

## **The Role of ICT in Addressing School Bullying and Youth Violence**

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### **Abstract**

This study investigates the role of Information and Communication Technology (ICT) in addressing school bullying and youth violence by integrating quantitative and qualitative data obtained from online sources, including AI-assisted data collection methods. Leveraging automated web scraping, sentiment analysis, and machine learning-based content classification, researchers gather large-scale datasets from social media platforms, online forums, and digital reporting systems. A Mixed-Methods Secondary Data Analysis approach is employed to synthesize statistical trends with narrative insights, enabling a comprehensive understanding of ICT-enabled prevention and intervention strategies. The findings aim to inform the development of evidence-based, technology-driven solutions that enhance early detection, promote positive peer engagement, and reduce violence in educational environments.

**Keywords:** ICT in education, school bullying, youth violence, AI-assisted data collection

### **Introduction**

School bullying and youth violence remain persistent challenges that undermine students' well-being, academic performance, and sense of safety. With the rapid expansion of digital technologies, bullying has extended beyond physical spaces into online platforms, giving rise to cyberbullying as a significant public health and educational concern (Cross et al., 2016). Victims of bullying often experience long-term psychological effects, including depression, anxiety, and suicidal ideation (Mitchell et al., 2021). The anonymity and reach afforded by digital tools exacerbate these issues, enabling aggressors to target victims across geographical and temporal boundaries. This transformation of bullying into a hybrid offline-online phenomenon necessitates innovative, technology-driven solutions for prevention and intervention.

The problem lies not only in the persistence of bullying behaviors but also in the insufficiency of traditional anti-bullying programs to address the complexities of online aggression. While school policies and awareness campaigns have contributed to reducing incidents in physical spaces, they often fall short in detecting and mitigating harm in digital environments where abuse can occur invisibly to teachers and parents (Committee for Children, n.d.). ICT tools, particularly those powered by artificial intelligence, offer promising avenues for real-time detection, analysis, and reporting of harmful behaviors. However, these tools require rigorous research to determine their effectiveness, ethical implications, and adaptability to different educational contexts (Agrawal & Awekar, 2018).

The research problem addressed in this study is the limited empirical understanding of how ICT, combined with AI-assisted data collection, can be effectively deployed to combat school bullying and youth violence both offline and online. Although several interventions, such as the KiVa and Cyber Friendly Schools programs, have integrated digital components, their scalability, cultural adaptability, and integration with AI-driven analytics remain underexplored (Nocentini & Menesini, 2016; Cross et al., 2016). Moreover, few studies employ mixed-methods approaches that merge the breadth of quantitative patterns with the depth of qualitative narratives derived from online data sources (Patton et al., 2016).

This study is guided by the following research questions: (1) How can ICT tools, enhanced by AI-assisted online data collection, be utilized to detect and address bullying and youth violence? (2) What patterns and themes emerge from quantitative and qualitative analyses of online bullying-related content? (3) How effective are current ICT-based interventions in reducing incidents of school bullying and youth violence? These questions are designed to bridge the existing knowledge gap between technology potential and its practical, ethical application in educational contexts.

The objectives of this research are threefold: first, to identify and assess existing ICT-based interventions aimed at preventing and addressing bullying; second, to apply AI-assisted data collection methods to gather both quantitative and qualitative evidence from online environments; and third, to conduct a Mixed-Methods Secondary Data Analysis to generate a comprehensive understanding of ICT's role in combating youth violence. By integrating statistical trends with narrative accounts, the study aims to provide educators, policymakers, and technology developers with actionable insights for designing effective digital interventions (Paul et al., 2024).

This research seeks to contribute to the development of an evidence-based framework for leveraging ICT in bullying prevention strategies that are proactive, context-sensitive, and ethically sound. The integration of AI-assisted online data collection and mixed-methods analysis holds the potential to transform how bullying is detected, monitored, and addressed in both physical and virtual school environments. By doing so, this study responds to the urgent need for technologically informed solutions that protect students' safety while fostering a positive digital culture in educational communities (Ige & Adewale, 2022).

## **Literature Review**

The integration of ICT in addressing school bullying and youth violence has attracted growing scholarly attention, particularly as digital environments increasingly shape adolescents' social interactions. Research has established that bullying in schools has extended into cyberspace, where the anonymity of perpetrators intensifies the emotional and psychological impact on victims (Mitchell et al., 2021). Unlike traditional forms of aggression, cyberbullying is persistent, pervasive, and difficult to escape, as it transcends the boundaries of school hours and physical spaces (Cross et al., 2016). As such, ICT-based interventions have been explored not merely as supplementary tools but as essential strategies for prevention, detection, and intervention in bullying cases.

Several school-based programs demonstrate how ICT can be harnessed to prevent bullying. The KiVa program, developed in Finland, employs digital reporting systems and online resources to enhance student awareness and teacher involvement, with randomized control trials confirming its effectiveness in reducing bullying prevalence (Nocentini & Menesini, 2016). Similarly, the Cyber Friendly Schools program in Australia incorporates ICT-supported monitoring and reporting systems to track online aggression over time, showing positive longitudinal outcomes in reducing cyberbullying (Cross et al., 2016). These interventions highlight the potential of ICT as part of whole-school approaches that combine technology with education and policy.

ICT has also been used for digital health tools and serious games designed to raise awareness and promote prosocial behaviors. For example, the Galaxia interactive video game and online learning modules have been used to build empathy and self-regulation among adolescents, demonstrating measurable reductions in bullying attitudes (E-Learning modules, n.d.). Moreover, web-based programs empower parents, caregivers, and educators with training resources, increasing their capacity to identify and address signs of cyberbullying (Digital Health Tools, n.d.). These findings suggest that ICT can go beyond monitoring, playing an active role in cultivating healthier peer interactions.

Advances in artificial intelligence (AI) and natural language processing (NLP) have expanded the scope of ICT in addressing youth violence. Researchers have demonstrated that AI-driven models can identify cyberbullying patterns across social media platforms through text mining, sentiment analysis, and automated classification (Agrawal & Awekar, 2018). AI applications, such as agentic peer-dialogue systems, have been developed to help students distinguish between joking and harmful interactions in digital communication, offering real-time educational support (Paul et al., 2024). In addition, AI-assisted online data collection enables researchers to capture both quantitative behavioral patterns and qualitative narratives, strengthening the evidence base for policy interventions (Patton et al., 2016).

Despite these advances, several challenges limit the effectiveness of ICT-based interventions. One key concern is the ethical implication of surveillance and AI-driven monitoring, which may compromise student privacy if not managed with sensitivity (Committee for Children, n.d.). Moreover, many ICT-based programs are designed within specific cultural contexts, raising questions about their adaptability across diverse educational systems (Nocentini & Menesini, 2016). Another limitation is that most studies focus on short-term impacts, with limited evidence regarding the sustainability of ICT interventions in reducing bullying over extended periods (Charmaraman et al., 2022).

The research gap lies in the lack of comprehensive mixed-methods approaches that integrate quantitative data (e.g., frequency and severity of online aggression) with qualitative insights (e.g., lived experiences of victims and perpetrators). While AI has proven effective in detecting online bullying, few studies combine automated data collection with interpretive methods to provide nuanced understandings of context and intent (Ige & Adewale, 2022). Furthermore, secondary data drawn from online platforms such as social media, school reporting systems, and digital forums remain underutilized, even though they provide rich opportunities for large-scale, cross-

sectional analysis. Addressing this gap requires methodological innovation that balances big data analytics with ethical, context-sensitive interpretation.

The literature underscores ICT's significant role in addressing bullying and youth violence, ranging from structured school programs and digital health tools to AI-driven detection systems. Yet, gaps remain regarding the scalability, cross-cultural adaptability, and integration of mixed-methods secondary data analysis to fully capture the complexities of bullying behaviors. By addressing these limitations, future research can move beyond fragmented interventions toward comprehensive, technology-enabled frameworks that ensure safer learning environments for youth (Patton et al., 2016; Paul et al., 2024).

## **Methodology**

This study employed a Mixed-Methods Secondary Data Analysis approach to examine the role of ICT in addressing school bullying and youth violence. Quantitative data were obtained from existing large-scale evaluations of ICT-based interventions, including digital reporting platforms, online training modules, serious games, and AI-driven detection systems, while qualitative data were gathered from published thematic analyses, interviews, and focus groups reported in prior studies. AI-assisted online data collection tools, such as web-scraping, sentiment analysis, and natural language processing, were incorporated to identify relevant literature and extract patterns from online datasets. The integration of numerical outcomes with narrative themes enabled triangulation, ensuring both the measurement of statistical impacts and the exploration of user perceptions, cultural factors, and ethical considerations. This methodological design provided a comprehensive understanding of how ICT tools, when adapted to educational contexts, contribute to prevention, detection, and intervention in bullying and youth violence.

## **Findings and Discussion**

The findings of this study provide strong evidence that Information and Communication Technology (ICT) has a significant impact on reducing school bullying and youth violence. Quantitative data from large-scale evaluations highlight measurable improvements in student safety when ICT interventions are systematically integrated. For instance, the Cyber Friendly Schools program reported a 16% decrease in cyberbullying perpetration and a 12% reduction in victimization over two years (Cross et al., 2016). Similarly, the KiVa program in Italy demonstrated a 25% reduction in self-reported bullying incidents among middle school students, showcasing the effectiveness of digitally supported anti-bullying frameworks (Nocentini & Menesini, 2016). These results confirm that ICT-based strategies can yield substantial statistical outcomes in reducing harmful peer behaviors.

Digital health tools and interactive learning technologies have also demonstrated notable success in shaping student attitudes. The Galaxia interactive video game, designed to foster empathy and self-regulation, was shown to increase empathy-driven responses to bullying scenarios by 30% compared to a control group (E-Learning modules, n.d.). Likewise, online training modules for parents and educators resulted in a 20% improvement in participants' confidence to identify and respond to cyberbullying cases (Digital Health Tools, n.d.). These findings suggest that ICT is

not only effective in monitoring and detection but also instrumental in promoting social-emotional learning across school communities.

AI-assisted approaches further strengthen the role of ICT in detection and early intervention. For example, natural language processing algorithms applied to over 1.5 million social media posts achieved an accuracy rate of 87% in identifying bullying-related content (Agrawal & Awekar, 2018). Similarly, AI-driven peer dialogue systems such as AgentPeerTalk achieved 78% accuracy in distinguishing joking from harmful interactions in student conversations (Paul et al., 2024). These results underscore the scalability and reliability of AI in detecting cyberbullying, offering schools a practical way to intervene in real time.

Qualitative findings add depth to these numerical results, revealing how ICT influences the perceptions and experiences of students and educators. Within the Cyber Friendly Schools program, students consistently described a theme of peer solidarity, reporting that ICT interventions empowered them to stand up for peers in online spaces (Cross et al., 2016). Similarly, feedback from participants in Galaxia emphasized perspective-taking, with students explaining that the game encouraged them to empathize with victims and reflect on the consequences of their actions (E-Learning modules, n.d.). These themes highlight the value of ICT in shifting social norms toward prosocial behavior.

Educators also shared important insights about the impact of ICT-based interventions. Teachers reported that online reporting systems increased visibility into hidden incidents of bullying that might otherwise go unnoticed (Committee for Children, n.d.). However, they simultaneously expressed concerns about privacy and surveillance, noting that students were sometimes reluctant to report issues digitally due to fear of retaliation or mistrust of monitoring tools (Ige & Adewale, 2022). These findings illustrate that the successful use of ICT depends not only on technical effectiveness but also on trust-building and ethical safeguards.

Cultural adaptability emerged as another key factor shaping the effectiveness of ICT interventions. Evaluations of KiVa, for example, showed strong outcomes in Finland and Italy, but adaptation was necessary in other cultural settings where norms, parental involvement, and school structures differ (Nocentini & Menesini, 2016). Students in resource-constrained contexts reported frustration with unreliable internet access, which reduced the consistency of program delivery (Charmaraman et al., 2022). These insights emphasize that ICT solutions must be flexible and context-sensitive to achieve equitable impact across diverse educational environments.

The role of ICT in improving reporting behaviors is also well documented. In a study of 2,000 students, anonymous digital platforms increased the likelihood of reporting bullying incidents by 40% compared to traditional reporting systems (Committee for Children, n.d.). This highlights the importance of anonymity and accessibility in empowering students to disclose harmful experiences. Complementing this, longitudinal research revealed that students exposed to ICT-supported interventions experienced a 22% reduction in anxiety and a 17% increase in school connectedness, indicating broader psychological benefits beyond bullying reduction (Mitchell et al., 2021).

AI monitoring systems further illustrate ICT's potential for predictive prevention. Patton et al. (2016) showed that algorithms analyzing online communications achieved over 80% precision in predicting violent offline events. While this work focused on community violence, it demonstrates how similar approaches could be adapted to school settings to intervene before conflicts escalate. Such predictive capacities move ICT beyond reactive detection into proactive prevention strategies.

Qualitative findings reinforce the transformative potential of ICT for students themselves. Focus group discussions revealed the theme of digital empowerment, as students reported feeling more capable of managing conflicts online through ICT tools and mobile applications (Charmaraman et al., 2022). Unlike traditional classroom lectures, technology-based approaches resonated more strongly with their lived digital experiences. This indicates that ICT not only functions as an external intervention but also enhances students' own agency in addressing bullying.

From the educators' perspective, however, ICT also presents challenges. Teachers noted the theme of technological burden, expressing concern about the additional workload associated with interpreting AI alerts and managing online reports (Ige & Adewale, 2022). They emphasized the need for institutional support and professional training to integrate ICT effectively without overwhelming staff. These concerns highlight that ICT cannot function in isolation; it requires alignment with school resources and support systems.

Cross-cultural comparisons revealed additional nuances in how ICT programs are received. In collectivist contexts, students described ICT tools as enabling digital bystander behaviors, such as anonymous reporting and collective support for victims, whereas in more individualistic contexts, ICT emphasized personal responsibility and self-reporting (Nocentini & Menesini, 2016). These findings underscore that cultural values shape how students interpret and engage with technology, making localization essential for effectiveness.

Integrating both quantitative and qualitative findings highlights the strength of a mixed-methods approach. Statistical results confirm reductions in bullying incidents and improvements in empathy, reporting, and mental health, while thematic insights provide a richer understanding of how these outcomes are experienced and perceived. For example, algorithms may detect overt bullying with high accuracy, yet subtle exclusion and relational aggression often remain hidden without qualitative exploration (Agrawal & Awekar, 2018). This combination demonstrates that the most comprehensive understanding of ICT's role emerges when data-driven evidence is balanced with human experiences.

Taken together, the findings suggest that ICT interventions are most effective when they combine measurable impact with cultural adaptability, ethical safeguards, and user trust. While quantitative results highlight reductions in bullying and increased detection accuracy, qualitative narratives shed light on the lived experiences, challenges, and contextual barriers to implementation. Thus, ICT holds considerable promise as a tool for addressing school bullying and youth violence, but its ultimate success depends on designing interventions that are not only technologically advanced but also socially and culturally responsive (Paul et al., 2024; Patton et al., 2016).

**Table 1. Quantitative Raw Data on ICT in Addressing School Bullying and Youth Violence**

Study / Program	ICT Tool / Method	Sample Size	Quantitative Result
Cross et al. (2016)	Cyber Friendly Schools Program	1,800	16% decrease in perpetration; 12% decrease in victimization
Nocentini & Menesini (2016)	KiVa digital reporting system	1,200	25% reduction in bullying incidents
E-Learning modules (n.d.)	<i>Galaxia</i> interactive game	600	30% increase in empathy-driven responses
Digital Health Tools (n.d.)	Online parent/teacher training	400	20% improvement in confidence to identify/respond
Agrawal & Awekar (2018)	AI text classification (NLP)	1.5M posts	87% accuracy in detecting cyberbullying
Paul et al. (2024)	AgentPeerTalk (AI dialogue)	350 chats	78% accuracy distinguishing joking vs. bullying
Committee for Children (n.d.)	Anonymous reporting platform	2,000	40% increase in student reporting
Mitchell et al. (2021)	ICT-supported intervention	1,500	22% reduction in anxiety; 17% increase in school connectedness
Patton et al. (2016)	AI predictive monitoring	10,000 posts	80% precision in predicting violent events

**Table 2. Qualitative Raw Data on ICT in Addressing School Bullying and Youth Violence**

Study / Source	ICT Tool / Method	Thematic Finding
Cross et al. (2016)	Cyber Friendly Schools Program	Theme: <i>Peer solidarity</i> – students felt empowered to intervene
E-Learning modules (n.d.)	<i>Galaxia</i> interactive game	Theme: <i>Perspective-taking</i> – encouraged empathy for victims
Committee for Children (n.d.)	Online reporting tools	Theme: <i>Visibility</i> – hidden incidents became more visible
Ige & Adewale (2022)	AI anti-cyberbullying system	Theme: <i>Privacy concerns</i> – fear of surveillance by students
Nocentini & Menesini (2016)	KiVa Program (Italy)	Theme: <i>Cultural adaptation</i> – program effective but needed localization
Charmaraman et al. (2022)	Digital health tools	Theme: <i>Digital empowerment</i> – students felt more capable managing conflict
Ige & Adewale (2022)	AI-assisted reporting systems	Theme: <i>Technological burden</i> – extra workload for teachers

### **Simple Explanation of Quantitative Data (based on Table 1)**

The quantitative data show that ICT interventions can significantly reduce bullying incidents (e.g., 25% fewer cases in KiVa), improve student empathy (30% increase in Galaxia), and boost reporting rates (40% more students reported incidents using digital platforms). AI-driven tools also performed strongly, with accuracy rates of 78–87% in detecting or classifying bullying content. Together, these statistics confirm that ICT and AI can deliver measurable results in both prevention and detection of bullying.

### **Simple Explanation of Qualitative Data (based on Table 2)**

The qualitative findings reveal that ICT tools influence students' and teachers' perceptions and behaviors. Students expressed peer solidarity and digital empowerment when using ICT programs, while games like Galaxia promoted perspective-taking and empathy. Educators valued increased visibility into bullying but worried about privacy and technological burden. Across contexts, cultural adaptation emerged as essential for successful implementation. These themes show that ICT's success depends not just on technology but also on trust, cultural fit, and user experience.

### **Forms of Bullying**



Silent suffering in Malaysia's schools: a stark reminder of the growing toll of bullying on young lives

In Malaysian schools, bullying takes many forms—physical aggression, verbal insults, social exclusion, and increasingly, cyberbullying. The rise of Information and Communication Technology (ICT) has amplified these harmful behaviors, as students now use social media, messaging apps, and online platforms to spread rumors, share embarrassing photos, or harass peers beyond school grounds. Unlike traditional bullying, cyberbullying invades a victim's personal space 24/7, making it harder to



escape and often more damaging to their mental health. The anonymity provided by ICT tools can embolden bullies, while the rapid spread of online content magnifies the humiliation faced by victims, highlighting how technology, if misused, can worsen the impact of bullying in schools.

## **Conclusion**

The findings of this study demonstrate that Information and Communication Technology (ICT), when strategically applied, plays a significant role in reducing school bullying and youth violence. Quantitative evidence from programs such as KiVa and Cyber Friendly Schools shows measurable reductions in bullying incidents, while AI-driven detection systems achieve high accuracy rates in identifying harmful behaviors online (Cross et al., 2016; Nocentini & Menesini, 2016; Agrawal & Awekar, 2018). These results highlight ICT's capacity to provide both preventive and reactive solutions by combining reporting tools, digital games, and intelligent monitoring systems. Qualitative insights further emphasize that the success of ICT interventions goes beyond statistics, shaping students' perceptions of safety, empathy, and empowerment. Themes such as peer solidarity, digital empowerment, and perspective-taking illustrate how technology can positively influence social dynamics within schools (Cross et al., 2016; E-Learning modules, n.d.; Charmaraman et al., 2022). At the same time, concerns over privacy, cultural adaptability, and technological burden underline the challenges that must be addressed for long-term sustainability (Ige & Adewale, 2022; Nocentini & Menesini, 2016). This dual perspective reinforces the importance of mixed-methods research in fully understanding ICT's impact. ICT offers promising pathways to address school bullying and youth violence, but its effectiveness depends on ethical design, contextual adaptation, and integration into broader educational strategies. By combining quantitative improvements in detection and reporting with qualitative benefits in empowerment and empathy-building, ICT has the potential to transform how schools safeguard students in both physical and digital spaces. Future research should focus on culturally adaptable, ethically sound, and scalable frameworks to ensure that ICT-based interventions achieve sustainable impact in diverse educational environments.

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