Spectator LF Streamer: Facilitating Better Stream Discovery through Spectator Motivations and Stream Affordances

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ABSTRACT

This paper explores game spectator needs, and proposes design choices aimed at enhancing the exploration and discovery experience on game streaming platforms. It does so by combining insights from previous game streaming research with a new survey study conducted among Twitch users (N = 124) to understand how to use spectator characteristics, searching behaviour, motivations and stream(er) affordances as a way to control and enhance the search experience. Preliminary results from the survey are presented, as are a set of initial design goals to improve the spectator experience based on the uncovered findings. Moving forward, these design goals will be evaluated and refined through user interviews and an iterative user-centred design process of prototypes.

CCS CONCEPTS

• **Human-centered computing** → **User studies**; **Information visualization**.

KEYWORDS

video games, spectator experience, Twitch

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1 INTRODUCTION

Watching video games instead of playing them has gained huge popularity. Twitch [13], the leading game streaming platform worldwide, hosts content generated by 7.4 million streamers per month, with a daily viewer count of 30 million people [6]. This popularity has resulted in the emergence of a multitude of new players offering game streaming services, such as YouTube Gaming and Facebook Gaming.

Game spectators have multiple reasons to watch games and its streamers [17]. Cheung and Huang [4] categorise spectators into multiple personas such as those who wish to be entertained, inspired by, or learn from watching experts to develop their own skills. Different types of streams cater to different personas. Streamers can focus on playing games casually without constraints, perform speed runs to break records in front of a cheering audience, review games, play a game in a demonstrative manner to teach viewers its strategies and intricacies, and so on [26]. Spectators can support their favourite teams or players, while getting deeper insights into the workings of (professional) play [2, 31].

As more streamers and games end up on game streaming platforms, we want to explore how this abundance of information impacts users trying to find their way among these massive libraries of broadcasts. The popular streaming platforms often provide simple filtering mechanisms such as keyword and text search and categorise games by genre or game title while sorting by popularity of the streamer. However, we assume spectators have different search incentives which are not facilitated by current user interfaces. Finding a specific niche might not be straightforward. We therefore wish to explore possible stream(er) attributes that are of personal importance (i.e. stream(er) affordances [8, 22, 23, 27]), such as the personality of the streamer, their skill level, but also gender, style, and type of audience so that spectators can find not just a stream but a community they can relate to.

Our goal is to better understand the needs of game streaming users (i.e. spectators), specifically starting with their characteristics, behaviour, motivations and stream(er) affordances during the exploration and search for new content. Based on existing literature and a survey study conducted among Twitch spectators (N = 124), we identify several spectator motivations to create a set of design goals which explore what metadata and what control are necessary to meet these needs. Through a user-centred iterative design approach, we will subsequently design, prototype, and evaluate new search and exploration solutions to create a better spectator experience, help users find and even serendipitously discover specific niches. In sum, we focus on the following research questions: *RQ1: Which characteristics, searching behaviour, stream(er) affordances and motivations can be identified among Twitch game streaming spectators?*, and *RQ2: Which design choices can improve the search and exploration experience of video game streaming platform users?*

Section 2 *Related Work* explores current game streaming literature on spectator personas, needs, wishes and motivations. These

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insights form the basis of Section 3 *Survey*, in which we detail the methodology and preliminary results of our survey research that maps the spectator needs of Twitch game streaming users. In section 4 *Preliminary Design Goals* we detail preliminary design goals to create a better spectator search and exploration experience, based on prior literature and the survey results. Finally, section 5 *Future Work and Conclusion* explains the steps we will take to further evaluate and refine our design goals.

2 RELATED WORK

The rise of game streaming has returned the social interactivity of bystanders, similar to gatherings around arcade games in the 1980s and LAN-parties of the 1990s. Spectating people playing games has become a mass phenomenon [9]. Several studies have explored what motivates spectators, providing insights into how specific stream and streamer attributes have consequences on popularity and provide value to the spectator [4, 7, 9, 19, 23, 26, 28]), but no studies seem to address how users search and find streams that match their motivations.

Guo et al. [8] explores the streamer characteristics that influence their popularity, such as attractiveness, competence, and communication style. Beauty, expertise, and humour lead to watching intention, as well as community, interactivity and emotional support [3]. This is similar to the motivations of YouTube spectators who value both personality and physical attractiveness and look for YouTubers they can identify with [16]. Live streams can provide the social interaction and a sense of belonging spectators long for [12], which is facilitated better through streams with a smaller amount of participants instead of large, fast-moving chat rooms [10].

Categorisation of spectators and their specific behaviour, as well as game genre and their relevant gratifications can give us insights into what spectators require to find the streams that meet their needs. Schuck et al. [22]'s Social Player wishes to interact with the stream and streamer; the Content Observer wishes to consume the stream undisturbed, while the Financial Supporter is willing to donate to the streamer. Competitive games attract spectators looking to learn new strategies, while sandbox games' slow pace welcomes interaction between streamer and spectator [26]. Often it is merely tension release that motivates people to watch a stream [24].

Efforts to improve the experience of spectators have been made in different ways. Apart from interaction with fellow spectators and the streamer through chat, new ways of interactivity create a more immersive and fun experience [20]. Real-time dashboards for games can help spectators better understand and follow the action in fast-paced esports games [2]. However, the act of finding a specific stream is an experience in itself that our research sets out to improve.

This experience on online services is facilitated by search functionality, categorisation, and recommender systems to help users navigate the abundance of data they provide. Twitch relies heavily on the latter (see Figure 1). But recommender systems often behave as "black boxes", meaning the rationale behind the recommendations is often not explained to end-users [18]. Still, allowing users to understand and customise these recommendations can be beneficial to the experience and result in better acceptance and efficiency for the users [11, 15, 30]. This study will delve into what control is required within the context of streaming platforms.

3 SURVEY

In order to get a better understanding of spectators' needs during exploration and discovery of new game streaming content on Twitch, we set up an online survey that was conducted internationally over a two-month period (April to June 2023). The survey was programmed in Qualtrics. It was disseminated on relevant Reddit and Discord channels, and flyers were posted around the researchers' university campus. In the invitations, it was clearly indicated that we were looking for adult participants (18 years and above) who used the Twitch platform to watch game streams. No personal data were collected, and participants consented to voluntary participation. An overview of the survey questions (along with references to the source materials) can be found in Appendix A. 187 people eventually took part in the survey, with 124 participants completing it. Our analyses were performed on these 124 complete survey responses.

3.1 Spectator Characteristics

The survey started off with questions on participants' sociodemographic profile, namely their gender, age and country of residence. Descriptive statistics of these sociodemographic variables show that 94 of our participants (75.8%) identified as male, 20 (16.1%) as female, 9 (7.2%) as non-binary and 1 (0.8%) preferred not to say, which is in line with Twitch's user base [5]. The mean age of our participants was 27.08 years old (SD = 7.32). 53.2% of the participants hailed from Belgium (i.e. the researchers' country of residence), but participants from a wide range of other countries were reached as well, across three different continents: Europe (other than Belgium: 25.0%), America (21.0%) and Asia (0.8%).

The survey also gauged participants' spectator profile, such as how long and how often they have been using Twitch, and how often they watch specific genres of game streams (e.g. Competitive, Casual) and games (e.g. Shooter games, Sports games). Descriptive statistics of the game spectator characteristics of our participants showed that the majority had been using Twitch to watch game streams for more than three years (less than a year: 4.8%, one to two years: 11.3%, three to five years: 47.6%, six to eight years: 24.2%, nine years or more: 12.1%), and watch Twitch on a weekly basis ((almost) never: 5.6%, a few times a year: 9.7%, at least monthly: 16.9%, at least weekly: 42.7%, daily: 25.0%). With regards to game streams genres, Competitive, Let's Play and Casual game streams (Mdn = 3) were watched more often than Speedruns, Talkshows, How to Play and Review streams (Mdn = 2). Finally, certain game genres also proved to be more popular than others, with Shooter games, Role-Playing games, Action & Adventure games, Strategy games and Sandbox games (Mdn = 3) being watched more often than Card & Board games, Sports games, Simulation games, Puzzle games, Massively Multiplayer Online games (Mdn = 2) and lastly, Rhythm games (Mdn = 1).

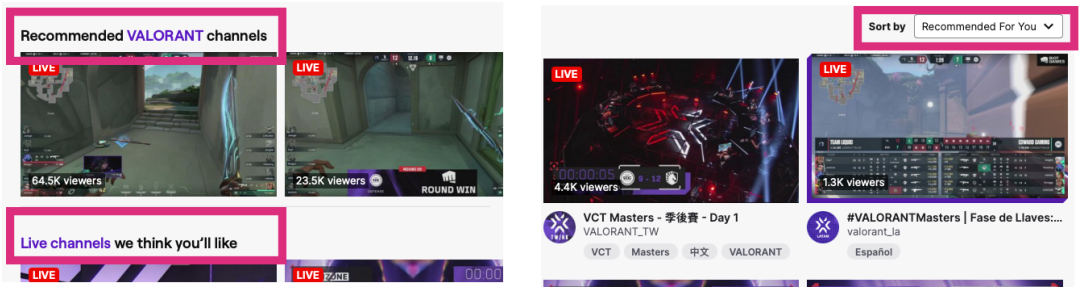

Figure 1: Twitch relies on recommendations for their main navigation. The homepage (left) shows a carousel of recommended videos (top), "Recommended channels"and "Channels you'll like". Sorting on other pages (right) defaults to "Recommended for you".

3.2 Searching Behaviour

Next, participants were queried on how often (*never, rarely, sometimes, very often, always*) they make use of the searching and browsing options that Twitch currently provides (e.g. searching by typing in keywords in the search bar, browsing what is trending on Twitch), and how often they use Twitch's sorting and filtering options to further refine these search results (e.g. sorting by Recommended For You, filtering by Language). Descriptive statistics show that three browsing strategies were generally used to look for new game streams to watch, namely browsing the channels of the streamers that people follow/subscribe to (*Mdn* = 4), browsing by game (*Mdn* = 3) and searching by typing in keywords in the search bar (*Mdn* = 2.5). Other searching and browsing options were rarely used. The same goes for Twitch's sorting and filtering options: the results show that participants rarely use these options to refine their searching and browsing results. The option to sort by Viewers (High to Low) is used most commonly if people do use these options (*Mdn* = 2.5).

3.3 Stream(er) Affordances

Moreover, the survey probed how important (*not important, slightly important, moderately important, important, very important*) 31 attributes of the game stream and/or streamer are to the participants when deciding on something to watch (e.g. the stream's audiovisual quality, the streamer's gender) [8, 22, 23, 27]. Descriptive statistics show that certain stream(er) attributes are more important to our participants than others when searching for a game stream. The streamer's personality, voice and speaking style, interaction with the audience, the atmosphere of the chat room and the stream's audiovisual quality are generally seen as the most important attributes (*Mdn* = 4), outranking the others.

3.4 Motivations

Finally, participants were asked to what extent (*strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, strongly agree*) a series of 24 motivational statements apply to their experience with Twitch game streaming, assessing the reasons why they liked to watch streams overall [1, 3, 25]. We performed a Principal Components Analysis (PCA) with orthogonal rotation (varimax) on our 24 motivational items to explore which spectator motivations emerged from our data. The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis (.78). Bartlett's test of sphericity X^2 (276) = 1885.08, $p < .001$, showed that correlations between items were sufficiently large for PCA. The PCA showed that 6 components had eigenvalues over Kaiser's criterion of 1 and which cumulatively explained 71.61% of the variance (see Table 1 for a summary of the PCA results).

Subsequently, new variables were computed based on these 6 components, averaging the scores on each component's items: 1) Community Engagement (N = 7, *Cronbach's* α = .93), 2) Learning and Skill Improvement (N = 3, *Cronbach's* α = .92), 3) Entertainment (N = 4, *Cronbach's* α = .79), 4) Social and Emotional Support (N = 4, *Cronbach's* α = .78), 5) Game Discovery (N = 3, *Cronbach's* α = .78), and 6) Pastime and Habit (N = 3, *Cronbach's* α = .72). When looking at the means of these six motivations among our participants, we see that Entertainment is their primary motive to watch gaming streams on Twitch (M = 4.14, SD = .69), followed by Pastime and Habit (M = 3.22, SD = 1.04), Game Discovery (M = 3.20, SD = 1.12), Learning and Skill Improvement (M = 3.04, SD = 1.26), Social and Emotional support (M = 2.83, SD = 1.01) and finally, Community Engagement (M = 2.75, SD = 1.10).

3.5 Relationships between Variables

Apart from frequencies and descriptives for our measured variables, we also explore the relationships that exist between them by means of Pearson correlation analyses. Interestingly, our preliminary results suggest that different motivations may be related to different spectator characteristics, searching behaviour and stream(er) affordances. In what follows, we will briefly summarise the most salient insights that we have gathered so far, according to motivation.

3.5.1 Community Engagement. The motivation of Community Engagement proves to be weakly to moderately and positively related to a large variety of game spectator characteristics, searching behaviour and stream(er) attributes. The strongest relationships can be found with:

- **Spectator characteristics:** how often participants use Twitch to watch game streams ($r(124) = .265$, $p = .003$), and how often they watch Casual game streams on Twitch ($r(124) = .257$, $p = .004$).
- **Searching behaviour:** how often they browse by asking friends or other users for recommendations ($r(124) = .240$, $p = .007$), and how often they make use of the sorting option Viewers (Low to High) ($r(124) = .296$, $p < .001$).

Table 1: Summary of PCA results for motivations for watching streams on Twitch. Factor loadings under .4 have been omitted.

Item	Community Engagement	Learning and Skill Improvement	Entertainment	Social and Emotional Support	Game Discovery	Pastime and Habit
I watch streams where the streamer values my contributions to the chat	.89					
I watch streams where the community values my contributions to the chat	.87					
I watch streams to communicate with streamers	.86					
I watch streams where the streamer recognises my presence	.85					
I watch streams to communicate with other viewers	.82					
I watch streams to communicate with friends	.77					
I watch streams to feel like I'm part of the community	.65					
I watch streams to look for information on game tips and tricks		.91				
I watch streams to get information on learning how to play games		.91				
I watch streams to be better informed about (new) game strategies		.81				
I watch streams to be entertained			.89			
I watch streams to have fun			.86			
I watch streams to relax			.72			
I watch streams to be excited			.64			
I watch streams to escape the real world (e.g. work, school, family) for a bit				.76		
I watch streams to feel less lonely				.76		
I watch streams in order to not be alone				.72		
I watch streams to be immersed in the gameplay of streamers				.56		
I watch streams to find games I would not otherwise have found					.88	
I watch streams to be better informed about new games I consider playing					.80	
I watch streams to stay up-to-date about games					.59	
I watch streams because it passes the time, particularly when I'm bored						.90
I watch streams when I have nothing better to do						.87
I watch streams out of habit, it is just something I do						.58
Eigenvalues	6.06	4.13	2.42	1.85	1.46	1.27
% of variance	25.26	17.19	10.09	7.72	6.08	5.27

- **Stream(er) affordances:** the importance of the streamer's interaction with the audience ($r(124) = .377$, $p < .001$), the atmosphere of the chat room ($r(124) = .433$, $p < .001$), and the streamer giving the audience more control over the stream ($r(124) = .240$, $p = .007$); the presence of links to the social media accounts of the streamer ($r(124) = .224$, $p = .012$), a FAQ or About Me section with a personalised description of the streamer ($r(124) = .335$, $p < .001$), and the broadcasting schedule of the streamer ($r(124) = .262$, $p = .003$).

3.5.2 Learning and Skill Improvement. Learning and Skill Improvement shows weak to moderate relationships with a variety of variables. Specifically, the motivation is most strongly correlated with:

- **Spectator characteristics:** how often participants watch Competitive game streams ($r(124) = .304$, $p < .001$), and how often they watch How to Play game streams ($r(124) = .331$, $p < .001$).
- **Stream(er) affordances:** the importance of the streamer's gaming skills ($r(124) = .3214$, $p < .001$), the game mode or map that the streamer is playing ($r(124) = .246$, $p = .006$), and the in-game character or equipment that the streamer is using ($r(124) = .340$, $p < .001$); the presence of machine specifications that describe the specific technology/tools the streamer uses ($r(124) = .313$, $p < .001$).

3.5.3 Entertainment. Entertainment shows weak to moderate correlations with a variety of variables, most importantly relating to:

- **Spectator characteristics:** how often participants use Twitch to watch game streams ($r(124) = .291$, $p = .001$), how often they watch Sandbox games ($r(124) = .387$, $p < .001$), how often they watch Let's Play game streams ($r(124) = .2540$, $p = .004$), and how often they watch Casual game streams ($r(124) = .304$, $p < .001$).
- **Searching behaviour:** how often they browse the channels of the game streamers that they follow/are subscribed to ($r(124) = .298$, $p < .001$), and how often they browse by asking friends or other users for recommendations ($r(124) = .249$, $p = .005$).
- **Stream(er) affordances:** the importance of the atmosphere of the chat room ($r(124) = .269$, $p = .002$).

3.5.4 Social and Emotional Support. Social and Emotional Support is weakly to moderately related to a large variety of variables, with the most important relationships being:

- **Spectator characteristics:** how often participants watch Role-Playing games ($r(124) = .308$, $p < .001$), and how often they watch Let's Play game streams ($r(124) = .262$, $p = .003$).
- **Searching behaviour:** how often they browse the channels of the game streamers that they follow/are subscribed to ($r(124) = .293$, $p < .001$), and how often they browse what Twitch recommends to them ($r(124) = .302$, $p < .001$).
- **Stream(er) affordances:** the presence of donation links that make it possible to donate money to the streamer ($r(124) = .249$, $p = .005$), and the broadcasting schedule of the streamer ($r(124) = .267$, $p = .003$).

3.5.5 Game Discovery. Game Discovery is weakly to moderately related to only a small variety of variables. The strongest relationships can be found with:

- **Spectator characteristics:** how long they have been using Twitch to watch game streams ($r(124) = .301$, $p < .001$).
- **Searching behaviour:** how often they browse by Recently Released Games ($r(124) = .302$, $p < .001$).

3.5.6 Pastime and Habit. Finally, Pastime and Habit is related to almost no variables. It shows a few weak relationships, with the strongest being with participants' **searching behaviour**, specifically: filtering by Tags ($r(124) = .271$, $p = .002$).

4 PRELIMINARY DESIGN GOALS

Twitch's basic browsing structure focuses on current subscriptions/channels spectators follow and recommendations as a first step into exploration of the abundance of streams. From the survey, we learn that spectators often browse through streamers they follow, have a specific game in mind, or even use keywords in the

search bar as preferred choice of navigation, but also that spectators find streamer attributes such as personality and speaking style important.

Based on the literature and survey results, we look at how to improve the exploration experience of the stream spectators through a series of design goals focusing on which attributes or metadata the user should directly or indirectly be given control of. The examples of metadata given here are merely a subset of possibilities which will be evaluated in their effectiveness and usefulness through an iterative process to refine the design goals (see Section 5).

4.1 Design Goal 1: Social Interaction

The social interaction between spectator and streamer, but also spectators among themselves, is an important motivator when watching a stream. To help spectators discover streams that satisfy their social needs, the metadata should relate to the level of interaction the stream provides. Based on our survey and related work, examples of attributes are:

- **Viewer count:** a low number of participants can be an indication of how approachable the streamer is. Streamers with small audiences might interact more with their audience, creating a more personal experience and relationship with the streamer. A high number of participants often requires the use of moderators, thus limiting the direct interaction with the streamer. This might indicate a more active and social community [10].
- **Game and stream genre:** slower paced games such as Sandbox games, and Casual streams offer room for the community to participate, due to their slower paced and exploratory nature, while other genres (e.g. Real-Time Strategy) do not [26]. This suggests that these genres can help spectators discover new social communities.
- **Stream attributes:** streamer's equipment, such as the presence of a microphone and camera can indicate that the streamer interacts with its audience. Participants motivated by seeking social and emotional support found donation links important, which invite spectators to interact financially.
- **Personality traits:** directing your search based on personality, looks, gender, and sexual orientation etcetera can help spectators discover streamers and communities they can identify with [12, 16].
- **Chat atmosphere:** participants with a high community engagement motivation valued the type of atmosphere when looking for a stream, an attribute that could be crowd sourced through ratings of the community or average user profile ratings.

Motivations: *Community Engagement, Social and Emotional Support.* ***Personas:*** *Social Player, Streamer-focused Observer [22]*

4.2 Design Goal 2: Knowledge Acquisition

Many streamers have a high level of gaming skills, be it professional esports players catering to their fans through their channel or "casual players" that clock many hours on a specific game. Spectators report that they watch streams to learn new tricks and strategies from their favourite players. Often they will watch streams to learn about new games to help them decide whether the game is worth buying or if it meets their expectations. A first logical step is choosing the game to learn about, but with recently released and popular games, this filter often results in an abundance of streams. Therefore, these examples of attributes can help spectators find their preferred stream:

- **Streamer skill**: the frequency of watching Competitive games is high with participants motivated to improve skills. Identifying esports players, as well as providing access to a more general indicator of streamer skill level, either crowd sourced or set by the streamer, could help spectators discover new, skilled players. Online competitive games often have in-game ranking which can create an objective alternative indicator.
- **Game and stream genre**: specific types of games and streams lend themselves better for learning. How to Play streams specifically teach the player about the game. Multiplayer Online Battle Arena games which are popular in esports provide insights into expert strategies [26].

Motivations*: Learning and Skill Improvement, Game Discovery* ***Personas****: The Curious, The Pupil [4]*

4.3 Design Goal 3: Captivation

Often spectators want to watch a stream for the sake of enjoyment, distraction or out of boredom. The eventual types of streams that fall under this category are broad. One could argue that Twitch's current recommender approach suffices to cater to this audience. However, providing ways of fine-tuning the spectator's search towards their personal preference could still prove beneficial. A spectator might be in a specific mood and could be looking for an either more active or relaxing stream, the enjoyment of streamer's gear, personality traits, looks, or the atmosphere in the chatroom. Future user evaluations will have to define the broadness of the parameters required to meet this goal. Examples of parameters that fit this category are:

- **Game and stream genre:** participants of the survey who wish to escape real life for a while lean towards Role-Playing games and Let's Play streams. Sandbox games and Let's Play content cater to participants looking for entertainment. Sjöblom et al. [26] similarly report that First-Person Shooter games result in tension release.
- **Personality traits:** streamers beauty, expertise, humor, and passion influence watching intention [8]. Survey participants considered streamer's personality the most important factor when searching for streams.

Motivations*: Entertainment, Pastime and Habit* ***Personas****: Content Observer [22], The Bystander, The Entertained [4]*

5 FUTURE WORK AND CONCLUSION

Twitch's current approach of sorting streams by recommendations, by viewer count and "Recently started", does not facilitate the broad amount of motivations and needs of spectators. Our goal is to explore the attributes (metadata) and their values required to give users more control during the exploratory phase in spectating.

However, the joy of unintentionally discovering a new streamer must not be ignored. Twitch's recommendations do provide the user with the necessary "randomness" (albeit based on the user's behaviour on the platform) to create these serendipitous moments, but with little control. This lack of control could be part of the reason why our survey shows less interest in the recommended channels. Meta-recommendation systems provide users with personalised control over the generation of these suggestions by allowing alteration of the importance of certain parameters [21]. Yucheng et al. [14] provided users different levels of control, where a high-level of control showed to produce better acceptance of music recommendations. Similarly, adding such control to Twitch recommendations could help improve the quality of the recommendations from the user's perspective.

The goal of this research is to understand what parameters will have the biggest impact on the search experience of the spectators, either by allowing manual filtering (e.g. through faceted search [29]) or as an input for recommender systems to mould recommendations to the user's needs.

To further refine our design goals and the required parameters for a better search experience, we will conduct user interviews and take an iterative user-centred design approach, building prototypes that mimic the behaviour of the Twitch interface to test the effectiveness and usefulness of a multitude of parameters. We will also explore the granularity of the control required: should users be given full control to parameters such as number of participants and personality traits, or do users prefer a more abstract approach where their motivation choice automatically provides specific values for the parameters that either return a result or tweak the recommender system.

The guidelines suggest what metadata could be beneficial to support a better search experience. Note that we currently do not take into account the availability of the required metadata. We acknowledge that some metadata (e.g. attractiveness, personality traits, and even skill) are subjective attributes that will require careful considerations. The feasibility of certain metadata and their ethical implications will also be explored in future research.

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A SURVEY QUESTIONS

A.1 Spectator Characteristics

First, we would like to ask you a couple of questions to get a sense of your socio-demographic profile.

Q1. Which gender do you most identify with?

□ Male □ Female □ Non-binary/third gender □ Prefer not to say □ Other: ...

Q2. What is your year of birth?

Q3. In which country do you currently reside?

The next couple of questions will ask you about your profile as a game spectator.

Q4. How long have you been using Twitch to watch gaming streams?

□ Less than a year □ One to two years □ Three to five years □ Six to eight years □ Nine years or more

Q5. How often do you use Twitch to watch gaming streams?

□ (Almost) never □ A few times a year □ At least monthly □ At least weekly □ Daily

Q6. How often do you watch the following game categories on Twitch? [26]

□ Never □ Rarely □ Sometimes □ Very often □ Always

(1) Action & Adventure games (e.g. Platformer, Survival)
(2) Shooter games (e.g. First-Person Shooter, Hero-Shooter)
(3) Card & Board games (e.g. Collectible Card, Chess)
(4) Rhythm games (e.g. Music, Dancing)
(5) Role-Playing Games (e.g. Action-RPG, Roguelikes)
(6) Strategy games (e.g. Real-Time Strategy, Multiplayer Online Battle Arena)
(7) Sports games (e.g. Football, Racing)
(8) Simulation games (e.g. Life, Vehicle, Management)
(9) Puzzle games (e.g. Tile-Matching, Puzzle-Platformer)
(10) Massively Multiplayer Online games (e.g. MMORPG, MMOFPS)
(11) Sandbox games (e.g. Open World, Game (Creation) Platform)
(12) Other: ...

Q7. How often do you watch the following types of gaming streams on Twitch?

□ Never □ Rarely □ Sometimes □ Very often □ Always

(1) Live channels: live gaming streams
(2) Videos: previously recorded gaming streams
(3) Clips: brief highlights from previously recorded gaming streams

Q8. How often do you watch the following types of gaming content on Twitch? [26]

□ Never □ Rarely □ Sometimes □ Very often □ Always

(1) Competitive: competitive matchmaking, esports tournaments and matches
(2) Let's Play: the streamer plays a game from the start
(3) Casual: no strict structure or aim, relatively explorative
(4) Speedruns: the streamer attempts to complete a game as quickly as possible, sometimes with additional restraints
(5) Talkshows: the streamer (sometimes with guests) discusses topics centered around a particular game (culture)
(6) How to Play: the streamer plays a game in a demonstrative manner, teaching viewers its strategies and intricacies
(7) Reviews: the streamer gives an analytical review of a game

A.2 Searching Behaviour

In the next part of the survey, we are interested in knowing how you search and browse for gaming streams to watch on Twitch.

Q9. How often do you use the following searching and browsing options on Twitch when looking for something to watch?

□ Never □ Rarely □ Sometimes □ Very often □ Always

(1) I search by typing in keywords in the search bar
(2) I browse the channels of the gaming streamers that I follow/subscribe to
(3) I browse by game category (e.g. "Shooter", "Role-Playing")
(4) I browse by game (e.g. "Call of Duty: Warzone", "Hogwarts Legacy")
(5) I browse what Twitch recommends to me (e.g. "Live channels we think you'll like", "Recommended Gaming Streams")
(6) I browse what is trending on Twitch (e.g. "What's hot", "All aboard the Hype Train!")
(7) I browse by Recently Released Games
(8) I ask friends or other users for recommendations

Q10. How often do you use the sorting and filtering options of Twitch when looking for gaming streams to watch?

□ Never □ Rarely □ Sometimes □ Very often □ Always

(1) Sort by: Recommended For You
(2) Sort by: Viewers: High to Low
(3) Sort by: Viewers: Low to High
(4) Sort by: Recently Started
(5) Filter by: Language
(6) Filter by: Top (24h, 7d, 30d, All)
(7) Filter by: Past broadcasts
(8) Filter by: Highlights
(9) Filter by: Uploads
(10) Filter by: Tags

A.3 Stream(er) Affordances

The next couple of questions will ask you about which stream (er) characteristics you find important when deciding on something to watch on Twitch.

Q11. How important are the following factors related to the stream(er) to you when you are searching for a gaming stream to watch on Twitch? [8, 22, 23, 27]

□ Not at all important □ Slightly important □ Moderately important □ Very important □ Extremely important

(1) The stream's audiovisual quality (e.g. whether or not the stream has smooth and high quality audio and video)
(2) The streamer's streaming equipment (e.g. whether or not the streamer uses a microphone and webcam)
(3) The streamer's gaming equipment (e.g. whether the streamer plays on PC or game console)
(4) The streamer's environment (e.g. the streamer's decor style, props, theme)
(5) The streamer's gaming skills (e.g. whether the streamer is an expert or rather an amateur in the game)
(6) The game mode or map that the streamer is currently playing (e.g. Battle Royale, Capture The Flag)

(7) The in-game character or equipment that the streamer is currently using (e.g. the hero or gun they are playing with)
(8) The streamer's popularity (e.g. the number of followers or lack of followers)
(9) The streamer's gender (e.g. whether the streamer is male, female or non-binary)
(10) The streamer's sexual orientation (e.g. whether the streamer is heterosexual or L.G.B.T.Q.I.A.+)
(11) The streamer's personality (e.g. whether the streamer is funny, warm, serious, angry)
(12) The streamer's physical appearance (e.g. whether the streamer is attractive, has specific physical features, has a certain style of fashion)
(13) The streamer's voice and speaking style (e.g. whether the streamer has a British accent, is loud, talks very fast)
(14) The streamer's amount of speaking (e.g. whether the streamer is quiet or talks a lot)
(15) The streamer's interaction with the audience (e.g. whether or not the streamer is interacting and communicating with the chat room a lot)
(16) The atmosphere of the chat room (e.g. the type of interaction within the chat room: friendly, hostile, funny, toxic)
(17) The streamer's use of drops and giveaways
(18) The streamer giving the audience more control over the stream (e.g. the audience being able to add or remove enemies, change the game's rules, trigger in-game events)

Q12. How important is the presence or absence of the following factors related to the stream(er) to you when you are searching for a gaming stream to watch on Twitch? [27]

□ Not at all important □ Slightly important □ Moderately important □ Very important □ Extremely important

(1) Additional (non-game) background music
(2) Visual overlays giving more insight into the game, e.g. detailing the streamer's current game mode, hero, gun, level
(3) Visual overlays indicating subscriber count and donor information
(4) Links to the social media accounts of the streamer
(5) Donation links that allow viewers to donate money to the streamer
(6) Links to sponsors, accompanied by call-for-actions and links to specific products/services
(7) Link to the subscription page of the streamer, detailing the benefits subscribers get
(8) Machine specifications that describe the specific technology/tools the streamer uses
(9) A FAQ or About Me section with a personalised description of the streamer
(10) Links to a merchandise store
(11) Rules defining the code of conduct for the channel
(12) A top donor list highlighting the highest donations made by viewers
(13) The broadcasting schedule of the streamer

A.4 Motivations

Finally, the next couple of questions will ask you about your motivations as a game spectator.

Q13. Please rate the following statements regarding why you watch gaming streams on Twitch. [1, 3, 25]

□ Strongly disagree □ Somewhat disagree □ Neither agree nor disagree □ Somewhat agree □ Strongly agree

(1) I watch streams to be entertained
(2) I watch streams to have fun
(3) I watch streams to be excited
(4) I watch streams to relax
(5) I watch streams to escape the real world (e.g. work, school, family) for a bit
(6) I watch streams to be immersed in the gameplay of streamers
(7) I watch streams to stay up-to-date about games
(8) I watch streams to be better informed about new games I consider playing
(9) I watch streams to find games I would not otherwise have found
(10) I watch streams to be better informed about (new) game strategies
(11) I watch streams to get information on learning how to play games
(12) I watch streams to look for information on game tips and tricks
(13) I watch streams where the streamer recognises my presence
(14) I watch streams where the streamer values my contributions to the chat
(15) I watch streams where the community values my contributions to the chat
(16) I watch streams in order to not be alone
(17) I watch streams to feel less lonely
(18) I watch streams to feel like I'm part of the community
(19) I watch streams to communicate with friends
(20) I watch streams to communicate with other viewers
(21) I watch streams to communicate with streamers
(22) I watch streams out of habit, it is just something I do
(23) I watch streams because it passes the time, particularly when I'm bored
(24) I watch streams when I have nothing better to do

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