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Socio-affective engagement and vicarious technologies in Outdoor Education for All

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Abstract. The gradual decline in direct experiences in natural environments may limit physical, sensory, cognitive, emotional and relational opportunities, particularly for young people with intellectual disabilities in marginalised contexts. This theoretical and practical paper examines the pedagogical conditions through which digital technologies can support socio-affective engagement in Outdoor Education for All, without replacing direct contact with the environment. Engagement is considered in its behavioural, emotional and cognitive dimensions (Fredricks et al., 2004), whilst bodily experience is regarded as a constitutive dimension of knowledge and participation (Sibilio & Galdieri, 2022). This reflection integrates the concept of the Hybrid Mind (Louv, 2011, 2015), the perspective of vicariousness (Berthoz, 2015; Sibilio, 2016) and digital mediation in outdoor settings (Ceciliani, 2018). Building on these premises, a model of outdoor–indoor–outdoor continuity is proposed, linking bodily exploration of the environment, documentation and digital reworking, and new field observations. The model forms the conceptual basis for a future action research project at Casa Raoul, in Quarto, involving young adults with intellectual disabilities and educators. The planned research will investigate the conditions under which digital tools and educational supports can enhance initiative, emotional expression, communication, collaboration and autonomy. No empirical results are presented, as the trial has yet to be carried out.

Keywords: Outdoor Education for All; socio-affective engagement; bodily experience; vicariousness; digital technologies.

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1. Problem identification: Outdoor Education for All and access to nature[1]

The gradual decline in opportunities for direct experience in natural environments calls for pedagogical reflection on the conditions that enable meaningful educational participation, particularly for people with intellectual disabilities living in contexts of socio-territorial marginalisation. The concept of 'nature-deficit disorder', introduced by Louv (2005) for descriptive rather than diagnostic purposes, draws attention to the consequences that a disconnect from nature can have in terms of opportunities for sensory exploration, movement and interaction with the environment. In this regard, the literature highlights the restorative potential of natural environments in relation to stress (Ulrich et al., 1991), their possible protective role in conditions of vulnerability (Wells &

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Evans, 2003) and the benefits of interaction with nature on attentional processes (Berman et al., 2008).

These considerations take on particular significance within the framework of 'Outdoor Education for All', understood as a pedagogical approach aimed at promoting the accessibility, participation and meaningfulness of outdoor educational experiences, through the recognition of the diversity of needs, abilities and ways of interacting with the environment. Within this framework, inclusion is not limited solely to the possibility of physically accessing natural spaces, but involves the creation of educational conditions that enable each individual to explore, choose, communicate and build meaningful relationships with their surroundings.

The perspective of *'green inclusion'* allows us to explore the inclusive value of our relationship with nature, recognising the environmental experience as a potential resource for broadening opportunities for participation (Louv, 2011). At the same time, the integration of digital technologies raises new questions regarding how to support exploration and the construction of meaning without replacing the bodily and sensory dimension of the experience. In this regard, Ceciliani (2018) identifies Outdoor Education as a significant framework for rethinking the relationship between digital education and hands-on experience.

This paper aims to outline a theoretical and design-oriented perspective that integrates physicality, socio-affective engagement and the vicarious function of digital technologies within Outdoor Education for All. By comparing different scientific perspectives, we aim to argue for the pedagogical potential of an outdoor–indoor–outdoor continuity model, in which direct exploration, digital documentation and shared re-elaboration work together to broaden the possibilities for participation. This model forms the conceptual framework for a subsequent action research project aimed at young adults with intellectual disabilities who are socially and educationally marginalised.

2. Theoretical framework

2.1. Socio-affective engagement and educational participation

The construct of engagement occupies a central position in reflections on inclusive educational processes, as it allows participation to be considered not solely in terms of presence or involvement in activities, but as a multidimensional expression of the individual's engagement with the experience. Fredricks et al. (2004) identify three interrelated components of engagement: behavioural, emotional and cognitive. The first concerns participation in activities and persistence in action; the second encompasses affective reactions and a sense of belonging; the third refers to cognitive investment and a willingness to engage in learning processes. This framework has subsequently been explored in greater depth, including in relation to out-of-school educational contexts and activities organised outside the school environment (Fredricks, 2011).

Within the framework of Outdoor Education for All, these dimensions can take on different forms depending on individual characteristics, environmental conditions and the quality of educational facilitation. From this perspective, socio-affective engagement can be viewed as an interpretative framework

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through which to explore the interaction between active participation, the expression of emotions, personal initiative and the formation of meaningful relationships. The opportunity to observe a natural feature, share a discovery, choose an exploratory route or collaborate on an activity can provide a chance to practise communicative and interpersonal skills, as well as cognitive and motor skills.

For young adults with intellectual disabilities, this perspective requires recognising the variety of ways in which engagement can manifest itself, avoiding the tendency to reduce it solely to verbal performance or the independent completion of a task. Eye contact, gestures, emotional expression, asking for help, choosing between alternatives and taking the initiative in interacting with peers can all serve as potential indicators to be observed and interpreted in relation to the individual's characteristics and the context.

In this regard, the theory of self-efficacy (Bandura, 1997) also offers a useful perspective for understanding the possible relationship between opportunities for action and the perception of one's own abilities. Educational experiences that enable individuals to make choices and experiment with personal ways of participating could contribute to the development of a sense of competence, provided they are supported by accessible conditions and intentional pedagogical guidance.

Socio-affective engagement is therefore treated in this paper not as a proven outcome of the use of digital technologies, but as a theoretical and observational framework through which to examine the conditions of participation in outdoor experiences. Future action research will investigate whether, and under what circumstances, digital tools integrated into direct exploration can support attention, initiative, emotional expression, communication and collaboration.

2.2. Embodiment as a constitutive dimension of learning and participation in Outdoor Education for All

Reflection on socio-affective engagement in Outdoor Education for All requires a deeper exploration of the role of bodily experience in processes of learning and participation, moving beyond a conception of educational experience based on the separation between the cognitive and bodily dimensions. From this perspective, Sibilio and Galdieri (2022) recognise the body as a complex system in which perceptual, motor, cognitive, emotional and relational components contribute to the construction of experience. The body is therefore not merely an executor of action, but actively participates in cognitive processes through a dynamic relationship with the environment.

This approach is grounded in the perspectives of Embodied Cognition and enactivism, which recognise the embodied and situated nature of knowledge. As Sibilio and Galdieri (2022, pp. 192–194) highlight, perception and action are not processes separate from cognitive activity, but mutually interdependent dimensions through which the individual interacts with the context and constructs meaning. In Outdoor Education for All, this approach allows the exploration of natural environments to be interpreted as an embodied experience, in which observation, movement, multisensory perception and

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interaction with environmental elements can contribute to the construction of knowledge and meaningful relationships.

The communicative potential of the body takes on particular significance; Sibilio and Galdieri (2022, p. 194) highlight how educational interaction takes place through a variety of verbal and non-verbal codes, in which gestures, postures, glances and facial expressions all play a part in constructing meaning and regulating relationships. This perspective is particularly relevant for young adults with intellectual disabilities, as it allows for the recognition of forms of participation that are not necessarily linked to verbal communication or the independent performance of a task. Socio-affective engagement can therefore also be considered through bodily manifestations of interest, initiative, emotional expression and interaction with others, to be interpreted in the light of individual characteristics and contextual conditions.

The relationship between bodily expression and participation can be further explored through the work of Gomez Paloma and Minghelli (2022), who, in the context of teacher training, emphasise the perspective of Embodied Cognition and the circular relationship between perception, action, emotion and cognition. The authors examine the potential of audiovisual documentation as a resource for observation and reflection on inclusive educational practices, recognising that video can serve as a medium for narrative and reflective mediation. This contribution enables us to explore the relationship between lived experience and its subsequent representation, highlighting how documentation can support the re-elaboration of the meanings attributed to educational action.

When applied theoretically to Outdoor Education for All, this perspective suggests that photographs, videos and recordings can support the recollection and shared re-elaboration of experiences, without replacing physical engagement with the natural environment. Digital documentation can be interpreted as a potential bridge between direct experience and reflection, offering different ways to recall what has been experienced, express emotions, communicate observations and share meanings. In this regard, the centrality of physicality forms the theoretical basis for a subsequent exploration of the vicarious function of digital technologies, understood not as alternatives to experience, but as potential resources for broadening the ways in which one can access, express and participate in education.

2.3. Vicariousness, simplicity and digital technologies as inclusive mediators

The recognition of bodily experience as a constitutive dimension of learning and educational participation highlights the need to consider the plurality of strategies through which individuals can interact with their environment, access knowledge and pursue meaningful objectives. From this perspective, the construct of **vicariousness**, developed by Berthoz (2015), highlights the human being's adaptive and creative capacity to resort to alternative means to fulfil the same function, tackling the complexity of situations through different solutions. This concept finds a possible pedagogical and didactic application in the theory of **'simplicity'**, which recognises in the principles of flexibility, anticipation and deviation certain resources through

which living systems tackle complexity without eliminating its constitutive characteristics (Berthoz, 2011).

Applying these principles to educational practice enables us to move beyond a rigidly linear conception of the educational project, shifting towards adaptive approaches that are sensitive to individual variability. Sibilio (2018) interprets vicariousness as a resource for constructing non-linear strategies, based on the ability to draw upon different repertoires of action through memory, flexibility and adaptation to change. Within this framework, **methodological deviation** does not represent a departure from educational objectives, but rather an opportunity to intentionally reorganise tools, procedures and modes of communication in relation to the characteristics of the individual and the conditions of the context.

Of particular significance is the distinction between **functional vicariousness and vicariousness of use**. The former concerns the possibility of carrying out the same task through different processes or strategies; the latter refers to the ability to assign different functions to objects, tools and environments in relation to the intentions behind the action (Berthoz, 2015). Di Gennaro et al. (2016) explore these dimensions from the perspective of inclusive education, recognising vicariousness as a potential resource for personalising educational experiences and for valuing individual differences. The diversity of verbal, gestural and iconic languages, together with the possibility of using materials and spaces in alternative ways, broadens opportunities for accessing knowledge and allows for a rethinking of teaching mediation in line with the characteristics and resources of each individual.

In Outdoor Education for All, this perspective provides a theoretical framework for interpreting the potential inclusive role of digital technologies. Photographs, audio recordings, videos and nature identification apps can serve different purposes depending on the educational objectives and the communicative, perceptual and cognitive abilities of the participants. A photograph, for example, can document an element of the environment, but it can also aid in recalling the experience, facilitate a decision or promote communication; similarly, an audio recording can enable the recall and recognition of a previously observed event. Such applications constitute a proposal for the pedagogical transfer of the principles of vicarious learning and do not imply that the mere introduction of the tool automatically creates conditions for inclusion.

The mediating function of technologies requires, in fact, an educational intent capable of keeping the relationship between the individual, the body and the environment at the centre. In this regard, Ceciliani (2018) identifies Outdoor Education as a significant approach for integrating concrete experience and digital representation, whilst safeguarding sensorimotor engagement. This approach allows technological tools to be viewed not as alternatives to direct experience, but as potential resources to support its exploration, documentation and subsequent re-elaboration. The relationship between corporeality and technology can be further interpreted through the perspective of extended cognition, as referred to by Sibilio and Galdieri (2022), in which external tools

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can contribute to the organisation of cognitive processes and broaden the ways in which we interact with our environment.

A further element concerns the **inter-individual dimension of vicariousness**, which Sibilio (2018) links to opportunities for cooperation between professionals and the shared mobilisation of educational resources. This perspective is significant in inclusive design, as it highlights the relational and situated nature of pedagogical mediation. Within the context of future action research at Casa Raoul, this can guide collaboration amongst educators in selecting differentiated strategies, tools and supports, whilst valuing the individual ways in which young adults with intellectual disabilities participate.

Vicariance and simplicity therefore offer a conceptual framework for designing flexible educational experiences, in which technology can broaden opportunities for perception, action, communication and re-elaboration, without replacing the direct relationship with the natural environment. The proposal for an *outdoor–indoor–outdoor* continuum is based on these premises, in which bodily experience, digital documentation and subsequent exploration can be integrated within a mediation process aimed at supporting socio-affective engagement and educational participation.

2.4. The outdoor–indoor–outdoor continuum: a proposal for an inclusive pedagogical model

The relationship between physicality, socio-affective engagement and the vicarious function of digital technologies makes it possible to outline a pedagogical proposal based on continuity between direct experience, mediated re-elaboration and active participation. From this perspective, the outdoor–indoor–outdoor continuum is proposed as a theoretical and design model in which interaction with the natural environment constitutes the central focus of an educational process structured around three interrelated stages: direct exploration, the reworking of the experience, and the return to the environment. The sequence is not conceived as a rigidly linear procedure, but as a recursive process, open to adaptation in relation to the participants' characteristics, the educational objectives and the contextual conditions.

The first phase, taking place outdoors, emphasises physical and multisensory engagement through the exploration of the natural environment. From the perspective of Embodied Cognition, learning emerges from the dynamic relationship between perception, action and context, recognising the body as playing a constitutive role in the construction of knowledge (Sibilio & Galdieri, 2022). In this framework, observing natural elements, moving, listening to environmental sounds and being able to choose what to focus on provide opportunities through which the individual can actively participate in the experience. The deliberate use of mobile devices and nature identification apps could support these processes, offering diverse ways of exploring and documenting, provided that technological mediation remains functional to bodily interaction with the environment and does not replace it.

The second phase, which takes place indoors, is geared towards the individual and shared re-elaboration of the experience through photographs,

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videos, audio recordings and other materials produced during the exploration. Digital documentation can take on a mediating function when it enables users to recall observed elements, recognise details, reconstruct sequences and communicate meanings through different expressive languages. Gomez Paloma and Minghelli (2022) highlight the value of audiovisual mediation in reflective processes linked to embodied experience, offering a theoretical framework for interpreting the potential of documentation as a support for educational reflection.

This perspective can be further explored through the narrative paradigm, which recognises storytelling as a means of organising and attributing meaning to personal experiences. Sabatano et al. (2023), drawing on the work of Bruner and Ricoeur, highlight the role of narration in constructing the meaning of experience and in the re-elaboration of personal identity. Within this framework, the process of 'emplotment', drawn upon by the authors through the work of Croce (2013), allows us to interpret narration as a process of establishing meaningful connections between events, emotions and choices. Narrative reconstruction is therefore not limited to the reproduction of what has been experienced, but can offer opportunities to recognise and share the meanings attributed to that experience.

Of particular relevance is the vicarious function of narration, understood as a potential mechanism for differentiating the ways in which experiences are expressed and interpreted. Sabatano et al. (2023) link this function to the promotion of individual uniqueness and the flexibility of inclusive planning. In Outdoor Education for All, this perspective suggests that the selection of photographs, the construction of visual sequences and the sharing of recordings can support forms of multimodal storytelling, in which verbal, gestural, iconic and auditory languages all contribute to communicating the experience. Narrative documentation can also serve as a form of individual and collective memory, making materials and meanings available that are useful for shared reflection and the continuity of the project. This application constitutes a theoretical and pedagogical extension of the constructs examined, to be explored further in future action research.

The third phase involves a return to the natural environment, where the representations and meanings developed indoors can guide new observations, comparisons and explorations. The images and narrative sequences could be used to recognise places already encountered, select further elements of interest and contribute to the definition of new experiences. The narrative would thus serve as a link between what has been experienced and subsequent possibilities for action. This organisation can be interpreted through the principles of functional vicariation and vicariation of use, which recognise, respectively, the possibility of pursuing the same objective through different strategies and of attributing alternative functions to tools and materials (Agrillo et al., 2016). Technology could therefore take on different functions in the subsequent phases of the process, supporting exploration, recollection and orientation towards new experiences.

The proposed model can be further explored through the construct of self-determination, understood as a dynamic process that develops through the

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interaction between individual characteristics, environmental opportunities and support systems. From the perspective of the theory of causal agency by Shogren et al. (2015), as cited by Viola, the individual is recognised as a subject capable of intentionally directing their own experiences through choices, initiatives and decisions. This conception aligns with the paradigm of personalised supports proposed by Schalock et al. (2021), which emphasises the role of contextual conditions in promoting effective opportunities for participation and autonomy. In this regard, self-determination cannot be attributed solely to individual competences, but requires contexts capable of offering concrete opportunities to exercise personal choice and initiative.

In 'Outdoor Education for All', these references enable the *outdoor–indoor–outdoor* continuum to be interpreted as a potential space for exercising self-determination, in which young adults with intellectual disabilities can actively contribute to selecting the elements to be explored, documenting their experiences and choosing subsequent activities. From this perspective, technological and narrative mediation takes on a potential vicarious function when it broadens the ways in which a person can express preferences, communicate intentions and participate in decision-making, without taking the place of their own initiative. Self-determination therefore constitutes a dimension complementary to socio-affective engagement: whilst the latter concerns behavioural, emotional and relational involvement in the experience, the former refers to the individual's ability to intentionally contribute to shaping its course. The recursive nature of the model finds further support in the perspective of 'simplicity', which values flexibility, adaptation and methodological deviation as resources for addressing the complexity of educational practice (Sibilio, 2018). The *outdoor–indoor–outdoor* continuum does not, therefore, presuppose that all participants will undertake the same activities according to uniform timings and methods, but requires a design capable of differentiating between tools, supports and opportunities for action, recognising individual variability as a constitutive component of the inclusive experience.

Within this framework, the model aims to explore the conditions that can support socio-affective engagement, taking as a reference the behavioural and emotional dimensions of educational engagement identified by Fredricks et al. (2004) and examining their relational implications in greater depth. The possible manifestations of attention, initiative, persistence, communication, collaboration and emotional expression constitute dimensions to be investigated in future action research, without assuming that positive effects automatically result from the use of technology. The continuum is therefore adopted as an inclusive pedagogical approach in which physicality, storytelling, self-determination and vicarious technological mediation can work together to broaden opportunities for participation, whilst maintaining the direct, emotional and social relationship with the natural environment as central.

3. Research Objectives

This paper aims to outline a theoretical and design framework for investigating the potential of digital technologies as vicarious mediators *in*

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Outdoor Education for All, with a particular focus on the socio-affective engagement of young adults with intellectual disabilities in contexts of socio-educational marginalisation. Building on the integration of the constructs of corporeality, vicariousness and simplicity, the main objective is to define the pedagogical conditions through which digital tools can broaden opportunities for exploration, communication and participation, without replacing the bodily and relational experience with the natural environment.

From this perspective, the *outdoor–indoor–outdoor* model is proposed as a framework for experiential continuity to be explored in greater depth through subsequent action research. The study will aim to understand whether, and under what conditions, the intentional integration of digital technologies, audiovisual documentation and narrative reworking can support the behavioural, emotional and relational dimensions of engagement, with particular reference to attention, initiative, persistence, communication, collaboration and the expression of emotions.

A further objective concerns the exploration of the possible implications of such experiences on participants' perception of competence and autonomy, in light of the construct of *self-efficacy* (Bandura, 1997). The future action research will also aim to identify the conditions that make technology-mediated learning accessible and pedagogically meaningful, taking into account the personalisation of tools, the diversity of expressive languages, the active role of participants and the quality of the educational relationship. Particular attention will be paid to the involvement of educators in shared planning, documentation and reflection on experiences, with a view to progressively guiding the redesign of activities.

The objectives outlined constitute the epistemological and methodological guidelines for the forthcoming study and do not represent empirical findings that have already been established.

4. Research Hypothesis

The hypothesis guiding the future action research is that the intentional integration of digital technologies into the *outdoor–indoor–outdoor* continuum may help to support the socio-affective engagement of young adults with intellectual disabilities, provided that the technological tools serve as a mediating agent rather than a substitute for bodily and relational experiences with the natural environment.

This hypothesis is based on the possibility that the recursive alternation between direct exploration, digital documentation, narrative reworking and subsequent outdoor experience offers differentiated modes of participation, depending on individual characteristics and the opportunities offered by the context. In particular, it is hypothesised that the ability to choose what to observe, take photographs and make recordings, reconstruct and share experiences through verbal and non-verbal languages, and use the materials produced to guide new explorations may foster displays of attention, initiative, persistence, communication, collaboration and emotional expression.

From this perspective, the vicarious function of technologies is linked to the possibility of pursuing educational objectives through alternative strategies and

differentiated ways of using the tools, in accordance with the principles of functional vicariousness and vicariousness of use (Agrillo et al., 2016; Sibilio, 2018). At the same time, the narrative reworking of the experience could offer further opportunities for meaning-making, the expression of lived experiences and shared participation, in line with the perspective of storytelling as a potential vicarious device in inclusive design (Sabatano et al., 2023).

It is also hypothesised that opportunities for choice and active participation may help to support participants' sense of competence and autonomy, in relation to the construct of *self-efficacy* (Bandura, 1997). These possibilities will be considered in relation to the quality of educational mediation, the accessibility of tools, the flexibility of activities and the individual characteristics of the young people involved.

The hypothesis formulated does not presuppose a proven causal relationship between the use of digital technologies and an increase in socio-affective engagement, but rather constitutes an interpretative perspective to be explored further through systematic observation and the triangulation of qualitative evidence gathered in subsequent cycles of action research.

5. Research context

This research forms part of the educational programme of the Cittadella dell'Inclusione (Sabatano, 2022), established in 2013 in the Phlegraean area as a permanent educational initiative aimed at promoting social inclusion, autonomy and the development of emancipatory pathways for people in vulnerable circumstances. In particular, the study will be carried out at **Casa Raoul**, a socio-educational centre located in the municipality of Quarto (NA), which supports young adults with intellectual disabilities and promotes programmes aimed at developing personal, social and occupational autonomy.

The centre operates in an area characterised by the coexistence of socio-economic and educational marginalisation, which can affect opportunities for participation and access to training and experiential resources. From this perspective, the local context is not merely a geographical backdrop, but a dimension to be taken into account when understanding the relationships between individual characteristics, environmental conditions and opportunities for participation. Casa Raoul therefore represents a significant educational context for exploring approaches aimed at enhancing individual potential, building meaningful relationships and expanding opportunities for direct experience in natural environments.

The forthcoming action research project will involve **twenty young adults with intellectual disabilities, aged between 20 and 30**, and the educators who support them in their daily activities. The latter will be actively involved in joint planning, facilitating experiences and subsequent reflection on educational practices, adopting a participatory and collaborative approach.

Within this framework, Casa Raoul will serve as the key socio-educational setting for exploring the potential of the *outdoor–indoor–outdoor* model, in which direct experience in natural environments is integrated with the deliberate use of digital technologies and the narrative reworking of lived experiences. The focus will be on the pedagogical conditions that can foster socio-affective engagement,

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communication, personal initiative and participation, whilst promoting diverse ways of interacting with the environment. The actual composition of the group and the characteristics of the intervention will be documented throughout the action research.

6. Proposed methodology

The research is conceived as a qualitative study with a phenomenological-hermeneutic orientation (Mortari, 2007), developed according to an action research design aimed at exploring the pedagogical conditions through which digital technologies, used as vicarious mediators, can support the socio-affective engagement of young adults with intellectual disabilities *in Outdoor Education for All*. This approach involves the active participation of Casa Raoul's educators in the design, implementation, observation and review of the experiences, following a recursive cycle of planning, action, observation and reflection. The action research will enable us to take account of the complexity of educational situations and to progressively refine strategies in relation to the participants' characteristics and contextual conditions.

The methodological framework will be the *outdoor–indoor–outdoor* continuum, structured into three interconnected phases. The first phase, *the outdoor phase*, will be dedicated to the direct exploration of natural environments through physical and multisensory experiences, in which participants will be able to observe, recognise and select significant elements of the context. The deliberate use of digital apps for nature identification, photographs and audio recordings may accompany the experience, offering varied ways of accessing information and documenting it. The second phase, *indoors*, will focus on the individual and shared reworking of the materials collected through the selection of images, listening to recordings and the construction of simple narrative sequences. In this context, multimodal storytelling will be considered a potential substitute mechanism, capable of broadening opportunities for expression and the attribution of meaning to the experience (Sabatano et al., 2023). The third phase will involve a return to the natural environment, where the materials and meanings developed can guide new observations, choices and explorations, following a flexible and recursive progression consistent with the principles of simplicity and vicariousness (Sibilio, 2018).

Data collection will be carried out through systematic and participant observation, supplemented by field notes, photographic and audiovisual documentation, and sessions of reflective discussion with the educators. Particular attention will be paid to identifying observable manifestations of socio-affective engagement, taking as a reference the behavioural and emotional dimensions of educational engagement (Fredricks et al., 2004) and exploring their relational implications within the context of the inclusive experience. The behavioural dimension will be explored through indicators such as the direction of attention towards environmental stimuli, initiative in initiating activities, the ability to express preferences and make choices, and persistence in exploration. The emotional dimension will encompass verbal and non-verbal expressions of interest, curiosity, pleasure, hesitation or discomfort, considered in relation to individual characteristics and the situations experienced. The relational

dimension will be observed through patterns of interaction with peers and educators, the sharing of attention, collaboration and participation in shared activities.

Alongside these dimensions, two further areas of observation will be considered, consistent with the specific nature of the proposed model. The communicative-narrative dimension will concern the ways in which participants can express experiences, preferences and meanings through verbalisation, gestures, pointing, the selection of images, recordings and the construction of narrative sequences. The dimension of vicarious mediation, on the other hand, will be explored through the observation of alternative methods used to access the experience, recognise environmental elements, communicate and process what has been experienced. In particular, attention will be paid to the conditions under which a digital tool may offer a different functional mode for pursuing the same educational objective or take on different uses in subsequent stages of the programme, with reference to the constructs of functional vicariousness and vicariousness of use (Agrillo et al., 2016). The assessment will distinguish between the participants' own initiatives and the support provided by educators, taking care not to automatically attribute any manifestations of engagement to the technological tool.

The indicators will be organised into an observational grid on a four-level descriptive scale (0–3), designed to document the degree to which the identified behaviours manifest in specific educational situations. A *'not observable'* (N/O) category will also be included for circumstances in which it is not possible to make a reliable observation, accompanied by qualitative notes relating to the context, the support provided and individual responses. Emotional manifestations, including those of hesitation, refusal or discomfort, will be documented without automatically attributing a negative connotation to them, but by considering their possible significance in relation to the experience. The grid will serve an exclusively pedagogical and observational purpose, not a diagnostic one; the descriptive levels will therefore not be interpreted as clinical measures or as independent indicators of the intervention's effectiveness.

The information gathered will be subjected to qualitative thematic analysis following the approach of Braun and Clarke (2006), with the possible support of MAXQDA software. Triangulation between observations, field notes, narrative materials and educators' reflections will enable a deeper understanding of the modes of participation and the identification of any convergences, divergences and relevant contextual conditions. The analysis will aim to understand not only the manifestations of socio-affective engagement, but also the educational, relational and technological conditions that might foster or limit them. The implementation of the activities will involve appropriate procedures for informed consent, the protection of confidentiality and the management of audiovisual documentation, whilst respecting the characteristics and participation possibilities of those involved.

The methodological framework outlined here constitutes a proposal for action research to be implemented and documented, aimed at exploring the feasibility of the *outdoor–indoor–outdoor* model and the possible relationships between bodily experience, vicarious technological mediation, narrative

reworking and socio-affective engagement. The evidence gathered may inform subsequent pedagogical reflection and the redesign of the activities, without presupposing the model's effectiveness or anticipating empirical results that are not yet available.

7. Theoretical discussion, limitations and future developments

The proposal for an 'outdoor–indoor–outdoor' continuum invites reflection on the potential of integrating bodily experience, digital technologies and narrative reworking to promote inclusive educational processes. From this perspective, 'Outdoor Education for All' represents an opportunity to rethink the conditions of access to the natural experience, recognising the centrality of the individual, their modes of participation and their relationships with the environment. The vicarious function of technology takes on particular significance when it enables the expansion of possibilities for exploration, communication and the attribution of meaning to the experience, without replacing its physical and relational dimensions (Sibilio & Galdieri, 2022; Sabatano et al., 2023).

The proposed model also suggests a possible connection between socio-affective engagement and self-determination, recognising active participation, the expression of emotions and the exercise of choice as key dimensions of the educational experience (Fredricks et al., 2004; Shogren et al., 2015). From this perspective, technological and narrative mediation could help to create conditions in which young adults with intellectual disabilities can take on a more active role in shaping their own experiential pathways.

The main limitation of this contribution lies in the theoretical and design-oriented nature of the proposal, which has not yet been subjected to empirical testing. Future action research at Casa Raoul will enable us to explore the feasibility of the model, taking into account the diversity of participants, the accessibility of tools, the quality of educational support and the environmental conditions. Systematic observation and the shared reflection on experiences will help to identify the opportunities and challenges associated with the use of technology, guiding the gradual refinement of the activities.

The outdoor–indoor–outdoor continuum therefore emerges as a pedagogical approach warranting further empirical investigation, in which technology does not replace the natural experience but can help to make it more accessible, participatory and meaningful, whilst enhancing the participants' physical engagement, socio-emotional dimension and scope for choice.

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