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AI: A Bad Teacher?

Marta Raffone[1]

[1] Pegaso University, marta.raffone@pegaso.it;

Abstract: The extraordinary speed of technological progress has led Artificial Intelligence to be part of the daily behaviour of human beings. We intend to analyse in this contribution the possibility of human-machine interaction in the recognition and management of emotions. The significant contribution in this sense of AI Moxie will be discussed, an embodied artificial intelligence that aims to support its users in emotional development, especially in reference to individuals with specific developmental disorders. The contribution also explores the reality of countries in which experimentation for the development of emotional skills in school systems is progressing and the lack in Italy of structured curricula on emotional education in formal learning contexts.

Keywords: Embodied Ai; Artificial Intelligence; Inclusion; Socio-Emotional Learning

1. Introduction

Training and education evolve their forms in a dynamic and continuous way and the demand for an organized and structured development of emotional intelligence is no longer postponed. This article explores the contradiction that occurs in the coexistence of investments and development of advanced technology of recognition and management of emotions such as Moxie AI and the lack of school and university curricula that include teaching and learning about emotional education.

Emotions represent an important level of knowledge in humans (Goleman, 1995). Achieving and maintaining an adequate threshold of attention to complete a task is influenced by emotions (Pekrun, 2006). The memories and the information connected to them are recalled through the emotions: if, for example, the stimulus proposed was neutral or had a poor resonance for the subject, the amygdala would not attribute emotional meanings to the information, returning, thus, a memory less vivid and, with time, more faded, to make it ephemeral and fleeting (Phelps, 2006). Emotions are also able to influence learning motivation, an element that is already sufficient to reason about strategies related to early school leaving in many areas of the country, especially in Southern Italy. Positive emotions, in fact, favor cognitive development and an open-minded attitude to the reception of new information (Dweck, 2006). Decision-making, problem-solving skills, and critical thinking share the emotional drive. Emotional intelligence allows to recognize and regulate the intensity of emotions allowing the achievement of well-considered solutions and encouraging the exchange of opinions and relational skills (Salovey & Mayer, 1990; Elias et al., 1997).

It seems, therefore, no longer postponed the request for a socio-emotional learning (SEL) thanks to which you can not only recognize and manage their emo-

tions according to a task to be performed but develop judgments on such emotions, to have the ability, in other words, to build a habit of critical and complex thinking, action that will be increasingly central in the management of the man-machine relationship.

Talking about SEL means talking about humanity which is an important counterweight to an extremely rapid technological progress that seems to know no obstacles to its rampant pervasiveness.

2. Embodied Ai

Speaking of technological advances, the embodied AI or Artificial Intelligences embodied represent an interesting experiment. These artificial intelligences can have both a virtual body and a physical body like a robot. Both reproduce human-related behaviours, such as facial expressions or voice modulation, but only physically embodied agents have the unique opportunity to share the physical environment with their users. In this way, the physically embodied agent can interact through modes that a virtual agent cannot clearly reach.

The embodied agents are very engaging, especially for younger people. A study conducted in the Netherlands and Pakistan showed a significant increase in gestures related to the affective sphere during a game session with the robot socially assisted iCat compared to the game alone (Shahid et al., 2014).

In a previous study, levels of involvement between users and the robot PaPeRo have been shown to double the levels of involvement with the robot (Komatsu, 2010).

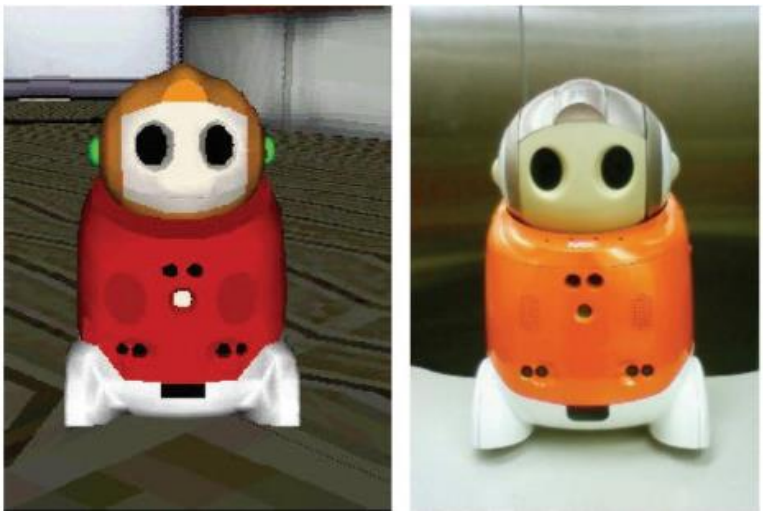

Figure 1. RoboStudio Virtual Agent (left) RoboStudio Embodied Agent (right)

Following a meta-review of 65 articles comparing non embodied agents and embodied agents, in 93.8% of the studies the embodied agent is at least able to match in efficiency a nonembodied agent, while in 78.5% of studies the embodied agent outperforms the performance of the nonembodied agent (Deng et al., 2019).

3. Moxie Ai

Figure 2. Moxie Robot

Numerous studies in the field of child development have shown that the intersection between artificial intelligence and education can create innovative solutions. Moxie, a socially assistive robot developed by Embodied Inc. in collaboration with the Global Robotics Laboratory (GRL), represents a new approach to supporting individuals with specific developmental disorders. Going beyond traditional interventions, Moxie provides a personalized and engaging platform for children aged 5 to 10.

Children with developmental disorders face many challenges in understanding and expressing emotions and require personalized educational approaches. Moxie, an artificial intelligence embodied at the forefront, emerges as a beacon of hope. Designed to engage and interact with children, Moxie helps users recognize, express and manage their emotions. It can be safely stated that the potential impact of such a tool on the emotional development of children with specific developmental disorders is very profound.

Moxie's activities aim to guide users in the practice of skills essential to life such as shift, eye contact, emotion regulation and problem solving.

Moxie is designed to evolve together with the child. This approach creates a personalized engagement strategy with the child as the robot's mentor, fostering empathy and collaborative skills. Moxie, in fact, learns from its user by proposing activities individualized and adapted to the specific characteristics of the subject. Moreover, it generates constant routines that are fundamental in cases of autism spectrum disorders and whose standards are hardly comparable to those attainable by human caregivers.

Moxie's content is strategically classified into five areas: Stories, Mindfulness, Creative Play, Life Skills and GRL Moxie Missions. On a weekly basis, users are guided into themed activities such as drawing, mindfulness practices, reading and exploring interpersonal relationships.

4. STAR Framework

The study entitled "Social and Emotional Skills Training with Embodied Moxie", presented in 2020 by Embodied Inc. together with the University of

Pittsburgh, assess the impact of repeated interactions with the socially assistive robot on the social and emotional skills of school-age children with autism spectrum disorders (ASD) and developmental-specific disorders (Hurst, N., Clabaugh, C., Baynes, R., Cohn, J., Mitroff, D., & Scherer, S., 2020)

The STAR Framework (Situation - Task - Action - Results), developed by Embodied Inc., is the therapeutic framework created to allow the assistive robot to monitor and improve the social and emotional skills of children, individualizing the learning experience. The STAR Framework incorporates the principles of applied behavioural analysis and combined with naturalistic therapy (nABA) as well as gradual suggestions and cognitive behavioural therapy (CBT) to help children make progress towards specific goals and generalize the skills learned to their social interactions in the real world.

NABA therapy is based on some aspects that are key elements in the embodied AI Moxie. First, the actions take place in environments where the subject is at ease such as domestic or school. Secondly, the so-called incidental teaching is of great importance, in which daily opportunities are used to teach specific skills. This is extremely important when the user must learn to deal with situations outside of their daily routines. One of the most interesting features is the child-led approach: this means, in fact, that the interventions are guided by motivations and personal interests of the user. Through the observation of the spontaneous behaviours and interests of the child, it is possible to individualize the teaching/learning process very effectively. Finally, nABA therapy focuses on teaching functional skills, such as communicative, social, self-help, and adaptive skills that are relevant to the daily life of the individual.

The great technological advances in the analysis and in the recognition of the alterations in the socio emotional behaviour and the functioning of the verbal and non-verbal behaviour give the possibility to the robot to supply the quantitative assessments, allowing an extremely objective monitoring of the results of areas considered fundamental for a complete development of the individual such as communication skills and emotional skills. To carry out such assessments, Moxie thanks to the constant exchange of multimodal information that it receives from both the environment and the user, uses a combination of vision algorithms and lightweight neural networks. This exchange takes place very quickly and this is to simulate the cycle perception-reactivity typical of the human being. Imitation of this cycle is necessary to structure a relationship of trust between user and robot (Gratch et al, 2006).

Moxie Ai's experimentation at the Help Group School in Los Angeles was based on subjective pre, intra and post intervention evaluations, through standard tests for parents and therapists, including the Social Responsiveness Scale (SRS) for the severity of social symptoms and the Social Skill Improvement System Rating Scale (SSIS) for a complete balance of social skills. The Moxie robot collected objectively measurable data through facial expression analysis, eye contact, number of smiles, and automatic language recognition.

The aforementioned subjects confirmed, through the tests administered, the existence of significant improvements in the regulation of emotions, self-esteem, the ability to converse and ability to make friends. The objective evaluations of Moxie have recorded after only six weeks of intervention equally significant improvements

in terms of time of attention and involvement, eye contact, balance of the shift, conversational smiles and relational speech.

5. The Italian situation

While in the rest of the Western world research and experimentation related to the integration of artificial intelligence and emotional education seem to progress, in Italy we proceed in a seemingly discontinuous and not very organic way. The reasons for this should not be investigated in the lack of resources alone but in a cultural tendency to consider the emotional skills little "structurally" in organized knowledge. It is enough to consider, for example, that only from May from the school year 2022/23 Italian schools can introduce experimentally the skills indicated as "not cognitive" in their school programs. Considering non-cognitive competences as all those competences that are not immediately linked to past and previously structured knowledge should make us reflect on the modest importance that we intend to give to this field of knowledge.

With Law 2782/2022, a 3-year voluntary trial was launched for children in the 6–16-year cycles. The project does not provide additional school hours but a review of teaching methods to develop methodologies based on emotional intelligence. For this reason, the project provides that the first year is aimed at preparing teachers and the last two to work with the pupils. The voluntary nature of the initiative confirms the tendency to consider emotional education secondary.

It is, therefore, still far from defining as a priority the need for the inclusion of emotional education in schools. There are many praiseworthy actions in primary school for the development of emotional skills in subjects from 6 to 10 years, with an emotional intelligence being built but such activities represent sporadic and unstructured initiatives of teachers and school managers. What is perplexing is the absence of references to this fundamental sphere of human development in the second degree of Italian education. In the secondary school of first and second degree, in fact, the initiatives aimed at improving the recognition and management of emotions are drastically reduced.

In this regard, an interesting experiment on the integration of artificial intelligence and emotional education, could involve secondary school users to assess whether or not interventions of this kind can improve the sociality and relationships of those who already have partially structured emotional skills.

Today we are witnessing a progressive increase in violence precisely in the age groups that most of all are left without a structured emotional guidance. Bullying and cyberbullying are becoming increasingly common. Many identify the causes of this increase in the problematic use of electronic devices, with particular reference to smartphones and social networks.

In 2020 Méndez and colleagues carried out a study to analyse any differences in bullying and cyberbullying among adolescents who manifested a problematic attachment to cell phones. Attempts were made to identify different profiles that differed from each other in relation to the problems inherent in the use of smartphones and inappropriate communicative and emotional models. Later, it was speculated that the kids most affected by school violence issues such as bullying or cyberbullying were those who used the smartphone in a problematic way. 810 secondary school teenagers were included in the research (Mendez et al., 2020).

The authors submitted a questionnaire on school violence (Álvarez-García et al., 2011) which examines various manifestations of violence, from the indirect physical one of students to the direct physical one among students. The questionnaire also evaluates elements such as social exclusion and violence by teachers. Finally, students were presented with the Mobile Related Experiences Questionnaire (CERM-Beranuy et al., 2009) to assess mobile phone abuse. This includes two factors: problems resulting from abuse of the cell phone and problems due to the inappropriate communicative and emotional use of the cell phone.

The results identified three types of problematic use of the smartphone: a first group that constitutes 65.9% of the sample has been identified as a non-problematic user; a second group of students which constitutes 25.8% of the sample is characterized by moderate problematic use of the smartphone and, finally, a third group of students, 8.3% of the sample, reports high levels of problems and high levels of inappropriate communicative and emotional use.

The research therefore demonstrates how various manifestations of school violence have a direct relationship with the problematic use of new technologies (Arnaiz et al., 2016). The problems in the sphere of socialization, due to excessive and problematic use of the smartphone and poor emotional and communicative adaptation, are connected to the fact that the use of the cell phone stimulates intense emotional reactions that adolescents seem unprepared to manage (Serrano-Puche, 2016).

The results therefore highlight the need to make young people aware of the problems that can arise from inadequate use of the telephone and to carry out actions that promote coexistence, social and communication skills as well as the management of emotions and stress for adolescents (Moral and Suárez, 2016).

Italy shows a significant delay in the teaching of emotions compared to other countries but the international Eumoschool project for the teaching of emotional education and against school dropout gives hope. The Eumoschool Comparative Research Report involved approximately 3000 stakeholders from the education and training sector in 6 countries (Italy, United Kingdom, Turkey, Hungary, Romania, Austria) and aims to structure, test and implement a new and coherent methodology linked to emotional education within school environments. And this above all to reduce the phenomenon of student abandonment and to promote the development of a holistic culture, capable of structuring emotionally competent individuals and capable of overcoming obstacles without being overwhelmed by emotions (Dolci, D. 2017).

6. Conclusions

Considering the evidence of research in the intersection between artificial intelligence and transversal skills, it is necessary to fully understand the importance of structuring emotional education within school curricula, therefore within a formal educational context. The challenges of modernity have meant that, for too long, emotional skills have been placed in the background compared to those skills defined as hard, that is, objectively measurable. We need to take a step forward to prevent the cold dichotomy of binary language from taking on more and more space to the detriment of complex language, which is necessary for the development of both a critical sense and a culture that truly wants to be called "holistic".

The worrying impoverishment of the lexicon, due to the need for speed in sharing information, has a price: the trivialization of meanings. This leads the individual, among other things, to not adequately recognize an emotion because one is no longer familiar with the relationship between signifier and signified. There is, in other words, a difficulty in adequately recognizing emotions and naming them. Often, anger is confused with wrath, boredom with apathy. Anxiety is indicated as a panacea to describe an indefinite state of disturbance, when, in fact, it is an extremely precise state of mind, if only one took the time to learn its meaning. All this only fuels a confused emotional environment, in which emotions fluctuate without form and whose incomprehension frightens the individual faced with their power. This leads him to be increasingly self-centred and less willing to welcome others. The polarization of opinions is a direct consequence of this approach. By doing so, the risk of violent actions is increased, the extent of which is often not only not contemplated in advance by the individual who is acting but which is not even understood after the violent act itself.

Through a simple structured programming of emotion recognition, a virtuous circle could be triggered while waiting for larger experiments in this sense to produce reliable and reproducible results. In this regard, embodied or otherwise artificial intelligences can help in this process by carrying out, for example, exercises aimed at developing emotional and relational skills and evaluating them in terms of effectiveness. These exercises, however, need to be planned with clear medium and long-term perspectives and objectives. Lifelong learning represents the most suitable approach to ensure that such programming develops fully.

" The true measure of a civilization is not its technological advances or material riches, but the depth of empathy and understanding among its people." -Bryant H. McGill.

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