

THE VICARIOUS POTENTIAL OF THE BODY IN DIGITAL LEARNING ENVIRONMENTS: TOWARD ARTIFICIAL EMOTIONS?

IL POTENZIALE VICARIANTE DEL CORPO NEGLI AMBIENTI DIGITALI DI APPRENDIMENTO: VERSO LE EMOZIONI ARTIFICIALI?



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ABSTRACT

Artificial intelligence, with its pervasive impact on science and society, has raised significant questions regarding the integration of technologies in daily life and its effects on personal, prosocial and educational aspects, extending to emotional and cognitive domains. This study explores the importance of immersive education that, by enhancing the vicarious role of the body, emphasizes emotional intelligence as a fulcrum for harmonious personality development, defining new educational scenarios. Through an analysis of the vicarious potential of bodily experiences and an approach that privileges the structuring of knowledge as a process of discovery, a vision is proposed in which new technologies serve as social catalysts and vehicles of cultural authenticity within digital learning environments.

L'intelligenza artificiale, con il suo impatto pervasivo su scienza e società, ha sollevato questioni significative riguardo l'integrazione delle tecnologie nella vita quotidiana e i suoi effetti su aspetti personali, prosociali ed educativi, estendendosi agli ambiti emotivi e cognitivi. Questo studio esplora l'importanza di una didattica immersiva che, valorizzando il ruolo vicariante del corpo, enfatizza l'intelligenza emotiva come fulcro per lo sviluppo armonico della personalità, definendo nuovi scenari educativi. Attraverso l'analisi delle potenzialità vicarianti delle esperienze corporee e un approccio che privilegia la strutturazione della conoscenza come processo di scoperta, si propone una visione in cui le nuove tecnologie fungono da catalizzatori sociali e veicoli di autenticità culturale all'interno degli ambienti digitali di apprendimento.

KEYWORDS

Body; Emotions; Digital environments.
Corpo; Emozioni; Ambienti digitali.

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Introduction

Recent explorations in the field of advanced cognitive science (Lakoff & Johnson, 1999; Borghi & Iachini, 2004; Johnson, 2017) have provided new stimuli to pedagogical studies, pushing them toward a fresh reinterpretation of educational methodologies. The latter, now more than ever, recognize the importance of the body as a key element in education and training processes (Gamelli, 2001; Rivoltella, 2014). The notion of vicariousness, in particular, amplifies the debate on education from a dual perspective, that of the teacher and the student, allowing the former to explore innovative teaching approaches and techniques for adapting teaching (Chevellard, 1985; Develay, 1995) that privilege creative and nonlinear paths (Sibilio, 2015a; 2015b; Sibilio & Zollo, 2017) in order to better adapt to the specific needs of students.

Recent studies highlight that our bodies can operate as an intermediary and vicarious simulation agent (Sibilio & Galdieri, 2022), bringing to light the complexity and extended dimensions of cognitive capabilities. This view is based on the idea that our thought processes transcend the traditional boundaries of brain and body, leveraging technological devices that interact directly with our cognitive system (Caruana & Viola, 2018). In this context, there is an expansion of human capabilities (Sibilio, 2017), through both physical extensions and sophisticated technological tools, thus highlighting the concept of an 'extended mind.' The latter, extending beyond conventional limits, immerses itself in an intricate web of relationships with the environment, supported by the human body and artifacts (Oliverio, 2017). As a result, the body is not only embedded in an environment that influences the way we think, but also harnesses tools that, when employed in education, foster the application of vicariousness. This allows each individual to explore and select learning methods that best suit their natural inclinations (Berthoz, 2015).

The advent of digital technologies imposes a significant transformation in teaching and learning methods, requiring not only the adoption of new teaching strategies but also the redefinition of educational spaces. This evolution is based on recent findings in educational neuroscience (Dehaene 2019; Geake 2016) and Embodied Cognition Science (ECS), which emphasizes the active role of the body in the educational process.

For the immersive teaching approach to be effective (Murray, 1998), it is essential that it leads to positive results both in terms of learning and in the development of so-called life skills. In this context, the integration of skills related to emotional intelligence (Goleman, 1999) through educational environments that stimulate curiosity and exploration is essential.

With these premises, the paper aims to present a conceptual framework for framing the vicarious potential of the body within the perimeter of immersive learning environments, gradually abandoning the flattening on the Cartesian plane that forces reality into a non-natural dimension, and expanding to three-dimensional space, grounding interaction on the body, with cognitive implications that foreshadow convergent scenarios between body-centeredness and the technological dimension. Now more than ever, it is essential to provide teachers with training that empowers them to harness positive emotions such as motivation, satisfaction and a sense of personal efficacy. These cognitive elements are recognized as key determinants of academic success and stimulate learning. One of the methodologies for activating these principles is the immersive teaching approach (McMahan 2003), a cutting-edge teaching technique that, through the use of virtual and augmented reality, proposes novel instructional modalities. This method is also particularly effective for students with learning difficulties, allowing them to adapt their study method to the educational context proposed by the teacher (Cottini, 2017).

Key concepts in immersive education include blended learning, techniques such as gamification, which incorporates playful elements typical of video games into educational settings, and playful learning, which emphasizes the importance of play in personal development and the acquisition of complex knowledge (Winnicott, 2019). In this landscape, methods such as role playing and dramatization emerge as effective and relevant tools. Emphasizing the importance of adapting teaching strategies to current circumstances, direct experience shows that immersive teaching can also be enhanced through the use of social media, providing an effective and contemporary learning pathway (Calvani et al., 2021).

The goal of revolutionizing traditional classroom spaces, transforming them into dynamic environments where technological innovation merges with educational innovation, is central to the 2030 Agenda and has spurred significant investment and research in education. The increasing integration of digital tools in teaching and the continuous updating of digital literacy programs for teachers and students are central to an in-depth debate on the effective technological transformation of education. Education must evolve in response to the changing directions of the sociocultural context by incorporating cutting-edge and relevant teaching methods. In this context, the pedagogical debate focuses on the importance of ensuring high-quality education facilitated by information and communication technologies. However, the crucial element and main challenge in the current educational landscape is to make this mediated approach not only more embodied but also

more interactive (Gelsomini et al., 2020), emphasizing the importance of learning that is both deeply integrated with bodily experience and dynamically interactive.

1. The neuroscientific dimension from a systemic perspective

Current neuroscientific research supports the embodied and enactive nature of the mind: we perceive and understand reality through the continuous activity of the body. It is through the motor experience of the world that we develop the principles that guide our thinking; by acting, we experience the causal and spatio-temporal relationships of phenomena. The ego is thus primarily bodily, and the motor system plays a crucial role in providing the basis for the development of more sophisticated social cognitive skills (Oliverio, 2004).

Another decisive contribution to overcoming Cartesian epistemology, and a confirmation of what I have termed the subjectivity of the body, is the discovery of mirror neurons (Rizzolatti & Sinigaglia, 2006), which further highlights the corporeal character of cognition. Mirror neurons, although belonging to the motor system, are not limited to the control of movement, but also respond to visual stimuli. When I see someone grasp a glass, the understanding of the action is immediate because my mirror neurons activate as if I were performing that action. In other words, observing someone else's action activates the same motor circuit in me that is responsible for that specific action. My body understands the other person's intention by simulating their action, thus directly grasping the purpose of their behaviour. Mirror mechanisms are also fundamental to our ability to perceive and share the emotions of others. When we observe facial expressions, the muscles of our face are activated in a way that is congruent with those of the other person. This empathic relationship is interactive and closely linked to the sensorimotor system. Understanding moods, therefore, is not a mentalistic process, as the classical cognitivist approach suggests, involving higher cognitive functions. The states of mind of others are primarily understood enactively; it is on this basis that the capacity for more complex understanding is built.

The grounding of the mind in the body - including the self-conscious mind characterised by complex functions such as language, thought and symbolic activity, which are strongly influenced by culture - implies the recognition of continuity between body, mind and social and cultural environment.

This view goes beyond the traditional notion that mental states are completely internal to the organism: 'Where does the mind end, and the rest of the world begin? [...] The idea is that in some cases the vehicle of human cognition is not just

the brain, nor the brain in association with the body, but a broader system that includes mind/brain, body and environment' (Di Francesco, 2009, p. 175).

With this last statement, we find ourselves immersed in the coordinates of systemic thinking. This view holds that reality consists of a network of relationships. Living systems - a totality of elements integrated in a dynamic equilibrium that continuously interact according to a complex causality - are not isolated, but always connected to the environment. At the same time, they are self-referential: the environment may cause perturbations, but it is the system itself that chooses between the various stimuli and processes them autonomously.

According to Maturana and Varela, life is cognition. The behaviour of living beings - even in the absence of a central nervous system - reflects their ability to maintain their organisation by managing perturbations from the environment. For them, cognition is "effective action, which enables a living being to continue its existence in a given environment, touching its world" (Maturana, 2003, p.49). "Living can be said to be knowing (living is effective action in the domain of the living being's existence)" (Ibid, p.154).

Maturana and Varela defined living systems as autopoietic machines (Maturana, Varela, 1985). Autopoiesis is the process in which all components of the system contribute to the transformation of the system itself. This concept emphasises the plasticity of the structure, flexibility in the relationship with the environment and organisational autonomy. Autopoiesis restores to bodies that creativity (subjectivity) that had been denied by the Cartesian concept of *res extensa*, the machine body.

The concept of the body outlined here is not the simple biological body, a mere natural mechanism, but the lived body, understood as intentionality, which acquires self-awareness and creates meaning by living in the world. Man's capacity to produce meaning is already inscribed in his body, thanks to his open biology. It is the body that allows us to have a world. The Cartesian dichotomy between body and mind, as well as that between nature and culture, is definitively overcome. Man (as a body-mind unity) and the world are intimately intertwined, and through their continuous implication, our life becomes history, with our experiences intertwining and connecting in a web of meaning.

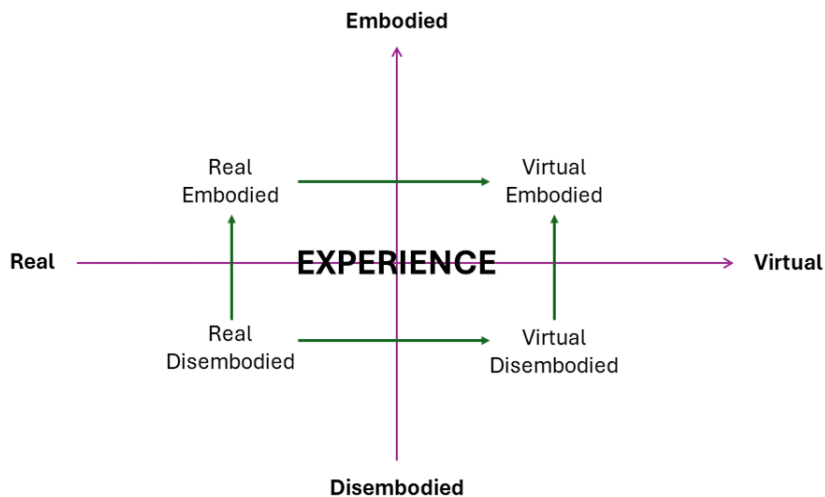


Figure SEQ Figure * ARABIC 1 Scheme on experience through embodiment and virtualization.

2. The vicarious potential of the body in interaction

The innovative reflections of the new cognitive sciences (Lakoff & Johnson, 1999; Borghi & Iachini 2004; Johnson, 2017) have made a significant contribution to educational studies, fostering a rethinking of educational practices that value the body as a fundamental pedagogical tool in educational and training processes (Gamelli, 2001; Rivoltella, 2014). The rethinking of classical cognitivism and the overcoming of the idea that the human mind can be compared to a computer have led to the affirmation of an embodied vision of cognition, in which all cognitive processes, including the most abstract ones, are distributed and often physically implemented on the same neural substrate responsible for perception and action (Caruana & Viola 2018).

Cognition takes shape through the human sensorimotor system, which, as a system among systems (Bateson, 1979), constantly interacts with the context (Varela et al. 1991). Cognitive processes are not only embodied, but also enacted and originate from this dialogic dynamic between organism and environment, in which perception and action are configured as specific exploratory activities (Caruana & Borghi 2016). These processes assume centrality in approaches such as enactivism, whose fundamental principle is the recognition of the intrinsic circularity between action and experience, i.e. that all knowledge is action (Maturana & Varela 1999).

Enactivism recognises that every cognitive act is always accompanied by patterns of action, identifying in every living system the capacity to enact reality. This outlines an image of the body as an instrument through which the perceiving subject co-evolves with the environment and co-constructs its knowledge. Didactic action must therefore consider the subject's adaptive modes and the interaction between perceptive, cognitive, emotional and bodily components, which return a complex and plural image of the person in dialogue with the environment. In the evolutionary path and adaptation to the context, reciprocal perturbations are triggered between the systems (Maturana & Varela, 1999), and a relationship of mutual co-definition is established between the acting subject and the environment, where it is the actor who determines the social, cultural and physical influences to which he or she is sensitive (Durand & Poizat 2017).

These theories highlight how the teacher's effectiveness depends on his or her ability to adequately disrupt students' activities, creating a correspondence between environmental perturbations and their receptivity (Durand & Poizat, 2017). Learning environments thus become the ground on which to build a didactic action capable of enhancing the subjective cognitive experiences and constituent aspects of each individual, providing stimuli useful for the development of each student. This requires the adoption of teaching-learning strategies and practices that consider teachers and students as units in dialogue and interaction (Damiano, 2008; Sibilio, 2020), modulating the understanding on the basis of an inevitable structural coupling.

Didactics, by welcoming bodies in action and interaction, valorises the different didactic corporeities (Sibilio, 2011, 2015), that bodily potential that is expressed in non-verbal form, consciously and unconsciously, and that guides the actions of the various protagonists of the educational relationship. Several studies recognise the communicative potential of corporeity (Argyle, 1992), the value of a gesture, a glance, a facial expression (Ekman & Friesen, 2007; Kendon, 1994), and highlight its centrality in educational relationships (Rivoltella and Rossi 2017). These elements enrich the didactic transposition with meaning, where the body becomes a mediator (Damiano, 2013; Rossi & Pezzimenti, 2017).

Thus, didactic corporealities emerge as representations of the interaction between teacher, learner and environment, and as the set of elements that lead to a process of complex signification of teaching practices (Sibilio & Zollo, 2020). In these practices, a body teaches and a body learns (Sibilio, 2014), and individuals in constant interaction transfer not only knowledge, but also their own habitus, a personal way of being in the world (Bourdieu, 1972), which translates into specific

modes of action and relationship based on renewed values, languages, new knowledge and beliefs (Aiello et al., 2016).

This interpretative key of the corporeal and cognitive dimensions and of the educational relationship recognises the learner's body as a cognitive potential and the teacher's body as a mediator of the dynamics within the classroom space. In this way, teaching corporeality becomes a strategy for dealing with formative complexities (Sibilio, 2015a) and teaching-learning processes.

The various theoretical approaches that have explored the relationship between body, cognition and movement from multiple perspectives have recognised the central importance of the bodily-kinesthetic dimension in knowledge construction mechanisms. These studies have laid the foundations for a reassessment of the educational, expressive and communicative potential of the body in educational action. In particular, research in the field of Embodied Cognitive Science (ECS) has enriched didactics with reflections on embodied and vicarious simulation processes (Gallese & Goldman, 1998; Rizzolatti & Sinigaglia, 2017), contributing to a better understanding of the complexity of individuals involved in the teaching-learning process.

A person's imaginative abilities, memory, abstract thought and language, according to emerging scientific evidence, seem to depend on embodied simulation processes, i.e. on the "reactivation of sensorimotor patterns extrapolated from their motor function and exploited in cognitive processes different from those for which the patterns evolved" (Caruana & Viola, 2018). These processes occur in natural and cultural contexts, where the person's action results from a feeling aimed at building relationships and exchanges with the environment.

The action of the body, capable of soliciting cognitive mechanisms, manifests itself both in direct action and in the observation of the other. The brain's proactive capacities enable simulative and emulative processes of reality based on the subject's planned actions (Rivoltella, 2014; Sibilio, 2017a). The discovery of mirror neurons (Rizzolatti et al., 2002), which scientifically explain the imitative capacities of gestures and actions already analysed in the psychological theories of learning by imitation (Bandura, 1986), demonstrates that specific neural cells are activated both when performing an action and when observing the actions of others. This finding reconfirms the importance of body action and explains people's ability to understand emotional expressions, which find one of their main channels of manifestation in the face (Ekman & Friesen, 2007; Ekman, 2008).

Simulation thus constitutes a pre-reflective and automatic process (Rivoltella, 2014; Berthoz, 2015) that facilitates intersubjectivity, an essential element of an educational-didactic relationship that welcomes each individual's bodily experience

and opens up new cognitive horizons of the other. These recent acquisitions lead didactics to valorise the body's multiple capacities for action, communication and expression, whose potential goes beyond mere readiness for simulation and imitation, and extends to higher cognitive processes that favour the emergence of vicarious and adaptive capacities.

In the process of adapting to the environment, vicariousness - understood as the creative capacity of the brain - allows the person to achieve a goal by experimenting with sometimes unusual strategies to compensate for a lack of meaning or to make up for a process (Sibilio, 2016, 2017b). This 'creative deviation' is made possible by diversity and represents a fundamental property of human beings, that of overcoming the rigid constraints of the norm to find original solutions to problems (Berthoz, 2015).

The concept of vicariousness enriches pedagogical-didactical reflection for both teachers and students. For teachers, it offers the possibility of experimenting with didactic deviations and forms of didactic transposition (Chevallard, 1985; Develay, 1995), following non-linear trajectories (Sibilio, 2015a, 2015b; Sibilio & Zollo, 2016) that better respond to the specific characteristics of students. The complexity of the teaching-learning process demands functional vicariousness from teachers, i.e. the ability to draw on a repertoire of alternative and complementary teaching actions in terms of communication, content and proposed activities (Sibilio, 2017b). Teachers' vicarious abilities find a synthesis in the dimension of the body and movement. The vicariousness of gesture allows teachers to use mimicry and gesture in their teaching action, supporting the sharing of content and compensating for speech. Similarly, students deploy vicarious solutions whenever they become active participants in the educational relationship, using the body to express themselves, communicate and learn, especially in the presence of special educational needs.

Further studies emphasise the simulative and vicarious potential of the body, focusing on the extended characteristics of cognition. Cognitive processes extend beyond the brain and the physical body, exploiting external technological supports that play an active role in the functioning of the mind (Caruana & Viola, 2018). These 'projections of bodily functions' suggest the existence of an extended mind that arises from a vast network of relationships with the world, through the body and human tools (Oliverio, 2017). The body, therefore, acts in an environment that influences thinking and incorporates tools that, employed in education, allow for vicariousness to be used to find learning strategies congenial to each individual (Berthoz, 2013).

3. Body, cognition and emotion in immersive learning environments

In the definition of learning experiences, reference is made to the concept of context and environment as containers and promoters of learning. The teaching and learning process takes place within specific spaces that have undergone significant transformations over the years. The traditional learning space model has been replaced by the idea of innovative learning environments (Scarinci, di Furia, & Peconio, 2022). The reformulation taking place at the national level focuses on a clear objective: improving the effectiveness of learning environments. In this context, several policies are active: firstly, significant investments come from the National Plan for the Digital School (PNSD) and from European funds to increase research and training in the digital sector (Digital Europe 2021-2027). The Ministry of Education, as part of the National Recovery and Resilience Plan (PNRR), has promoted the 'School 4.0' initiative, which aims to create hybrid learning environments capable of combining the educational impact of physical space with the innovation and inclusion potential offered by the digital environment. In particular, the 'School 4.0 Plan' report shows that the investments made from 2014 to date, thanks also to PNSD and PON funds for schools, have led to a significant growth in the level of digitisation of Italian schools.

Currently, investment 3.2 'School 4.0 - Innovative Schools, New Classrooms and Laboratories' represents the central line of intervention within Mission 4 of the NRP, with the aim of transforming approximately 100,000 classrooms into innovative learning environments and creating laboratories dedicated to training for the digital professions of the future.

In this context, the prospect of immersive didactics enhancing new dimensions of inclusive learning emerges. According to the report 'School Plan 4.0' (2022), learning spaces can be classified into three dimensions:

- physical environment;
- digital environment (online and immersive);
- hybrid environment.

Within immersive education, the ediverse (application of the metaverse in learning contexts) offers new opportunities for experience at various levels - creativity, sharing, communication - creating a continuity between real and virtual. In Italy, there are various experiences of immersive didactics in the various school levels, from primary school to higher academic education.

Technologies act as social catalysts, influencing the way people interact. It is crucial to harness the potential of these technologies, learning to manage the relational processes they activate and promoting the construction of communities of practice that enhance the human element and anticipate a new humanism. Recently, also

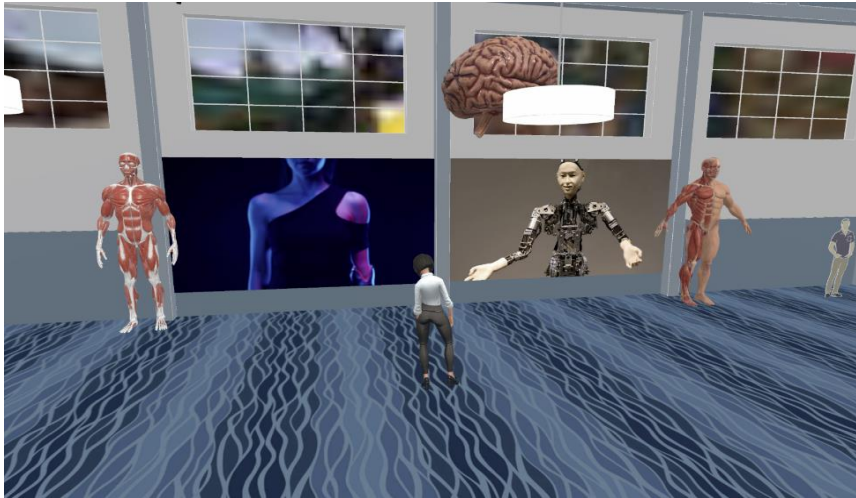


Figure SEQ Figure * ARABIC 2 Example of immersive experience.

due to the psycho-social consequences of the pandemic, new reflections have emerged on the digital revolution and the culture of artificial intelligence, in which we are immersed as individuals, citizens and educational professionals (Iaquinta, 2022). There is a need to rethink the use of new technologies and revise immersive education in order to understand and deal with the potentialities and risks of the Net, promoting exploratory contexts that, starting from school, transform dispositives into ways, and not only tools, to explore, know and transform reality. Hyper-connected and sometimes lost, we tend to compensate our inability to inhabit physical or virtual reality with an excessive use of new digital technologies, which should instead represent a resource. The problems and opportunities are above all educational, as shown by the normalisation of Media Education and the need to develop new literacies to deal with the risks and promote the correct use of the digital. Digital competence, to live emotionally online, should be based on an education that addresses the critical, ethical and aesthetic dimensions of New Media Education (Rivoltella, 2020).

The critical dimension facilitates the understanding of cultural forms, literate access, media complexity and the development of thinking through devices, tools and languages. The ethical dimension concerns resistance and responsibility, with an analysis of the effects of digital, information management and online participation. The aesthetic dimension involves creativity and a commitment to language coherence, precision and functionality.

Living emotionally online means being educated in the languages of New Media Literacy for a conscious handling of one's human dimension, preventing and coping with difficulties and emotional disorders. Immersive learning is not temporary, but creates and involves new ways of thinking, seeing and constructing the world. Digital intelligence, integrating with other forms of intelligence, makes it possible to connect to knowledge and discover reality, developing new forms of contemporary educational relationships (Mariani, 2022) and promoting personal growth. Taking care of relationships requires the educator to pay attention to shared rules, emotional management and the reduction of sensory overstimulation. It is necessary to create stimulating contexts that foster multimodal learning, where new technologies support the discovery and development of one's potential. The digital space becomes an innovative open space for building the new world and promoting the harmonious growth of the personality. The world of emotions, the expressive process of each individual, must be approached consciously, distinguishing how, when and what happens to the most intimate dimension of the human (Bruzzone, 2022). Schools and every educational context can implement their own cultural resources and promote healthy development and disciplinary integration that enables rational emotional education (Di Pietro, 1992) with Coping Power strategies that also act on individuals' Locus of Control. Coping Power (Lochman & Wells, 2002) includes work sections to develop emotional and prosocial competences, with parallel paths of emotion management and educational contracts based on the Token Economy. This pro-gram integrates the emotional and cognitive dimensions of learning. The Locus of Control (Rot-ter, 1966) makes it possible to assess the factors attributed to the causes of events, influencing personality development and the management of emotional reactions also in the digital context. Human education has a great responsibility in shaping the metaverse, where it will be increasingly difficult to distinguish between the real and the virtual (Griffin, 2022). This process of fusion can only be avoided by restoring power to e-education, the only weapon for constructing emotional experience, supporting development and promoting personal awareness.

The growing interest in this field of study and the expectations associated with the experimental studies being launched justify the focus of research in the European landscape on these issues. This is particularly relevant for future perspectives concerning the promotion of well-being and inclusion of students with Special Educational Needs (BES) (Bryant, Brunner & Hemsley, 2020).



Figure SEQ Figure * ARABIC 3 Example of immersive learning

4. Towards artificial emotions? What future prospects for quality didactics?

When aiming for high-quality education, one of the most relevant reflections of the last decade concerns the concept of immersiveness and full involvement in learning processes. This study therefore analysed the current state of active policies and the prospects for evolution in the national and European landscape, implemented by governmental bodies. With regard to the impact of technologies on teaching, the analysis focused on two fundamental areas in the learning system: social and cognitive skills. It emerged that immersive teaching has significant development potential in both fields.

Strengthening social skills in learning environments has been shown to be strongly supported by the use of immersive technologies, benefiting both typically and atypically developing learners. Among the main skills enhanced are social interaction, communication and interpersonal skills, cooperation and empathy (Mesa-Gresa et al., 2018; Howard & Gutworth, 2020; Sharma, Giannakos & Dillenbourg, 2020; Ke, Moon & Sokolikj, 2022).

From a cognitive perspective, perception and cognitive load in immersive learning environments has been explored. Studies have shown that perception is one of the most involved components: when immersed in a virtual environment, visual stimuli are amplified, thus increasing the use of working memory (Sweller et al., 2011; Han,

2020), which can sometimes be overloaded. Considering the increased working memory load, it is useful to reflect on the correlations between perceived cognitive load during academic performance and performance itself.

In order to ensure that immersive learning environments are truly effective and inclusive, it is fundamental to design these environments with the cognitive components mentioned above in mind and to further investigate scientific research in this area, observing how these components vary according to the developmental trajectories - typical or atypical - of each individual and learner.

In the modern era, in addition to developing skills for interacting with artificial intelligence, it is crucial to address the pedagogical challenges that this new technology entails. One of the main challenges facing the world of education concerns the emotional and relational aspect of learning. In the past, it was believed that human thoughts and emotions were impenetrable. However, with the ability of algorithms to recognise and manipulate states of mind, new and complex ethical, pedagogical and organisational issues emerge.

According to historian Yuval Noah Harari (2015), artificial intelligence will have a significant impact not only on consumption and work, but also on the way people think. Harari argues that the dominance of algorithms could threaten individual freedom and self-determination, and urges world leaders to regulate the use of AI-related data.

Today, machine learning systems and, in particular, 'affective computing' systems, which are based on deep learning mechanisms, can penetrate the world of human emotions and make them understandable. A significant example is a Beijing company that developed software for smile recognition, used to combat depression in the workplace. This software only recognised smiling staff, increasing organisational well-being. In another case, a US company created software that recognises emotions based on the tone of voice, telling employees how to better manage their emotional state.

Emotions are becoming a territory of conquest for digital technologies. Not only can we ca-know what is going on behind our emotions, but we can also interact with them, modifying them according to functionality criteria (Huyskes, 2021). The use of affective computing could improve the performance of di-employees, but also make them feel dehumanised, as they are deprived of their emotional intelligence.

Emotional AI, by radically altering communication and interaction, will have a significant im-pact on organisational structures and educational relationships, where empathy and otherness are fundamental. The international scientific

literature highlights artificial intelligence in education as an emerging field (Baker & Smith, 2019).

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According to Bucchi (2020), we are heading towards a reality in which our personal devices will know us better than our own families and will be equipped with emotion recognition technologies. These prospects raise concern, but also the possibility of revolutions in the educational field, improving the personalization and humanization of digital experiences.

Every innovation has a positive and a negative side: it solves some problems and creates others. Technology is not an island, but requires other infrastructures, practices and habits to function effectively (Bucchi, 2020). The challenge for pedagogy will therefore be to ask the right questions within each organizational context, dealing with new types of relationships.

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