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Examining Malicious Online Comments from the Bystander Effect Perspective

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ABSTRACT

Cyberbullying has become a social problem as malicious text messages and online comments among teenagers have increased in the late 2000s. Some serious reporting has attempted to impress on us the need to pay more attention to reducing malicious online content as a typical type of cyberbullying. Meanwhile, despite environmental changes that have made it easier to report perpetrators of such messages, it is often the case that the crime occurs in a public place and is tolerated. However, there is a growing tendency for people to exhibit the bystander effect, the problem of personal indifference to witnessing or knowing about crimes, but individuals do not offer any means of help to a victim when other people are present. This effect is rampant in the case of cybercrimes. This study aims to extract the motivations behind posting malicious comments through in-depth interviews and to suggest recommendations for relative issues by demonstrating how the bystander effect can be reduced using causal relationship diagrams of the system dynamics methodology. Hopefully, this work will contribute to a better understanding of factors that could cause a decrease in malicious online comments.

Keywords: Cyberbullying, Malicious Comments, Bystander Effect, Causal Loop Diagram, Systems Thinking

Ⅰ. Introduction

Cyberbullying is a systemic process where attackers use an online communication medium to threaten other people who are victims (Zambrano et al., 2020). It has become a social problem as malicious text messages and online comments among teenagers have increased in the late 2000s (Smith et al., 2008). In reality, victims of cyberbullying often experience lowering self-esteem, increasing depression, and feelings of powerlessness and may commit self-harm and even suicide, all of which has raised awareness

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of the seriousness of this social issue (Van Geel et al., 2014). According to a Fox5 story in October 2017, suicide rates for teenage girls in 2015 saw five suicides out of every 100,000 girls.[1] This social problem is still growing as is the need to take more direct action to stop it. According to a survey conducted by Pew Research Center (2017) on 4,248 adults, 41% of respondents received malicious comments on the internet, and 66% witnessed harm to others.[2] As a number of famous celebrities in South Korea have died by suicide recently due to malicious comments, but it goes without saying that no one deserves to be the target of cyberbullying. A psychology professor in South Korea stated that keyboard warriors tend to post malicious comment without hesitation while people remain passive onlookers and contribute to the problem.[3]

In the bystander effect, individuals are less likely to feel responsible for an incident since they can share responsibility when there are other people present, so they do not intervene to help the victim (Chekroun and Braue, 2002). The bystander effect is more obvious in cyberspace since most cyberbullying behaviors like malicious comments occur while bystanders are around. Therefore, it is necessary to not only take into consideration the immediate effects caused by malicious comments, but also to the influence of bystanders who never report the harm they have witnessed. Since the effects spread more quickly online, it is necessary to control the negative aspects of bystander effect and to enhance the virtuous cycle for positive outcomes. For a virtuous cycle from the bystander effect perspective, it is important to spread self-purification by increasing each person's sense of responsibility through such acts as reporting cyberbullying by malicious comments. As cyberbullying in the form of malicious comments is becoming a serious social issue, there are an increasing number of related studies, but most of the previous studies (Chen and Chen, 2002; Kim et al., 2020; Song et al., 2019; Whittaker and Kowalski, 2015; Ybarra and Mitchell, 2004) are about the prevalence and characteristics of cyberbullying from the view of offender or victim. However, most cyberbullying cases happen online where many people can witness it, so it is necessary to see such cases from the perspective of bystanders that have a negative effect even though they are not direct victims.

Therefore, this study aims to investigate the phenomenon of malicious comments from the perspective of bystander effect and suggests countermeasures to reduce the malicious comments. More specifically, this study elucidates (1) reasons why people post malicious comments in the first place, (2) the inhibitors that bring on the bystander effect in online environments, and (3) ways to get people to respond to malicious comments to create a virtuous cycle. This study derives reasons for posting malicious comments, reasons for why bystanders report or do not report malicious comments as bystanders, and methods of reporting through interviews. Based on the factors derived through the interviews, it is evident that the interactions and effects of inside system and suggests countermeasures by developing the causal loop diagram (CLD) of malicious comments increase, bystander effect and self-purification effort using the methodology of system dynamics. We improve the results' feasibility and credibility through developing the causal loop diagram (CLD) based on the factors

1) http://www.oxygen.com/blogs/self-harm-and-suicide-attempts-rise-for-girls-are-smart-phones-and-cyber-bullying-to-blame

2) https://m.post.naver.com/viewer/postView.nhn?volumeNo=15937321&memberNo=11166748&searchKeyword=%EC%82%AC%EC%9D%B4%EB%B2%84%20%ED%8F%AD%EB%A0%A5%20%EC%82%AC%EB%A1%80&searchRank=108

3) https://www.dailymedi.com/detail.php?number=850288

derived through the interviews. In addition, this study contributes to healthier circles of online communication by suggesting countermeasures to reduce malicious comments.

Ⅱ. Conceptual Background

2.1. Literature Review

Recently, various communication activities are increasing in an online environment due to the development of information technology and the increase of social media use. While this phenomenon enables individuals to express and share their opinions freely, it may have a negative influence on online communities as people post malicious comments to others' postings. Malicious comments are a type of cyberbullying, and most existing studies (Berne et al., 2019; Choi et al., 2020; Kim et al., 2020; Lee and Kim, 2015; Whittaker and Kowalski, 2015) refer to malicious comments as cyberbullying. A malicious comment is a negative electronic communication in an open forum that may include curse words, statements of hate, or intimidation to another person, breaking social convention (e.g., inappropriate sexual remarks or images) or interfering with normal operation within an online community (Kim and Park, 2018; Lee and Kim, 2015; Ybarra and Mitchell, 2004). As cyberbullying becomes a serious social problem, some related studies have been conducted (see <Table 1>). The previous studies covered the prevalence and characteristics of cyberbullying (Chen and Chen, 2002; Kim et al., 2020; Song et al., 2019; Whittaker and Kowalski, 2015; Ybarra and Mitchell, 2004), methods for detecting cyberbullying (Choi et al., 2020; Menini et al., 2019), and motivation and effects of cyberbullying (Berne et al., 2019; Lee and Kim, 2015), to understand and prevent cyberbullying. Most of the studies were about the characteristics of cyberbullying from the offender or victim's perspective, and recently, some studies were about methods to

<Table 1> Previous Studies on Cyberbullying

Theme	Author	Method	Purpose	Findings
Methods for detecting cyberbullying	Menini et al. (2019)	Social network analysis	To present a system for the monitoring of cyberbullying phenomena on social media	Presented a system for the monitoring of cyberbullying and evaluated the system
	Choi et al. (2020)	Text mining, social network analysis	To develop a practical method of identifying key cyberbullies with high rates of insulting comments and analyze the influence	Developed a method of identifying key cyberbullies and validated the proposed method through a real-word application
Prevalence and characteristics of cyberbullying	Whittaker and Kowalski (2015)	Innovative method	To examine the prevalence rates of cyberbullying, the venues which cyberbullying occur, and perceptions of cyberbullying	Found texting and social media are the commonly used for cyberbullying and the venue and features of the target influenced the nature of online exchanges
	Ybarra and Mitchell (2004)	Interview	To examine characteristics of internet harassment	Found that youth aggressor / targets reported characteristics similar to conventional bully / victim youth, including many commonalities with aggressor-only youth, and significant psychosocial challenge

<Table 1> Previous Studies on Cyberbullying (Cont.)

Theme	Author	Method	Purpose	Findings
Prevalence and characteristics of cyberbullying	Song et al. (2019)	Survey method	To investigate the relationships among aggressive traits, beliefs about aggression, network public opinion, and cyberbullying	Found that aggressive traits and beliefs about aggression were all positively correlated with cyberbullying, aggressive traits were positively correlated with beliefs about aggression, and aggressive traits were negatively correlated with network public opinion
	Kim et al. (2020)	Survey method	To investigate effects of anonymity and need for attention on posting malicious comments online and compare these two factors	Revealed that the need for attention affected malicious comments through partial mediation of neutralization. Anonymity did not significantly affect malicious comments.
	Chen and Chen (2020)	Survey method	To investigate the prevalence or rates of cyberbullying and form of cyberbullying	revealed that cyberbullying is prevalent and online curses / insults / humiliation was the most frequent form of cyberbullying
Motivation and effects	Berne et al. (2019)	Literature review	To review the evidence for an independent contribution of childhood bullying victimisation to the development of poor outcomes throughout the life span and discuss the implications for policy and practice	Suggested that public health interventions could aim at preventing children from becoming the target of bullying behaviours from an early age
	Lee and Kim (2015)	Interview	To find the reasons people post malicious comments online and the problems of online comments	Found the reasons for posing malicious comments online (i.e., resolving a feeling of dissatisfaction, hostility toward others, poor self-control, etc.) and the problems of online comments (i.e., anonymity, lack of responsibility, etc.)

monitor or detect cyberbullying from the perspective of system.

However, there are rare studies that focus on the bystanders that have a negative influence on cyberbullying behaviors although they are not direct offenders of cyberbullying. Most cyberbullying cases happen in online environments where many people can witness, so the role of witnesses is important not to mention those of offenders and victims. Bystanders are central to forming the dynamics of cyberbullying (You and Lee, 2019). Therefore, it is necessary to investigate the cyberbullying behaviors from the bystander's perspective. In addition, most previous studies rely on surveys or interviews, but more systemic and reliable analysis is needed to formulate methods which prevent and respond to cyberbullying. Even though Lee and Kim (2015) investigated motivation factors and problems of malicious comments and suggested countermeasures based on their findings, they did not analyze the relationships among the factors. Therefore, this study derives not only reasons for posting malicious comments but also factors of reporting and not reporting them from the perspective of bystander effect through interviews. Regarding the derived factors, their causal relationships and effects are comprehended through

the methodology of system dynamics to present methods to reduce malicious comments.

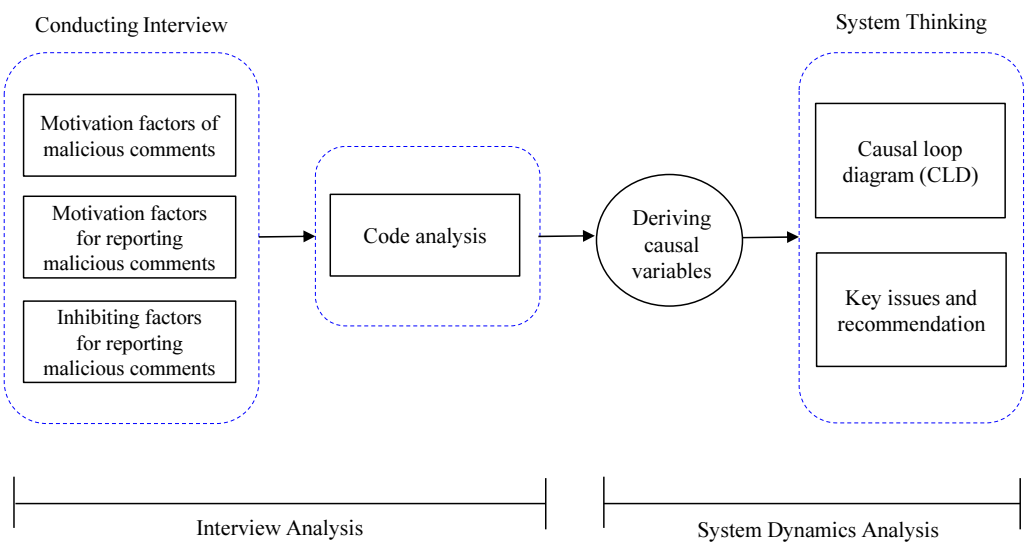
2.2. Online Bystander Effect

A bystander is a witness who does not engage in an action they are aware of (You and Lee, 2019). In previous studies of physical violence, a bystander knows about the situation, but remains silent or may even agree with it, thus indirectly contributing to creating and sustaining a culture of violence by empowering the perpetrator (Sutton and Smith, 1999; Ziegler et al., 1991). The bystander effect is a coined psychological term to describe a phenomenon where if there are more people around you, there is a higher chance you will not help a person or people in need. The bystander effect arises from the expectation that someone else will provide help. The influence of the bystander effect is lower when you are alone and faced with someone in need of help. Unlike actual crimes in the real world, cyber crimes such as cyber violence create a very strong public feature because many people can see it happening. There has been other research on the offending effects of offenders (Hollis-Peel et al., 2011; Nicksa et al., 2014). This study focuses on the effects of the bystanders online and investigates that it is the most important way to prevent the offense by inhibiting the bystander effect.

Ⅲ. Research Methodology

In this study, we use two research methods which are interviews and system dynamics to achieve the research objectives. The research procedure of this study is shown in <Figure 1>.

The method of interviews in qualitative research enables the collection of in-depth information so that subjects may be properly understood. In other words, it has an advantage that the essence of a phenomenon can be minutely observed due to the possibility of understanding and reasoning of the phenomenon (Yin, 2003). However, there can be



<Figure 1> Research Procedure

an intervention of subjective opinions of interviewer and interviewees, and there is a limitation in comprehending causal relationships among factors derived through interviews. The system dynamics is a methodology presented by Forrester (1997), and it is broadly applied to establish strategies and policies for various social problems and decision-making behaviors. Especially, the system dynamics enables estimation for simulation and non-linear changes, so it can be regarded as a methodology that can be used for the frame of standards on phenomena composed of complicated causal relationships. Therefore, this study derives reasons for posting malicious comments and reasons for reporting and not reporting them as bystanders through interviews, and then develops causal loop diagrams (CLD) using system dynamics for the derived factors. Next, it suggests countermeasures as causal relationships and effects are comprehended among each diagram content. This study is conducted from more comprehensive views, and its feasibility is supported as the two methods are used to compensate limitations that one method has (Venkatesh et al., 2013).

3.1. In-depth Interviews

We conducted interviews as an exploratory qualitative study. The interview methodology can obtain rich findings and insights about the phenomenon (Lee, 2015; Lee et al., 2014; Yu, 2013). For the data collection (i.e., interviews), we recruited 15 online users in Korea. These users are those who have seen malicious comments more than once in online communities. The sampling method was snowball sampling, which is a non-probabilistic sampling method, followed by an interview with a specific acquaintance, and then an online user introduced by the acquaintance to act as the next interviewee (Goodman, 1961). On top of these first 15 users, 90 other persons were recruited, so total 105 interviewees have participated. The number of interviewees was determined by confirming theoretical saturation (Strauss and Corbin, 1998). We conducted both face-to-face and online interviews. The interview questions and objectives are shown in <Table 2>.

Based on the interview questions, we had them answer additional questions for better clarification.

<Table 2> Contents of the Interview

Division	Purpose	Contents
Malicious comment	To identify cases of malicious comments	If you have ever seen a case of malicious comments on the Internet, what was the content of the bad comment?
	To identify countermeasures against malicious comments	How did people respond to such comments?
	To derive motivating factors	Why do people leave such comments?
Reporting malicious comments	To derive motivation factors of reporting	Why are people "reporting" such comments?
		Why do people not "report" such comments?
		How do people "report" such comments?
Improvement plan	To understanding motivations for reacting the malicious comments	Why do people reply to such comments?
		Why do some people not respond to such comments?
	To derive an improvement plan	How would you be able to make people reply to offensive comments?

<Table 3> Demographic Information of Interview Respondents

Classification		Frequency	%
Gender	Male	65	62
	Female	40	38
Age	10-19 years	9	9
	20-29 years	44	42
	30-39 years	36	34
	40-49 years	16	15
Occupation	Office worker	52	50
	Student	41	38
	Self-employed	8	8
	Unemployed	4	4
Total		105	100

The average interview time per person was 30 - 40 mins. The interviews took place for two weeks in November 2016. <Table 3> shows the demographic characteristics of the interview respondents.

The interview transcripts were subjected to content analysis based on open coding approach (Corbin and Strauss, 2008). Open coding is an initial step of theoretical analysis and is involved with categories and early findings of their properties (Glaser, 1992; Lee et al., 2019). Axial coding is the process to search relations among categories, and in this study, it is used to connect categories with sub-categories. Three researchers participated in the coding process. During the open coding, each coder reviewed interview transcripts line by line and identified codes. The individual responses were analyzed to extract key expressions that indicated possible motives for making malicious comments, motives to report the motions of such comments, and the impeding factors. Secondary coding was performed based on the similarity of the purpose of use. The coders discussed each concept, named them, and grouped them into same codes. To verify the results of data coding, other two researchers performed a peer review of interview details and keyboard classifications. Then, to settle any inter-rater disagreements, we recruited a coder who was uninvolved with either the data collection or discussion of it. The inter-rater agreement scores averaged of the coding results are 0.85 respectively (Cohen et al., 2000).

3.2. Research Analysis and Results

In total, 105 interviewees participated, and 127 responses (i.e., codes) for motivation factors of posting malicious comments were collected. Regarding motivation factors of reporting malicious comments, 130 responses (i.e., codes) were collected, and 121 responses (i.e., codes) were collected to identify inhibiting factors for reporting malicious comments. In the result of grouping relevant codes in each question, motivation factors for posting malicious comments are anonymity (35%), lack of responsibility (35%), criticizing others (17%) and no reason (13%). The coding results of interview responses for reasons for reporting and not reporting malicious comments are in <Table 4>.

<Table 4> shows motivation factors of reporting

<Table 4> Coding Results

Motivation factors for reporting malicious comments			Inhibiting factors for reporting malicious comments		
Factor	Examples	Freq. (%)	Factor	Examples	Freq. (%)
Altruism	I reported it to prevent excessive malicious comments from being shown by other people. It ruins the community atmosphere and makes others hesitate to post.	53 (41)	Indifference	There is no reason to do so, and there is no change even if you report it. It has nothing to do with me, so I am not interested.	46 (38)
Personal Injury	I reported it when someone I support was the target of malicious comments. I was directly damaged by malicious comments.	36 (28)	Concerns	After logging in, my ID will be exposed. People will not report if they are aware that their information may be exposed.	29 (24)
Morality	Comments are reported in order to impose sanctions on comments that are too discriminatory or blasphemous. People judged that the malicious comments were morally wrong	24 (18)	Abandonment	I don't think reporting will improve the malicious comment problem. Because reporting does not impose sanctions on malicious comment publishers.	28 (23)
False Information	When it is determined that the content is not true, it is considered to be reporting a malicious comment. In order to build a correct comment culture, we aim to achieve a self-cleaning action by reporting false information.	17 (13)	Complexity	It is a bother to log in to report. The process is stressful, such as writing the reason for reporting.	18 (15)
Total		130 (100)	Total		121 (100)

malicious comments and inhibiting factors for reporting malicious comments. The motivation factors of reporting malicious comments are altruism (41%), personal injury (28%), morality (24%), and false information (13%). The behaviors to prevent me and people around me from being damaged by malicious comments and to prevent the atmosphere of online community from being ruined are altruism and personal injury. Regarding morality and false information, people report malicious comments because most of them are false, and they are ethically wrong. The inhibiting factors for reporting malicious comments include indifference (38%), concerns (24%), abandonment (23%), and complexity (15%). Regarding indifference and concerns, people think malicious comments have nothing to do with them or are afraid that their personal information is revealed. Regarding abandonment and complexity, people think reporting would not solve the malicious comments, or the procedures and process of reporting are too complicated. The occurrence of malicious comments and factors of reporting or not reporting them derived through interviews are represented in the causal loop diagram (CLD) through the following system dynamics methodology.

Ⅳ. System Dynamics

System dynamics is a methodology for framing, understanding, and discussing complex issues and problems (Lee et al., 2014; Sterman, 2001). In this

study, the facilitators and inhibitors of malicious comments derived from the interviews were drawn using causal relationship diagrams that are the core of the systems thinking approach. Causal relationship diagrams can be structurally examined as a result of causal relationships and effects analysis of each factor (Akkermans and Van Helden, 2002; Somers and Nelson, 2001). This study uses causal diagrams to identify causal relationships between the factors that impede the reporting of evidence and to suggest schemes to ultimately reduce such comments. It shows the causal loop diagrams (CLD) of the increase of malicious comments, bystander effect and self-purification efforts in community based the interview contents and deduced factors.

4.1. Results

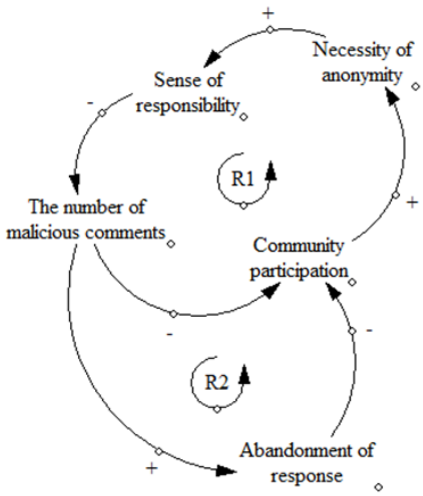
4.1.1. CLD for Increasing the Number of Malicious Comments

The Causal Loop Diagram in <Figure 2> illustrates the loop of increasing comments as a factor affecting the number of malicious comments derived from the interviews. The most important factor for the increasing number of malicious comments is the lack of accountability for posting comments. The reason for the lowered sense of personal responsibility is derived from the lowered need for anonymity as the participation of the community is hindered. Lee and Kim (2015) mentioned that the most problematic aspect of comments culture is anonymity, the next is the lack of accountability for comments people post. When people can post comments anonymously in online communities, they are less likely to be responsible for the comments they post. In other words, they can easily post malicious comments since their identities are not exposed (Anderson et al., 2014). When community participation is active, members are required to have relatively high anonymity to create an environment of positive opinions. Therefore, a low anonymity environment weakens the sense of responsibility for comments, resulting in a relatively increased number of malicious comments [R1]. An interview subject stated, "*I prefer the anonymous bulletin board because I can feel free and participate in discussions more actively.*" Moreover, if the number of malicious comments is too high, it may result in giving up the response, which may also hinder community participation [R2]. According to the gap theory by Loewenstein (1994), if a person understands a subject by 75%, there is a gap of knowledge by 25%, which is when the person's curiosity reaches its climax. On the contrary, if there is too much that a person does not know, the person gives up knowing. Applying this to the diagram, if there are too many malicious comments, people would give up reporting them.

4.1.2. CLD for the Bystander Effect

This study focuses on the bystander effect as a major factor impeding people from reporting malicious comments. As shown in <Figure 3>, a reduction in the number of malicious comments derived from the actual interview results is blocking the content of such comments. Respondents stated that the reason to impede reporting malicious comments is there is an increase in the number of extremely malicious comments. Many interview subjects commented on "*extremely offensive comments*" which included serious personal attacks and profanity, which turned out to be a bystander for declaring such comments.

First, increases in the number of extremely malicious comments generate more likelihood of personal injury and personal exposure to the individual writing

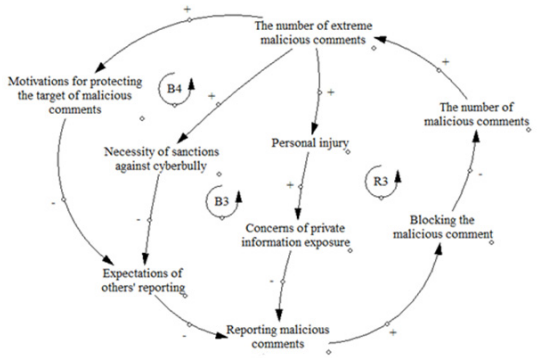


<Figure 2> CLD for Increasing the Number of Malicious Comments

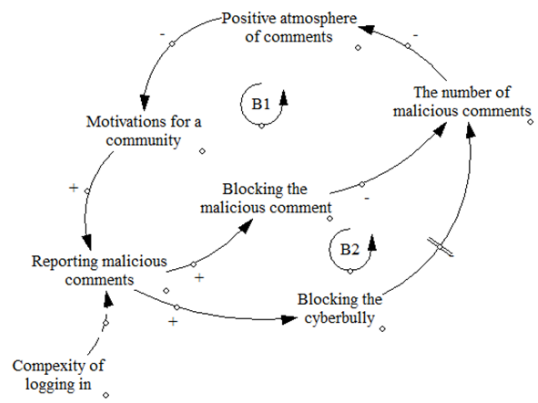
the comments. The fact that there are extremely many malicious comments means many people agree with the malicious comments. Like witch-hunt, people post malicious comments by finding a specific person's personal information, so it can lead to the increase of concerns about private information explore. As a result of these perceived risks, reporting is reduced [R3]. One interview subject replied, "*I do not want to expose myself…I feel scared to argue online.*" The decrease of reporting malicious comments leads to the decrease of blocking malicious comments, so eventually, the number of malicious comments increases. Second, as the numbers increase, the more there is a need for sanctions against perpetrators of the comments. However, we found that the necessity of sanctions increases the vague expectation that other people will report the troublemaker because of the increased necessity of not reporting the complaint directly. The bystander effect begins to become expressed through convoluted thinking that I would not have to participate in deciding the attitude and behavior toward such comments (someone else will do it). The bystander effect works better with more bystanders. Therefore, if people expect others to report malicious comments, the malicious comments are not reported. This expectation of others making a report is ultimately the main cause of the reductions in reported complaints [B3]. One interview subject said, "*I expect someone will reply to or report that comment.*" Third, the extreme number of such comments will motivate victims. As the protection motivation for this specific object becomes stronger, it acts as a voluntary reporting motive, so that the expectation for someone else to file a report becomes lower. As a result, expectations of other people become lower, resulting in an increase in reported complaints [B4]. This can lead to someone's action toward malicious comments.

4.1.3. CLD for the Self-purification Efforts within the Communities

This study reveals another major factor in the reporting of malicious comments is related to community efforts. From these interviews, people said that the main cause of malicious comments was behavioral motivation for the whole community in the commenting activity. In other words, if the mood of the entire comment is deteriorated due to an increase in the number of bad comments within the community in which I work, it can lead to motivation to report these comments. The increase in the number of reported complaints in this process can be attributed to two things: direct blocking of content [B1] and blocking the related commenters [B2]. An interview subject stated, "*I usually report such comments to keep the atmosphere friendly.*" This can be connected in a loop that reduces the number of malfunctions. In the latter case, we saw that the number of malfunctions was reduced by the time difference. In addition, many respondents mentioned the complexity of



<Figure 3> CLD for the Bystander Effect



<Figure 4> Self-purification Effort Loop in Community

log-in as a factor that hinders reporting complaints. An interview subject stated, *"I have tried to report malicious comments but given up because the log-in process was too complicated."* The complexity of these procedures proves that even if there is motivation to report, it does not necessarily lead to action. The causal diagram for efforts within the community is shown in <Figure 4>.

Ⅴ. Discussion and Implications

5.1. Recommendations for Reducing Malicious Comments

Based on the causal loop diagrams, we have identified three key issues, namely, bystander effect, self-purification effort within the communities, and system construction. <Table 5> shows the specific recommendations to reduce malicious comments. To overcome the limitation of measures to regulate such comments on a specific site, attention was paid to the way in which the user voluntarily reported such comments and made his own efforts.

One recommendation is to promote campaign activities to raise consciousness to encourage people to report bad actions voluntarily. From a long-term viewpoint, a multifaceted campaign for the creation of a sound commentary culture will enable comment users to participate. The campaigns can raise public awareness on cyber bullying and the dissemination of false news (Amarah, 2020). Moreover, an incentive system could be introduced, as currently, there is no compensation for declaration. Community efforts should be made to encourage voluntary reporting by publicly recognizing good complainants based on the frequency of reporting within the community. Second, measures to promote self-purification efforts within the community can be a recommendation to encourage reporting. This includes efforts to create internal measures to direct regulation of maliciousness. The issue of freedom of expression is pervasive within the comment culture, but it also protects the increase in malicious comments. Internal regulations to apply penalties driven by cumulative accusations of offensive comments should be prepared.

In addition, the implicit expectation that someone else would do the reporting was found to be a major factor impeding reporting. To hinder these tacit expectations, efforts to improve the sense of belonging to the community are needed. This will help people raise awareness and volunteer to contribute to community efforts. Finally, a systematic improvement is needed. In the case of extremely malicious com-

<Table 5> Key Issues and Recommendations

Division	Key issues	Recommendations
Bystander effect	None of my business	(1) Need to change people's awareness - Campaign for reporting cyberbullying
	Absence of compensation for reporting	(2) Introduction of reporting incentive system - Voluntary reporting of claimant badge, good claimant listing, etc.
Self-purification effort	As the freedom of expression increases, the number of malicious self-expression increases	(3) Direct regulation of such comments - Giving penalty
	Expectation of self-purification efforts - Implicit expectation of others' reporting	(4) Boosting sense of belonging about the community - Campaign within the community
System construction	Generating extreme malicious comments because of the anonymity	(5) Automatically regulating malicious comments - Blocking comments
	Difficulties in response to malicious comments - Complexity	(6) Technical improvement - Single-sign-on systems

ments, most sites are being monitored by automatic filtering (Menini et al., 2019). However, where expressions such as profanity, accusation, and attacks are infinitely generated, it is necessary to constantly supplement and manage such systems. For example, the complexity of logging in could be reduced, which would encourage more people to report.

5.2. Implications

This study identified core issues through causal diagrams of reports of malicious comments and suggests some concrete measures to reduce these comments. Based on the results, there are some academic and practical implications. The first academic implication of this study is that the proposed measures are from in-depth interview-based empirical data. In previous studies, indirect interviews were conducted to reveal personal perceptions about such comments (Boyce and Neale, 2006), which has a limitation of being unable to provide specific measures. In this study, interviewees were asked about the direct reporting of the complaints, and suggestions about the issue and concrete recommendations were presented. In addition, an interview approach is highly reliable and can be used to explain a phenomenon because it provides a precise observation of the nature of the phenomenon. It focuses directly on the research topic and deliver perceived causal inferences (Lee et al. 2019; Yin, 2003). It is one of the best ways to understand the phenomenon and derive key factors about the theme (Choi et al., 2019; Moscovici, 1984).

Second, this study represented causal loop diagrams (CLD) among factors through the system thinking approach by system dynamics, and suggested countermeasures. It shows positive and negative relations among the factors derived through interviews and suggests countermeasures for each issue occurring at each diagram. While most previous cyberbullying related qualitative studies focus on fragmentary phenomena through interviews, this study represents causal loops among factors through the system dynamics methodology and presents methods of prevention and response from the macroscopic viewpoint. Lee and Kim (2015) which has similar objectives to one of our objectives derived motivation factors of posting malicious comments through

interviews. In this study, we derived not only motivation factors of posting malicious comments but also factors of reducing bystander effect and responding to malicious comments from the perspective of bystanders. In addition, this study added values by comprehending the causal loop and influences among the factors derived through interviews, using system dynamics.

Third, the effect of the bystander, which has been applied to offline crime (Chekroun and Brauer, 2002; Van Bommel et al., 2012), was extended to the cybercrime known as "malicious comments." While the impact of the bystander effect in online crime situations has not been fully discussed, it is evident that it is applicable to solving this serious social issue. This study has academic significance in that it implies the applicability of another psychological perspective in explaining the behavior of online users.

This study has the following implications in practice. First, it is possible to develop new ideas to cope with such comments through the causal relationship between the motives of the people who publish such comments, the motive of when and how people report perpetrators of these crimes, and the factors that inhibit many online users from actively reporting related cyber crimes that they know of. The second practical implication can be found in the concrete recommendations presented from the results of this study from three perspectives: the bystander effect, self-purification efforts, and system construction. This work will contribute to a better understanding of factors that could cause a decrease in malicious online comments in a new perspective.

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