

Power to the Spectator: Towards an Enhanced Video Game Stream Discovery Experience

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Abstract. Game streaming platforms like Twitch could benefit from more user control and transparency in recommendations. In this paper, we highlight the importance of allowing users to customise their streaming experience through three design goals: Social Interaction, Captivation, and Knowledge Acquisition, the latter addressing both skill improvement and serendipity. We discuss the preliminary results of our on-going iterative and user-centred design process aimed at improving the exploration experience for game spectators. More specifically we report on the results of co-design research to explore the parameters necessary for game spectators' enhanced control over their game stream discovery experience.

Keywords: Esports · Spectator experience · Video games · Twitch

1 Introduction

The act of watching video games has become very popular, with leading game streaming platform Twitch [11] reaching a daily viewer count of 30 million people watching content generated by 7.4 million streamers per month [5]. As the variety of streamers and games on these game streaming platforms grows, users have to find their way through massive libraries of broadcasts to find a stream that caters to their specific interests. We posit that the existing searching and browsing tools of game streaming platforms—like keyword searches and sorting by popularity—may be insufficient for helping game spectators find a stream or community they can relate to.

Prior research has shown that there are a variety of reasons for watching game streams, ranging from pure entertainment and pastime, a need for community engagement and social-emotional support, to discovering new games and learning from the gameplay of expert players [1, 2, 4, 9, 14, 20, 23]. Different games and game streams tend to satisfy different spectator motivations. For instance, competitive games attract spectators looking to learn new strategies but these fast-paced streams often leave little room for social interaction, while sandbox games' slow pace welcomes interaction between streamer, spectator and community [9, 20]. In addition to that, game spectators

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also value the personal attributes of the streamer and stream, like personality, skill level, gender, style, and audience type [9, 18, 19, 21].

As such, every type of game spectator has a different set of requirements when looking for a stream which can furthermore vary from session to session [9]. Previously, our research has gained more insight into these spectator needs by investigating game spectator characteristics, searching behaviour, motivations and stream(er) affordances of game spectators on Twitch by means of a survey study [9]. The results of the survey suggest that finding a new stream to watch on the platform is not a straightforward process due to the limitations of its user interface. The existing method on Twitch of organising streams by recommendations, games/game categories, viewer count, and “Recently started” does not adequately address the diverse motivations and needs of spectators.

Based on the results of the survey, we have therefore suggested a series of design goals to improve the spectator experience in the game stream discovery phase (and provide a more personalised searching experience), using Twitch as a case study [9]. These design goals give examples of which attributes or metadata the game spectator should directly or indirectly be given control of during their exploration experience. In this paper, we go a step further and explain our iterative and user-centred process of designing a new Twitch exploration interface that implements the aforementioned design goals. Specifically, the following research question takes centre stage: *which design choices can improve the search and exploration experience of video game spectators on Twitch?*

2 Related Work

Plenty of research has focused on the motivation behind and experience of watching streams. While entertainment is a major motivational factor when watching esports [24], people also watch professionals at play to learn how to improve their own skills [23, 24]. To support spectators in making sense of complex, fast-paced gameplay, streaming platforms such as Twitch [11] help spectators by augmenting the viewing experience through visual overlays, while professional esports streams such as ESL [6] visualise game metrics during tournaments to facilitate viewer understanding of in-game events. Live dashboards and companion apps can provide the spectator with even more live insights and predictions [2, 10] while post-game visualisations help both spectator and player to learn about successful and less successful tactics [23]. Next to entertainment and learning, spectators have a wide range of motivations to participate in streams [14]. Often they are simply looking for communities to interact with or want to become immersed in the streamer’s game through innovative ways of interactivity [17]. They wish to support their esports teams or watch to gain in-game rewards (“drops”) [15, 24].

Research shows that YouTube spectators value both personality and physical attractiveness of YouTubers [13]. Similarly, Guo et al. [7] discovered that streamer popularity is influenced by characteristics such as attractiveness, competence, and communication style. Beauty, expertise, and humour, as well as community, interactivity and emotional support attract spectators [3]. While this research explains what motivates spectators to

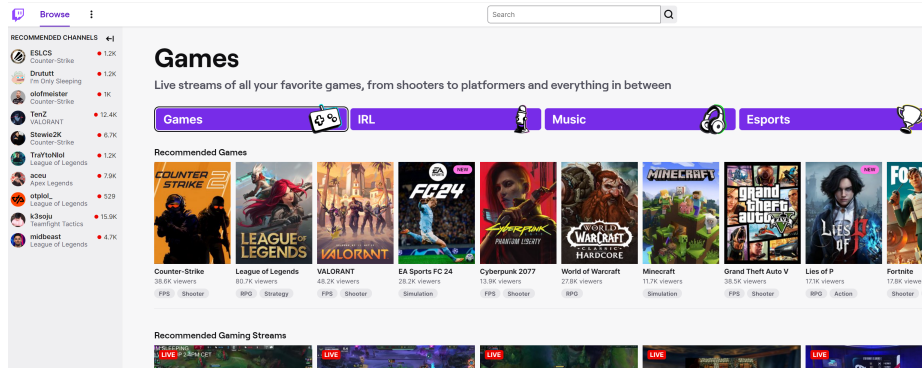


Fig. 1. The current browsing interface of game steaming platform Twitch.

choose specific streams, little research focuses on how platforms facilitate bringing the user to their specific niche stream.

Game streaming platforms rely heavily on recommendations but provide little control to the user. Twitch’s browsing structure, for example, prioritises current subscriptions, followed channels, and recommendations (see Figure 1). In addition, it allows users to filter by game, game category and viewer count. This “black box” approach means the user has no insight into the process behind the suggestions [16]. We have learned [9] that Twitch users often browse through streamers they follow, navigate specific game titles, or search content by typing in keywords in the search bar, but also that they find streamer attributes such as personality and speaking style very important when choosing content to engage with: factors that are currently very difficult to include in searches on the platform. In line with prior research on recommender systems of other platforms [8, 12, 22], we therefore posit that allowing users to understand and tweak their proposed recommendations can create a more efficient and enjoyable user experience.

3 Design Goals

In our previous paper [9] we have defined three design goals to improve the exploration experience of the stream spectators, based on the insights garnered from our survey and pertinent literature: 1) **Social Interaction**, 2) **Captivation** and 3) **Knowledge Acquisition**. In this section, we elaborate further on these goals.

3.1 Design Goal 1: Social Interaction

The first design goal is to foster enriching social interactions. This includes the interactions between spectator and streamer, as well as among the spectators themselves since connecting with others is a big reason why people watch streams. To help spectators find streams that match their social preferences, it is important that the metadata includes an indication of how interactive a stream is. Therefore, we proposed to focus on several key attributes [9]:

- First, the **viewer count** can hint at how approachable a streamer is. A smaller audience might suggest that the streamer can interact more and have a closer, more personal relationship with viewers. In contrast, a larger audience—which might need moderators—indicates a lively, socially active community.
- Moreover, the **game and stream genre** can significantly influence how much room there is for community participation. For instance, slower-paced sandbox games and casual streams tend to encourage spectator participation, helping spectators find new, socially cohesive communities.
- **Stream context** attributes—including a streamer’s setup, like having a microphone or camera—also signal the streamer’s willingness to engage with the audience. The availability of donation links, which enable financial interaction, plays a noteworthy role as well, especially for those spectators looking to build a social and emotional connection.
- Additionally, allowing spectators to tailor their searches based on **personal traits** of the streamer, including personality, appearance, gender, and sexual orientation, can further streamline the process of finding relatable streamers and communities.
- Finally, recognising the importance of **chat atmosphere** is crucial; spectators who prioritise community engagement value a friendly atmosphere, a quality that can potentially be evaluated through community ratings or user profile reviews.

In focusing on these attributes, our goal is to address motivations like “Community Engagement” and “Social and Emotional Support” [9], aiming to cater to various spectator types or personas including “The Social Player” and “The Streamer-Focused Observer” as conceptualised by Shuck et al. [18]. This approach strives to create a platform where every spectator can find a community that resonates with them, enhancing the overall user experience.

3.2 Design Goal 2: Captivation

The second design goal focuses on holding the attention of spectators who are looking for fun, a break from monotony, or simply a distraction. Even though Twitch’s current recommendation system might suit this audience to some extent, we believe that a more tailored approach that allows spectators to fine-tune their searches based on personal preferences and current mood could be highly beneficial. Depending on whether spectators want active engagement or just a chilled watching experience, they might choose a stream based on various aspects like the streamer’s setup, looks, unique personality, or the vibe in the chatroom. To address this, we proposed the categorisation of streams based on the following attributes [9]:

- First, the **game and stream genre** significantly impact a spectator’s choice. Our survey revealed that spectators seeking an escape from reality often prefer Role-Playing games and “Let’s Play” streams, viewing them as an entertainment source and a means to unwind. This sentiment is echoed by Sjöblom et al. [20], which noted the role of First-Person Shooter games in facilitating tension release.
- Second, the streamer’s **personal traits** are a dominant factor; spectators are drawn to streamers with qualities like attractiveness, skill, humour, and enthusiasm. In

fact, our survey highlighted the streamer’s personality as the most critical element in influencing the choice of streams.

With these attributes, we aim to target motivations such as “Entertainment” and “Pastime and Habit” [9] and cater to the needs of spectator personas such as Cheung and Huang’s “The Entertained” and “The Bystander” [4]. By focusing on the outlined attributes, the design goal seeks to foster a dynamic and immersive viewing environment where spectators can find streams that not only entertain but also resonate with them on a personal level.

3.3 Design Goal 3: Knowledge Acquisition

The third design goal addresses those spectators who watch streams to improve their gaming skills and knowledge. It can be subdivided into two impulses: Skill Improvement and Serendipity. **Skill Improvement** looks at the spectators wanting to learn how to play and get better at specific games, while **Serendipity** focuses on discovering new games or learning about newly released video games [20].

Many streamers, including both professional esports players and seasoned “casual players”, share their gaming expertise and use their platforms to teach their followers. Spectators often tune in to these streams to learn new techniques and strategies from their favourite players and to get information on new games, assessing whether they satisfy their expectations before making a purchase.

To help spectators navigate through the many streams available, especially when exploring recently released or trending games, we proposed two key attributes that could guide users in choosing the most informative streams:

- First, highlighting the **streamer’s skill level** can be instrumental. Spectators who want to improve their skills often watch competitive games. To help them find skilled players, we suggest using information from esports player rankings and offering a general streamer skill rating. This could be determined through crowdsourcing or streamers rating their own skills. Importantly, in-game rankings in on-line competitive games can be used as an objective measure of skill levels, helping spectators make informed choices.
- Second, emphasising the **game and stream genre** can be a deciding factor in the learning experience. “How to Play” streams and Multiplayer Online Battle Arena (MOBA) games, prevalent in esports, serve as valuable resources. They provide detailed insights into expert strategies and game mechanics, satisfying spectators’ desire to learn [20].

By focusing on these attributes, we aspire to nurture a space that encourages “Learning and Skill Improvement” and “Game Discovery” [9], meeting the needs of personas such as “The Curious” and “The Pupil” by Cheung and Huang [4]. This approach aims to match the streaming environment with viewers’ learning needs, making it easier for them to find streams that are both educational and relevant to their gaming goals.

4 Designing for Enhanced Spectator Experiences

To further these design goals of enhanced social interaction, captivation and knowledge acquisition experiences, it is essential to undertake user evaluations to precisely define the range and scope of the necessary parameters and ideas for new exploration interfaces. Therefore, we are currently in the process of conducting an iterative user-centred design study. This study consists of several phases:

1. A **listing of (categories of) parameters** that could be beneficial to guiding users' search on game streaming platforms such as Twitch for the three defined experiences, based on our initial survey research [9];
2. **Designing a new exploration interface** for Twitch, taking into account these parameters;
3. **Conducting co-design research** with users of game streaming platforms, gathering feedback on the benefits, drawbacks, and usefulness of the parameters and the design;
4. Optimising the design of the exploration interface based on the co-design feedback;
5. Performing a large scale user evaluation of the final design.

Phases 1-3 have been carried out already and will be discussed in the remainder of this paper. Phases 4-5 are still in progress.

4.1 Listing Parameters



Fig. 2. Experiences as defined in our previous research [9] and their potential categories to tweak recommendations when browsing Twitch.

Based on the insights from our survey research and the design goals we put forward [9], we created an initial list of categories of parameters for each experience (i.e. Social Interaction, Captivation and Knowledge Acquisition, with the latter being further subdivided into Skill Improvement and Serendipity). The list of categories per experience is shown in Figure 2. For example, the experience of Social Interaction lists the categories Streamer, Streamer Context, Community, Game Genre, and Game Name.

Per category we furthermore defined a list of parameters. These parameters define the actual search filters or recommender system tweaks/weights the user can modify for

a more focused result while exploring streams. As an example, the tweaks listed within Community are viewer count, follower count, chat atmosphere, and chat per second. Streamer Context includes parameters such as the presence of a microphone, camera, hardware specifications, social media links, while the category Streamer encompasses skill, gender identity, personality, etc.

4.2 Designing a New Exploration Interface

We also created an initial design prototype for a new exploration interface for Twitch, based on the design goals of our previous work [9] and our initial parameter list (see Figure 3). Central to our design is the inclusion of four clearly labeled buttons at the top of the interface. These buttons represent the different types of experiences a user might be seeking: social interaction, skill improvement, captivation, and serendipity, providing a straightforward way for users to start their browsing journey based on their interests at that moment.

To complement this, we introduced a sidebar that houses a detailed list of parameters that can be expanded or collapsed according to the user’s preferences. This feature allows users to fine-tune their search criteria, enabling a more personalised and efficient browsing experience. The sidebar is designed to adapt to individual preferences, helping users find content that suits them best with minimal effort. Through this two-part design approach, we aim to create a user experience that is both simple and deeply customisable, encouraging more satisfying and relevant engagements with the Twitch platform.

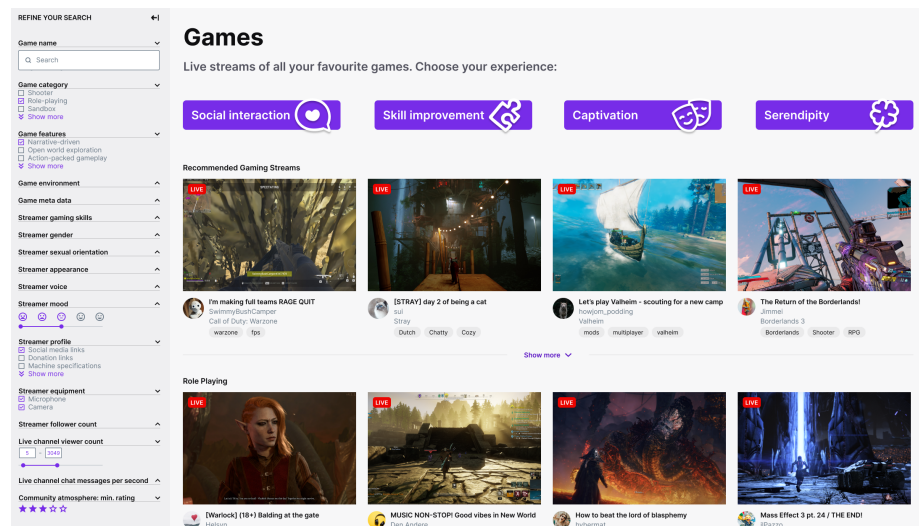


Fig. 3. Prototype of a Twitch exploration interface with a focus on the spectator experiences “Social Interaction”, “Skill Acquisition”, “Serendipity”, and “Captivation”. The sidebar provides a list of tweaks to refine the results even further.

4.3 Conducting Co-Design Research

In order to gather user feedback on our list of parameters and design prototype, we have conducted co-design research with six participants who play games themselves and are active video game spectators as well (5 male, 1 female, age range 24-43 years old). All participants had experience watching streams through the platforms Twitch or YouTube.

The first goal of this session was to gather initial feedback on our list of categories and parameters for each type of experience. Examples of each category were explained orally and the participants received the list on paper, including examples of tweaks/parameters within each category. We encouraged the participants not to limit themselves to the technical and practical feasibility of the parameters on the list or any new parameters they could think of, but that the required metadata for such parameters could potentially be gathered from the streams through manual extraction, streamer input, machine learning, etc. The usefulness of the resulting parameters will be evaluated again through a large-scale online questionnaire.

Our second goal was to gather feedback and ideas for a user interface design to facilitate both user flow based on preferred experience (Social Interaction, Captivation, Skill Improvement, Serendipity) as well as user control regarding recommendation. To this end, we let users think about the optimal user interface and flow themselves, after which we presented them with our own design prototype and asked them for their evaluation.

The session lasted approximately 90 minutes, and was audio recorded and transcribed.

5 Preliminary Feedback

Next, the findings from the co-design session were analysed and synthesised. In the current paper, we present insights on the four major themes that emerged from our participants' feedback: 1) **Streamer Characteristics**, 2) **Social Interaction**, 3) **Skill Improvement**, and 4) **User Experience**.

5.1 Streamer Characteristics

Achieving popularity on game streaming platforms involves various factors, including the streamer's attractiveness and communication style, as noted in recent studies [3, 7]. Consequently, our proposed parameters encompass both the physical appearance and personality traits of the streamer.

Participants acknowledged that these parameters carry certain risks, such as the potential for discrimination or the promotion of unrealistic physical standards among streamers. Conversely, they also highlighted the benefits, including the ability for spectators to find streamers who better align with their own identity, cultural backgrounds or experiences. To gain deeper insights into the utility and ethical implications of these parameters, we plan to subject them to more comprehensive evaluations on a larger scale.

Parameter Examples. *gender identity, sexual orientation, hair colour, eye colour, clothing style, piercings, tattoos, makeup, posture, voice type*

5.2 Social Interaction

Participants proposed moving beyond basic statistics such as the number of viewers and instead advocated for exploring parameters that offer a more accurate representation of chat room activity. They recommended examining the spectator count over specific time intervals, such as the past week or month. This approach could not only reveal the stream's growth trajectory, highlighting trending streamers, but also forecast chat engagement levels. While chat participation may require some time to ramp up, predicting activity would disregard the initial cold start of live stream chats when users are searching for active streams.

Nevertheless, participants acknowledged the advantages of a simple viewer count. They pointed out that lower chat participation allows for more direct interaction with the streamer, while busier chat rooms often necessitate moderators, making direct engagement with the streamer challenging. Spectators seeking a more intimate connection with the streamer might opt for those with smaller communities.

In addition, we proposed a parameter to assess the quality of the chat, such as identifying whether it is characterised by toxicity or fosters a positive atmosphere. Participants recommended employing crowd-sourcing methods to collect data on chat quality, thereby assisting in the evaluation of this aspect.

Parameter Examples. *viewer count, follower count, recent number of viewers, chat atmosphere, level of chat activity*

5.3 Skill Improvement

Participants noted that they refrain from utilising platforms like Twitch for “educational” purposes and instead prefer to rely on prerecorded instructional content found on YouTube. This situation presents an opportunity for live streams, especially considering that participants also pointed out that numerous esports players maintain personal streams on Twitch.

In terms of refining skill enhancement methods, a streamer's online ranking emerged as a quick gauge of their proficiency in a specific game. This allows spectators to delve deeper into specific parameters, such as game mode or difficulty level, and even the particular class or weapon employed by the streamer. This provides valuable insights on how to elevate one's gameplay within these precise settings and at a higher skill tier. Additionally, some games incorporate training modes, as seen in the Street Fighter series, making such streams an excellent source of targeted guidance for skill improvement.

Another suggestion involved streamers who are dedicated to teaching and willingly share their knowledge. Here, crowd-sourcing could play a pivotal role in evaluating and rating a streamer's teaching aptitude and willingness, providing a reliable metric for potential viewers seeking educational content.

Parameter Examples. *ranking, game mode, level, map, weapon, class, character, difficulty level*

5.4 User Experience

The initial prototype received positive first impressions. Users appreciated the straightforward approach of presenting four motivations at the top of the screen, finding it inviting and clear. However, the sidebar, which contained a lengthy list of parameters that could be expanded or collapsed based on user preferences, felt overwhelming to participants. One participant even mentioned that they tend to dismiss similar interfaces instantly.

Participants proposed a wizard-like approach: when selecting a motivation, users would have the choice to either view the results directly or be guided through the parameters they want to modify. They acknowledged that this step-by-step process might become tedious if repeated frequently, so presets were suggested. These presets would allow users to save their preferred parameter settings for future use, streamlining their search experience on subsequent visits.

Regarding skill acquisition, one participant suggested the ability to easily delete presets related to this motivation when a user loses interest in a particular game.

One participant suggested archetypes to represent different types of streamers, their audiences, and the content they offer. It was also proposed to explore character creation approaches, which would tie into the numerous parameters related to streamer appearance, offering a more engaging and enjoyable way to search for the ideal streamer.

Examples of User Experience Tweaks. *wizards, presets, archetypes, character creation*

6 Conclusion & Future Work

This paper presents an ongoing design study aimed at improving the exploration tool for video game spectators. With platforms like Twitch continuous growth, conventional methods such as keyword searches and popularity-based sorting are inadequate in providing a personalized and gratifying user experience. In response to these challenges, we have introduced three key design goals: Social Interaction, Captivation, and Knowledge Acquisition. These goals are intended to enrich the exploration journey for stream spectators, addressing their diverse requirements.

Our ongoing user-centered design study involves gathering feedback from experienced stream spectators. This process has yielded valuable insights, such as the expansion of control parameters and user interaction approaches to streamline the discovery process.

Our goal is to create an environment where each viewer can effortlessly find streams and communities that resonate with their preferences, thereby enhancing their overall viewing experience. To achieve this, we will combine the feedback acquired during our co-design session with the findings from our prior work, enabling us to advance our iterative user-centered design process. Building upon these insights, we will develop

new designs that will eventually undergo a comprehensive evaluation involving video game spectators. Subsequently, the resulting design will be assessed for its feasibility, usefulness, ethical implications, and potential impact.

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