MEDIATORS FOR GAME STREAMING

A Research Paper submitted to the Department of Engineering and Society
In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science in Computer Science

By

Tanapol Kosolwattana

March 27, 2020

On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

ADVISOR
Catherine D. Baritaud, Department of Engineering and Society

A CURRENT PROBLEM IN GAME STREAMING COMMUNITIES

A toxicity problem, especially cyberbullying, is a common issue which users can encounter on the internet. In the online world, social media communities and gaming communities are affected most by toxic actions, especially in hate speech because it does not set the boundary to indicate how intentional the wordings are. Also, the freedom of speech and user anoymity allow some users to abuse their status to post or share their thoughts by using negative words or phrases to discredit or bully the victimized users. The challenging problem that both communities are facing is how to handle this suituation properly. Therefore, the technical research and the STS research are coupled in the way that both projects are prompted to produce different approaches to mitigate toxicity within the online community.

The first approach from the technical project is to develop the algorithm that detects as many toxic words as possible so that whenever these words occur in the platform, they will be automatically deleted. However, some methods do not have the ability to find the intentions of the words which can be slurs, trolling, and inside jokes. One of the implementations that can potentially be useful in this case is the the natural language processing toolkit called GloVe: Global Vector for word Representation, which can perform sentiment analysis based on nearby contexts of the sentences (Pennington, 2014).

The second approach is to find or establish the organization that supports the victims and finds the right solutions to solve the problem. In game streaming communities, some streamers do not know exactly where to get access for help in some specific issues. While some of them receive help from platform providers, the platform tools and policies do not create a long-term solution to the deep-rooted cause. Therefore, mediators will play a role as the connection

between streamers and platform providers to provide streamers the proper channels to get help and encourage platform providers to develop tools to solve problems appropriately.

The latter approach motivates the research questions for the STS paper: How does a mediator make a positive impact in reducing toxicity in game streaming communities, and what are a mediator's responsibilities? The illustration of the relationship between members of the game streaming community will be represented through the Technical and Social Relationships framework. Also, there will be an analysis of why game streaming communities need mediators to reduce toxicity problem. In the end, the proposed model that explains how mediators fit in the game community will be illustrated through Pinch and Bijker's framework of the Social Construction of Technology (SCOT) (Pinch & Bijker, 1987).

TOXICITY WITHIN GAME STREAMING COMMUNITIES

Nowadays, game streaming communities are facing the toxicity problem where some viewers comment and post messages filled with negative words, usually involved in hate speech. Currently, when this problem occurs, streamers refer to platform's policies and follow its instructions to solve issues. However, the solutions that the platform gives to streamers do not apply in all cases.

Richard Procter, a professional journalist who specializes in writing eSport and gaming contents for Forbes magazine (Procter, 2015, para. 4), gave the example case of Rumay "Hafu" Wang, a Heartstone player who faced the toxic atmosphere while being the only female player in the tournament. According to Procter, sexist hate speech exists within live streaming chat and as the article stated that "When you have a tournament and there's just one girl in a sea of guys, the Twitch chat is disgusting," (Procter, 2015, para. 4). Procter made the argument that even though

Twitch offered the moderating chat tools for streamers to prevent negative words, it was difficult to ban or timeout viewers in a more specific issue which was sexism in this case (Procter, 2015).

The toxicity problem consists of three groups of people, including streamers, viewers, and platform providers. The communication between viewers and streamers happens informally in the streaming chat box where viewers type their responses to interact with what streamers say or discuss during the streaming time. Also, viewers' responses can be in the form of reactions to how streamers perform on the activities they are doing. With the variations of responses in the streaming chat, some sentences or phrases are sometimes hard to identify whether they are trolling or toxic. Moreover, platform providers, Twitch for example, interfere with streamers in terms of streaming content when it violates copyright and distribution rules, but do not moderate streaming chat since they give full authority to streamers to control (Twitch, n.d.). To find the framework to address the relationship of the people involved in this problem, the current process of how the toxicity problem occurs is illustrated through the Technology and Social Relationships, shown in Figure 1 below.

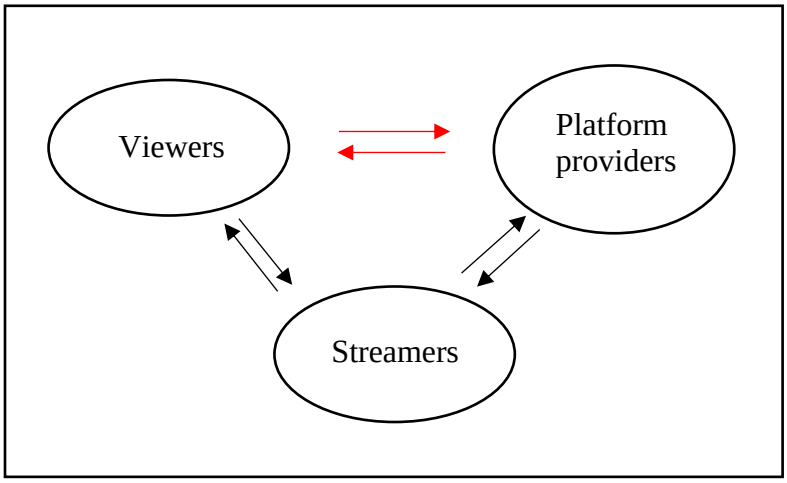

Figure 1: The current process of solving toxicity issues: The model contains black arrows which illustrate how individuals interact with each other. The red arrow refers to the lack of understanding of viewers even though all actions that take against viewers are from platform providers. (Adapted by Arty Kosolwattana (2020) from W. Bernard Carlson 2009)

It is true that this process can be applied when streamers have enough resources to manage, such as human moderators who monitor the chat feed during streaming time. Also, it can be applied when the problem is generic enough so that the fundamental tools on the platform can solve the problem. However, some streamers sometimes do not receive help in the right direction from the platform provider since the interaction between streamers and platform providers appears in a more formal approach which is through communicating in limited channels such as email or report submission. These ways of communication lack the interpretation of the problem in sociotechnical perspectives since platform providers do not have a proper evaluation of how their current technology makes positive impacts to streamers for reducing toxicity in streaming chat. Also, even though this platform provider provides a way to report the issues, it only takes the action against specific viewers. It does not provide a recommendation of how to mitigate this problem for a long-term period.

BRIDGING THE RELATIONSHIP BETWEEN PLATFORM'S POLICIES AND USER APPROACH

Currently, the solution to mitigate the toxicity is to let streamers give their permission to a group of people who can moderate chats during streaming time. For instance, Twitch gives a permission to streamers to nominate their trusted people to be a role called "moderator" to time out or ban users in the streaming chat (Twitch, n.d.). Moderators can also select the modes which allow specific group of people to join the chat such as, Subscriber-only or Follower-only chat modes (Twitch, n.d.). However, this method only applies to streamers who have enough human moderators to look for this problem. Jessica Reyman, an Associate Professor of Digital Rhetoric and Professional Writing in the department of English at Northern Illinois University, and Erika M. Sparby, an Assistant Professor of digital Rhetoric and Technical Communication at Illinois

State University, (2019) also address this problem in their book “Digital Ethics: Rhetoric and Reponsibility in Online Aggression”. The authors stated that “It may also be that streamers do not have the appropriate resources to consistently address harassment, such as not having enough moderators online to assist.” (Reyman & Sparby, 2019, p. 59). They added that since streamers do not know how to mitigate the harassment in a streaming chat, they decide to ignore it.

Another approach of monitoring streaming chat is to implement an automating system to detect negative words or phrases and automatically ban or timeout viewers who post them. For example, streamers can apply alternatives which are bots to automatically manage streaming chat while they play games. According to LVLup Dojo website, there are several types of common Twitch bots, such as Moobot, Nightbot, Xanbot, Deepbot, Phantombot, and Ankhbot (LVLUP Dojo, 2017). Each bot has different features so that streamers can select it based on users’ need.

Although these automated bots can act as a chat moderator, their different features and usages often confuse streamers when selecting bots to solve their problems. Also, automated bots work as a command-based unit which means they only do the tasks that a streamer or a human moderator instruct them to do (LVLUP Dojo, 2017). Therefore, implementing bots require resources and accurate instructions so that streamers can set up correct commands to monitor their streaming chat.

With the problem of translating the instructions of the platform’s tools and policies to a more understanding version, game streaming communities need a middle person or organization who bridge the processes between interpreting streamers’ sociotechnical problems and implementing the platform’s action against hate speech. Therefore, mediators who provide information of how to access platform resources appropriately are the solution that fit in the system.

The example case that indicates the need for mediators is from a Twitch's tool called AutoMod. Cecilia D'Anastasio (2016), a professional reporter on gaming topic and winner of Writers Guild award for digital news writing in 2019 (D'Anastasio. n.d.), stated that AutoMod has the ability to catch the negative words or phrases from the streaming chats for human moderators. However, Claudia Lo (2018), a researcher from the Department of Comparative Media Studies at Massachusetts Institute of Technology, argued that even though AutoMod filters various general toxic words, users can avoid the catch by using emotes, memes, or scene-specific in-jokes to indicate harassment, requiring human moderators to look at each streaming chat flow case by case (Lo, 2018, p. 36). In this case, there should be a mediator who evaluates what situation AutoMod can be applied to solve the problem and when it needs to be improved so that it can cover more cases of toxic words and phrases.

This example case shows the incompatible action from the platform since there is no suitable assessment where the usability of streamers are determined case by case. Also, there is a lack of the platform's evaluation on effectiveness of its tool implementation. Therefore, when no one stands in this position, the bias for tool development occurs in the platform which implies its worsened outcome when solving the toxicity issues.

HOW CAN MEDIATORS REDUCE TOXICITY IN GAME STREAMING COMMUNITIES?

In the previous section, the question arises: What can a mediator do in reducing toxicity in game streaming communities? The STS research answers this question by showing the example of how mediators as the organization interpret the problems in a sociotechnical approach so that they can address which tools can solve members' problems. Also, the case study in the next section will clarify how the game streaming community adopts this concept to

mediate the connection between the tool usage and streamer's problems regarding hate speech. The mediator will be in the form of a specific system, organization, or association in game streaming community which organizes the sociotechnical issues based on streamer experience and how they receive the assistant from platform providers. This organization may provide a more deeper understanding of the problem to the platform while giving more proper tools for streamers to solve their issues. The model can be illustrated through Pinch and Bijker's framework of the Social Construction of Technology (SCOT) in Figure 2 below (Pinch & Bijker, 1987). The red arrows represent the additional communications that refer to the sociotechnical issues, which in this case is about hate speech. If the streamers need more information about platform providers, mediators will be the medium to acquire the relevant tools or policies for streamers to use and follow. On the other hand, if platform providers need more insights about viewers' behaviors, they can request support for a mediator to provide an evaluation of how many viewers of specific channels use toxic words or phrases so that they can improve their policies.

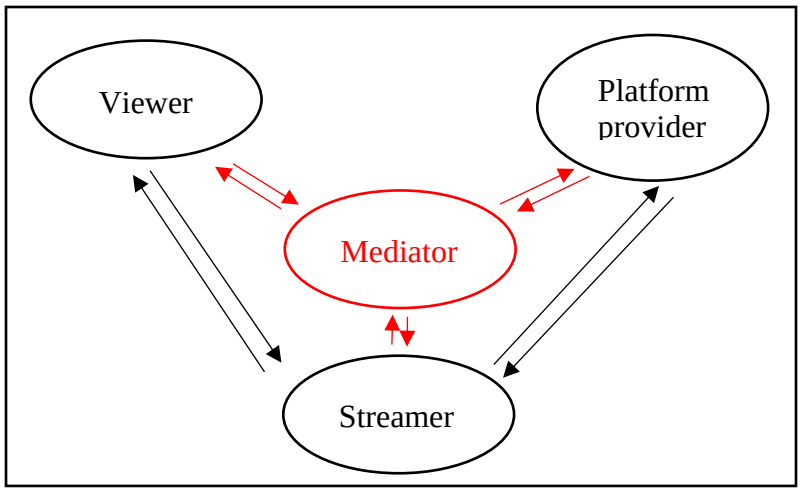

Figure 2: A depiction of the mediators as the center of the system: Since mediators aim to encourage a deeper understanding of the hate speech issues, they not only provide support for streamers, but to portray the effectiveness of the actions that platform providers take against viewers. This method will help platform providers to understand the situation more and reduce bias in improving tools/ policies to solve the issues. (Adapted by Arty Kosolwattana (2020) from W. Bernard Carlson 2009)

CASE STUDY: MEDIATORS IN SOCIOTECHNICAL SYSTEMS

The example case of effective mediation is from The Swedish Urban Network Association (SUNA), a non-profit organization who welcomes different sizes of firms to join as members and provides information about various network infrastructures (Wihborg & Söderholm, 2013, para. 1). According to Wihborg & Söderholm (2013), the objective of the association is to "… promote the development of an open, fibre based IT-infrastructure." (p. 271, para. 2). The association not only provides the conference for members to keep updated on news and reports on activites that give the opportunities to cooperate with group members, but it promotes the practices that provide the knowledge that members can refer to. Therefore, the mediator or the SUNA in this case acts as the supporter for members who need to access help from the organization and be the advisory center for trading knowledge among group members.

This example relates to a mediator for gaming communities in the way that a mediator encourages support from platform providers to streamers in gaming communities and even seek some references from the internet to fulfill the guidelines for them. In the toxicity problem, when streamers ask the mediator to help them find the resources for installing automated bots on the streaming chat, mediators will explain how to connect the bots with platform providers and the information of the automated bots that streamers can use.

Also, a mediator encourages the platform providers to improve their tools based on feedback from streamers and the performance to handle the problem. A mediator aims to reduce bias in developing technology and encourage streamers to find optimal solutions to handle hate speech in the community. For instance, if a streamer reports the issues about how a streaming chat is flooded with too many toxic words, instead of sending the case and letting the platform ban those viewers who commit the actions, a mediator will address more social perspectives that

prompt the platform to make an evalution of the case and select the correct tools or policies to take actions in the appropriate manners. As explained above about the tasks of mediators in game streaming communities, the objective of creating mediators is not only to solve toxicity problem for users as the short-term solution, but to suggest a recommendation for platform providers to analyze the situation in more sociotechnical perspectives and develop tools and policies according to the streamers' problems or clients.

THE FURTHER RELATIONSHIP BETWEEN MEDIATORS AND GAME STREAMING COMMUNITIES

As explained in the Swedish Urban Network Association (SUNA) of how mediators play an important role in supporting members in communities, game streaming communities can apply this example to greatly reduce the hate speech problem by letting mediators mediate the situation for streamers and provide an entrance for knowledge of the supporting tools given by platform providers accessible for all streamers. Also, the mediator can be initiated from small groups of streamers or gaming professionals who have different backgrounds and experience in handling toxicity issues. By doing so, group members can exchange their opinions and come up with various case studies that can potentially be added to the center knowledge for solving the problem regarding toxicity. However, the next step of developing the mediating group will be to consider some constraints for further research and development. First, it might be hard to find the right person who is willing to share what they have encountered and how a platform provider should handle a situation since some issues are sensitive to him or her. Also, there might be some aspects that do not agree with the mediator establishment. For instance, there might be an aspect that thinks of games as the entertainment source and it might not be worth creating such an official organization to look for hate speech. Another aspect might be that creating the mediators

might affect the equality of rights for users on the internet. It is true that the users that got banned or timed out are the ones who commit the wrong actions, but there is no official posting threshold on the rules that limits how users can post on the practical internet world. Therefore, this paper hopes to contribute as the starting point to consider mediators as the solution to reduce toxicity issues.

WORK CITED

Bijker, W., & Pinch, T. (1987). The social construction of facts and artifacts: Or how the sociology of science and the sociology of technology might benefit each Other. *Social Studies of Science* (*Social Studies of Science, Vol. 14*, 17–50).

D'Anastasio, C. (n.d.). LinkedIn profile of Cecilia D'Anastasio. Retrieved from https://www.linkedin.com/in/cecilia-d-anastasio-51a15668/

D'Anastasio, C. (2016, December 14). Twitch's automod is already a game-changer, streamers say. Retrieved from https://kotaku.com/twitch-s-automod-is-already-a-game-changer-streamers-s-1790109323

Kosolwattana, T. (2020). *The current process of solving toxicity issues.* [1]. *STS Research Paper: Mediators For Game Streaming* (Unpublished undergraduate thesis). School of Engineering and Applied Science, University of Virginia. Charlottesville, VA.

Kosolwattana, T. (2020). *A depiction of the mediators as the center of the system.* [2]. *STS Research Paper: Mediators For Game Streaming* (Unpublished undergraduate thesis). School of Engineering and Applied Science, University of Virginia. Charlottesville, VA.

Lo, C. (2018). When all you have is a banhammer: the social and communicative work of volunteer moderators. Retrieved from https://cmsw.mit.edu/wp/wp-content/uploads/2018/05/Claudia-Lo-When-All-You-Have-Is-a-Banhammer.pdf

LVLUP Dojo. (2017, November 20). Common twitch bots. *Medium*. https://blog.lvlupdojo.com/the-most-common-twitch-bots-e07bed06538

Pennington, J., Socher, R., & Manning, C. (2014). Glove: global vectors for word representation. proceedings of the 2014 conference on empirical methods in natural language processing (EMNLP), 1532–1543. https://doi.org/10.3115/v1/D14-1162

Procter, R. (2015, September 25). How women in esports deal with twitch toxicity every day. *Forbes*. Retrieved from https://www.forbes.com/sites/richardprocter/2015/09/25/women-streamers-twitch-chat/

Procter, R. (n.d.). Richard Procter. Forbes. Retrieved from https://www.forbes.com/sites/richardprocter/

Reyman, J., & Sparby, E. M. (2019). Digital ethics: rhetoric and responsibility in online aggression. 59.

Twitch. (n.d.). Managing roles for your channel. Retrieved from https://help.twitch.tv/s/article/Managing-Roles-for-your-Channel

Twitch (n.d.). Twitch.tv—terms of service. Twitch.Tv. Retrieved from https://www.twitch.tv/p/legal/terms-of-service/#8-user-content

Wihlborg, E., Söderholm, K. (2013). Mediators in action: organizing sociotechnical system change. *Technology in Society*, *35*, 271. https://doi.org/10.1016/j.techsoc.2013.09.004

BIBLIOGRAPHY

Bijker, W., & Pinch, T. (1987). The social construction of facts and artifacts: Or how the sociology of science and the sociology of technology might benefit each Other. *Social Studies of Science* (*Social Studies of Science, Vol. 14*, 17–50).

core-こあ-. (2019, October 1). To the Thai who gave me a reply. You don't have to feel responsible for bad people because you are Thai. I don't really care about race, such as Thai and Japanese. → [Tweet]. Retrieved from @core63_mc website: https://twitter.com/core63_mc/status/1179059713406726145

Cybersmile Foundation (n.d.). Twitch announce new tool to help reduce harassment and abuse – Cybersmile. Retrieved from https://www.cybersmile.org/news/twitch-announce-new-tool-to-help-reduce-harassment-and-abuse

D'Anastasio, C. (n.d.). LinkedIn profile of Cecilia D'Anastasio. Retrieved from https://www.linkedin.com/in/cecilia-d-anastasio-51a15668/

D'Anastasio, C. (2016, December 14). Twitch's automod is already a game-changer, streamers say. Retrieved from https://kotaku.com/twitch-s-automod-is-already-a-game-changer-streamers-s-1790109323

Dhakal, A., Kedia, D. (2019). Toxicity classification on social media platforms. poster presented in CS 224, Stanford University. Retrieved from https://web.stanford.edu/class/cs224n/posters/15722323.pdf

Donegan, R. (2012). Bullying and cyberbullying: history, statistics, law, prevention and analysis. The Elon Journal of Undergraduate Research in Communications, 3(1), 33-42. Retrieved from https://www.elon.edu/u/academics/communications/journal/wp-content/uploads/sites/153/2017/06/04DoneganEJSpring12.pdf

Edge, N. (2013). Evolution of the gaming experience: live video streaming and the emergence of a new web community. Elon Journal of Undergraduate Research in Communications, 4(2). Retrieved from http://www.inquiriesjournal.com/articles/821/evolution-of-the-gaming-experience-live-video-streaming-and-the-emergence-of-a-new-web-community

ElSherief, M., Nilizadeh, S., Nguyen, D., Vigna, G., & Belding, E. (2018). Peer to peer hate: hate speech instigators and their targets. Twelfth International AAAI Conference on Web and Social Media. Presented at the Twelfth International AAAI Conference on Web and Social Media. Retrieved from https://www.aaai.org/ocs/index.php/ICWSM/ICWSM18/paper/view/17905

Gaydhani, A., Doma, V., Kendre, S., & Bhagwat, L. (2018). Detecting hate speech and offensive language on Twitter using machine learning: an N-gram and TFIDF based approach. ArXiv:1809.08651 [Cs]. Retrieved from http://arxiv.org/abs/1809.08651

Grayson, N. (2019, January 29). For streamers dealing with stalkers, Twitch's solutions fall short. Retrieved from Kotaku website: https://kotaku.com/for-streamers-dealing-with-stalkers-twitchs-solutions-1832063386

Jabeen, H. (2018, October 23). stemming and lemmatization in Python. Retrieved from DataCamp Community website: https://www.datacamp.com/community/tutorials/stemming-lemmatization-python

Kosolwattana, T. (2020). *The current process of solving toxicity issues.* [1]. *STS Research Paper: Mediators For Game Streaming* (Unpublished undergraduate thesis). School of Engineering and Applied Science, University of Virginia. Charlottesville, VA.

Kosolwattana, T. (2020). *A depiction of the mediators as the center of the system.* [2]. *STS Research Paper: Mediators For Game Streaming* (Unpublished undergraduate thesis). School of Engineering and Applied Science, University of Virginia. Charlottesville, VA.

Lo, C. (2018). When all you have is a banhammer: the social and communicative work of volunteer moderators. 36. Retrieved from https://cmsw.mit.edu/wp/wp-content/uploads/2018/05/Claudia-Lo-When-All-You-Have-Is-a-Banhammer.pdf

LVLUP Dojo. (2017, November 20). Common twitch bots. *Medium*. https://blog.lvlupdojo.com/the-most-common-twitch-bots-e07bed06538

Pennington, J., Socher, R., & Manning, C. (2014). Glove: global vectors for word representation. proceedings of the 2014 conference on empirical methods in natural language processing (EMNLP), 1532–1543. https://doi.org/10.3115/v1/D14-1162

Petrov, C. (2019, December 28). The latest cyberbullying statistics you should know in 2019. Retrieved from Tech Jury website: https://techjury.net/stats-about/cyberbullying/

Procter, R. (2015, September 25). How women in esports deal with twitch toxicity every day. *Forbes*. Retrieved from https://www.forbes.com/sites/richardprocter/2015/09/25/women-streamers-twitch-chat/

Procter, R. (n.d.). Richard Procter. Forbes. Retrieved from https://www.forbes.com/sites/richardprocter/

Reyman, J., & Sparby, E. M. (2019). Digital ethics: rhetoric and responsibility in online aggression. 59.

Twitch. (n.d.). Managing roles for your channel. Retrieved from https://help.twitch.tv/s/article/Managing-Roles-for-your-Channel

Twitch (n.d.). Twitch.tv—terms of service. Twitch.Tv. Retrieved from https://www.twitch.tv/p/legal/terms-of-service/#8-user-content

Wihlborg, E., Söderholm, K. (2013). Mediators in action: organizing sociotechnical system change. *Technology in Society*, *35*, 271. https://doi.org/10.1016/j.techsoc.2013.09.004

What Is Cyberbullying. (2012, March 7). Retrieved from StopBullying.gov website: https://www.stopbullying.gov/cyberbullying/what-is-it/index.html