# Media at a Crossroad: Where Streaming, Games, Culture and Learning Meet

**Laura Vawter and Marion Schulte**
Institute for English and American Studies, Rostock University, Universitätsplatz 1, Rostock, Germany

laura.vawter@uni-rostock.de
marion.schulte@uni-rostock.de

**Abstract:** This article investigates instances of knowledge transference and construction in game-centred interactions. It combines computer science and linguistic research techniques to analyse instances of learning in streamed interactions. It identifies instances of knowledge transference and construction in chat interactions, streamer-chat interactions, and streamer-player interactions. The argument is presented that with a combined linguistic and game-based learning analysis technique instances of learning can be holistically explored and identified.

**Keywords:** Game-based Learning, Knowledge Transference, Knowledge Construction, Conversation Analysis, Cognitive Apprenticeship, Stream, Twitch.

## 1. Introduction

In the field of game-based learning (GBL), gaming holds as much potential for learning as educational gameplay. The range of genres within the field of gaming makes it difficult to explore instances of learning as understood through the transference and construction of knowledge. Nowadays, streaming platforms, like Twitch, play host to a significant portion of gameplay that occurs in massively multiplayer online (MMO) games as well as massively multiplayer online role-playing games (MMORPG). These streaming platforms, in turn, expand the potential for learning beyond in-game interactions and further complicate the identification of isolated instances of knowledge transference and construction.

This paper explores learning in the form of instances of knowledge transference and construction across three gaming genres during Twitch streams. It explores the scaling of knowledge within a domain, along the spectrum of “expert” and “novice” by leaning on previous research in these areas. Instances of knowledge transference are explored between streamers, players, and chat participants active in streamed sessions of Minecraft, PUBG, and Final Fantasy XIV. The author uses Computer-Mediated Conversation Analysis (CMCA) to investigate instances of knowledge transference and construction within the domain of serious games entertainment gaming. Through a combined analysis of player actions and dialogic interactions, the argument is presented that instances of knowledge transference and construction can be identified across gaming genres. The argument is also presented that not all instances of knowledge transference correlate to learning within the context of knowledge construction.

The data from this paper comes from an investigation of around 15 hours of Twitch streams, including a minimum of 90 minutes of game-play in three different gaming genres. The results are not groundbreaking but an accurate depiction of the complexity of identifying learning in gameplay of entertainment titles.

### 1.1 Learning in GBL

In the field of game-based learning (GBL), serious or entertainment games are seen as containing as much potential for learning as digital tools whose central aim is learning. To understand the use of entertainment games for learning, we must first understand learning.

Learning can be understood through an examination of knowledge construction and transference. Knowledge can be transferred between individuals who operate within the ascribed spectrum of “novice” and “expert” and interact within a domain. The knowledge that is transferred can also be scalable along the hierarchy of “rudimentary” and “complex” within said domain.

The range of genres within the field of GBL makes it difficult to explore instances of learning as understood through the transference and construction of knowledge. Furthermore, streaming platforms, like Twitch, play host to a significant portion of gameplay that occurs in massively multiplayer online (MMO) games as well as massively multiplayer online role-playing games (MMORPG). These streaming platforms, in turn, expand the potential for knowledge transference and construction beyond in-game interactions and further complicate the identification of isolated instances of knowledge transference and construction.

## 2. Knowledge Forms

In sociolinguistics knowledge transference and constructed throughout a conversation and within an interaction. Additionally, both occur on an individual or collective level and are tracked through the sequencing of linguistic markers in a conversation. These markers are then distinguished as indicators of either transference or construction. These instances are further influenced by social and collaborative interactions, speaker contexts, and speaker backgrounds (Heritage, 2013).

In GBL an analysis of linguistic actions and interactions is combined with an analysis of gameplay. Consequently, research has shown that knowledge transference and construction can occur between the game and the player or between players during gameplay (Gardner, 2010).

### 2.1 Domain Knowledge

Domain Knowledge is viewed differently in sociolinguistics and GBL. In sociolinguistics, knowledge is understood as common, mutual, or shared (Lee, 2001). In analysis knowledge of the world or environment is differentiated from linguistic knowledge (Kess et al, 1985). It follows that knowledge can be understood within a local or global context. Domain knowledge is then understood on a micro, meso, or macro level and is always understood in the context of a conversation. For example, domain knowledge can refer to the background of an individual or a shared context between individuals. On a micro level, domain knowledge could refer to a specific topic or a previous interaction within a conversation, i.e. what someone said two minutes ago. On a meso level, domain knowledge could refer to a topic or interaction across a set of conversations- i.e an individual's experience on a series of dates. On a macro level, domain knowledge could refer to a larger cultural trend or a knowledge category, i.e. discussions on politics in Western societies. In all instances, micro, meso and macro domain knowledge exists and functions within a larger social or cultural context.

In GBL, domain knowledge can be understood as the learning domain or the area in which learning takes place. Learning domains often refer to traditional school or learning subjects like Math, Science, or Literature (Bakan et al, 2018). In serious games, domain knowledge has traditionally been identified as knowledge of game mechanics, knowledge of a game, or gameplay within a game (Hanghøj et al, 2022).

#### *2.1.1 A "Right" to Domain Knowledge*

When knowledge is understood in a larger social, societal, and cultural context, an individual's right to participate in a knowledge domain, is always determined by others. These individuals could simply be participants in the conversation or outside individuals who are community members within the said domain. Individuals not only determine participation in a domain but also participation in knowledge construction. Moreover, an individual's status in a domain, ascribed by other individuals, is often based on their experience within that domain (Stevanovic, 2014). An individual's right to a knowledge domain and participation in knowledge construction is understood as epistemic authority.

Epistemic authority is understood as a right to or knowledgeability in a domain, which is often attained through experience in that domain. Epistemic authority is indexed in a conversation as high (K+) or low (K-), based on a speaker's expression of knowledge and the acceptance of a speaker's knowledge and authority by other participants in the conversation (Heritage 2013, Baynham, 2011). The transfer of knowledge occurs between participants with higher and lower epistemic authority. Thus an analysis of epistemic authority includes a distinction of knowledge transference and construction.

When combining these contexts, domain knowledge on a micro level would be understood as actions, events or affordances in a game, including previous conversations about the game. On a macro level, knowledge domain would be understood as the larger social and cultural field of gaming or the experience of an individual in gaming throughout their life. Finally, the status and role of an individual as "gamer" would be contingent on their epistemic authority, as well as knowledge transference and construction while interacting in a gaming community.

### 2.2 Knowledge Construction

Participants in a conversation create coherence, or shared meaning about identities, meanings, and events (Jacoby et al, 1995). As active participants in a conversation, Individuals process knowledge as the conversation progresses, and construct new knowledge based on the synthesis of transferred knowledge. Knowledge

construction is understood as the collection, refinement, and reflection of instances of knowledge transference (Hull et al, 2009).

Knowledge can also be constructed collectively and collaboratively- known as knowledge construction or co-construction (Zheng, 2012). Social constructivism and constructivist learning view (social) interaction as essential for learning. It follows that knowledge construction and co-construction is a paramount action in collective and collaborative learning theories. Moreover, the examination of the performance, negotiation, and attributions of roles and status during knowledge construction is equally valuable in the investigation of collaborative and collective learning (Baynham, 2011). In GBL, social constructivism and constructivist learning theories view expert (domain) knowledge and game progression as contingent on player interaction (Egenfeldt-Nielsen, 2006). Consequently, constructivism looks at competition and collaboration gameplay and game affordances that impact expert knowledge construction (Bakan et al, 2018).

### 2.3 Knowledge of Individuals

In a conversation, Knowledge construction includes constructing knowledge of individuals within a conversation. Individuals in a conversation express, perform or negotiate a status or role. Similarly, an individual can ascribe or be ascribed a status and role according to their epistemic authority. When it comes to domain knowledge, a common role and status is “expert” and novice”. (Thorne et al, 2012).

In GBL, the expression, performance, negotiation or attribution of the role and status of expert and novice is analyzed through collaborative and collective game-play. (Drosos et al, 2021). In these interactions, the game itself functions as a platform for collaboration between experienced (expert) and less experienced players (novice) (Rama, 2012). Moreover, gameplay and player interaction become a means by which players negotiate their roles as novices and experts (Steinkuehler, 2012). The role of expert, for example, is taken on when players give feedback on in-game action and gaming strategies. In contrast, the role of novice is performed and the status of expert is attributed when less experienced players seek advice on gaming strategies or in-game action from another player.

The performance of the expert role or status can also be then identified through the expression of expert knowledge. In some instances, the status and role of an expert is understood as a player possessing and executing expert knowledge of a game. A player with expert knowledge is seen as someone who can control game mechanisms or mechanics, comprehend multimodal texts, interact with and use game artifacts, and navigate, strategize, and problem-solve using game rules and affordances (Kiourti, 2022). The expression of expert knowledge can also be demonstrated through the refinement and reflection on past in-game actions (Richard, 2019) or the increase in speed or routine nature of in-game actions (Drosos et al, 2021).

## 3. Streams and Gaming

Streaming platforms provide a complex and rich setting for the investigation of knowledge construction (Tsovaltzi et al, 2019) and collaborative game-centered interactions (Faas et al,2018). Twitch is a streaming platform through which users from multiple languages, educational, and socio-economic backgrounds participate in gaming communities and collaborative gameplay known as live gaming. In streamed live gaming sessions gameplay can be in solo modes, player versus player, and collaborative modes of play with other streamers or in teams. Participants in streamed live gaming sessions can interact with streamers/players in chat and through the purchase of emotes and gifts that are channel specific. In GBL, an analysis of streamed gameplay can provide insight into collaborative interaction between players with varying game experiences, play levels, and gaming backgrounds. knowledge transference (Tsovaltzi, 2019) and collaborative learning (Faas, 2018) Our study focuses on gameplay in Twitch streams.

A stream based analysis was selected for this research packages based on the nature or previous research in streamed game-based interactions. Ideally, a stream-based analysis framework would yield uniform results across entertainment gaming title genres and gameplay interactions.

## 4. Data Collection

What follows is an examination of collaborative gaming interactions, across three games and genres in Twitch streams. The analysis of streams is done through the examination of knowledge transference and construction within the framework of Computer-Mediated Conversation Analysis (CMCA) (Herring, 2004).

### 4.1 Research Question

There are two questions we sought to answer through data collection about knowledge construction and transference. The first question is how knowledge transference and construction are present. This entails the identification of instances of knowledge transference and construction and an analysis of the content and nature of such knowledge. Does, for example, the nature or content of knowledge change? The second question is how knowledge transference and construction relate to the relationship between players and community members who are participating in the streams. Is, for example, knowledge more often transferred or constructed as the players move away from being novices to experts?

### 4.2 Game Selection

Three entertainment title genres were selected based on data on popular games among EU and US gaming populations (Newzoo, 2023). One game was selected for each category based on similar studies (Hanghøj et al, 2022, Albathi, 2022).

The three game categories selected were a.) open world-sandbox, b.) action adventure-atmospheric exploration, and c.) tactical first-person shooter. An open-world game is any virtual unstructured world where a player can freely, as opposed to linearly, move around and accomplish tasks in a game. A sandbox game is a creative element to a game that allows players more freedom in accomplishing goals in a game. Action-adventure games emphasize physical challenges that require players to use motor skills to accomplish goals, overcome obstacles, or collect items. Action-adventure games often surround a single theme, story, or setting that is explored as the game progresses. Shooter games involve the use of weapons to battle opponents, or complete challenges in the game. Finally, a tactical game involves strategic movement along a grid, often a map, and is played in a first-person format.

The games in this study are Minecraft, PUPG Battlegrounds, and Final Fantasy XIV. This selection of games also ensures the inclusion of Massively Multiplayer online (MMO) games as well as Massively multiplayer online role-playing games (MMORPG). From the selection of games, gaming modes were specified. In Minecraft gaming sessions survival mode was selected since it was a linear goal of defeating the Ender dragon. In PUBG Teams has a linear goal of surviving a Battle Royal, and Final Fantasy XIV has a player versus player (PvP) function in Crystalline Conflict and Frontline that has the linear goal of a team successfully pushing a crystal to the opposing team's side. All of these modes require collaborative gameplay and coordinated game action.

### 4.3 Stream Selection

Streamers who streamed consistently gameplay in each of these games were selected for our investigation. From here three sets of streamers were selected based on their experience and background in a single entertainment title or series. We selected streams that had beginner to advanced-level experience in one of the target games. This was easier for some games than others. Since player versus player (PvP) in Final Fantasy XIV is so niche, it was easy to find first an experienced player and isolate streams where they played with players who played in the Final Fantasy series but did not play PvP. Similarly, since Minecraft is often played by younger players, it was easy to find two adult streamers who were new to the game. Since PUBG has been around so long it was easier to isolate expert streamers, but because it is seen as a relaxed first-person shooter compared to other titles, it was difficult to find streams where the role of novice was distinct.

From the collection of these streamers' published streams, streams that involved collaborative play of two players (including the streamer) were selected. The decision for a two-player format was due to the issues of audio quality and transcription with teams of 3 or more players. In these streams, speech overlap made analysis too difficult. Initially, it was decided that three streaming sessions would be selected for each set of players. Since the streams varied drastically in length. This led to a distinction of rounds. Though a round varied in length, it was possible to isolate streams where a minimum of three rounds were played with a minimum of 90 minutes of playtime between the 2-players. Final Fantasy PvP rounds were understood as instances where players participated in a Team match in PvP in Frontlines or Crystalline Conflict which lasted anywhere between 15 and 20 minutes. A round in PUBG was understood as the players entering a battle royal game as a team which lasted anywhere from 10 to forty minutes. Minecraft rounds were understood as sessions where players collaborated in the collection of items or tried to defeat the final boss or Ender Dragon.

**Table 1: Summary of Players selected**

| Streams | | | |
|---|---|---|---|
| Games | Final Fantasy XIV | PUBG Battlegrounds | Minecraft |
| Players | "D" and "K" | "B" and "J" | "I" and "M" |
| Experience level | Beginner, high beginner | Advanced, Intermediate (Beginner in PVP) | High Intermediate, Intermediate |
| Language of Play | English, Spanish | English, German, Swedish | English |

Instances of knowledge transference and knowledge construction were isolated between chat participants, chat participants, and streamers in and around each round through an investigation of linguistic and in-game actions. What follows is a detailed summary of the results.

## 5. Results

These results are based on the transcription and analysis of roughly 405 minutes of streamed gameplay, which was completed over 6 months. Several patterns emerged from our analysis of game-centered interactions in Twitch streams related to domain knowledge. Knowledge complexity and knowledge construction.

### 5.1 Domain Knowledge

In our study instances of domain knowledge occurred largely on a micro level. The most common domain knowledge discussed on a micro level was game events while game world was the most common on a micro level.

**Table 2: Domain knowledge on a macro and micro level.**

| Domain | |
|---|---|
| Mico | Macro |
| Player moves and actions | Player experience |
| Game Event | Game world or rules |
| Location | Stream or game technology |
| Game Item or token | |
| Game affordance or mechanics | |

**Table 3: Domain knowledge ratio across all games and all rounds.**

On a micro level, domain knowledge involved player moves, game events, game items, and location. Player moves or actions were understood as any action a player took in the game. Some common moves were dying, attacking, killing, teleporting, collecting, running, jumping, regenerating, or healing. A game event was understood as a spawning of game characters, or changes in game setting or environment. In Final Fantasy and PUBG teams, game events were also understood as a team's status as losing or winning when it directly affected the gaming environment and setting. Location was understood as where a player or item was situated within the game. Game items and tokens could be weapons, supplies, game objects, or achievements. Game mechanics were understood as game affordances, settings, or actions that solely involve gameplay. Common topics across games were hot bar setup, actions on the controller or keyboard, inventory uses, and combo executions.

On a macro level, domain knowledge involves player experiences, game world, and technology. The player's experience was understood as any information about a player's experience The game world and rules were patterns of gameplay, items, affordances, or events. Stream or game Technology was understood as technical or mechanical knowledge. These three domain knowledge forms are related to participation in a larger gaming community or long-term experience playing a game or a series/update within or outside a gaming genre.

#### *5.1.1 Domain Knowledge Complexity*

Across all gaming genres, we found changes in domain knowledge complexity. As players played more rounds together the domain knowledge complexity shifted from game technology, affordances, and mechanics to game events and items. This change was more evident in players who took on the role or performed the status of novice.

### 5.2 Knowledge Construction

Knowledge construction was found across all games and occurred between players, players and chat members, and chat members. Indications of knowledge construction were identified through linguistic markers but could also be found solely in in-game action. However, every instance of knowledge transference did not correlate with knowledge construction. The correlation was highly dependent on the context and knowledge content being transferred (Heritage, 2013). Moreover, knowledge construction presented differently in each game.

In Final Fantasy, player "J" constructed knowledge about strategies of play in PvP, including how to execute combos, support teammates, survive and execute attacks, use character abilities, and how to win and lose a match. Players "B" and "J" co-constructed constructed knowledge of collaborative actions when playing on the same and different teams, including adapting to playing styles, and coordinating with each other's and other teammate's actions.

In PUBG, since "M" and "I" had extensive experience playing in teams, they relied on the co-constructed knowledge to prevent killing or shooting each other, coordinated killing or injuring other players, and coordinated avoidance of the ever-decreasing zone perimeter. Verbless sentences dominated knowledge construction in PUBG. However, it is unclear if this correlated to instances of high stress (Albathi, 2022) or the play style. In the following example "M" and "I" are constructing knowledge of opposing team members:

| | | |
|---|---|---|
| 1 | M: | Next to us (.) |
| 2 | | Southwest, |
| 3 | | (5.0) |
| 4 | M: | No south, (.) |
| 5 | | Outside, (.) |
| 6 | | Down |

In this interaction "M" relies on verbless sentences (Lines 1-6) while "I" relies on coordinated in-game action to construct knowledge. Knowledge is transferred each time "I" and the opposing player change locations. After "M" indicates the opposing player's location (Lines 1-2) "I" turns left, then right, then left, heading to the southwest corner of the room, using the on-screen compass. After "M" expresses a change in player location using a recast (Line 4), "I" remains on the lower level of the room, not ascending the stairs directly ahead, walks into an offshoot of the main room, down an outer aisle, and shoots and kills the targeted opposing team player.

In PUBG, “I” and “M” also construct knowledge about their shared long-term gaming experience. They share experiences of player interaction, hacks, and bots in the game while playing and participating in the PUBG gaming community. In the following example “M” and “I” co-construct knowledge about a game hack:

| | | |
|---|---|---|
| 1 | I: | He just landed in the middle of open (.) |
| 2 | | below us, |
| 3 | | (1.0) |
| 4 | M: | What |
| 5 | I: | Yeah, |
| 6 | | What the fuck you run into the wall? |
| 7 | | What? |
| 8 | | Dude (.) |
| 9 | | That's not the first time I see that (.) |
| 10 | M: | [Okay] |
| 11 | I: | [He just ran through the wall on my |
| 12 | | screen,] |
| 13 | | He landed outside and just run through |
| 14 | | the wall (.) |
| 15 | M: | Hm (.) |
| 16 | I: | Fuckin’ (.) |
| 17 | | What? |

When If this interaction was only isolated in the (micro) context of the immediate interaction, the response tokens “Yeah” “Okay” and “Hm” (Lines 5, 10, 15) and expletives (Line 16) would initially signal knowledge transference. However, within the larger (macro) context of “M” and “I”’s cumulative knowledge of hacking, this interaction can be interpreted as knowledge construction.

In Minecraft, “D” and “K”, as beginners, largely constructed and co-constructed knowledge about the use of game items, game mechanics, and game rules. Their knowledge construction through chat interactions changed in complexity. As “K” and “D” played more together, participated in the Minecraft community, and interacted with community members, they learned to scale the epistemic authority of chat participants. This resulted in not all instances of knowledge transference being accepted and used in knowledge construction of the game and gameplay. In the following example, “D” and “K” are learning to locate an in-game event and use a game item:

| | | |
|---|---|---|
| 1 | K: | Is it like under this mountain (.) |
| 2 | | You think? |
| 3 | D: | Yeah (.) |
| 4 | | we might be able to just dig |
| 5 | | ⌜guys, |
| 6 | | Do you think we should just dig |
| 7 | | down here?⌝ |
| 8 | K: | People are sayin’ “dig” |
| 9 | D: | Okay yeah (.) |
| 10 | | Let’s dig down here |

The use of tag questions (Line 2), model verbs “might” and “should” (Line 4, 6), the hedge “like” (Line 1), and response tokens “yeah” and “Okay” (Line 3, 8) indicate the co-construction of knowledge between the players and chat participants. In this interaction “D” and “K” the acceptance of the transference of knowledge and the epistemic authority of chat participants is shown in the in-game action of digging in the indicated spot.

## 5.3 Novice and Expert Status and Role

Across all gaming genres, the roles of expert and novice were identified. Similarly, expert status was attributed to players and chat participants. The status of expert was attributed to players who coordinated gameplay, demonstrated collaborative gameplay (Steinkuehler, 2012), demonstrated expert knowledge, or identified as members of the gaming community (Thorne et al, 2012). One common demonstration of expert knowledge was the use of items and affordances to defeat spawned characters or win a match against other players (Kiourti, 2022). Another demonstration of expert knowledge was increased speed or efficiency in the execution of in-game actions (Drosos et al, 2021).

### *5.3.1 Status and Role Demonstration and Attribution*

The demonstration of expert status and role was found in each game. Although its demonstration varied slightly between games.

In Final Fantasy, the coordination and collaboration of in-game actions was attributed to the role and status of expert. During each round “B” took on the role of expert by using “callouts” or verbal cues to coordinate and direct in-game action. Though “J” took on the role of expert knowledge in his use of callouts in later game rounds, their reliance on requests indicated that “B” was attributed the status of expert. This was due to the fact that both “J” and “B” had played all Final Fantasy games, but only “B” had experience in PvP.

In PUBG, the role of expert was demonstrated through expert knowledge and coordinated game action. An example of expert knowledge expression was “I”’s number of kills, assists, or hits (Knocks) compared to “M”. An example of coordinated action was when “M” used requests to determine movement within or between locations. Similarly, even though “M” and “I” demonstrated expert knowledge of the game, “M” used compliments and apologies, regarding in-game action, to attribute the status of expert to “I”.

In Minecraft, the role and status of expert were connected to expert knowledge expression. One example is “K” completing in-game actions “D” indicated as non-expert knowledge and that led to his death. Consequently, the role of expert was attributed to “D” by “K” through compliments, requests, an suggestions, even though “D” had only begun playing Minecraft a few weeks before “K”.

### *5.3.2 Status and Role Negotiation*

Across all games, the role and status of expert were also negotiated between players, chat participants, and players and chat participants. The negotiation of attributed roles was done by the individual upgrading, downgrading, or accepting the role.

In the following Final Fantasy PvP interaction, the negotiation of the role of expert and novice was negotiated between “J” and “B” through their coordination of actions, in this case, the order of attack on an opposing team member:

| | | |
|---|---|---|
| 1 | J: | Oh (.) this Ninja's gotta go: |
| 2. | B: | He should be down here. |
| 3 | | (1.0) |
| 4 | J: | Yeah (.) |
| 5 | | I'm gonna ┌ I'm gonna get'e:m ┐ |
| 6 | | Maybe not maybe not (.) |
| 7 | | He's healin', (.) |
| 8 | B: | [Finish hi::m,] |
| 9 | | He's healin', (.) |

10 I got one more ┌ one more┐

11 B: [I got'em]

12 J: You got'em?

13 B: Yeah

14 J: Yeah he's done (.)

15 Good Teamwork (.)

16 Look at that,

17 (1.0)

18 See (.)

19 I'm not complete ┌ completely useless

20 for that ┐

In this interaction, the model verbs “should” and “gotta” (Lines 1, 2) and imperative sentences (Line 8) indicate the expression of the role of expert. Even though “J” downgrades his through the adverb “maybe” (Line 6), he further negotiates his role through the adverb “completely” (Line 19). The response tokens, or “yeah” (lines 4, 13, 14) and compliments (Line 15) are also an indication of “J” negotiating and “B” accepting this role.

The negotiation of the role of expert and novice was also present in chat and player interactions. In the following interactions, the role of expert is negotiated by two chat participants Kaixer9 and kasbig.

1 kasbig: Hi! I just got back into FF14.

2 When I left, like 6 years ago,

3 i had a character with every job 4 at 60 and i had most of the

5 Endgame content downed.

6 Should I just start a new

7 character? its been a looooong

8 time.

9 (1.37)

10 Kaixer9: @kasbig no, you can always do

11 New game+

12 (1.22)

13 Kaixer9: and they gifted 1 free fantasia

14 for new players that ends ARR,

15 if you didnt get it in the past

16 maybe you have it now to redo

17 your character (not sure)

18 (0.50)

19 kasbig: alright cool. my inventory is

20 fulled with idk what. just gonna

21 put it all in storage and keep

22 playing lol

23 lol thanks [player “B”]

Through the response token “no” (Line 7) and the adverb “always” (Line 8) Keixer9 tries to perform the role of expert (Line 12). A lack of response from kasbig leads to a renegotiation of the role, evident through Kaixer9’s use of the adverb “maybe” (Line 11). This downgrade is accepted by kasbig in his response token “alright cool” (Line 14). Finally, kasbig’s response token “thanks” (Line 17) affirms the attribution of the status of expert to “B” instead of Kaixer9.

Another example of the downgrade of a role or status performance can be seen in the following exchange during Minecraft gameplay. In this interaction chat members express the role of expert by using suggestions, warnings, and requests, and “D” and “K” reject their role performance:

| | | |
|---|---|---|
| 1 | 420weedtown: | da spawn |
| 2 | Ricegrt: | bed for respawn at the |
| 3 | | portal !! |
| 4 | Ulovehd: | noo you need beds |
| 5 | | [player “K”]!! |
| 6 | Snowy_chan: | SET SPAWN AT AT |
| 7 | | STRIKING HOLD |
| 8 | hea111: | Bed fer spawning |
| 9 | gothbimbo_rat: | MO BED |
| 10 | [player “K”] | yall [player “D”] |
| 11 | | has two beds /lh |

The chat’s uses of the response token “no” (Line 3) and imperative sentences (Lines 2, 4, 5, 6), including the commands (Line 4, 6) and requests (Line 1, 5), indicate their negotiation of the role of expert. The players “K” and “D” not placing the requested item is a rejection of this role expression. The shift to capital letters (Lines 4, 6) demonstrates the chat’s attempt to upgrade their role and express their role of expert. This attempt is rejected and their role is downgraded through “K”’s clarification and use of the pronoun “Y’all” (Line 7).

## 6. Conclusion

The result of this investigation identified domain knowledge, knowledge construction, and role negotiation in streamed collaborative gaming scenarios. These elements were found in the CMC systems of Twitch in written (chat) and spoken interactions (audio/video) between players and stream participants. Though some argue that knowledge transference is synonymous with learning (Chen, 2015), this analysis cannot definitively prove that knowledge every instance of knowledge transference correlated to learning nor that the prevalence of knowledge transference guaranteed a correlation with knowledge construction.

Overall, these results demonstrate that an analysis of streamed interactions can provide a multifaceted and holistic view of knowledge construction and gaming community membership and participation.

Future research into streamed interactions would be beneficial to GBL in its investigation of the stages of cognitive apprenticeship.

## Acknowledgements

This paper would not be possible without the dedication of streamers, their followers, and participants. We would like to give a thank you to the streamers KurtisPogger, DannyGamezales, BrianRicardo, ItsMellowMel iBBA, and DJManmade.

## References

Bakan, U., & Bakan, U. (2018). Game-based learning studies in education journals: A systematic review of recent trends. Actualidades Pedagógicas, 72(72), 119-145.

Baynham, M. (2011). Stance, positioning, and alignment in narratives of professional experience. Language in Society, 40(1), 63-74.

Chen, C.-H., Wang, K.-C., & Lin, Y.-H. (2015). The Comparison of Solitary and Collaborative Modes of Game-based Learning on Students' Science Learning and Motivation. Educational Technology & Society, 18 (2), 237–248.

Drosos, I., & Guo, P. J. (2021, October). Streamers teaching programming, art, and gaming: Cognitive apprenticeship, serendipitous teachable moments, and tacit expert knowledge. In 2021 IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC), 1-6.

Egenfeldt-Nielsen, S. (2006). Overview of research on the educational use of video games. Nordic journal of digital literacy, 1(3), 184-214.

Faas, T., Dombrowski, L., Young, A., & Miller, A. D. (2018). Watch me code: Programming mentorship communities on Twitch. tv. Proceedings of the ACM on Human-Computer Interaction, 2(CSCW), 1-18.

Gardner, R., & Levy, M. (2010). The coordination of talk and action in the collaborative construction of a multimodal text. Journal of Pragmatics, 42(8), 2189-2203.

Hanghoj, T., Kabel, K., & Jensen, S. H. (2022). Digital Games, Literacy and Language Learning in L1 and L2: A Comparative Systematic Review. L1-Educational Studies in Language and Literature, 22(2), 1-44.

Heritage, J. (2013). Action formation and its epistemic (and other) backgrounds. Discourse Studies, 15(5), 551-578.

Herring, S. C. (2004). Computer-mediated discourse analysis: An approach to researching online behavior. Designing for virtual communities in the service of learning, 338-376.

Hull, D. M., & Saxon, T. F. (2009). Negotiation of meaning and co-construction of knowledge: An experimental analysis of asynchronous online instruction. Computers & Education, 52(3), 624-639.

Kess, J. F., & Hoppe, R. A. (1985). Bias, individual differences, and 'shared knowledge'in ambiguity. Journal of Pragmatics, 9(1), 21-39.

Kiourti, E. (2022). Layering literacies and metagaming in counter strike: Global offensive. L1-Educational Studies in Language and Literature, 1-27.

Lee, B. P. (2001). Mutual knowledge, background knowledge and shared beliefs: Their roles in establishing common ground. Journal of pragmatics, 33(1), 21-44.

Newzoo International B.V. (2023, October 15). PC & Console Gaming Report 2023. Newzoo.com.

Rama, P. S., Black, R. W., Van Es, E., & Warschauer, M. (2012). Affordances for second language learning in World of Warcraft. ReCALL, 24(3), 322-338.

Richard, G. T., McKinley, Z. A., & Ashley, R. W. (2019). Collegiate Esports as Learning Ecologies: Investigating collaboration, reflection and cognition during competitions. Transactions of the Digital Games Research Association, 4(3), 1-41

Steinkuehler, C., & Oh, Y. (2012). Apprenticeship in massively multiplayer online games. Games, learning, and society: Learning and meaning in the digital age, 154-184.

Stevanovic, M., & Peräkylä, A. (2014). Three orders in the organization of human action: On the interface between knowledge, power, and emotion in interaction and social relations. Language in society, 43(2), 185-207.

Thorne, S. L., Fischer, I., & Lu, X. (2012). The semiotic ecology and linguistic complexity of an online game world. ReCALL, 24(3), 279-301.

Tsovaltzi, D., Weinberger, A., Schmitt, L., Bellhäuser, H., Müller, A., Konert, J., & Rosé, C. (2019). Group formation in the digital age: Relevant characteristics, their diagnosis, and combination for productive collaboration. CSCL 2019, 719-726.

Zheng, D., Newgarden, K., & Young, M. F. (2012). Multimodal analysis of language learning in World of Warcraft play: Languaging as values-realizing. ReCALL, 24(3), 339-360.