

## Performing Game Development Live on Twitch

Mia Consalvo  
Concordia University  
Mia.consalvo@concordia.ca

Andrew Phelps  
RIT  
[amp53145@rit.edu](mailto:amp53145@rit.edu)

### Abstract

*This study is a preliminary exploration of how professional game developers live stream their creative work on Twitch.tv. It asks how and in what ways these developers engage in co-creative acts with their viewers and how they engage in game talk in their design process. It further analyzes discourse about the act of streaming development as presented in professional and popular journalistic and personal sites online.*

### 1. Introduction

How do game developers experience the act of creating games? How do they talk about it, both with other developers, and with their player communities? Until about a decade ago, scholars asking such questions mainly focused on mainstream professional developers working in large, AAA studios. Yet with major shifts in the game industry, knowledge has accrued in areas adjacent to that gap. Scholars have generated key knowledge focused on larger business trends in the game industry; the practices and attitudes of individuals at game jams and other limited term game creation events; the discourses and work of independent developers who are more committed to sharing knowledge with both scholars and other developers. However, much of this research still fails to examine how game developers themselves talk about the process of creating games.

### 2. Literature: Studying the game industry

Scholars have investigated the game industry as a business, including political economic work [1], the evolution of game creation, production, circulation and sales practices [2], studies of national game industries [3], and investigation of the growing concentration of the global game industry [4]. Others have begun investigating support industries that help indie developers achieve success [5]. Examination of short-term events related to game creation includes scholars examining game jams and their potential as a transformative (feminist) method [6] and how they

may serve as a novel platform for doing design related research [7]. Yet such findings are limited in their applicability, given their temporal boundedness and the diverse nature of participants, who are often not working professionals. Similarly those who have studied incubators and workshops that teach game design often focus on the politics of such programs [8], [9], rather than the discourses of the participants as they progressed. While valuable studies, such work is more focused on the structures that support developers rather than the developers themselves.

Scholars have engaged in ethnographic studies, including of Montreal indie studios housed in an accelerator program, to determine “how indie developers frame risk, creativity, success, and failure in relation to the communities they are a part of” [10]. Likewise Young followed “independent game makers” to better understand how they were influencing the larger scene or culture of game development [11]. Koleva et al studied the tools and design processes used by a small Spanish studio, noting the “sheer quantity of collaborative work” that was necessary to complete projects [12]. Similarly, Casey O’Donnell observed the daily production practices of a AAA studio, and how it navigated everyday challenges including tool development and use, the difficulties of communicating across specialist areas, and navigating the secrecy demands of the larger industry [13]. O’Donnell writes about the importance of “game talk” – a shorthand for workers to use that abstracts from references to older games or game genres. Like other forms of professional insider language, game talk works because it “appeals to the game and its underlying systems in a fashion that gets at not precisely the content of the game, but its functionality” [13]. Even though game talk can potentially exclude those without the requisite knowledge to understand it, when it succeeds it does so because “games provide discursive resources for developers trying to describe abstract concepts, like game mechanics” [13].

John Banks similarly conducted a multi-year ethnography of the Australian independent game studio Auran [14]. Banks had privileged access to

daily work practices, including the at times uneasy relationship between the developers and the game's players. Because the studio relied heavily on fan labour in creating various content for several of their games, they were often placed in a fraught relationship, because as Banks explains:

[M]any of Auran's senior managers failed to recognize that harnessing the support and input of these players involves an implicit recognition of the players' expert-status as co-creators. ... Rather than grappling with the problem and potential of fostering links throughout the organization with the core player-testers so as to encourage opportunities for the development and design teams to *innovate and create with the gamers*, Auran management often siloed the problems raised by the core gamers as a communication and 'expectations management' issue for the marketing, customer service and community relations team [14, pp. 124–125].

Banks's work is especially critical for his formulation of the concept of co-creative cultural production, which is a "bottom-up and peer-to-peer dynamic among amateurs," that also requires "the craft skills and knowledge and commitment of professionals and experts" [14, p. 3]. However as Banks is also careful to note, co-creativity often generates "uneven practices," and "irresolvable tensions and conflicts [are] at the very heart of co-creativity" [14, p. 4].

Yet the work of game development is becoming more public facing, as smaller (usually indie) developers are actively writing about their processes and challenges on both personal blogs and more professionally oriented industry websites, as well as creating videos and live streams of their development work on sites such as Twitch. While all such outlets are mediated in some way, the potential especially for 'live' or relatively unfiltered content to reach outsiders and give us a glimpse into game development and the everyday lives of developers deserves closer scrutiny. Such activities are of course done for many reasons, but create valuable opportunities for better understanding developers and the act of game making as it happens. One such practice that is becoming more popular is live streaming game programming, design, and art creation on the site Twitch.tv.

## 2.1 Literature: Live streaming

Research on live streaming more broadly has been growing rapidly, but originated with Theresa Senft's work on camgirls [15]. These women set up webcams in their homes that automatically uploaded still images to the Web for others to view. Senft theorized that such workers' activities embodied a way to

create 'microcelebrity' around a 'brand' that expressed the cammer's self presentation. Senft writes more recently that in relation to various contemporary internet-related practices and the influencers that we now see online, "a successful person doesn't just maintain a place on that stage; she manages her online self with the sort of care and consistency normally exhibited by those who ... believed themselves to be their own product: artists and entrepreneurs" [16, p. 2]. Certainly developing a following would be advantageous to creating a fan base for one's future games. But is that the only reason for game developers to live stream? How are they engaging with live streaming and to what end? To this point, no research has investigated that topic, with researchers instead focusing on videogame audiences and the players who can become professional live streamers by successfully broadcasting their own consumption of and commentary about videogames.

Indeed, over the past decade, live streaming of gameplay has become enormously popular and research about those practices has exploded. Initially most scholarly attention was on practices surrounding eSports games [17]–[19], but research has expanded to those who engage in "variety streaming," with the draw being a streamer's personality. Hamilton, Garretson & Kerne [20] argue that Twitch streams can act as "virtual third places, in which informal communities emerge, socialize, and participate" [20]. Johnson & Woodcock point to how live streaming can push players to "building an audience" [21] and also how they acknowledge not everyone can be successful, but still believe that hard work will be rewarded [21].

Yet so far, work on live streaming in relation to games has focused almost exclusively on *players*. But what of game developers who stream their activity? What are they doing on a daily basis, and how are they talking about their work, both on stream and in other development-related spaces? Although it has been occurring for some time unofficially, Twitch officially launched the "Game Development" category on October 16, 2014 [22]. A few weeks later Crecente noted that only about 200 people were watching 16 streaming channels. On June 6, 2018, the Twitch Game Development category had 535 viewers at 2:00 pm EDT spread across 63 channels.

## 3. Methods

To investigate that activity and the discourse surrounding it, this project takes an exploratory approach, investigating how game developers utilize

live streaming as part of their development process. It does so in two ways: first it investigates game developers' public discussions of their streaming activities to see how they have talked about the process and its rewards as well as challenges. Second, it engages in preliminary analysis of two game developer live streams. In doing so it seeks to answer two research questions:

1. How/in what ways do game developers engage in co-creative practices with audiences while live streaming their game development work?
2. How/in what ways do game developers engage in game talk with audiences while live streaming their game development work?

As a way to gain insight into these questions, we first began by conducting a search of game development, tech development, and games journalism websites searching for developers reflecting on (or being interviewed about) the process of live streaming their development process. We also identified two game development streams to view to gain further insights into how developers were engaging with their viewers, and if and how co-creativity and game talk were occurring.

#### 4. The Discourse About Live Streaming

Reasons varied for *why* developers chose to live stream. Certainly, many developers (and corporate spokespeople) argue a key reason is to help sell the game once it launches for public consumption. Most working developers, such as Jesse Freeman, make the case for a grass roots approach that will “build up a community” around the game being created [24]. Freeman points out that such an act is a two-way street, which requires the developer to interact with viewers, but only in particular ways. For example, he suggests keeping one's personal life off the stream, and maintaining a “clear separation” between work and personal concerns.

A second goal for developers to live stream is accountability. As Adam15331 explains, “I needed to make sure I wasn't getting distracted on a daily basis (e.g. reading reddit, playing games) and that I wasn't getting distracted overall” [25]. Likewise, Rami Ismail, perhaps one of the most popular indie game developers to live stream, said in a GDC presentation about the process that, “it's also a great way to stop you from checking your Facebook” [26].

Ismail also explains that his team had live streamed the creation of *Nuclear Throne* at least in

part to prevent cloning of the game by other developers – an issue that had come up with their prior game *Ridiculous Fishing* [23]. Finally, some developers mentioned motivation as a reason for streaming, which builds off elements like audience feedback and subsequently can build morale amongst studio members, who can often work years on a game with little public acknowledgment of their work [25].

Actual sales resulting from live streaming would be difficult to track, as would measurement of the community surrounding a particular game or even how to define the range or boundaries of what a community might entail. One idea largely dismissed is gaining revenue from the act of streaming itself. The Vlambeer studio stands as an exception, as it enjoyed viewership of 25,000-30,000 viewers for its twice-weekly streams of *Nuclear Throne* development, allowing the team to actually profit from the activity. In contrast, Steven Yau explains that his own experiment in streaming for three months to create a game tied to Twitch functionality was “not a sustainable way to make a living” as he averaged 10 unique viewers per stream, gained zero sponsors, and made only £17 in donations during that timeframe [27]. Given the numbers of viewers that are currently being drawn to the Game Development category, Yau's experience is probably more representative than that of Vlambeer.

One of the most remarked on outcomes for streamers is feedback and/or help: both in terms of offering instructional help to others or gaining help or feedback from viewers. Such outcomes stand in direct contrast to O'Donnell's findings about AAA studio developers' labouring in secrecy due to NDAs and other forms of corporate secret keeping. Developers who stream see the act as one for both imparting wisdom as well as seeking help of varying kinds. For example, Joe Kelly, a developer for Psydra Games, writes, “if you're programming, you'll also get questions and comments about your code” and suggests that “many viewers are new developers who come for knowledge and inspiration” [28]. Therefore, streamers should be sure to “always be telling your viewers what you're trying to accomplish” and “vocalize your every thought.” Other developers see streaming as a way to explain to potential players the complexities of coding and development – such as when Rami Ismail noted that “we saw that we were teaching people stuff” such as when “the team explained that bullet collision had to actually be programmed – that collision isn't just something that simply *exists*” [29]. In addition to serving as experts to other developers and the player community, streaming allows developers to solicit help for their

own work. Adam13531 writes in relation to technical issues “several times throughout the last couple of years, I’ve said to myself, ‘if I wasn’t just given that piece of advice [from a viewer], I would have gone down a three-week-long rabbit hole and *still* ended up with a worse solution” [25].

Such help and feedback goes beyond technical help. One of the most commonly cited benefits is the opportunity to gain feedback from potential players before the game is finished. For example, nearly all developers cited streaming as a way to “hear straight from players about what they think of the concept, art, gameplay and what they want to see in the game” before it’s complete [30]. This echoes John Banks’ findings about Auran and the ways that some developers strive to work with players to shape how their games get made [14]. Most developers have largely been positive, or fairly vague, on how useful such feedback can be however. While the developers from Proletariat, Inc. have pointed out that the tolerance among fans for “raw products” seems to be increasing, there is always the danger that showing rough, incomplete, or even broken work can be detrimental and lead to less than useful feedback. Of course, the danger of trolls and toxicity is always there as well.

At least some developer streamers made mention of sociality being a particular benefit. For example, Brouwer points out that even if a stream draws only a few viewers, “game development has traditionally been an endeavor relegated to individuals or small teams. Developers may like the added company and support, even if it is only a few dozen viewers at a time” [31]. Likewise, Adam13531 argues that because indies often work at home in “relative isolation,” a streaming audience can come to “feel almost like co-workers” [25]. Yet as Adam himself points out, the relative size of that audience is important in terms of the impacts of sociality. A few viewers who are active and engaged can give feedback as well as a sense of camaraderie, but when viewership grows past a particular point, a stream can be derailed with duplicate questions, the (perhaps perceived) need to interact with all viewers, and other issues. As he explained in March 2018, the growth in viewers to his stream past a certain number has meant spending less time actually coding and building his game as compared to interacting with his viewers [32]. While most developers do not have this problem, it does point to the downsides of live streaming one’s development activities.

## 4.1 Streaming Development: A tale of two Adams

In addition to seeing how developers talked about the process of live streaming we also wanted to observe how that worked out in practice. We were interested in their overall approaches, as well as how they interacted with their audiences (both in providing and seeking help) and how they talked about games (game talk) generally. We selected two developers to provide an initial point of comparison, selecting one developer primarily working on coding, and another focused on art. We wanted developers who streamed regularly, i.e. on a semi-regular basis as well as having a streaming history of at least a year. To make specific choices, we looked at online lists of recommended development streams, and we also viewed live streams in the Twitch “game development” category to ensure streamers were active and had audiences of more than a few viewers to see how they interacted. The two streamers selected were: Adam13531 (already cited above and now referred to simply as “Adam”), an American programmer making *Bot Land*, and Chluaid, an Australian artist working as part of a two person team on *BrackenSack: A Dashkin Game*.

For each streamer we decided to view a randomly selected archived stream, rather than watching a live stream, so that we could pause or rewind when necessary to make notes and take screenshots without missing any relevant data. Twitch now archives a stream’s chat alongside video of the stream. We viewed the first two hours of one stream for each developer. Viewing two hours of one stream each provided sufficient data to give us an initial view of how individuals set up and ran their streams, what kinds of communities were present, and how they engaged with those communities. We next provide an overview of each stream and its particularities, and then discuss commonalities, how co-creativity and game talk were produced (or not), and other important elements.

### 4.2 A victim of his own success: Adam13531

On several occasions when visiting the Game Development category on Twitch, Adam’s channel was the most viewed stream, and as he has also written extensively about the process of live streaming, we felt viewing his stream was a logical choice. Adam is the main developer of *Bot Land*, a multiplayer online strategy game “with a focus on animation.” The game is currently in beta release,

with full release for mobile scheduled for late 2018/early 2019. The game allows players to design bots, tell them what to do, and battle other players. Adam is the central developer and coder of the game, although he has hired others to work as artists and user interface designers.

Adam began streaming development of the game in September 2015, became a Twitch partner a year later, and has streamed for more than 3500 hours, listing a regular streaming schedule of 32 hours a week. As of this writing, his stream averages 101 viewers, and he has 12,313 followers. He has written extensively about the act of live streaming his development process, some of which is detailed and discussed above. He also maintains multiple FAQs about his stream and game, he has a blog, a subreddit, Twitter and a YouTube account.

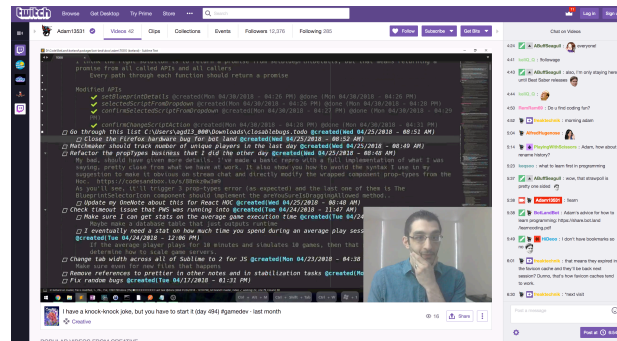


Figure 1: Adam13531's May 2018 stream

For this project we selected his May 1, 2018 stream for viewing and analysis. Overall the design and layout of the stream itself stresses functionality and simplicity. The majority of the screen is taken up with Adam's own monitor screen and currently open windows, including ones for coding, internet searching, and other types of documents. His webcam is at the lower bottom right of the screen, showing Adam himself in front of a blank background that lights up and changes colors over time. When community members follow Adam or host his channel, a notification will pop up in the center of the screen. The title for the stream changes each day, listing the number of days that the game has been in development, some theme or commentary on the day's activities, and any categories Adam has linked his stream to. For May 1, for example, Adam's title was "I have a knock knock joke, but you have to start it (day 494) #gamedev".

### 4.3 Chluaid: Streaming Art and Animation

The second stream we chose to study was from Chluaid (Adam Phillips, here referred to by his

screen name to avoid confusion), the Australian artist/ animator for the studio Brackenwood Games, a partnership with Kirk Sexton, a coder from the US who also streams his game development work. *BrackenSack* is a multiplayer 2D side-scrolling ball game already in release for Windows, but with a Steam launch planned for later in 2018. During the stream we analyzed, Chluaid was creating art for a new level in the game, as well as animations for a new character ability.

Chluaid has been streaming for 7 years on various platforms. He began streaming on Twitch in October 2011, currently has 6,965 followers, and averages 37 viewers per stream [33]. It isn't clear from his site if he is partnered or an affiliate, but viewers can subscribe to his channel at all three tiers of support as well as cheer him with Bits. His Twitch channel screen features handmade art that includes his streaming schedule (Saturday, Sunday and Monday 1 – 6 pm and 7 pm – midnight) and his Sydney, Australia time zone. Below that he has a countdown timer to his next stream, a gear list, channel rules, links to the game's website and developer blog, an About Me section and a series of old updates. Interestingly in his channel rules under "No" he lists no "backseat animating. I am a pro" along with no trolling, bullying, and harassment.

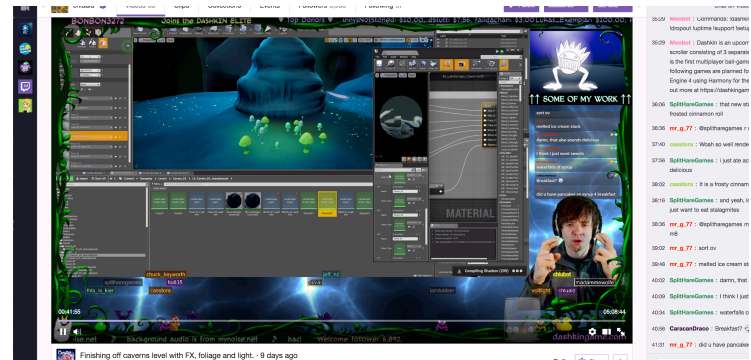


Figure 2: Chluaid's streaming setup.

We chose to analyze his stream from June 2, 2018, again for the first two hours. The differences in visual design between Adam and Chluaid were immediately apparent, and perhaps to be expected, given Chluaid's background as an artist. His "self-branding" as a game artist was displayed to maximal effect in multiple ways [16]. Chluaid's stream featured the same basic structural elements as Adam – his work windows were the central focal point, and his webcam placed on the bottom right corner of the window. Beyond that however, a host of differences emerged. Surrounding the screen is a frame of green leaves, drawing from the art style of his game. At the

top of the frame is a horizontally scrolling ticker listing top donors; the bottom of the frame features a similar scrawling ticker, this one displaying the source playing the stream's music as well as recent follower names. At the right top corner of the frame is an inset showing animated images, below that a caption reading "some of my work," suggesting his wider portfolio. Finally, below his work screens is a rectangular space showing animated creatures hopping around with names above them – which appear to be the names of those currently chatting in his channel. On this day the title of his stream was "Finishing off caverns with FX, foliage and light" and it was flagged to list in the Creative category, although many of his other streams have also used the Game Development as well as Animation category placements. Clearly Chluaid put significant amounts of work into creating a distinctive looking channel, one that not only conveyed some flavour of his game, but also his work as an artist. Especially as compared to Adam's more Spartan layout, Chluaid's stream would be instantly recognizable even if you did not see his name or face immediately upon starting the stream.

#### 4.4 Setting the stage

During the two hours viewed, both Adam's and Chluaid's streams followed many of the conventions that others have found for variety and other game-playing related streamers [34]. At the start of the streams both developers welcomed their viewers and talked about what they wanted to accomplish in the game's stream. Both also created a "to do" list on the stream itself, walking viewers through what they were doing, why, and how it related to the game overall. They greeted people already talking in chat and answered questions and offered commentary on how things were going, both personally and work related. Chluaid also immediately asked if anyone had seen his partner Kirk's stream, as it had just been hosted by prominent indie developer Jonathan Blow, and had seen its viewer count reach 120 people, which was obviously much larger than normal. Chluaid then took a cup of coffee from 'Jeanette' who was offscreen. At the beginning of his stream Chluaid worked to create a sense of community with his followers, often by employing inclusive language such as "let's open up the editor and have a look at the game as it is." These rituals of both Adam and Chluaid are nearly identical to many variety game streamers other researchers have studied, and suggest it is not only game streamers who seek to form social ties and connections - or the appearance of social ties and connections - with their audiences [35].

After greetings were done, Adam moved to the creation of a straw poll for a later stream, which asked viewers to vote on what type of stream it would be – playing a classic SNES game or coding a non-*Bot Land* challenge to be determined. He created a link to the poll and asked viewers to take part, announcing the results later. He then went into more detail about the work he had to do on this particular stream, which included creating a toggle for switching between two game modes in the mobile version. After those clarifications, his work began, and the rhythm of the stream became normalized - Adam would talk aloud about what he was trying to do (such as finding a code library with some basic code he could adapt), he read aloud as he coded, he would pose both rhetorical and literal questions to his chat, and he would constantly monitor chat, reading and responding to what people were saying there.

While Chluaid's approach was similar to Adam's, he was more laid back in terms of his approach. This extended to his use of trance music playing in the background (Adam had no music), his generally more laid back style, and less cycling of windows and screens. Chluaid also seemed more likely to break off in mid-sentence to answer a question in chat, and other chat members would often trigger bots giving answers to commonly asked questions. Overall however the structure was similar, with Chluaid moving between designing a game element, problem solving that design, testing it by running the game, and interacting with chat.

#### 4.5 Playing with or for one's viewers

Other scholars examining live streamers who play games have suggested that how streamers interact with their chat changes in a qualitative way as a stream gets more views, and it becomes difficult for the streamer to both process and identify individual calls for help, information or recognition [35]. Scully-Blaker et al write that smaller streamers are playing *with* their audiences and can engage in meaningful interactions with them, while larger streamers are playing *for* them, and often only selectively respond to chat, and/or have moderators engage with viewers on a more granular basis. During his stream, Chluaid had few problems interacting with his chat while he was working on his designs, easily able to respond to messages, even if his answers were sometimes delayed. However, in Adam's case he did his best to identify and answer incoming questions and respond to comments, but likewise did not always immediately do so, and occasionally let some pass unnoticed, particularly if he was intently working on something on screen.

Adam has written about this issue on his blog, and the challenges of remaining interactive with a growing viewership [32]. What's key to note here is that this breakdown is happening as his average concurrent views are breaking 100 – a much smaller number than most variety streamers would consider large - suggesting that it is even more cognitively difficult to code a game and interact online than it is to play a game and interact with other people. This suggests we should be careful in drawing hard lines about what specific size of 'view counts' signal shifts in interaction style (playing with or for) for different kinds of streamers.

As with other types of streamers, Adam and Chluaid would also occasionally pause to take brief breaks, sipping water or coffee, engage with chat more directly and sometimes go off on brief tangents before returning to their work. Chat volume varied – Adam's included a number of active individuals and was nearly always scrolling upward. Moderators, subscribers and general viewers were all present. At least some individuals appeared very knowledgeable about the project, and regularly offered technical advice or asked detailed questions about what Adam was doing (such as freaktechnik's comments in figure 3 below). Some members of chat also answered questions that newcomers posed, or triggered bots that would provide those answers. Chat would also sometimes tease Adam about various things (such as his resemblance to actor Jeff Goldblum), and appeared lively and without toxicity. As with other experienced streamers, Adam was adept at keeping up a near-constant patten of talk and interaction while streaming, to complement the work he was doing coding his game. In contrast, Chluaid had a dedicated but smaller group of chatters who often fell silent for varying amounts of time, although they too would provide answers to new viewers, and would joke amongst each other when Chluaid fell silent.

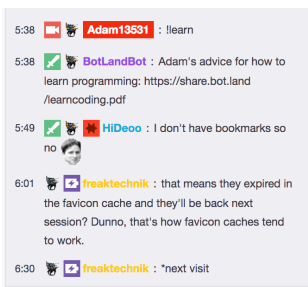


Figure 3: Adam 13532 triggers the !learn command for BotLandBot's response.

## 4.6 Creating a distinctive channel

One distinctive element of Adam's stream was his heavy use of bots, FAQs and other documentation in response to viewer questions and comments. Even though Chluaid had some similar streaming elements, the sheer number of Adam's various explanatory texts was notable. And although they obviously took quite a bit of work to create, ultimately these components served as a labour saving device for him. Whenever a viewer asked a question not immediately related to the problem at hand, Adam (and often other viewers) would make reference either via a link or triggering a bot to the standard answer to that question such as in figure 3 above. This occurred constantly during the two hours we viewed, and Adam's blog posts suggest the increasing prevalence of such questions is an ongoing issue that threatens to disrupt his coding work. Yet Adam has dealt with that onslaught by creating and referencing ever more documentation of his various activities, including FAQs on the game he is making, his streaming practices, personal questions and technical issues, as well as documents about how to get started programming, his daily 'to do' lists, his straw polls, how to type faster, and the like. This near constant reflecting back of information has not simply offloaded the constant answering of repetitious questions, it has also created a certain model for streaming, and a brand association for Adam – he is the well-documented game coder/creator. As Senft would argue, streamers are looking for ways to attract views, and adopt particular styles or personas to differentiate themselves from similar streams [16]. Adam's labour saving devices also mark him as the well organized, near obsessively documented game developer who has the answer to (almost) any question somewhere in his FAQs, while Chluaid's design choices for his channel created a different kind of impression and brand.

## 4.7 Co-Creativity

In response to how the two streamers engage in 'co-creative practice' with their streaming community, we found multiple ways they do so, including Adam's straw poll, and both's deployment of informal knowledge sharing, general sociability, and soliciting and/or accepting help from their respective communities.

As mentioned above, at the start of his stream Adam created a straw poll, to have audience members vote on what a future stream would focus on. At the time we stopped viewing, votes heavily favoured Adam working on some sort of basic coding challenge, which suggests his audience is interested

in technical work (the alternative was playing a game), and in learning from Adam. However, as much as such streams provide a space for a streamer to teach others, the creation of the poll itself ensures that the audience has some say in what Adam is doing – they are helping to determine the direction of the stream and his activities, even if it is concerning a ‘bonus’ stream apart from his normal work.

Likewise, although it isn’t explicitly about co-creativity, both developers engaged in regular social banter with his stream. During the period we analyzed Adam took part in numerous conversations that he and his audience initiated, including the merits of attending TwitchCon, discussing *Stardew Valley* with a streamer making a farming simulator game, and jokes that he might really be a robot. Chluaid was more focused on his work and the act of streaming, but did joke with his audience about how some features in the game’s level looked like frosted cinnamon rolls, and also about his own background as an artist before moving into the games industry.

While seemingly unrelated to the actual creation of either game, those social interactions and others like them function to create bonds between participants, and to make the space one that feels familiar, with in jokes, common topics of conversation, and familiar ‘faces.’ In creating such spaces, Adam and Chluaid are building participatory cultures, where individuals can feel comfortable interacting and hanging out, which leads to greater possibilities for sharing insights, knowledge, and work related information [36]. This kind of space also provides a welcoming environment for viewers who may not be as technically adept, but are interested in learning more, or simply seeing a game in the process of being created.

In terms of more explicit forms of co-creativity, informal knowledge sharing also happens on stream. For example, while starting his stream, Adam noticed that his Chrome icons were displaying as default versions, and asked “has anyone else had this Chrome problem where the icons are gone?” While this isn’t something important to his actual game, it suggests Adam is comfortable asking others for help or input, setting the stage for more formal requests later on.

Similarly when one viewer mentioned she had done her first two streams that day and “got 8 followers,” Chluaid responded by congratulating her with “that’s a huge follow day” while he was simultaneously waiting for a program to load on his screen. This led to an extended interchange where the

viewer asked for streaming tips and Chluaid responded with a lengthy discussion of the difficulties of gaining an audience and his recommendation that streamers should “go into doing it because you love it, not because you’re trying to get big.” Such back and forth with help and advice is of course ultimately controlled by the streamer, but also works to position the streamer as a person unafraid of asking for aid, and the viewers as potentially valuable sharers of knowledge. Of course not all informal requests to share/help are fulfilled. Later in the stream Chluaid asked “I think I asked yesterday and never got an answer. Is there such a thing as a silent controller?” but received no answer to his question and moved on without comment. As other researchers have found, individuals can sometimes fail in their actions on stream, but must carry on regardless of particular outcomes [37].

More formal aspects of co-creativity appeared organically throughout Adam’s stream and interspersed in Chluaid’s stream. Adam’s more frequent co-creative actions were likely due in part to his ‘talk aloud’ method while coding, which means that he often poses questions out loud that he is asking of himself as he builds his game. Because many of his viewers appear to have similar technical backgrounds, they often will offer suggestions as he is working. During observation we saw him thank one viewer for a suggestion about “disabling the cache” in his project, reviewed some past documentation on coding that featured quotes from chat with attributed information, and thanked another community member for his “good call” on why a particular animation wasn’t working. Similarly, as mentioned above in the prior section, Adam has a history of welcoming feedback and help from his community, as much as he likes to help and teach them about his own coding practices. In this way, Adam embodies many of the practices that Banks discusses in relation to successfully enacting co-creative design and development [34]. Yet just as Banks found pushback with developers he observed, Adam likewise struggles, not necessarily with the help that is offered, or with asking for help, but in dealing with the increasing volume of feedback that he receives, and how to most efficiently sort through it, without giving his stream or his development practice short shrift. In contrast, Chluaid did not always explicitly ask for advice, but employed a similar ‘talk aloud’ technique, such as he was thinking about adding different colored lights to highlight some waterfalls he was adding to a level and a viewer suggested “can’t you just have some red or blue glow worms close to the waterfall edge? So you do not need to colour the water itself?” and



Chluaid responds, “that’s a really good idea.” Although he ultimately decides not to place the worms in the waterfall area he is currently working on, he says he wants to use them at the top of a cliff area instead “so if anybody does jump up here they’re gonna see a continuation of the glow worms.” Here we see the continued struggle that Banks describes, as even when potential (or actual) players suggest a seemingly good idea for level design, the developer has ultimate authority over what is implemented, and is somewhat ambivalent in their reaction to such advice.

## 4.8 Game Talk

One notable finding was a lack – we found very few instances of game talk in our sample streams. There were none mentioned in Adam’s stream, and only one in Chluaid’s. Approximately a half hour into the stream, a viewer asked if the game was “like speedball for amiga” to which C laughed and replied “I don’t know, what does speedball for amiga look like?” He then went on to further describe his game, likening it to football as a way to make it recognizable. The viewer, *mr\_g*, explained that “speedball is kinda like fighting rugby” as a way to clarify his reference. However, this instance points to a problem that O’Donnell highlights with using game talk at all – all parties involved must be familiar with the reference for it to succeed [13]. Clearly “speedball” was not a good example.

Further research should investigate how frequently game talk occurs in other developer streams. It’s possible more such talk happened after our initial analysis period. It could also be the case that these games were already fairly well conceptualized by their respective developers, and so references to other games or game mechanics were not needed. Either way, more study would be helpful to see if and how such talk happens, particular as developers try to convey their ideas to general audiences.

## 5. Conclusions

This research presents only a first step into investigating and better understanding how game developers are using Twitch to stream their creation process. Here we investigated how they use it as a potential site for co-creative design as well as a space to engage in game talk. While there was little evidence of game talk being employed, the idea of live streaming as an opportunity to reach out to potential as well as actual players, alongside other

developers, for feedback and support as well as sociability and accountability, definitely merits further investigation. In particular, this study suggests that participatory communities are not only the province of game streamers, and that different types of streaming activities can change the size of the audience that streamers deem ‘too large’ as well as comfortable or too small. Further, developers themselves can both subtly or explicitly shape the type of feedback they want or don’t want, through such efforts as creating statements that limit ‘backseating’ (much as some game streamers do) or through offering extensive documentation and answering as many questions as they can handle. Their efforts are further shaped by the size of their viewership, as well as the types of viewers they attract. It was clear that Adam had a significant number of skilled coders in his audience that he interacted with regularly. Chluaid had a greater diversity of viewers, although a few did make comments that demonstrated knowledge of animation and design skills, although there was less back and forth in his stream concerning how he should deal with various elements.

In addition to contributing to scholarship on live streaming among game players, this research also demonstrates another viable outlet to study and better theorizes the processes that game developers employ in their creative work. Both through their written accounts as well as their streams, developers are offering perhaps not an unfiltered view of what they are doing, but another angle for understanding the complex work of game development.

## 6. References

- [1] S. Kline, N. Dyer-Witthof, and G. De Peuter, *Digital play: the interaction of technology, culture, and marketing*. Montréal ; London: McGill-Queen’s University Press, 2003.
- [2] A. Kerr, *The business and culture of digital games: gamework/gameplay*. London ; Thousand Oaks, Calif: SAGE, 2006.
- [3] O. Sotamaa, “Studying game industries (plural),” Concordia University, 11-Apr-2016.
- [4] D. B. Nieborg, “Crushing Candy: The Free-to-Play Game in Its Connective Commodity Form,” *Soc. Media Soc.*, vol. 1, no. 2, Dec. 2015.
- [5] J. Whitson, “The ‘Console Ship is Sinking’ and What this Means for Indies,” *Loading...*, vol. 7, no. 11, Dec. 2012.
- [6] H. W. Kennedy, “Game Jam as Feminist Methodology: The Affective Labors of Intervention in the Ludic Economy,” *Games Cult.*, p. 1555412018764992, May 2018.
- [7] A. Kultima, “Multidisciplinary game design research: ontologies and other remarks,” in *Game Design*

- Research: An Introduction to Theory and Practice*, Pittsburgh: Carnegie Mellon University: ETC Press, 2017, pp. 35–50.
- [8] S. Fisher and A. Harvey, “Intervention for Inclusivity: Gender Politics and Indie Game Development,” p. 16.
- [9] A. Harvey and T. Shepherd, “When passion isn’t enough: gender, affect and credibility in digital games design,” *Int. J. Cult. Stud.*, vol. 20, no. 5, pp. 492–508, Sep. 2017.
- [10] P. Browne, “Jumping the gap: Indie labour and the imagined indie community,” Concordia University, Montreal, Canada, 2015.
- [11] C. Young, “Game Changers: Everyday gamemakers and the development of the video game industry,” University of Toronto, Canada, 2017.
- [12] B. Koleva, P. Tolmie, P. Brundell, S. Benford, and S. Rennick Egglestone, “From Front-End to Back-End and Everything In-Between: Work Practice in Game Development,” 2015, pp. 141–150.
- [13] C. O’Donnell, *Developer’s dilemma: the secret world of videogame creators*. Cambridge, Massachusetts: The MIT Press, 2014.
- [14] J. Banks, *Co-creating Videogames*. Bloomsbury, 2015.
- [15] T. M. Senft, *Camgirls: celebrity and community in the age of social networks*. New York: Lang, 2008.
- [16] T. M. Senft, “Microcelebrity and the Branded Self,” in *A Companion to New Media Dynamics*, Wiley-Blackwell, 2013, pp. 346–354.
- [17] T. L. Taylor, *Raising the stakes: e-sports and the professionalization of computer gaming*. Cambridge, Mass: MIT Press, 2012.
- [18] N. Taylor, “Now you’re playing with audience power: The work of watching games,” *Crit. Stud. Media Commun.*, vol. 33, no. 4, pp. 293–307, 2016.
- [19] E. Witkowski, B. Hutchins, and M. Carter, “E-sports on the rise?: Critical considerations on the growth and erosion of organized digital gaming competitions,” 2013, pp. 1–2.
- [20] W. A. Hamilton, O. Garretson, and A. Kerne, “Streaming on twitch: fostering participatory communities of play within live mixed media,” 2014, pp. 1315–1324.
- [21] M. R. Johnson and J. Woodcock, “‘It’s like the gold rush’: the lives and careers of professional video game streamers on Twitch.tv,” *Inf. Commun. Soc.*, pp. 1–16, Oct. 2017.
- [22] B. Crecente, “Watch people develop games live in Twitch’s latest category,” *Polygon*, 29-Oct-2014. [Online]. Available: <https://www.polygon.com/2014/10/29/7091727/twitch-game-development-live>. [Accessed: 16-Jun-2018].
- [23] P. Geiger, “How Developers can use Twitch in the Live Streaming Age,” *Making Games*, 04-Mar-2015. [Online]. Available: <http://www.makinggames.biz/feature/how-developers-can-use-twitch-in-the-live-streaming-age,7527.html>. [Accessed: 16-Jun-2018].
- [24] J. Freeman, “What I’ve Learned After Three Months of Streaming Game Dev on Twitch : Appstore Blogs,” 17-Jun-2015. [Online]. Available: <https://developer.amazon.com/blogs/post/Tx2EYHK60WZ>
- EC07/What-I-ve-Learned-After-Three-Months-of-Streaming-Game-Dev-on-Twitch. [Accessed: 16-Jun-2018].
- [25] Adam13531, “Streaming game development (long follow-up post) : gamedev,” *Reddit*, Mar-2018. [Online]. Available: [https://www.reddit.com/r/gamedev/comments/82742e/streaming\\_game\\_development\\_long\\_followup\\_post/](https://www.reddit.com/r/gamedev/comments/82742e/streaming_game_development_long_followup_post/). [Accessed: 16-Jun-2018].
- [26] M. Leone, “Vlambeer details Nuclear Throne’s public development process,” *Polygon*, 17-Mar-2014. [Online]. Available: <https://www.polygon.com/2014/3/17/5520364/vlambeer-nuclear-throne-public-development>. [Accessed: 16-Jun-2018].
- [27] S. Yau, “Learnings from streaming Games Development on Twitch.tv,” 12-Mar-2017. [Online]. Available: <https://medium.com/@yaustar/learnings-from-streaming-games-development-on-twitch-tv-b56f29891138>. [Accessed: 16-Jun-2018].
- [28] J. Kelly, “Game Development on Twitch: Lessons Learned,” 24-Nov-2014. [Online]. Available: [https://www.gamasutra.com/blogs/JoeKelly/20141124/230825/Game\\_Development\\_on\\_Twitch\\_Lessons\\_Learned.php](https://www.gamasutra.com/blogs/JoeKelly/20141124/230825/Game_Development_on_Twitch_Lessons_Learned.php). [Accessed: 16-Jun-2018].
- [29] K. Graft, “Game development as performance: Making Nuclear Throne on Twitch,” 15-Aug-2016. [Online]. Available: [/view/news/279250/Game\\_development\\_as\\_performance\\_Making\\_Nuclear\\_Throne\\_on\\_Twitch.php](/view/news/279250/Game_development_as_performance_Making_Nuclear_Throne_on_Twitch.php). [Accessed: 16-Jun-2018].
- [30] J. Conditt, “Transparent development tales from three indies baring it all online,” *Engadget*, 28-Jan-2014. [Online]. Available: <https://www.engadget.com/2014/01/28/transparent-development-tales-from-three-indies-baring-it-all-on/>. [Accessed: 16-Jun-2018].
- [31] B. Brouwer, “Twitch Now Live Streams Game Developers As They Code, Create Games,” *TubeFilter*, 31-Oct-2014. .
- [32] Adam13531, “Growing Pains 2,” *Blogtonomous – Bot Land blog*, Mar-2018. .
- [33] “Twitchmetrics - Streamers, Teams, Games & Events.” [Online]. Available: <http://www.twitchmetrics.net/>. [Accessed: 16-Jun-2018].
- [34] M. Consalvo, “Kaceytron and transgressive play on Twitch.tv,” in *Transgressions in games and play*, K. Jørgensen and F. Karlsen, Eds. Cambridge, MA: MIT Press, forthcoming.
- [35] R. Scully-Blaker, J. Begy, M. Consalvo, and S. Ganzon, “Playing along and playing for on Twitch: Livestreaming from tandem play to performance,” in *Proceedings of the Hawaii International Conference on System Sciences*, Kona, Hawaii, 2017, pp. 2026–2035.
- [36] H. Jenkins, *Convergence Culture*. New York, NY: NYU Press, 2008.
- [37] Consalvo, Mia and M. Sugiarto, “Game Over? Not Really: Spectating Failure on Twitch.tv,” presented at the Association of Internet Researchers, Berlin, Germany, 2016.