

**PREVENTION STRATEGIES AGAINST CYBERBULLYING AND INTERNET
HARASSMENT AMONG CHILDREN AND TEENAGERS**

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By

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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.

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Modern society relies on gadgets and mobile devices in many different spheres of our everyday life, such as work, education, and even socialization. Even though devices and the Internet create a completely different medium, they do not solve social problems, such as bullying. Furthermore, this new medium might sometimes even exacerbate some societal problems and have a dramatic effect on the most vulnerable groups, such as children. This research analyzes the phenomenon of cyberbullying with a particular focus on cyberbullying among teenagers and adolescents. The goal of this study is to identify unique features of cyberbullying and metrics that will help to emphasize the importance of the problem. Another goal of this research is to propose a potential set of solutions that will help to regulate this problem and prevent cyberbullying. These solutions will be based on studies conducted by other researchers and on the analysis of modern tools, such as artificial intelligence, that can help to control cyberbullying on the Internet among children.

MOTIVATION BEHIND RESEARCHING THE CYBERBULLYING AND PREVENTION STRATEGIES AGAINST IT

The number of mobile devices and internet users is growing rapidly every year. According to Statista (2022), the number of internet users roughly doubled from 2013 to 2022 and was over 5 billion in 2022. This data can be observed in Figure 1 on page 2.

Number of internet users worldwide from 2005 to 2022

(in millions)

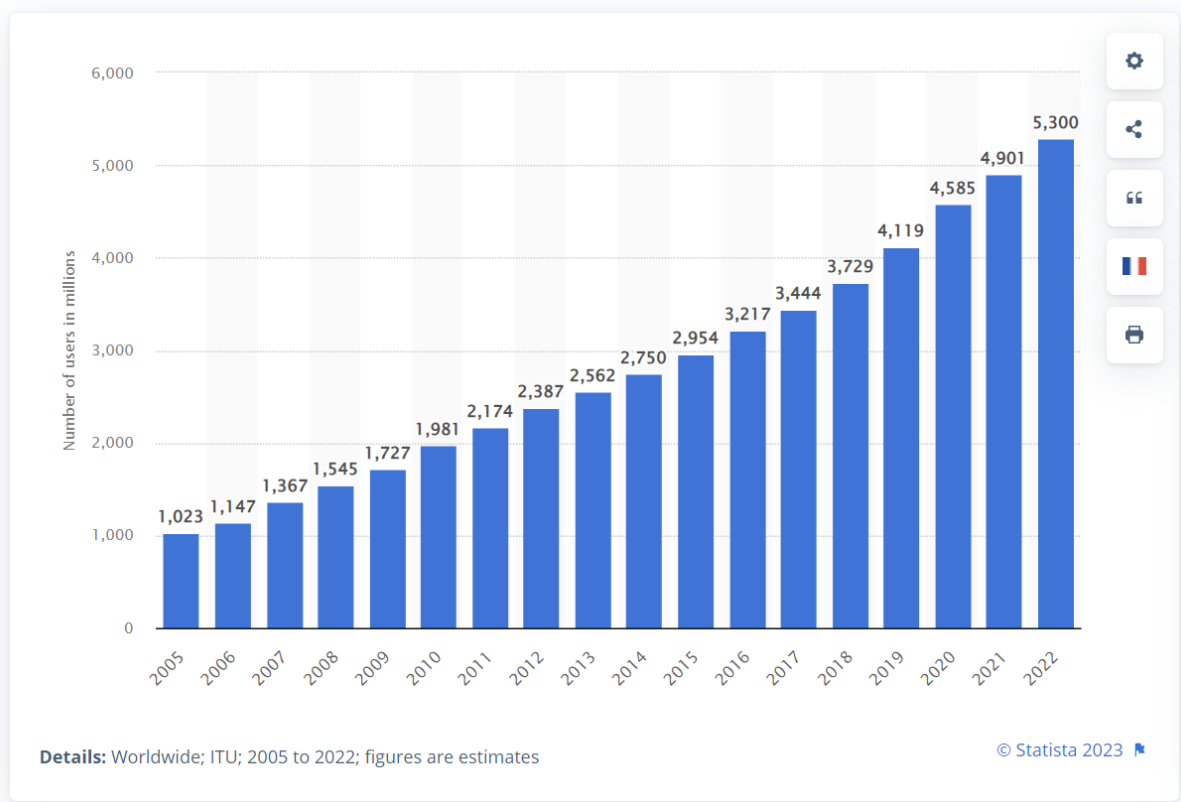


Figure 1: Number of internet users worldwide from 2005 to 2022: shows the number of internet users by year from 2005 to 2021 (Statista, 2022).

Therefore, the number of young users of mobile devices also increased. In the survey conducted by the Pew Research Center, they discovered that in the US in 2021 roughly 81% of children of age 11 and younger were using a tablet computer (Statista, 2022). Moreover, approximately 71% of children were using smartphones (Statista, 2022). This data is displayed in Figure 2.

Children in the United States using selected digital and gaming devices in 2020 and 2021

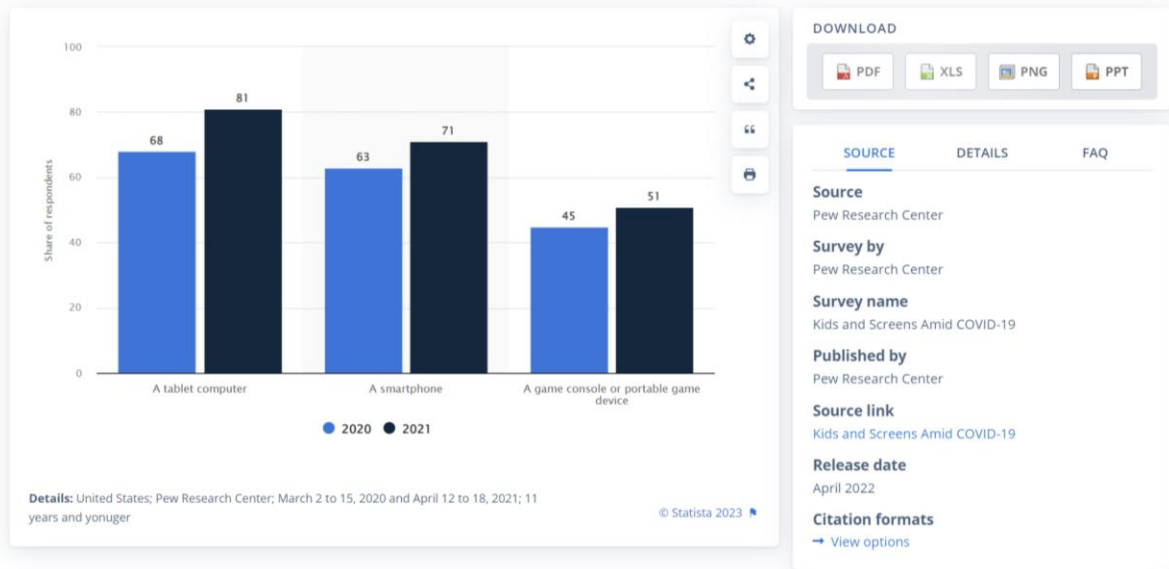


Figure 2: Children in the United States using selected digital and gaming devices in 2020 and 2021: shows the percent of children in the United States who use a tablet computer, a smartphone, and a game console or portable game device (Statista, 2022).

It is almost impossible to imagine the modern world without mobile devices and smartphones due to their usefulness and effectiveness. They significantly speed up and simplify many aspects of our everyday life, such as work, education, or even something as simple as shopping.

However, the widespread use of mobile devices and the Internet has its downsides. For example, nowadays, cyberbullying is an important issue that is widespread not only among adults but also among children and teenagers. For instance, according to Wang et al. (2019) on average among all ages, gender, and ethnic groups, approximately 14.9% of surveyed people experienced cyberbullying to some extent. Cyberbullying also affects some of the most sensitive groups, such as children and teenagers. According to Zhu et al. (2021), rates of cyberbullying victimization range from 13.99% to 57.5% in the period from January 1st, 2015 to December 31st, 2019. The same study reports that roughly 1/3 of internet users are under the age of 18 (Zhu et al., 2021).

Therefore, if we perform basic calculations, we can estimate the number of cases of cyberbullying victimization around the world. 13.99% (lower bound of the cyberbullying

victimization rates) of one-third (approximate fraction of Internet users under the age of 18 according to Zhu et al. (2021)) of 5.3 billion (number of internet users in 2022 according to the International Telecommunication Union) is 251.82 million. Therefore, according to the data provided above, approximately 251.82 children and adolescents report being cyberbullied worldwide. Accordingly, we can see that this problem is extremely important around the world. Moreover, this issue is also prevalent among American children. According to Olweus (2018), in his research paper on the issues of cyberbullying, he claims that some studies report that over 50% of students experience cyberbullying at some point. Additionally, according to Lapan (2022), a recent large national survey of 1588 middle school youth, ages 10-15, discovered that 32% of surveyed students had experienced online harassment. Therefore, these studies indicated that it is a global problem that has to be addressed to prevent traumatization of the future generations at a young age. Sarah Bottino et al. (2015), in their research, claim that approximately 10%-20% of adolescents experience cyberbullying and it is associated with anger, fear, and stress depression. Therefore, it is essential to provide children and teenagers with a safe environment that would prevent cyberbullying and all its negative effects. Consequently, I believe that it is important to create new regulations that would force social media companies to make an effort towards ensuring a safe environment for children that prevents cyberbullying. Fortunately, many politicians are trying to create new laws that would create a safe environment for children on the internet. For example, Sarah Lynch (2022) in her news article on the Stanford Institute for Human-Centered Artificial Intelligence website, reports that California Governor Gavin Newsom signed a bill that is designed to protect minors on the Internet. However, there are still no universal federal laws that would regulate social media platforms and the Internet. As a result, this paper, will analyze the problem and origin of cyberbullying and propose my

potential solution to an existing issue. The results will consist of the list of potential recommendations that can help to regulate the Internet and create a safe environment for minors. For this STS research, the Actor-Network Theory (Crawford, 2020) was chosen as the primary framework. It is a complicated problem that involves multiple actors. Therefore, this framework will help to analyze this issue from different perspectives.

Without the proper training, it would be really hard for me to conduct this research. Fortunately, in the Spring semester of my second year and the following Summer semester, I did an internship at the University of Virginia Development Hub. This internship helped me to prepare for this STS research and provided some useful skills to successfully conduct this research project. In my technical project called "A software development internship experience at the University of Virginia Development Hub," I described my internship in detail. Moreover, I described what skills and classes at UVA helped me to succeed during my internship.

As a result, a combination of a proper definition of the problem, a necessary skillset, and a correctly chosen framework will significantly simplify the research and ensure that meaningful results will be produced. Moreover, I hope to set a vector for future research that will help other scholars to further expand my study.

CURRENT STATE OF CYBER BULLYING AND POTENTIAL PREVENTION

STRATEGIES

HISTORY AND DEFINING CHARACTERISTICS OF CYBERBULLYING

In order to ensure that this study of cyberbullying is universal and objective, it is important to define cyberbullying and identify its characteristics. Smith et al. (2007) define cyberbullying as an aggressive, intentional act carried out by a group or individual, using electronic forms of contact, repeatedly and over time against a victim who can not easily defend

him or herself. Researchers separate this type of bullying from all the other kinds because it is done in a completely different and unique environment - through the internet. To better understand the nature of cyberbullying, it is important to analyze its history and defining characteristics. Since cyberbullying is a completely new phenomenon, we can use modern tools in order to study its history. For instance, a search volume on Google of the term "cyberbullying" can serve as a quantitative measure of how prevalent is cyberbullying in our everyday life.

Figure 3 displays this statistic.

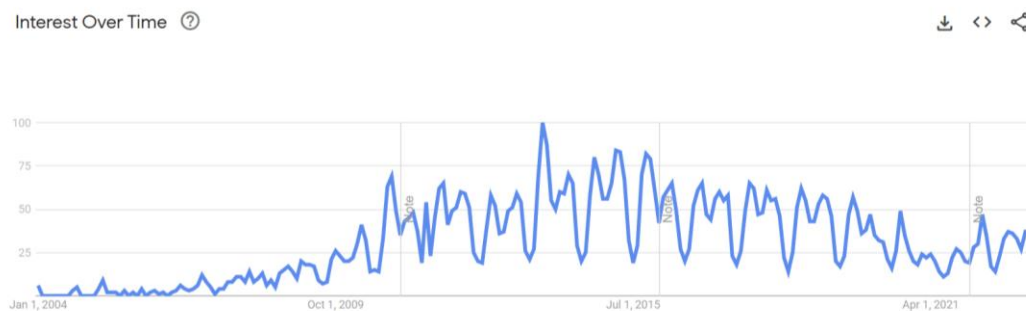


Figure 3: Search volume of the term “cyberbullying” on Google: shows the search volume of the term “cyberbullying” on Google over time (Google, 2023).

As can be seen on the graph, the term cyberbullying was at its peak in 2013 and still remains a popular search request on Google. Therefore, we can make a conclusion that it is still a problem that concerns people and requires to be addressed.

Besides analyzing the history of cyberbullying, it is important to identify its defining characteristics and evaluate the potential consequences of cyberbullying among children and teenagers. In their article, Pyzalski et al. (2022) analyzes defining characteristics of cyberbullying and the web environment. They state that the mediated character of online communication creates a sense of facelessness and deindividuation, which restricts the sense of responsibility by generating a cockpit effect (Pyzalski, 2022). This specific feature of the web environment only amplifies the aggression of children toward each other. This aggressive

behavior can lead to early-age trauma and have a permanent negative effect on the child's life in the future. Additionally, Pyzalski et al. (2022) state that the period of adolescence can be characterized by powerful egocentrism with its accompanying sensitivity about oneself, as well as conformism towards the peer group. Therefore, cyberbullying can cause stress and feeling of exclusion from a peer group that negatively affects a child's mental well-being.

Cyberbullying can potentially have a lot of different negative consequences. Therefore, it is critical to identify them to better understand the problem and to emphasize their importance. According to Yang et al. (2021), adolescents exposed to cyberbullying victimization retained a significant association with psychological symptoms, self-harm, suicidal ideation, and suicidal attempts. Moreover, they state that exposure to cyberbullying victimization, by contrast, was more closely associated with self-harm and suicidal attempts, and the effect was even over and above the contribution of traditional bullying victimization (Yang et al., 2021). Therefore, we can conclude that cyberbullying is a unique type of bullying that has to be studied separately. Its distinctive characteristics and consequences do not allow one to extrapolate one approach to all types of bullying.

STS RESEARCH MODEL

In order to analyze this particular problem, it is necessary to choose an approach that will help accurately describe the problem and help to come up with a potential solution. For the analysis of prevention strategies against cyberbullying, it was chosen to use the Actor-Network Theory. According to Crawford (2020), the Actor-Network Theory is a novel approach as it attempts to redefine actors not so much as willful or intentional agents but instead as any entity—human or nonhuman—that in some way influences or perturbs the activity of a techno-social system. Moreover, ANT resists large generalizations and categories, including the very

notion of the “social” which, according to Actor-Network theorists, is never an explanation but instead is that which must be explained (Crawford, 2020). Consequently, since this research seeks to explain what can be described as a social phenomenon or social problem, Actor-Network theory should perfectly meet our goals. It will help to ensure that all potential actors are taken into account and that the analysis of the problem is as detailed as possible. The Figure 4 describes the relationships between the actors in the modern mobile devices ecosystem.

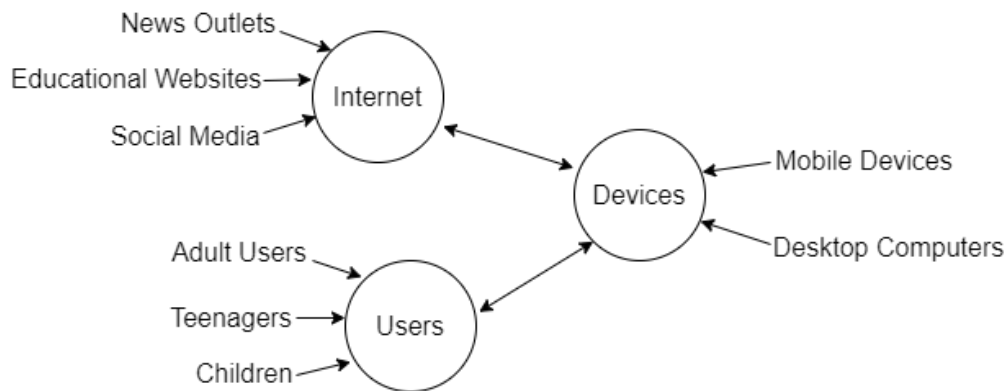


Figure 4: Illustration of ANT model of the internet accessed using mobile devices: shows relationships between all actors in the ANT model of the internet access using mobile devices (Maltsev, 2022).

As we can see, we have a major entity called users that can be further divided into three subentities: adult users, teenagers, and children. This division was chosen due to the characteristics that these three groups demonstrate, such as differences in sensitivity towards criticism and verbal aggression on the Internet. The entity devices also play an important role since different gadgets can create distinct environments and feeling while using them. Finally, the entity called the Internet is used to group various types of Internet platforms that have distinct characteristics and accordingly create distinguishable experiences.

PREVENTION STRATEGIES CATEGORIES

The Actor-Network Theory approach demonstrates that there are multiple different actors that play an important role in the modern internet ecosystem that is used as a medium for

cyberbullying. In particular, the entity called users provides useful insight that can help to identify potential perspectives for the solution of the problem. At the first glance, it might seem that government regulations can be the only possible solution. However, due to using Actor-Network Theory, it is clear that parents can also be important actors who can incorporate useful cyberbullying prevention techniques and strategies.

PARENT-LEVEL PREVENTION STRATEGIES

As it was mentioned before, the involvement of parents and family members can seriously help to prevent cyberbullying or control its results. According to Tozzo et al. (2022), it is necessary that strategies to combat it (cyberbullying) adopt an integrated and multilevel approach including schools, families, and political institutions in order to create a synergic intervention. Moreover, this study indicated that a comprehensive approach including media campaigns, school programs, teachers' and parents' involvement, legislative actions, and screening and interventions by pediatricians and healthcare professionals has been suggested as more appropriate (Tozzo et al., 2022). Therefore, it is possible to make a conclusion that technology by itself can not create a safe environment for children and teenagers on the internet. It requires many actors' concurrent work toward a collective goal - a cyberbullying-free environment for adolescents.

TECHNOLOGIES THAT CAN HELP TO PREVENT CYBERBULLYING

Even though the problem of cyberbullying among children and teenagers on the Internet is very complex and requires the concurrent work of multiple agents at the same time, the technological progress itself can already provide multiple tools to combat cyberbullying. Over the last few years, artificial intelligence technologies advanced dramatically and can be used as a more advanced filter utility. Previously, standard lexical analyzers were used to prevent the use

of offensive language and derogatory terms. However, these methods have significant downsides when used to prevent cyberbullying. For instance, verbal aggression might not include words or patterns that can be detected by the lexical analyzers. Moreover, the letters in words can be changed to numbers or to the similar letter and it will prevent them from being detected.

On the other hand, artificial intelligence can potentially help to prevent these vulnerabilities. According to Rakhmatov (2022), machine learning opens up many opportunities for preventing cyberbullying. Moreover, he states that there are currently many initiatives to create and train algorithms capable of detecting hate and offensive language on the Internet in order to block the user from viewing them and hence cyberbullying (Rakhmatov, 2022). By analyzing different sources, over time artificial intelligence can learn how to recognize less straightforward and concealed forms of cyberbullying. After that, the social media platform can take at least two different measures. They can prevent an offensive message to be delivered to the recipient and they can restrict user's access to the platform if a potential cyberbullying attempt was detected. However, there are still some issues that prevent artificial intelligence filters to be implemented on all social media platforms. According to Milosevic et al. (2022), the lack of datasets that contain sufficient examples of a variety of cyberbullying content, and perhaps more importantly, datasets which have been annotated by experts and with annotation guidelines that have been developed in collaboration with social scientists. Therefore, the IT industry cannot handle this problem by itself. It requires the involvement of multiple different specialists. In their work, Milosevic et al. (2022) emphasize that such collaboration is incredibly important, especially given the growing interest among computational linguists, as well as machine and deep learning computational scientists into this area.

RESULTS OF THE RESEARCH

CYBERBULLYING PREVENTION

As it was described in this work, cyberbullying is a very important issue that is still extremely prevalent among teenagers and children all around the world. Cyberbullying can lead to early-life traumas that can have long-lasting negative effects. Therefore, this requires a complex and effective solution in order to save the mental well-being of future generations and provide them with a safe environment that encourages the healthy development of personality.

As it was mentioned earlier, cyberbullying is a complicated problem that involves multiple actors who play important roles. Actor-network theory perfectly encapsulates this issue and helps to better analyze all aspects of cyberbullying. Using the actor-network approach, it was identified that society itself plays an important role in cyberbullying prevention strategies and cooperation between teachers, parents, and government is necessary to come up with the most effective and universal cyberbullying prevention strategies. Moreover, it was identified that technological progress can help to improve prevention strategies. In particular, various artificial intelligence systems allow for a better filter of the communication of children and teenagers on the internet and help to ensure their safety. Therefore, using the described above analysis, it was decided to come up with a list of potential regulations and programs that will help to prevent cyberbullying among teenagers.

RECOMMENDATIONS AND STRATEGIES TO PREVENT CYBERBULLYING

The described extensive analysis of cyberbullying makes it apparent that cooperation between different actors is necessary to maintain the most effective strategies for cyberbullying prevention. In particular, it is essential to create programs that will educate people on the problems of cyberbullying among teenagers and children. A big portion of the modern world

population does not use the Internet. Moreover, even those people who use it might not be aware of the cyberbullying problem. However, in some cases, their children might be active Internet users and can experience cyberbullying to some extent. Therefore, it is important to understand that parents are aware of this problem and are informed about all possible cyberbullying prevention strategies. For instance, they know how to properly monitor the social media of their children and know how to use certain filters to recognize potential cases of cyberbullying against their children that can negatively affect their mental health. Moreover, teachers also have to be informed about this issue. Teachers play an important role in children's lives and can serve as role models for many of them. Consequently, in some situations, they can be able to better communicate with adolescents and understand the context of their problems. As a result, it is important to make education workers informed about the ongoing cyberbullying situation. The best solution to this problem is to create voluntary programs for parents and teachers that will help to inform the population about prevention strategies and problems of cyberbullying among the younger generation.

In addition to informing parents and teachers, it is critical to use all available technologies to provide secure settings on social media for underaged users. In particular, this paper analyzed how old filter technologies do not provide reliable safety due to their limitations. For instance, offensive language can be altered and masked to prevent it from being detected by the filter. Moreover, in some cases cyberbullying might not even involve the use of cursing or derogatory terms. Therefore, it is necessary to use more advanced technologies that can help to determine possible cyberbullying. Fortunately, the progress in artificial intelligence provides us with some useful tools. Artificial intelligence is capable of learning different types of cyberbullying and verbal aggression on the Internet and therefore can be used as a more

advanced and secure protection measure. As a result, it is important that government creates a policy that would force all social media platforms to incorporate artificial intelligence that prevents cyberbullying. Even though it might have potential downsides, such as an increase in the time required to load a social media web page in the browser or some false-positive cases of cyberbullying detection, overall it will be beneficial. It will help to create a safe environment for the users and might even potentially help social media platforms to increase their profits. By creating a safe environment for young users, the social media platform will attract more brands that want to be associated with exclusively politically-correct and safe platforms. As a result, a decision that might be seen as a burden at the first glance might be actually very beneficial. Moreover, the biggest social media platforms should follow the engineering codes of ethics that emphasize that the safety of the client is one of the most important concerns of engineering.

CONCLUSION AND FUTURE WORK

It is important to mention that cyberbullying is a relatively modern phenomenon and it still requires study and analysis by scholars. However, it is generally agreed that cyberbullying and especially cyberbullying among children is an important problem that requires a proficient solution. Therefore, I hope that this research paper will serve as a valuable source of information for future research in this area and will speed up the creation of the most effective and universal cyberbullying prevention strategies.

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