Artificial Intelligence in the Fight Against Bullying: Integration of ChatGPT in an Emotional Support Chatbot

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Abstract

Bullying is a global problem that negatively affects students, their families, and communities. This study addresses the creation and evaluation of an artificial intelligence (AI)-based chatbot to provide emotional support to student victims of bullying, using a combination of exploratory and descriptive approaches. A chatbot was developed on the Telegram messaging platform, integrating the ChatGPT API to improve response generation. A topic- and equity-sensitive design was implemented, and conversation logging and harassment detection functionality was enabled. The research focused on the technical functionality of the chatbot and its ability to provide emotional support and guidance.

The chatbot proved to be capable of providing basic emotional support and guidance to users. The integration of ChatGPT enriched the consistency and contextualization of responses. Intuitive interaction was achieved through Telegram, providing relevant and contextually appropriate responses. Although this research focused on the technical functionality of the chatbot, its implementation in students and data analysis of user interactions represent important future steps. The chatbot has the potential to empower victims of bullying and improve school safety. In addition, this research contributes to the creation of a new tool for collecting and analyzing data on bullying, improving early detection and prevention.

Keywords

Bullying 1, Emotional support 2, Technology in education 3, Artificial Intelligence 4, ChatGPT 5

1. Introduction

Bullying is presented as a serious and widespread problem globally, exerting a negative impact on students and generating detrimental consequences for their well-being and academic progress [1]. The academic literature has coincided in providing consistent definitions of this phenomenon.

Various authors have addressed bullying, describing it as a repeated and deliberate pattern of verbal, psychological or physical aggression directed at a peer, without provocation or possibility of defense [2]. This definition is complemented by additional contributions [3], which highlight various manifestations of violence, including physical, verbal forms and social exclusion. On the other hand, some researchers [4] underline the even greater threat that bullying poses to the development of young people, even putting their lives at risk. It is important to note that the scope of bullying is social in nature, affecting not only students, but also teachers, parents and educational institutions [5].

According to data provided by [6], globally, 32% of students have experienced bullying. Although physical bullying predominates in most regions, psychological bullying is prevalent in Europe and North America. In addition, cyberbullying affects up to 10% of children. Alarmingly, 36% have been involved in physical fights and 32.4% have been physically assaulted. In the Peruvian context, the Specialized System for Reporting Cases of School Violence (SISEVE) has documented 68,854 incidents nationwide until October 2023, and the secondary level is

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responsible for 56% of these cases [7]. This problem requires effective solutions, given the lack of accessibility to counseling and guidance for affected students.

Although there are reporting platforms such as SISEVE or the Municipal Ombudsman's Office for Children and Adolescents (DEMUNA), their complexity and lack of confidentiality discourage their use [8]. In addition, the workload of teachers and the lack of training in dealing with bullying limit the identification and attention of cases [9]. This situation places victims in a cycle of silence and suffering, as fear of reprisals and stigmatization prevent them from reporting, perpetuating the bullying and affecting mental health [10].

In response to this scenario, there is a pressing need for effective solutions. Technology, especially artificial intelligence chatbots, presents itself as a promising alternative to provide guidance and support to student victims of bullying. This research aims to explore the feasibility of this tool in the search for relief from this persistent problem. Telegram, a messaging and social networking platform, is notable for its emphasis on user privacy and security [11]. In addition to basic messaging functions, Telegram allows the creation of chat groups, broadcast channels, and bots, expanding its usefulness and versatility.

Artificial Intelligence (AI) empowers machines to execute tasks that previously required human intervention [12]. This field encompasses skills such as natural language processing, machine learning, and decision making. Artificial Intelligence (AI)-based chatbots are systems capable of collecting responses to user queries through natural language processing, natural language understanding and response generation, and machine learning. [13] highlights that these conversational AI bots can interact textually or verbally with users, generating the feeling of a genuine conversation.

ChatGPT is an artificial intelligence conversational interface that employs natural language processing to hold realistic conversations, challenging incorrect assumptions and rejecting inappropriate requests [14]. This system is continuously refined through reinforcement techniques, natural language processing, and machine learning, with the goal of achieving a more complete interaction with users [15]. In addition, the system's ability to generate coherent text in response to questions posed by the user even allows it to simulate conversations on a wide range of topics [16].

1.1. Background

In a local study, the creation of a conversational robotic agent using Google's Dialogflow and a physical robotic agent connected by Bluetooth was proposed to foster entrepreneurship in university students [17]. Successful results indicated that the conversational robotic agent enabled students to explore fields of entrepreneurial interest and receive useful responses from the chatbot and the robotic agent.

On the other hand, the application of an artificial intelligence-based chatbot for requirements and incident management in an insurance company was investigated [18]. Notable benefits included the automation of response times, improving the efficiency and quality of service in a clear way, thus contributing to an effective solution. In a different study, a chatbot was implemented in an Academic Research course at a private university in Lima [19]. The automation of tasks, the speed of responses, and its positive contribution in time management and in the development of the course were outstanding aspects.

At the Complutense University of Madrid, a bullying counseling chatbot was created [20]. The chat prototype, called OttoBot, was evaluated in the training of psychologists in bullying therapies, demonstrating its usefulness. In Italy, a formative evaluation of an online life skills coaching intervention was conducted [21]. Students who participated in sessions with the chatbot found the intervention beneficial, user-friendly, and innovative. In Germany, chatbots were introduced to support self-learning for higher education students, presenting encouraging results in improving the availability of digital tutoring [22]. In the United Kingdom, child perceptions regarding the potential support of a chatbot in online threat situations were explored [23], identifying expected tasks for the chatbot in such contexts. In the United States, an artificial intelligence-based system was developed to combat cyberbullying [24], managing to identify and

stop harassing messages with high accuracy. In Malaysia, the adoption of chatbots in higher education institutions was investigated [25], concluding that the perception of trust and other factors influence the effectiveness of the adoption of these systems.

The present research addresses a problem of great social and educational significance: bullying, the prevalence of which makes it a major challenge [26]. The combination of Telegram chatbot together with Chat GPT emerges as a technological solution of great promise [13]. The constantly evolving natural language processing technology provides a solid foundation for addressing bullying, distinguished by its focus on innovative technologies such as Telegram, recognized for its accessibility, and the GPT model, capable of providing more humane and consistent responses [27].

A relevant point to highlight, is that these artificial intelligence (AI)-driven chatbots are scalable, dynamic and context-sensitive, allowing them to track different channels and languages [28]. In this sense, they differ from their predecessors in their ability to learn from usage patterns and user interactions, making them adaptive tools that improve over time. As AI technology advances, especially in the field of natural language understanding (NLU), the interest and application of these chatbots have expanded in various areas, both academic and industrial [22].

Consequently, AI-powered chatbots represent promising tools with the potential to enrich human interaction and provide support in various domains. Their ability to carry on conversations in a natural and seemingly human-like manner makes them valuable resources in areas such as customer service, education, and personal assistance. From the perspective of artificial intelligence and natural language processing, the incorporation of the GPT model into a chatbot is a significant advance [29]. This research could fill a knowledge gap, as few studies have explored the use of chatbots to mitigate bullying in high school students.

The research proposal has the potential to contribute to the creation of a new tool for the collection and analysis of data related to bullying. The chatbot could provide a more dynamic and accessible intervention, improving early detection and prevention [15]. In addition, it would empower victims and enable early interventions, ultimately improving school safety [28]. Also, this study could influence how variables associated with bullying are addressed and analyzed, contributing to a more effective and technologically advanced approach [30].

1.2. Objectives

The general objective of this research is to develop a chatbot using the Telegram platform and the GPT Chat model as a platform for complaints and emotional assistance for student victims of bullying.

In line with this general objective, the following specific objectives are raised:

- Design the chatbot architecture on the Telegram platform, integrating the GPT Chat model for the generation of contextualized responses.
- Develop the chatbot using Google Apps Script, implementing the necessary interactions to provide emotional support to student victims of bullying.
- Implement the functionality of logging and storing conversations in a Google Sheets sheet.
- Verify the functionality of the chatbot in a controlled environment that simulates real situations.

2. Methods

In order to comprehensively address the objective of this research, a combined research approach was implemented that incorporated both exploratory and descriptive elements. This multidisciplinary approach allowed for a deeper and more holistic understanding of the phenomenon studied.

The methodology adopted encompassed several crucial phases for the development of the study. First, the conception and design of a chatbot tool specifically created for the purpose of the research was carried out. This crucial component involved not only the technical structuring of

the chatbot, but also careful consideration of its usefulness and feasibility in the context of bullying prevention and support.

To contextualize and theoretically ground the research, an exhaustive review of the scientific and technical literature was carried out. This literature review focused on two key aspects: the phenomenon of bullying and the applications of artificial intelligence in the educational and mental health domains. The literature review was not limited to simple information gathering; rather, it was oriented towards identifying trends, challenges, and previous approaches in bullying prevention and support. Also, current developments in the field of chatbots and artificial intelligence were explored, with the aim of placing the research in the most up-to-date and relevant context.

2.1. Chatbot Design and Architecture

This system is based on the creation of an intelligent conversation platform, which uses Google Apps Script as the operational basis to interact effectively with users through the Telegram messaging platform. In parallel, the integration of the ChatGPT API has been carried out in order to generate consistent and contextualized responses, thus enriching the interaction experience. It is relevant to highlight that all the information derived from the conversations, including harassment complaints, will be recorded in a spreadsheet hosted in Google Sheets, for further analysis.

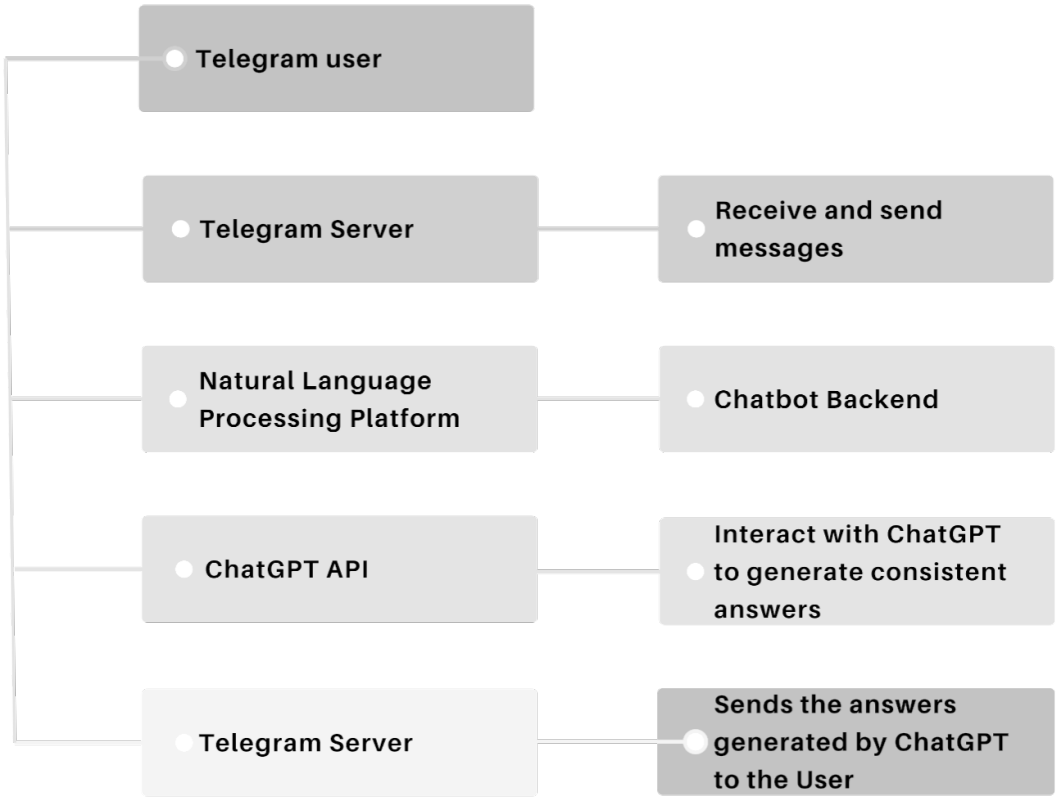

Figure 1: Design of the conversational architecture of the Chatbot

2.2. Chatbot development

To enable interaction, a bot was configured in Telegram with a unique access token that allows the bot to receive and send messages through the Telegram API. The chatbot development was carried out using Google Apps Script, which allows the creation of scripts in the cloud that integrate with Google services. This platform was used to implement the logic needed to receive

and send messages through the Telegram API, as well as to interact with the ChatGPT model. The interaction starts with Message Reception in which the chatbot captures messages from users through Telegram.

These messages are then processed in Google Apps Script, where a series of scripts act as intermediaries to communicate with the ChatGPT API. This API leverages the natural language processing capabilities of the ChatGPT model to generate consistent and contextually relevant responses. The core of the interaction is Response Generation, where the ChatGPT model comes into play. Based on the context of the user's message, ChatGPT elaborates responses that aim to be fluent and relevant. The artificial intelligence of the model allows the chatbot to adapt its response to the input message. The generated responses are sent back through Telegram to be delivered to the original user, thus closing the interaction cycle. Users receive the response generated by the chatbot and can continue the conversation if they wish.

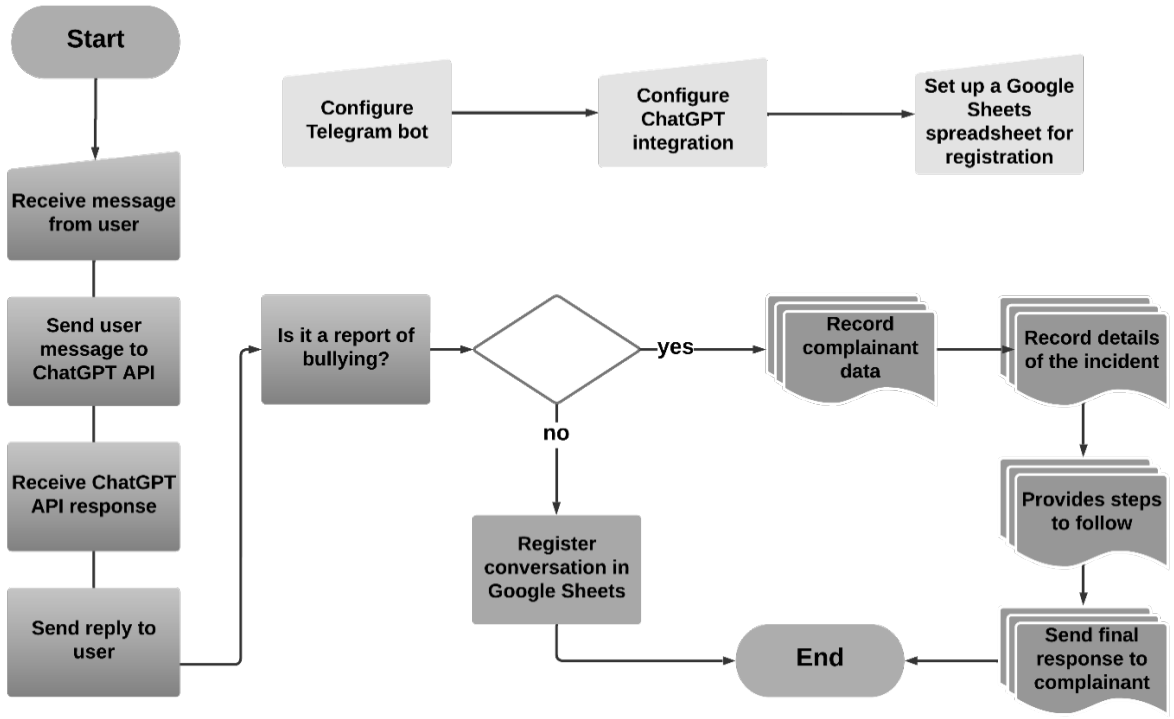

Figure 2: Chatbot flowchart

The training process for the ChatGPT model was meticulous and aimed at continuous improvement of response generation. A relevant dataset covering detailed examples of chat interactions between users was used, along with a variety of queries to enrich the model's capability. Integration of the ChatGPT model into the application was accomplished using the API provided by OpenAI. This approach allows for a dynamic and seamless interaction with ChatGPT, as each message from the user triggers a request to the API for a response. In addition, essential features such as conversation logging functionality and harassment detection were implemented.

For the implementation phase, a specific Google Sheets sheet was designed and configured to store conversations and complaint reports. This comprehensive logging strategy not only facilitates continuous monitoring of chatbot performance, but also provides a solid foundation for further analysis and continuous improvement. An additional crucial feature is the inclusion of the option for users to report possible cases of harassment. These reports are systematically recorded, including the full context of the conversation, allowing for a more thorough evaluation of each report and facilitating appropriate action. To ensure the chatbot's effectiveness in real-world situations, extensive testing was conducted. The system was subjected to a variety of scenarios and adjustments were made to ChatGPT's parameters to optimize its performance. The harassment detection logic also underwent continuous improvements to increase its accuracy and responsiveness to various situations.

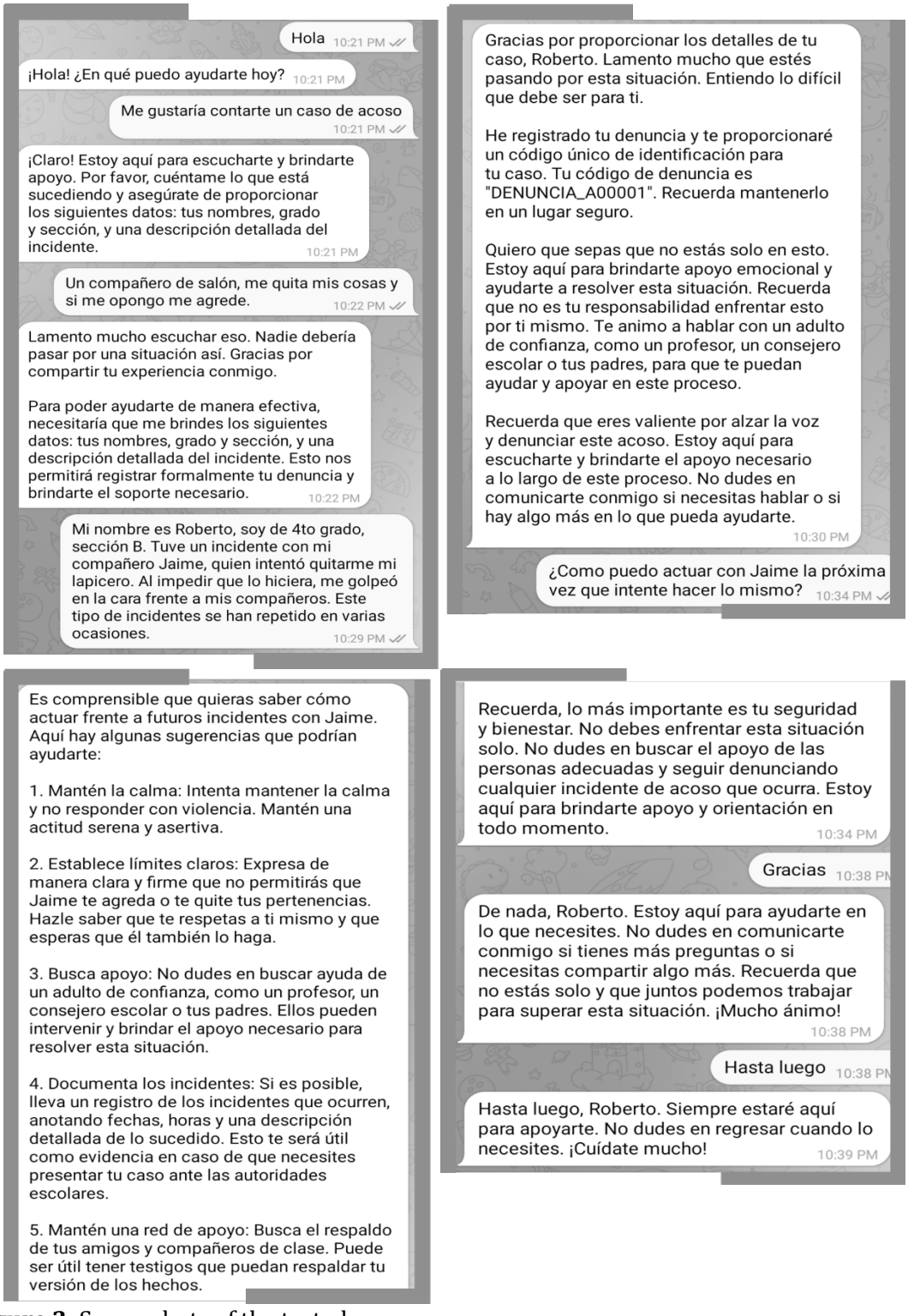

Figure 3: Screenshots of the test phase

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3. Results

The results presented focus primarily on the functionality and design of the chatbot, as this research was primarily concerned with the creation and configuration of the chatbot itself, excluding its actual implementation with students.

The chatbot demonstrated its ability to provide an elementary level of emotional support to users interacting with it. It provided messages of encouragement and guidance in dealing with bullying situations. In reporting contexts, it provided guidance on possible next steps and encouraged users to seek assistance from trusted adults.

The integration of the ChatGPT model into the chatbot had a significant impact on its responsiveness. ChatGPT enriched response generation by enabling the chatbot to generate more consistent and contextually appropriate content based on user interactions. This improvement was reflected in a more natural and understandable experience for users.

An intuitive interaction between users and the chatbot was achieved through the Telegram messaging platform. Users could initiate conversations with the chatbot and receive relevant and contextually appropriate responses to their queries. The design of this interaction focused on providing information in a clear and easy-to-understand manner.

4. Discussion

The chatbot's effectiveness in offering emotional support and guidance is consistent with previous research in similar areas. They also highlight how AI-based chatbots have demonstrated their ability to improve interaction with users and provide assistance in diverse areas such as customer service. The results obtained suggest that the designed chatbot has the potential to provide a basic level of support and guidance to students in bullying situations.

There are many opportunities to develop and evaluate computer-assisted diagnostic algorithms, such as computational learning methods that can be integrated into cell phone applications [31]. It is important to remember that ChatGPT has been trained with data that do not necessarily correspond to the state of the art in the topic addressed in the scientific article and may have biased information [29].

The integration of the ChatGPT model into the chatbot has proven to be a valuable advance in terms of generating more coherent and contextually relevant responses. These results are consistent with the research of those who emphasize how natural language processing technology improves the interaction between humans and chatbots. Moreover, this improved responsiveness can translate into a more satisfying experience for users, which is essential in emotional and sensitive contexts such as the one addressed in this study.

We should not forget that in the context of personal data protection, the identification of the data controller is essential, since this ensures that there is a person who is assigned a specific set of obligations arising from the processing and, therefore, there is someone who can be held accountable for the fulfillment of these obligations [32].

However, the use of AI raises ethical and privacy challenges that need to be addressed by ensuring the protection of personal data and establishing appropriate regulatory frameworks [19]. The intuitive interaction achieved on the Telegram messaging platform is a crucial aspect for chatbot success. Taking into account that, platforms such as Telegram can be especially effective in communicating with young users due to their familiarity with instant messaging technology.

5. Conclusions

In the context of the research, the creation and design of the chatbot to provide emotional support to students who are victims of bullying is a significant step towards the use of technology to address a problem of social and educational relevance.

The effectiveness demonstrated by the chatbot in providing emotional support and guidance is consistent with existing literature in similar areas. The integration of the ChatGPT model into the chatbot has enriched the generation of responses, allowing for a more natural and contextually relevant interaction. Although the present study has focused on the development and design of the chatbot, it is clear that the integration of natural language processing technologies, such as ChatGPT, adds significant value to emotional support tools.

The intuitive interaction achieved through Telegram has been a crucial aspect in facilitating communication between the chatbot and users. The choice of this platform aligns with current trends in digital communication, especially among young people. In addition, the design of the chatbot with an issue-sensitive approach and the promotion of non-discrimination and equity have ensured that the tool is accessible and suitable for a wide range of users.

It is important to highlight that this study has limitations that should be considered in future research. The exclusion of actual implementation with students and data analysis of real interactions limits the full understanding of the chatbot's effectiveness and response in real bullying situations. Also, the chatbot should be considered as a complementary tool to broader prevention and support strategies.

Finally, this study contributes to the advancement of the application of technologies to address sensitive and relevant problems in education. The designed chatbot offers a promising solution to provide emotional support and guidance to student victims of bullying. Despite its limitations, it lays the groundwork for future research and applications in this field, highlighting the importance of technology as an ally in the search for solutions to emotional and social challenges.

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