and Huang's, and the independent data from our study matches with the sentiment of the spectators that was observed in Cheung and Huang's work. Spectators prefer international event parts that provide competitive gameplay where the outcome is uncertain. Many of the most memorable events that were described in participant's responses included events that occurred during large international events.

5.2 Future Works

Both studies were conducted using surveys, and arguments could be made about the accuracy and validity of the answers received, since participants are recalling their behaviours and motivations rather than being monitored experimentally. To mitigate these concerns, future studies could be conducted experimentally, such as testing the usage behaviours of various interactive features. Some examples of such studies are discussed in this section.

One of the most popular livestream interaction features is the live chat system that enables spectators to communicate with other spectators as well the host. Experimental studies could be designed to study the usage behaviours by monitoring the various

behavioural variables. Participants could be recruited to participate in an onsite study where they are asked to watch their favourite livestream content, while being monitored live. In this setting, footage of the participants could be recorded from various angles. Their expressions, physical reactions, and behaviours could then be examined as to what event triggered the need for the participants to use the chat feature. Similar study setup can be used to study other features as well.

5.3 Conclusion

Throughout this thesis, two studies were conducted using two unique methods to further explore the motivations and behaviours of livestream spectators. We concluded that a typology framework would benefit the design and understanding of livestream spectators. While gamification typology can be used to evaluate spectators that are actively interacting with livestream interaction features, there is a significant portion of spectator that only passively consumes content. It is important to note that while they do not interact and contribute to the livestream interaction, it is hinted that active participant's action may impact passive spectators' motivations to watching livestreams. The specific effect of their impact was not researched in this study and presents a future research opportunity. It is possible that once a better understanding of passive spectators is established alongside the active spectators, a standardized typology for livestream spectator can be established.

Appendix

A.1 Spectator Profiling Survey

Survey Introduction

This survey will ask you questions about what motivates your video game play, as well as your familiarity and interest in various types of interactions that livestream spectators may take part in. Additionally, some questions will be asked about personality traits at the end of the survey.

Please note that all answers are kept anonymous, and any data gathered from this form will be analyzed and reported as a part of a group; no individual responses will be reported.

Note also that you may request your data be removed at any time. To do this, please contact the Study Administrator (james.robb@ontariotechu.ca) with either the exact date and time of your submission or the email you used (if provided).

Demographics

Age *

Short answer text
.....

Gender *

- Female
- Male
- Prefer not to say
- Other...

Please indicate your level of experience with playing video games *

- | | | | | | | |
|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------------|
| | 1 | 2 | 3 | 4 | 5 | |
| Never play video games | <input type="radio"/> | Play video games frequently |

Please indicate your level of experience with watching livestreamed video game content *

- | | | | | | | |
|---------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|--|
| | 1 | 2 | 3 | 4 | 5 | |
| Never watch livestreamed game content | <input type="radio"/> | Frequently watch livestreamed game content |

Player Type Assessment

Please indicate whether you agree or disagree with the following statements. *

	1 - Strongly Disagree	2 - Disagree	3 - Neither Agree or Disagree	4 - Agree	5 - Strongly Agree
Please answer 2 to this question	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am very ambitious.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Please answer "Strongly Disagree" to this question	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like helping others to orient themselves in new situations.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is more fun to be with others than by myself.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Please answer 5 to this question	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

It is difficult for me to let go of a problem before I have found a solution.

I enjoy group activities.

It is important to me to feel like I am part of a community.

Please answer "Neither Agree nor Disagree" to this question

The well being of others is important to me.

If the reward is sufficient I will put in the effort.

I like to question the status quo.

I prefer setting my own goals.

I like to provoke.

I often let my curiosity guide me.

I like to try new things.

Please answer "Agree" to this question

I feel good taking on the role of a mentor.

I see myself as a rebel.

I look out for my own interests.

It is important to me to follow my own path.

I like defeating obstacles.

I like mastering difficult tasks.

It makes me happy if I am able to help others.

Rewards are a great way to motivate me.

Being independent is important to me.

I dislike following rules.

Return of investment is important to me.

I like competitions where a prize can be won.

I like to take changing things into my own hand.

Interacting with others is important to me.

I like sharing my knowledge.

It is important to me to always carry out my tasks completely.

I like being part of a team.

Spectator Interactions

As a viewer of livestreamed game content, please rate on a scale of 1 to 5 how appealing the following interactions are for you.

Chat Input *

Interacting with the livestreamer and other viewers through a live chat room

1 2 3 4 5

Not at all appealing Very appealing

Voting or Polling *

Selecting options from a list to express opinion

1 2 3 4 5

Not at all appealing Very appealing

Affiliation *

Declaring permanent/semi-permanent allegiance to particular player or team

	1	2	3	4	5	
Not at all appealing	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very appealing

Betting *

Wagering in-game or streaming channel-based currency (no monetary value) on an outcome

	1	2	3	4	5	
Not at all appealing	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very appealing

Cheering and Donation incentives *

Spending money to display special emoticons, have an on-screen message or have the streamer react a certain way/read out a message during the live-stream

	1	2	3	4	5	
Not at all appealing	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very appealing

Commentary and Player Interviews *

People (may or may not be active players) providing informed insight on player behavior/mechanics/the events in game

	1	2	3	4	5	
Not at all appealing	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very appealing

Direct Viewer Participation and Lotteries *

Directly interacting in-game world with the streamer(s), potentially accessed by entering and winning a lottery

	1	2	3	4	5	
Not at all appealing	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very appealing

Viewer Created Content *

Submitting original game content (ex. levels) to streamers for them to play and broadcast

	1	2	3	4	5	
Not at all appealing	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very appealing

Game Content Modification *

Having indirect influence over elements of the game world (ex. spawning more enemies, sending in-game resources, changing visuals of the game, etc)

1 2 3 4 5

Not at all appealing Very appealing

Please let us know which (if any) of the above options were confusing, or if there is a type of interaction you would be interested in that has not appeared here.

Your answer

If you would like to be notified of any publications based on the results of this survey, please enter your email address below. Email addresses will not be shared with anyone nor will they be included in any analyses of the data.

Your answer

A.2 Esports Tournament Spectator Motivations and Behaviour Survey

Survey Introduction

YOUR PARTICIPATION

- Your participation in this survey is voluntary. You can choose to quit anytime without providing any explanations.
- The survey will take between 20 and 30 minutes to complete, depending on your level of interest and experience related to the subject of the survey.

YOUR DATA

- Responses are anonymized and no identifying information will be collected.
- There are no known or anticipated risks to you from participating in this study.
- Your responses will only be recorded if you complete the survey. You may choose to exit the survey at any time; by doing so all of your responses and any identifying information will be discarded.

⋮

Please confirm the statement below. If not, please exit the survey. *

I freely consent to participate in this study.

Pre-Survey Questions

Section 2 of 9

Pre-Survey Questions



Instructions: Please indicate the degree to which the following statements are characteristic of you from a scale of 1(Not at all like me) to 5 (Extremely like me)

I spectate professional (LEC, LCS, LPL, LCK, etc) league of legends esports tournaments. *

	1	2	3	4	5	
Not at all like me	<input type="radio"/>	Extremely like me				

I spectate non-professional LoL esports tournaments. *

	1	2	3	4	5	
Not at all like me	<input type="radio"/>	Extremely like me				

I identify as a gamer (I play games frequently). *

	1	2	3	4	5	
Not at all like me	<input type="radio"/>	Extremely like me				

Demographic

Section 3 of 9

Demographic



Description (optional)

Key terms and Definitions

eSports: "The term 'esports' (electronic sports) refers to professional video game play, whereby expert players compete within various sporting contexts such as leagues, sponsored teams, or bracketed tournaments in the presence of spectators"

Livestream: eSports professional games broadcasted through online channels such as twitch, youtube.

Spectator: refers to the viewers of livestreams. However, compared to viewers of traditional media, Spectators also have the ability to interact with the livestream with interactive features.

Interactive features: features that enable spectators to interact with other spectators or the hosts of the livestream. Such as, live chat, donation incentives, polling, etc

What is your age? *

Short answer text

How often do you play League of Legends? *

- Never
- A least once a month
- A least once a week
- I play every day



On a scale from one (1) to five (5), how often do you watch League of Legends professional tournaments. *

Never 1 2 3 4 5 Whenever there is a game happening

What does Lux's ult do? *

- Cast a storm of ice shards in a target area. Damage and slows all enemies inside.
- Shoots out an orb of light. Any enemies that are hit by the orb are rooted in place and take magic damage.
- Lux blasts a beam of light over a long distance. All enemies that are hit take a large amount of magic dam...
- Lux summons an angel that stands in a target location. All enemies within the angels range take magic da...

On a scale from one (1) to five (5), how often do you use livestream interactive features (example: chat, donations, polls) *

Never 1 2 3 4 5 All the time

Select all the interactive livestream features that you most frequently use when watching livestreams (you may select more than one answer). *

- Live chat
- Donations
- Polls
- Other features
- I don't use any interactive features

If you use other interactive features that were not mentioned in the question above, tell us what kind of features do you use.

Short answer text

.....

If you don't use any interactive features, let us know why.

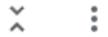
Short answer text

.....

Question #1

Section 4 of 9

Question #1



****Instructions:****

For the following questions provide as many details as possible about an experience that you had. Try your best to express your feelings about those events.

****Key terms and Definitions****

eSports: "The term 'esports' (electronic sports) refers to professional video game play, whereby expert players compete within various sporting contexts such as leagues, sponsored teams, or bracketed tournaments in the presence of spectators"

Livestream: eSports professional games broadcasted through online channels such as twitch, youtube.

Spectator: refers to the viewers of livestreams. However, compared to viewers of traditional media, Spectators also have the ability to interact with the livestream with interactive features.

Interactive features: features that enable spectators to interact with other spectators or the hosts of the livestream. Such as, live chat, donation incentives, polling, etc



Think about the experience you have/feel when watching eSports tournaments? Please reflect *
on that experience, try to describe the experience and provide as many details as possible.

Long answer text

What is the key part of the experience you remember the most? *

Long answer text

What were you doing/feeling at the time? *

Long answer text

How were you engaging with the livestream? *

Long answer text

Question #2

Section 5 of 9

Question #2



****Instructions:****

For the following questions provide as many details as possible about an experience that you had. Try your best to express your feelings about those events.

****Key terms and Definitions****

eSports: "The term 'esports' (electronic sports) refers to professional video game play, whereby expert players compete within various sporting contexts such as leagues, sponsored teams, or bracketed tournaments in the presence of spectators"

Livestream: eSports professional games broadcasted through online channels such as twitch, youtube.

Spectator: refers to the viewers of livestreams. However, compared to viewers of traditional media, Spectators also have the ability to interact with the livestream with interactive features.

Interactive features: features that enable spectators to interact with other spectators or the hosts of the livestream. Such as, live chat, donation incentives, polling, etc



What is the most ENJOYABLE experience you've had watching an esports tournament?? Please * describe that experience, and what was it that made it enjoyable?

Long answer text

What were you doing/feeling at the time that gave enjoyment? *

Long answer text

⋮
How were/were you engaging with the livestream? *

Long answer text
.....

Question #3

Section 6 of 9

Question #3



****Instructions:****

For the following questions provide as many details as possible about an experience that you had. Try your best to express your feelings about those events.

****Key terms and Definitions****

eSports: "The term 'esports' (electronic sports) refers to professional video game play, whereby expert players compete within various sporting contexts such as leagues, sponsored teams, or bracketed tournaments in the presence of spectators"

Livestream: eSports professional games broadcasted through online channels such as twitch, youtube.

Spectator: refers to the viewers of livestreams. However, compared to viewers of traditional media, Spectators also have the ability to interact with the livestream with interactive features.

Interactive features: features that enable spectators to interact with other spectators or the hosts of the livestream. Such as, live chat, donation incentives, polling, etc

Recall a tournament that you have spectated which you were actively using interactive features * such as chat, donations, polls, etc (this includes using tools that the streaming platform does not offer natively such as discussing the game live with your friends on Discord or discussion forums such as Reddit). What was happening that motivated you to get involved?

Long answer text
.....

⋮
What would motivate you to keep using those features after that experience? *

Long answer text

Question #4

Section 7 of 9

Question #4



****Instructions:****

For the following questions provide as many details as possible about an experience that you had. Try your best to express your feelings about those events.

****Key terms and Definitions****

eSports: "The term 'esports' (electronic sports) refers to professional video game play, whereby expert players compete within various sporting contexts such as leagues, sponsored teams, or bracketed tournaments in the presence of spectators"

Livestream: eSports professional games broadcasted through online channels such as twitch, youtube.

Spectator: refers to the viewers of livestreams. However, compared to viewers of traditional media, Spectators also have the ability to interact with the livestream with interactive features.

Interactive features: features that enable spectators to interact with other spectators or the hosts of the livestream. Such as, live chat, donation incentives, polling, etc

Why do you watch livestreamed esports tournaments? Check all reasons listed below that apply to you. *

- To learn/improve gameplay
- To support a team or player
- To socialize with the community
- To obtain incentives/prizes
- To enjoy gameplay performed at a professional/competitive level
- To lurk or have something playing in the background while doing other tasks
- To troll/meme with others
- Other reasons



If you selected other reasons, let us know what they are.

Long answer text

Given your answer(s) above, elaborate on your reasoning. What is it that makes it enjoyable? *

Long answer text

Short Answer Questions

Section 8 of 9

Short Answer Questions



Description (optional)

Do you spectate League of legends tournaments alone or with friends *

Long answer text

What is it that you keep on coming back and watch more tournaments? *

Long answer text

What do you enjoy most about the league of legends eSports scene or culture? *

Long answer text

Briefly describe if you prefer to playing the League of Legends or spectate others(Professionals * or Amateurs) play?

Long answer text

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