"They basically like destroyed the school one day": On Newer App Features and Cyberbullying in Schools

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ABSTRACT

This exploratory work studies the effects of emerging app features on the cyberbullying practices in high school settings. These include the increasing prevalence of image/video content, perceived ephemerality, anonymity, and hyperlocal communication. Based on qualitative analysis of focus groups and follow-up individual interviews with high school students, these features were found to influence the practice of cyberbullying, as well as creating negative socio-psychological effects. For example, visual data was found to be used in cyberbullying settings as evidence of contentious events, a repeated reminder, and caused a graphic impact on recipients. Similarly, perceived ephemerality of content was found to be associated with "broken expectations" with respect to the apps and severe bullying outcomes for those affected. Results shed light on an important technology-mediated social phenomenon of cyberbullying, improve understanding of app use (and abuse) by the teenage user population, and pave the way for future research on countering app-centric cyberbullying.

Author Keywords

Cyberbullying; mobile apps; focus groups; user studies; ephemerality

ACM Classification Keywords

H.1.2 User/Machine Systems, Human Factors

INTRODUCTION

Technological developments including smartphones, social media, and mobile apps have changed the way individuals interact with each other. Pater et al. [19] assert that today's "app-centric" teenagers use features to share images and videos (e.g., Instagram, Keek), send limited-time messages (e.g., Snapchat), and for hyperlocal communication (e.g.,

Yik Yak, Whisper) significantly more than a decade ago. Correspondingly, cyberbullying now occurs in forms that were impossible or uncommon a few years prior.

Cyberbullying is defined as: "When the Internet, cellphones or other devices are used to send or post text or images intended to hurt or embarrass another person" [9]. According to a National Crime Prevention Council report, more than 40% of US teenagers have reported being cyberbullied [17]. This is especially worrying, as multiple studies found that cyberbullying victims often have psychiatric and psychosomatic disorders [5], and a British study found that nearly half of suicides among young people were related to bullying [4]. These factors underscore an urgent need to understand, detect, and ultimately reduce the prevalence of all cyberbullying.

While cyberbullying in school settings has been previously studied [12, 23], no systematic analysis was found that focused on how the combination of newer social and mobile features (e.g., perceived ephemerality, location-based communication, and image-based messaging) have influenced the way cyberbullying occurs in high schools. Just as research contrasting cyberbullying with traditional bullying led to enhanced understanding and suggestions to prevent or reduce it, an exploration of differences between "traditional" cyberbullying (i.e., text-based messages on web 2.0 sites), and emerging challenges of mobile, "app-centric" cyberbullying is a vital first step towards mitigating its effects. It follows that the research questions addressed in this exploratory study are:

RQ1) What effect does the increasing prevalence of image and video content, compared to text, in messaging apps have on cyberbullying among high school students?

RQ2) What effect does the perceived ephemerality of messages have on cyberbullying among high school students?

RQ3) What effect do other features of popular mobile apps (e.g. location-based interactions, anonymity) have on cyberbullying among high school students?

RELATED WORK

Psychology, sociology, and social psychology scholars have focused on the role of age, gender, and social structure on cyberbullying prevalence [12, 13, 23], computer scientists have examined automated methods to detect cyberbullying

[9, 21, 36]. This paper uses a human-computer-interaction (HCI) perspective (e.g., [2, 10, 25]) to explore how newer mobile app features influence cyberbullying in the lives of teens. Consistent with the HCI literature (e.g. [18]), we consider a user's *perception* of an app's features to be of central importance and study the interplay between people, tools, and the cultural environment. While certain app features, like anonymity and the ability to share images, have been studied in different contexts [15, 23], changes in their ease of access, popularity, and varying levels of awareness of users have motivated this study of their effects on teenagers with respect to cyberbullying.

Hinduja and Patchin (2010) have reported that like traditional bullying, cyberbullying includes "being ignored, disrespected, picked on, or otherwise hassled" [12] (p. 208). However, when newer technological features are used to debase people, such as spreading rumors, stalking, or threatening, cyberbullying is more harmful and dangerous than traditional bullying. With the rapid changes in technology in recent years, it is important to revisit the effects of newer technology (e.g., apps) on cyberbullying.

Jacobs et al. [13] conducted focus-groups with cyber victims aged 12 to 15 and developed a coding scheme for cyberbullying. They found: a) common forms and consequences of victimizations; b) victims' perceptions and attitudes towards cyberbullying; c) reasons for cyberbullying; and d) reactions after being cyberbullied. However, the authors report that most findings are explained by the previous literature, and they did not hold follow-up individual interviews so that participants could share their experiences more privately or deeply.

Recent efforts in the HCI literature have focused on mechanisms to counter cyberbullying. Sutherland et al. [25] studied users' readiness for reporting cyberbullying to authorities as a function of severity of bullying in animated scenarios. Fan et al. [10] designed a social media app to foster positive online behavior and prevent cyberbullying. Ashktorab and Vitak's [2] participatory design study identified effective cyberbullying interventions. Our research, however, focuses on understanding the current state of cyberbullying, given the emergence of features that were not explored in past research [19]. Design interventions are believed to be more likely to succeed if built on a strong understanding of how the features of these new apps affect cyberbullying.

STUDY DETAILS

Setting and Participants

This paper reports findings from a multi-method exploratory study involving three focus group (total N=32) and follow-up individual interviews (N=11) with suburban high school students from US north east. In consultation with school authorities, students were recruited who had witnessed cyberbullying incident(s) in any role (bully, victim, bystander) in the last six months. Participants were asked to talk about their experiences of witnessing cyberbullying, and told that they could leave if they felt uncomfortable with the discussion. The study was approved by the school district's Board of Education, as well as the author's Institutional Review Board. A trained clinical psychologist (a co-author) was present during all focus groups and "on-standby" for all individual interviews. The psychologist was responsible for identifying any student needing follow-up counseling and advice due to uncomfortable sharing or re-living of painful experiences during the focus groups, as occurred in one case.

Three focus group with 9 - 12 students were arranged during lunch periods, for about one hour each in May 2016. Signed consent forms and demographic information surveys were collected before interviews and lunch was provided as compensation. The moderator (one of the authors) briefly went over ground rules that included a request that in speaking of cyberbullying students were to speak in general terms such as "my friend…" or "I heard about…" Semi-structured questions asked participants about cyberbullying experiences, its differences in new apps, impact, and how to cope. They were offered the opportunity for brief individual interviews (~20 minutes) after the focus groups to share more personal information. A total of 32 adolescents (17 females and 15 males) aged 14 to 18 participated in three focus groups and 11 (34%) of these took part in follow-up interviews. Thirteen (40%) students were African-American, 8 (25%) Caucasian, 8 (25%) Hispanic, 2 (6%) Asian, and 1 (3%) mixed.

Focus group and interview questions were based on the literature review and intended research goals. Verbatim transcripts were made from all digital audio recordings. Participants' names were randomly replaced by numbers and gender was indicated by M or F (e.g., P1M) for confidentiality. Data were analyzed qualitatively, combining and comparing responses with like answers grouped together to identify themes. The research team coded the transcripts using the Constant Comparisons Method [8], applying and building upon the coding scheme developed by Jacobs et al. [13]. The team met twice to discuss the emerging coding scheme and to resolve differences to achieve consensus.

FINDINGS

Participants spoke about experiences with cyberbullying of friends, acquaintances, and family members. See Table 1 for a summary of the social platforms discussed by the participants in order by frequency and their perceptions of the features that support cyberbullying. While popular social network sites like Twitter and Facebook continue to be used for cyberbullying, consistent with [19], participants said that teens go beyond these platforms to talk to each other as parents and school authorities are now present there. Consequently, a significant number of cyberbullying incidents occur beyond these platforms. Besides supporting social interactions, these platforms also included multiple features that could be associated with cyberbullying. These

included the prominence of visual data, perceived ephemerality of the content, hyperlocal interaction, and anonymity. While some features received significant support by the platforms other received only partial support. For example, according to participants, while Ogle does not restrict communication within a certain geo-radius, its features connect users with other users from the same school and nudge them into interacting within these specific "hyperlocal" communities. Similarly, while audio remains the prominent interaction mechanism on Skype, video interaction (and its abuse) is becoming more common.

Table 1: Summary of participant's list of social media platforms used for cyberbullying and their prominent features in order of frequency. (X indicates significant support; * indicates partial support for the corresponding feature, from analysis of participant responses)

Platform	Visual Data Prominence	Perceived Ephemerality	Hyperlocal Interaction	Anonymity
Instagram	X			
Twitter				
Facebook	*			
Snapchat	X	X		
Ogle	*		*	X
Burnbook			*	X
Skype	*			
After School			*	X

Many of the Jacobs et al. [13] themes were found to be present in the data. Additional themes emerged, particularly regarding the effect of new features of social media and mobile apps. Consistent with Jacobs et al. [13] a theme of "Performing Cyberbullying" (subthemes misleading/impersonating; uploading unwanted pictures; and calling names/ridiculing) emerged from the data. Also, the theme of "Experiences with Cyberbullying" appeared, with two focus groups discussing the subtheme "uploading unwanted pictures." Females in our groups also added the subtheme "gendered experience," including double standards, being bullied to upload risky pictures, and threatened with reprisals if they do not comply. With relationship to our research goals, apart from Jacobs et al. [13], a separate coding scheme was developed as these major themes emerged from the focus group analysis: Effect of Visual Data, Perceived Ephemerality, and Anonymity. These will be discussed below with examples from the data.

Theme: Effect of Visual Data
This major theme captured the increased prevalence of visual content vis-à-vis textual content as the primary mode of interaction in a platform, and included three subthemes: Evidence/Proof; Longevity/Reminiscence; and Visual Impact.

Evidence/Proof: Pictures can be used to cyberbully as they show Evidence/Proof in a way that text cannot and is easily shared. To illustrate this theme, one participant said "*Yeah,*

'cause the picture shows them actually doing what they're doing, and a text could just be saying something but not usually true. But actually having the picture has proof that it actually happened" (P14M).

Longevity/Reminiscence: Pictures or videos also allow people to revisit or repost multiple times, enabling longevity and ability to revive cyberbullying long after the initial post. As an example of this theme, one participant noted: "*I think the video was posted when they had already partially resolved the conflict, but we don't even know who actually posted the video. Maybe someone else posted the video, and then they were suddenly reminded of this incident, and it brought the conflict back in*" (P19M).

Visual Impact: Pictures also were described as causing more direct impact and personal embarrassment. As an example, one participant stated: "*I feel like it's more personal because other people are seeing your picture and you're looking at a face, so now people can identify you as a person who's being bullied I guess, so it's little bit more embarrassing than just a text*" (P16F).

Theme: Perceived Ephemerality
Perhaps the most important theme emerging from this research centered on the effects of perceived ephemerality, defined as the perception that one's posted content automatically gets deleted forever after a short duration, typically a few seconds. Note that this is the default behavior for messages sent using Snapchat where messages get automatically deleted after a sender-specified time duration. This theme included two subthemes: Perception of Privacy; and Circumventing Automatic Deletion.

Perception of privacy: Here participants talked about how ephemerality leads to recklessness. One participant said: "*I think that people are more apt to say things that aren't okay in any circumstance, even if you were gonna bully somebody or call somebody out on Twitter, Facebook or something that would be very different than what you'd probably be saying on Snapchat, if your intention is to hurt someone, because there's really no way for them to save what you're saying unless they either take a screenshot or save the chat, but how many times do you really think about that while you're having a conversation with somebody especially if you're upset?*"(P3F). Another participant elaborated: "*if the person doesn't save it, you're fine, so it can be like it's all made up and then you can get away with stuff like that*" (P2M).

Circumventing automatic deletion: Participants also discussed how the use of Snapchat has changed to defeat automatic deletion: "*I feel like on Snapchat, when it first came out...when it started disappearing and people didn't really think about screenshotting a lot of pictures, like inappropriate pictures or mean pictures would be taken by people, but I feel now that people can screenshot and there's other apps, too, to save the pictures*" (P24F). (Examples of photo-saving apps include SneakABoo,

Snapkeep, etc.) Participants noted that saving content on ephemeral apps is often with the intention to "trap" someone. One participant said: "*They started snapchatting and every time he would say something, she would highlight it. So like on snapchat if you're ever in a message with someone, a conversation, and you wanna keep it up, you can…just press on the message and hold it…and there's a grey bar and it highlights it and it saves it on both parties so you can see it and that person can see it, but only the person that saves it can unhighlight which then erases it. So he was having a conversation with the girl and didn't really think much of it and then a couple months went by and then and she just posted everything that they had said on Instagram… and tagged the girl he was talking to and…it was really bad.*" (P5M).

Theme: Anonymity

Following Zimbardo (1969), we interpret anonymity as the inability of others to identify or single out an individual such that the individual cannot be evaluated, criticized, judged or punished [29]. Anonymity has long been known as a contributor in cyberbullying. As might be expected, it was a theme across all three groups. In particular, all three groups spoke animatedly about a less well-known app, Ogle, which was described as a hyperlocal platform for anonymous posting of text, photos, and videos that had been used for cyberbullying in their school. Anonymity played an important part in how Ogle quickly spread throughout the school, with damaging consequences. For example, one participant noted: "*Yeah, there were a couple of pictures of different people and insulting them, and asking different things about, who's the biggest something or who's done this and who's done that, and people anonymously naming people's names, and it made me really upset and angry because I don't think anybody should be insulted, especially calling other peoples' names or calling them out for something they never done but just being rude.*" (P25F) Another participant said that this app soon created a dark place that "*destroyed the school one day…You just saw so many people saying negative things about others and you just felt really crappy about yourself and you didn't know who was saying it about you so kinda everybody was just angry, at one point*" (P29F).

Besides providing empirical evidence of the continued relevance of anonymity for cyberbullying in emerging apps, the discussions yielded interesting research directions for future investigation. One avenue for further investigation is the interplay between hyperlocal interactions and anonymity. While previous literature has suggested an interconnection between hyperlocal apps and cyberbullying [19, 28], the participants did not consider hyperlocal interactions to be a factor related to cyberbullying. Instead, the participants raised an important question regarding whether anonymity was really possible in hyperlocal communities. As a participant stated: "*I don't think location was really that important because we all knew pretty much each other and if something's being said, we all know*

pretty much either where it's said or where the person is" (P28F). This motivates a systematic investigation of the bounds of (perceived) anonymity in hyperlocal communities (e.g. Yik Yak, Ogle) in future work.

While not a primary focus, (the research goal is to understand the phenomena as a prerequisite for interventions), another theme was found that centered on mechanisms for coping with cyberbullying and suggestions on how app designers can help reduce cyberbullying. Under the theme "Active Coping," as suggested by Jacobs et al. [13] the theme of blocking and deleting was mentioned in all focus groups and two new subthemes of "asking others to delete" and "using IP tracker" were also found.

DISCUSSION

With the growth of multimodal content on online social networks (OSN), it is not surprising that multiple participants reported the effects of visual data **(RQ1)**. Visual content brings one's self-image or "face" directly into focus in online cyberbullying. Goffman wrote that face is a concern for one's projected image that is immediate and spontaneous and tied to the dynamics of social interaction [11]. The serious nature of face threats in cyberbullying can help explain why adolescents can be driven to serious depression or suicide by these online attacks [11, 20].

An important finding centers on perceived ephemerality of messages shared on certain apps (e.g., Snapchat) and its effects on cyberbullying **(RQ2)**. Prior work studying ephemeral connections has highlighted that such messages are motivated by "fun" and often include mundane "here now" content [24, 31]. Such interactions yield more positive affect in the moment, but lesser social support compared to more traditional modes of interaction (e.g., email, Facebook) [31]. Similarly, the temporal constraint on sharing – pictures must be taken live (not recorded) by the camera– may decrease the perceived stakes of sharing for the users [24, 31]. Consequently, Snapchat circumvents some of the "self-presentational" concerns that influence the user's experience with other media [11, 32]. Further, prior work suggests that Snapchat message recipients are often those with close ties (e.g., close friends) who have the knowledge needed to interpret content that includes incomplete context, minimal curation, and little description. Those with weak ties (e.g., casual acquaintances) can "like" a carefully posed photo on Facebook; only close ties can see an ugly photo on Snapchat [31]. Despite lacking the capacity for social support as on Facebook [16], Snapchat enables users to engage in a form of social grooming –a lightweight form of communication attention to ties that serves to reinforce social bonds [27]. While previous research [31], has suggested that these social grooming acts may fall short of creating a perception of social support, our results suggest that "close ties" in the lives of teenagers may be constantly evolving. While users may share intimate details with others, considering them to be close ties, such recipients may sometimes "trap" the sender and

later publically post such messages, resulting in significant harm to the sender.

Participants had different levels of familiarity with ephemerality which led to different outcomes. While some participants' perception or assumption was that all messages disappear after a short time, other described use of third party apps and other workarounds. Further, some participants recounted how they had been "trapped" by others because they did not understand the advanced features of the app (e.g., Snapchat's highlight feature). From a theoretical perspective, this finding ties back to a foundational idea of social informatics, that "technology affects different individuals differently" [22]. Unfortunately, the effects may be most severe for the users who may also be otherwise disadvantaged (less aware of tools, later to adopt technology, younger in age, etc.) One of the recurring threads associated with cyberbullying research is that of power imbalance. However the "power" may now no longer be physical or social, but rather stem from the awareness of the ins and outs of emerging technologies.

The third major theme was the continued importance of anonymity in cyberbullying **(RQ3)**. Consistent with prior literature, participants explained that anonymity results in an increase in reckless behavior [23]. As per the Social identity model of deindividuation effects (SIDE) theory, individuals may intentionally use anonymity in computer mediated communication in an attempt to take advantage of the benefits afforded by anonymity [30]. Individuals with anonymity often go into a "deindividuated" state that causes a decrease in self-observation, self-evaluation, and concern for social evaluation. This deindividuated state leads to weakened internalized controls such as guilt, shame, and fear, and leads to a greater expression of otherwise inhibited behavior including cyberbullying [29, 30, 35].

The findings also motivate new research directions. First, many newer apps support anonymity but are also hyperlocal. Participants reported being part of a relatively small school district and the notion of "true anonymity" was challenging for both bullies and victims, even though their names were not explicitly mentioned in the posts. Second, multiple participants identified the role of anonymity in aiding cyberbullying and as something that they would change if they were to redesign these apps. An intriguing area for future research was suggested by one participant, who was explicit in holding the app designers responsible for their design choices: "*there's like no way the creators of the app thought this was gonna be an innocent thing*" (P30F). This finding resonates with the principle of social informatics that the "effects of the design, implementation, and uses of Information and Communications Technologies (ICT) often have moral and ethical consequences" [22]. Today's high school students are sophisticated enough to hold designers responsible for their choices and might be valuable "participatory design" partners to reduce cyberbullying in teen-centric apps. This

is in line with the recent CSCW community discussions on "values in design" (e.g., Value Sensitive Design) [14].

This work is considered to be exploratory, and has limitations. Participants (N=32) were drawn from a single school in a small suburban city. While they were quite diverse in terms of gender and ethnicity, they do not constitute a population representative sample. Similarly, not all the participants agreed to provide detailed personal accounts in individual interviews.

Despite these limitations, this study has important implications for social computing/HCI literature. This study undertakes a systematic analysis of how the features of newer mobile apps influence the way cyberbullying takes place in school settings. It also contributes to the literature on the use (and abuse) of mobile apps by teenagers, who are among the most vulnerable populations, perhaps because of the increasing extent to which they, sometimes naively, use these technologies. Lastly, improved understanding of the phenomena acts as a first step in designing future intervention studies. Based on the results, larger follow-up studies will be designed with more representative student samples and will also include aspects of interventions.

From a practitioner perspective, a major contribution of this research is that teenagers understand the implications of the choices made by app designers and hold such designers accountable. In particular, the rationale behind designing anonymous apps for teenagers was questioned by multiple users. Further, the highlighting feature of Snapchat to record conversations brings out the issue of "broken expectations" and violates the "principle of least astonishment" [6, 7]. Users expected their posts to disappear, though in practice they did not, and this had serious consequences. This highlights an often overlooked aspect of multi-user system design: that certain features can be used as weapons if there is a big enough knowledge imbalance between users. Thus designers should consider such potential power imbalances when evaluating new features and consider methods to make the effects of an action transparent to all parties involved in multi-user system design more obvious. These findings may help future app designers to better cater to the teenage user population in a responsible fashion that does not put them continually at risk for cyberbullying. Educators and librarians also can use these study's results to inform student advisement and bully prevention or intervention [1].

CONCLUSION
This work is among the first to systematically study the influence of newer mobile app features like frequent sharing of images and videos, limited-time messages, and hyperlocal communication on cyberbullying in high school settings. Data analysis suggests that emerging app features play a significant role in how cyberbullying takes place in school settings. Specifically, we found that (1) differences in users' understanding of ephemerality can lead to scenarios where one party in a conversation may wield

much more power than the other, and can exploit this to their advantage; (2) students are more directly affected by visual content, as it can be   used as evidence or to reinvigorate arguments; (3) students are sophisticated enough to hold app designers responsible for the consequences of (mis)use of their apps. These findings, especially regarding how perceptions of ephemerality have been a game changer in cyberbullying, also broaden our understanding surrounding the complex interplay between novel app-features and cyberbullying in school settings and pave the way for future app design refinements, as well as intervention studies.

ACKNOWLEDGMENTS

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