

EXPLORING ONE'S EMOTIONS: THE POTENTIAL OF CHATBOTS FOR TEACHER EMOTIONAL EDUCATION

ESPLORANDO LE PROPRIE EMOZIONI: IL POTENZIALE DEI CHATBOT PER L'EDUCAZIONE EMOTIVA DEI DOCENTI

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ABSTRACT

Emotional intelligence is defined as a multidimensional construct and corresponds to the ability to recognise, understand, manage and influence one's own emotions and those of others effectively. In literature, it has been found that a teacher's emotional intelligence is a correlated or predictive factor of work and school success, personal well-being, self-efficacy, stress management and student outcomes. In particular, there is more evidence of increased teacher burnout when working in classrooms with pupils with special educational needs. The research aims to explore the potential of the educational use of chatbots. Thanks to their intrinsic characteristics linked to accessibility, customization and immediate feedback, these could represent useful tools to support the teacher in the acquisition of knowledge and abilities regarding emotions, which would then favour the development of emotional intelligence and emotional education in learners. Therefore, a longitudinal research project involving the use of a chatbot to foster teacher emotional literacy will be presented.

L'intelligenza emotiva è definita come un costrutto multidimensionale e corrisponde alla capacità di riconoscere, comprendere, gestire e influenzare efficacemente le proprie emozioni e quelle degli altri. In letteratura è stato rilevato che l'intelligenza emotiva di un insegnante è un fattore correlato o predittivo del successo lavorativo e scolastico, del benessere personale, dell'autoefficacia, della gestione dello stress e dei risultati degli studenti. In particolare, vi sono maggiori evidenze di un aumento del burnout degli insegnanti quando lavorano in classi con alunni con bisogni educativi speciali. La ricerca mira a esplorare il potenziale dell'uso educativo dei chatbot. Grazie alle loro caratteristiche intrinseche legate all'accessibilità, alla personalizzazione e al feedback immediato, potrebbero rappresentare strumenti utili per supportare l'insegnante nell'acquisizione di conoscenze e abilità relative alle emozioni, favorendo così lo sviluppo dell'intelligenza emotiva e dell'educazione emotiva nei discenti. Verrà quindi presentato un progetto di ricerca longitudinale che prevede l'utilizzo di un chatbot per favorire l'alfabetizzazione emotiva degli insegnanti.

KEYWORDS

Chatbot, Intelligenza Artificiale, emozioni, formazione docenti
Chatbots, Artificial Intelligence, emotions, teacher training

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1. Introduction¹

Emotional intelligence (EI), defined as a multidimensional construct, is essential to understanding, perceiving, managing, and influencing both one's own emotions and those of others, and it can be developed over time (Salovey, P., and Mayer, J. D. 1990, Panwar, 2023). Its importance is especially evident in the educational context, where teachers' emotional capacity is directly related to their effectiveness in the classroom, stress management, personal well-being, and student success (Cooper, 1997, p.33; Sharma & Bindal, 2012, Kauts and Saroj, 2010). Particularly relevant is the role of EI when teachers deal with students with special educational needs, situations often associated with a high risk of professional burnout (Brackett, Palomera & Mojsa, 2010; Murdaca, 2014). There is evidence that the presence of problem behaviors in the classroom, such as those manifested by students with ADHD, autism spectrum disorder, or oppositional behavior disorder, can intensify emotional dysregulation in teachers (Aloe et al., 2014; Carson, 2007; Chang, M.-L., 2013). This evidence underscores the importance of equipping teachers with effective tools to manage such behaviors. One of the key aspects of preventing burnout is emotional regulation skills and the adoption of positive coping strategies.

Indeed, Brackett et al. (2010) explored how the ability to know and regulate one's emotions positively affects job satisfaction and decreases burnout among teachers.

Emotions, described in the literature as impulses that turn into action plans to deal with daily challenges (Gothard & Hoffman 2010; Goleman, 2011; Galimberti, 2021), are essential in the educational process. Indeed, children develop the ability to manage their emotions primarily through interaction with adults.

Significant studies on modeling, illustrated by Bandura in the "Bobo Doll" experiment, and the function of mirror neurons, explored by Rizzolatti and collaborators (2007; Caruana & Gallese, 2011), have shown that children learn to regulate emotions by observing adults. Consequently, classroom observation of

¹ The article is the result of scientific discussion and collaboration among the authors. However, the attribution of scientific responsibility is as follows: Ilaria Viola wrote paragraphs 1. "Introduction," 4. "Exploratory survey on the use of chatbots for emotional education of teachers," 5. "Conclusions"; Flavia Capodanno is the author of paragraph 2. "The role of emotional education in teacher training in the field of special educational needs"; Lucia Campitiello is the author of paragraphs 3. "Exploring the Potential of Chatbots in Emotional Education"; Stefano Di Tore and Paola Aiello are the scientific coordinators of the research.

positive emotional management by the teacher not only promotes the acquisition of positive coping strategies but also a more effective learning environment, and also reinforces students' perceptions of self-efficacy, guiding them toward more positive management of their emotions (Taylor et al., 2017; Chang, M.-L., 2013)

Based on these premises, we infer, echoing the words of Goleman (2011), the centrality of teacher education based on emotional literacy, which includes the development of skills such as affective communication, collaboration, empathy and emotion management. Moreover, acquiring these skills by teachers and students is pivotal in the construction of inclusive contexts (Morganti, 2016); in this scenario, technologies, especially chatbots being highly accessible, prove to be a resource in teacher training in emotional literacy.

In this regard, the present study is part of a broad trajectory of research that aims to explore the integration of chatbots in teacher education (Di Tore, 2024; Sibilio, 2023), recognizing the potential of these digital tools to improve teachers' emotional preparation through accessibility and interactivity. This research, therefore, aims to outline the potential impact of the use of chatbots in teacher emotional training, starting with an exploratory survey of college students' opinions, and then experimenting with the use of a specifically trained chatbot in teacher education settings. It will investigate how interaction with these tools can facilitate the acquisition of knowledge about emotions through an innovative and accessible approach.

In the following paper, attention will first be focused on the relationship between teacher education and emotional education from an inclusive perspective, then the role of chatbots in this regard will be explored, and finally, the results of exploratory research regarding students' opinions on emotional education and the use of chatbots will be presented.

2. The role of emotional education in teacher training in the field of special educational needs

The topic of teacher training turns out to be central in numerous international studies and research, which go to link with suggestions present in school regulations. Specifically, most of the reflections converge on the definition of a profile of competencies that is necessary and indispensable for a teacher ready to provide educational-didactic responses appropriate to the multiple and diverse needs of his or her students, in order to enhance their talents and potential, in

terms of equity and inclusion. If in years past the teacher's habitus of competencies included especially disciplinary ones, in recent years a broader vision has been emerging, combining technical and non-technical competencies (Aiello, 2019).

In this context, the emotional competence of the teacher, who, speculatively, would be able to promote this skill to his or her students, assumes a certain relevance. In fact, with the establishment of the concept of Emotional Intelligence, a radical change in perspective has taken place, making emotions the main protagonists in school learning processes as well. In particular, there would be a relationship between pupils' social-emotional well-being and their learning: "positive mood states increase persistence in the task and promote generativity, mild anxiety states direct attentional focus, etc. In this sense, the expression 'regulation by emotions' is used" (Rothbart, Ziaie & O'Boyle, 1992; Fedeli & Munaro, 2022, p. 68). Because of this, it seems appropriate to emphasize the correlation between emotionally effective teaching and good learning for students' academic success. In support of this, there are numerous studies that point to the significant influence of the teacher's motivational and emotional components on learners' cognitive processes (Lumbelli, 1972; Gordon, 1991; Salzberger, Wittenberg, Polacco, Osborne, 1993; Tuffanelli, 1999; Rogers, 1983, 1997; De Beni & Moè, 2000).

Specifically, the emotional components of a teacher, which can translate into the ability to express emotions, the ability to interpret emotional behaviors, the capacity for control in relation to the context, mastery of emotional language, and the ability to cope with painful emotions (Gordon, 1989) would promote active involvement, a positive classroom climate, and the promotion of enthusiasm and motivation (Sharma & Bindal 2012). All these elements would improve learning and, in general, the entire process of development and training of students, promoting inclusion and equity. In this line of thought, as mentioned earlier, some legislative mandates, both international and national, are also situated. Internationally, the affirmation of the centrality of life skills, including emotional management and awareness (WHO, 1993; Thorn, 2009), has corroborated the necessity of considering such competencies necessary to navigate the complexities of situations and contexts. Shifting the focus to the Italian context, these suggestions have found correspondence in a legislative proposal initiated by parliament, inspired by another legislative process that was not concluded in the Senate (Bill no. 2943). This proposal envisages the development of non-cognitive and transversal competencies in the pathways of educational institutions and adult education centers, as well as in vocational education and training pathways. Thus,

the opportunity to promote initiatives for emotional education and literacy in schools and all places whose mission is training is emphasized. To this end, it therefore seems consistent to envision training programs for teachers, whose modeling is characterized by the recognized centrality of the emotional sphere. In particular, teacher training becomes central, aimed at providing conceptual and operational tools for didactic action, both in the planning and evaluation phases, attentive to the emotional and relational sphere of its students. This connects to the consideration of the indissoluble unity between the cognitive dimension and the affective dimension of the person (Vygotsky, 1978). In light of this, it would seem consistent to recognize in the emotionally competent teacher a reflective professional, capable of moving on "non-linear trajectories" (Sibilio, 2013). A teacher skilled in managing his/her own and others' emotions would be more inclined to use positive coping strategies, to better manage stress and frustration, appearing satisfied with his/her commitment and a real promoter of initiatives aimed at fostering the development of his/her students. From this perspective, a teacher with emotional competencies would become a model for students on how to adequately regulate their own emotions in the classroom. Moreover, the emotionally competent teacher would be capable of understanding the emotional state of the students and the causes of their behavior and, based on his/her reflections and considerations, would create an ideal learning environment for positive social interaction. Furthermore, in this perspective, the teacher's focus and concern would be directed not so much towards the product, in terms of results or performance, but towards the emotional process and the social progress of all students (Salovey & Mayer, 1990). In light of this, it would be advisable to promote research paths aimed at investigating potential formative trajectories focused on the promotion of teachers' emotional competencies, which, in a recursive manner, would also translate into opportunities for students. Indeed, fostering a teacher's emotional intelligence would be an indispensable element for the effectiveness of both cognitive and emotional-relational teaching-learning processes.

3. Exploring the Potential of Chatbots in Emotional Education

In the educational field, teachers play a crucial role in supporting students through their social and emotional development. The daily events that students encounter both in and outside the classroom can trigger a complex range of emotions, which in turn can significantly influence behavior, academic performance, and the quality of social relationships. Therefore, emotional intelligence (EI) emerges as a fundamental pillar in teachers' arsenal, as understanding and managing one's own

emotions, as well as being sensitive to the emotions of others, become indispensable skills for creating a safe, inclusive, and stimulating learning environment. In a school context where students may face complex situations such as family conflicts, bullying dynamics, and adapting to curriculum demands, it is essential that teachers are able to provide them with the necessary skills to understand and manage their emotions.

In recent years, there has been a growing interest in integrating digital technologies into the emotional education of teachers and students. In particular, the use of affective chatbots represents an innovative and promising research area, as virtual assistants can be a significant resource for teachers in teaching emotional intelligence to their students. Chatbots, with their ability to interact conversationally, can be integrated into the educational environment to provide emotional support and facilitate the understanding and management of emotions. For example, teachers could use specially designed chatbots to guide students in exploring their emotions, offering a safe and non-judgmental environment where children can explore and express their feelings. In other words, the use of chatbots can be integrated into teachers' pedagogical approach to foster the emotional and social development of their students.

Specifically, some studies have shown that virtual agents can be effective in a wide range of contexts, ranging from intelligent tutoring systems (D'Mello et al., 2007), decision support in the healthcare sector (DeVault et al., 2014), and even taking on increasingly significant roles as virtual therapists (Ring et al., 2016). An example is the studies by Santos and colleagues (2020) who explored the use of a chatbot called EREN designed to help children recognize and express their emotions through storytelling. The EREN chatbot uses the "Emotion Coaching" model to guide children in narrating emotional events and help them reflect and plan future actions. From the results of this research, it emerges that children shared a range of positive and negative emotions and perceived the chatbot as an effective companion, which does not judge and offers patient listening. The chatbot used active listening techniques and dialogue to encourage further narration and reflection. Challenges included communication issues and the chatbot's difficulty in accurately detecting emotions only from children's words, which sometimes required repeated confirmations to identify the correct emotion. Consequently, it is evident that chatbots using narratives can be considered valuable tools in children's emotional education, facilitating self-expression and emotional support in a non-judgmental environment. Ghandeharioun and colleagues (2019) also

conducted research by designing an intelligent personal assistant, called EMMA (EMotion-Aware mHealth Agent), to provide targeted interventions for mental well-being. This intelligent assistant utilizes mood detection through sensor data collected from smartphones, such as geolocation, to personalize interactions and wellness interventions based on predictions. This research indicates that EMMA was perceived as enjoyable and as effective as a system that uses emotion labels acquired through experience sampling. Therefore, emotionally intelligent chatbots, like EMMA, can have a significant impact on improving users' mental well-being, providing effective interventions at the right time. Through the use of advanced technologies, chatbots can simulate complex conversations and interpersonal situations, as demonstrated by the studies of Ferrández and colleagues (2024), who developed an educational chatbot, called CuentosIE, for teaching emotional intelligence through fairy tales. The chatbot combines moral narratives and metaphors to facilitate emotional learning, supported by a monitoring tool for teachers and psychologists, which uses indicators and data collected to track users' emotional development. CuentosIE is equipped with various features, including fairy tale search, text comprehension question generation, and user emotion classification to recommend relevant stories. Preliminary results from the use of CuentosIE, showing improvements in users' emotional intelligence, suggest future lines of research to explore the chatbot's effectiveness in different educational contexts. These studies demonstrate that chatbots can be a valuable tool for supporting teachers and students in emotional education, offering innovative and accessible emotional and psychological support. Incorporating the use of chatbots into teachers' educational approach becomes not only desirable but also an educational imperative to prepare students to face the emotional challenges of everyday life and to develop greater awareness and empathy towards themselves and others.

Based on these considerations, the following project aims to develop a chatbot to provide teachers with effective strategies to understand and manage their emotional state, so that they can face the daily challenges of the educational context with greater serenity and competence. Therefore, the main goal of the project is not only to increase teachers' awareness of emotions but primarily to equip them with the necessary skills to effectively manage these emotions through the application of specific cognitive restructuring techniques. To this end, the chatbot is specifically programmed to adopt an approach based on rational-emotive education. This approach does not merely celebrate emotions; rather, it focuses on teaching strategies to overcome harmful emotions and promote a more

consistent experience of positive emotions. Understanding emotions involves recognizing and being aware of the dynamic relationship between the mind and emotions, identifying the internal cognitive processes that influence the onset and maintenance of certain emotions.

3.1 Development and features of the educational chatbot

The following research project aims to explore how the adoption of chatbots in educational and instructional contexts can become an effective resource capable of enhancing the emotional and social skills of teachers. These digital assistants, thanks to their immediate accessibility and personalized interactions, provide relevant responses on specific topics, offering teachers a safe and controlled environment to practice and refine their emotional intelligence. This type of training helps teachers better manage classroom dynamics, respond to students' emotional needs, and create a more empathetic and engaging learning environment. Based on these considerations, a chatbot has been developed with the goal of promoting emotional literacy in teacher training (Figure 1). The chatbot was created using the Unity 3D graphic engine and implementing the advanced linguistic model LLaMA 2 to train it on specific competencies. Specifically, the chatbot has been instructed on emotional constructs to promote teachers' awareness of their emotional state and provide effective strategies for emotion management.

Furthermore, special attention has been given to the design of the chatbot to facilitate interactions with teachers and promote accessibility, taking into account the diverse needs of users to interact effectively with the chatbot and improve the user experience.

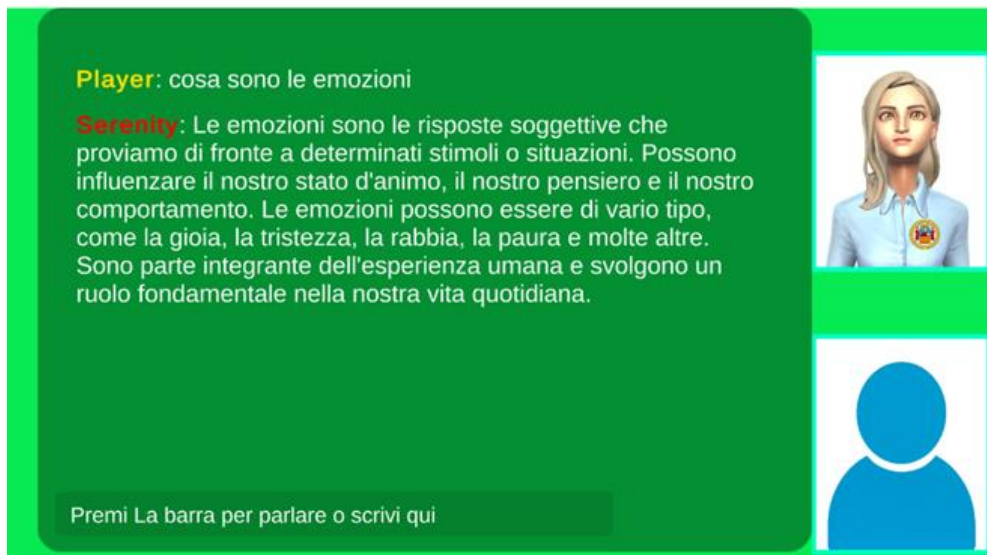


Figure 1. Chatbot trained on emotional literacy

4. Exploratory survey on the use of chatbots for emotional education of teachers

Aim

The objective of the following study is to survey students' opinions regarding the use of a chatbot to foster knowledge about emotions.

4.1 Methods and tools

A questionnaire was administered to students attending the General Didactics and Educational Technology course in the bachelor of science in primary education through a Google forms. The questionnaire consists of:

- one part aimed at detecting gender and age;
- a second part quanti and qualitative dedicated to emotional-affective education and training -In your opinion to talk about emotional-affective education who should be the first recipients of the training? (4 response options: teachers, students, school leader, parents/family), How important is the management of emotions in education by teachers? (1 not at all- 7 very much). Thinking about the teachers you have encountered in your school and

personal career, do you believe that they are able to be positive role models in terms of knowing and managing emotions for their students? (1 not at all- 7 very much), Do you think there is a need for specific training on emotions aimed at teachers? (1 not at all- 7 very much), On what would you orient emotion training for teachers?

- a qualitative third part geared toward eliciting reflection and gathering opinions about the role of chatbots in fostering knowledge about emotions - Considering the advent of chatbots, do you believe that knowledge about emotions and reflection on them can be fostered through interaction with a chatbot? If you are not familiar with chatbots just answer, If yes, what might be the benefits of interacting with a chatbot (such as chatgpt, bard) on emotions.

4.2 Data analysis

Questions with closed-ended or structured response on a Likert scale ranging from 1 (Not at all) to 7 (Very much) were analyzed using SPSS, and the data were examined using descriptive and frequency analysis. An open-ended question designed to detect an opinion on the use of chatbots to foster emotional literacy was analyzed using the qualitative bottom-up grounded theory approach, detecting codes corresponding to high keyword recursiveness. In contrast, the remaining open-ended questions were analyzed with T-LAB using textual statistical analysis. For the latter analysis, a dataset was created with the quantitative and textual data that constituted the corpus loaded into the software, then the textual data were analyzed with thematic analysis of elementary contexts.

4.3 Results

Data analysis shows that the sample has a mean age of 22.01 (Dev. St. 4.480) and 99.7% are female (F=169, M=5).

Descriptive analysis of the quantitative items reveals the crucial importance of teachers' management of emotions in education, with a recorded mean of 6.55 and a standard deviation of 0.823. In contrast, SFP male and female students reflecting on the teachers they encountered during their school and personal experience, attribute a low-to-medium score (M=3.63; St.Dev.= 1.46) to the ability of teachers to serve as positive role models in knowing and managing emotions toward their students. In fact, a high value of the mean, (M=6.33; Dev.

St.=1.028) , emerges in response to the question about the need for specific training on emotions for teachers.

The recipients of training, according to the participants' opinions should be primarily parents and family (81%; N=141), then the teachers (14.4%; N=26), then pupils 3.4%, N=6) and school leaders (1.1%; N=2). On the other hand, regarding the opinion on the use of chatbots to foster emotion awareness, the open-ended responses were read by the researcher and categorized into 4 codes, following the bottom-up logic. The codes with their frequencies are shown (Fig. 1): Yes (N=64, 36.8%), No (N=77, 44.3%), Don't know (N=10; 5.7%), Don't know chatbots (N=23; 13.2%).

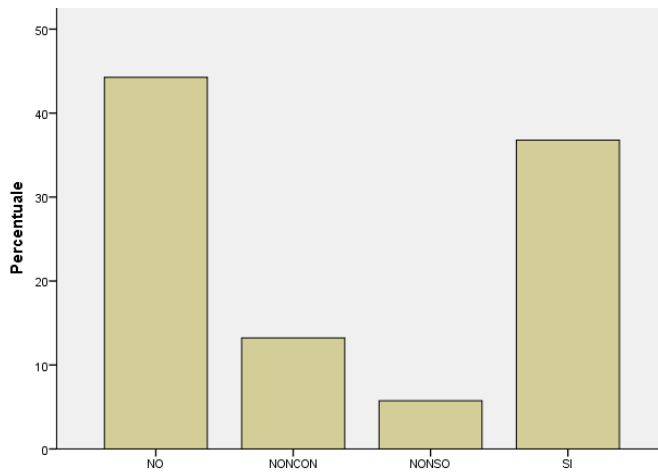


Fig 1 4 codes noted from open-ended responses on the use of chatbots to foster emotion awareness

It is inferred that there is an opinion with negative trend on the use of chatbots for emotional literacy.

Regarding the open-ended questions examined through textual statistical analysis with 212 keywords, the main results are reported. The clusters that emerged from the responses to the questions on what would guide teachers' training on emotional literacy are 5 with 151 elementary contexts: the first cluster "Pupil" explains 25.17% and encompasses those responses that highlight the centrality of training on emotions to foster the well-being of their students. Cluster 2, on the other hand, focuses on "Teacher Pathway" (5.3 percent), meaning that training should be structured as a specific pathway where theory and practice come

together. In clusters 3 and 4, the key words direct the training on the importance of learning to "Know"(20.5%) and "Recognize"(21.2%) emotions for the purpose of managing and dealing with them in the classroom, finally, in the responses of cluster 5, it is noted how the training can foster greater "Empathy"(27.8%) of teachers towards pupils.

Isolating the sample group that provided positive opinion to the use of chatbot to foster emotional literacy, it emerges that the benefits in interacting with a chatbot are: cluster 1 corresponds to 40.35 percent of the elementary contexts and the lemma with chi square highest is "People," referring to the benefits that people who use the chatbot can receive. In addition, the 15.79% explained by the second cluster highlights the importance of increased "Availability" of the chatbot, alluding to the accessibility and usability of the device. In contrast, the third and fourth clusters point to increased "awareness" (29.82%) given by increased information on "topics" (14.04%) as benefits.

5. Conclusions

This study explored the importance of emotional intelligence (EI) in teacher training and the potential role of chatbots in supporting this education. The analysis of the collected data revealed a complex picture that underscores a broad recognition of the importance of EI, yet also significant areas for improvement in current teacher training practices.

Data analysis showed that emotion management is perceived as extremely important within the educational context, with an average score of 6.55 on a scale of 1 to 7. This finding aligns with Cooper's (1997) research, which directly links teachers' emotional capabilities to their effectiveness in the classroom, and further supports the idea that emotional management is central to student well-being and success, as discussed by Sharma and Bindal (2012) and Kauts and Saroj (2010). Despite the high valuation of the importance of emotion management, future educators perceive a deficiency in current teachers' abilities to act as positive role models in this area, with an average score of 3.63. This discrepancy highlights a potential area of improvement in teacher education and corroborates the urgency for targeted training interventions, regarding the impact of EI in preventing burnout in stressful educational settings. The data exhibit strong support for specific EI training for teachers, with an average of 6.33. This response is consistent with the importance of promoting life skills and emotional competencies emphasized by WHO (1993) and indicates a clear need for training strategies that effectively

integrate emotional education into teacher training pathways. Regarding the use of chatbots for emotional education, the results are mixed. Despite 36.8% of responses affirming the effectiveness of chatbots in emotional literacy, a slightly higher percentage expresses skepticism. However, those who value chatbots highlight the benefits of their accessibility and non-judgmental nature. These observations suggest that, despite the challenges, chatbots have the potential to become valuable resources if properly integrated, as demonstrated by the work of Santos and colleagues (2020) and Ghandeharioun et al. (2019), who have successfully explored the use of virtual agents in emotional support and education. In summary, this study confirms the critical importance of emotional intelligence in education and reinforces the need to incorporate EI more systematically and deeply into teacher training programs. At the same time, it highlights the emerging potential of chatbots as supportive tools in emotional training, suggesting the need for further research and development to maximize their educational impact. The combination of robust emotional training supported by innovative technologies could significantly transform the educational landscape, promoting more inclusive, empathetic, and effective learning environments.

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