

NATURE-BASED RESEARCH-INTERVENTIONS FOR INCLUSIVE LEARNING AND WELL-BEING: A SYNECOLOGICAL APPROACH TO MARGINALIZED YOUTH IN SOUTHERN SALENTO

INTERVENTI DI RICERCA BASATI SULLA NATURA PER L'APPRENDIMENTO INCLUSIVO E IL BENESSERE:
UN APPROCCIO SINECOLOGICO AI GIOVANI EMARGINATI DEL SALENTO MERIDIONALE

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Double Blind Peer Review

Russo, C. (2025). Nature-Based Research-Interventions for Inclusive Learning And Well-Being:

A Synecological Approach to Marginalized Youth in Southern Salento. *Italian Journal of Health Education, Sports and Inclusive Didactics*, 9(3).

Doi: <https://doi.org/10.32043/gsd.v9i3.1606>

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gsdjournal.it

ISSN: 2532-3296

ISBN: 978-88-6022-522-1

ABSTRACT

English

Global educational landscape faces profound challenges, exacerbated by environmental and social crises, leading to phenomena like acceleration and alienation. Nature-based education emerges as a powerful response, fostering holistic development and addressing inequalities. This proposal outlines a research-training intervention targeting minors with disabilities and disadvantaged backgrounds, particularly those experiencing educational poverty in the inner marginal areas of southern Salento, Italy.

Italiano

Il panorama educativo globale si trova ad affrontare sfide profonde, acuite dalle crisi ambientali e sociali, che generano fenomeni come l'accelerazione e l'alienazione. L'educazione basata sulla natura emerge come una risposta potente, capace di promuovere uno sviluppo olistico e di contrastare le disuguaglianze. La presente proposta delinea un intervento di ricerca-formazione rivolto a minori con disabilità e provenienti da contesti svantaggiati, in particolare a coloro che sperimentano condizioni di povertà educativa nelle aree interne e marginali del Salento meridionale, in Italia.

KEYWORDS

Nature-based education, outdoor inclusion, educational poverty, marginalized areas, synecological learning; Educazione basata sulla natura; inclusione all'aperto; povertà educativa; aree marginalizzate; apprendimento sinecologico.

Received 21/09/2025

Accepted 28/10/2025

Published 07/11/2025

Introduction

Problem context:

Contemporary education is profoundly shaped by complex and interconnected global challenges, including climate change, increasing urbanization, widening social inequalities and the digital transformation of society. These factors contribute to a growing sense of acceleration and alienation, particularly impacting vulnerable populations. In the inner marginal areas of southern Salento, these challenges manifest as significant educational poverty and limited opportunities for minors, especially those with disabilities and from disadvantaged backgrounds. This context necessitates innovative educational approaches capable of fostering holistic development, promoting inclusion, and mitigating the effects of social and educational disparities. Nature-based education, offers a promising avenue by providing opportunities for emotional, social, physical, and cognitive development, while also serving as a tool to address environmental issues and reduce inequalities (Shanahan et al., 2019). This approach is rooted in a synecological perspective, recognizing that learning is a dynamic process influenced by the intricate relationships among individuals, environments, events, and situations. Effective collaboration between the Third Sector and public institutions at the community level is essential for developing comprehensive strategies to combat educational poverty and mitigate the inequalities exacerbated by interconnected global and local crises (Russo, 2025a).

Research Objectives

The intervention involves a multi-activity program within eco-cultural areas and natural reserves, including sailing, farming, orienteering, park adventures, rock climbing, trekking and river-cruising. Guided by a synecological perspective, this study aims to investigate the program's impact on participants' emotional, social, physical, and cognitive development, promoting inclusion, resilience, and ecological awareness (Hofman-Bergholm, 2024). Expected outcomes include significant improvements in well-being, social competence, and environmental connection, offering a replicable model for accessible outdoor learning.

Specifically, this work aims to:

- Investigate the impact of a multi-activity nature-based program on the emotional, social, physical, and cognitive development of minors with disabilities and disadvantaged backgrounds in Southern Salento. Assess the program's effectiveness in promoting inclusion, reducing educational inequalities, and enhancing the overall well-being and resilience of participants.

- Explore how direct experiences with nature foster a sense of connection with the environment and promote responsible ecological behavior among marginalized youth.
- Develop and evaluate a pedagogical model for accessible and inclusive outdoor learning tailored to the specific needs of vulnerable populations.

1. Methodology

Research Design

This study employed a qualitative approach to provide rich, contextual insights into the participants' experiences (Brantlinger et al., 2005). The study was conducted over the 18 months research-intervention project *MOVE IT - Educating in Action*, funded by the Italian *Presidency of Council of Ministers – Department of Family Politics* and coordinated by GAIA APS.

Studied activities included:

- *Summer Camps* focused on geology, archaeoastronomy, marine and terrestrial biodiversity, AgroPedagogy laboratories, sailing, cultural and multisport activities all around Salento's area
- *Eco-Explorers Camps* with tours on geological, historical and natural resources of southern Salento
- A *Multi-outdoor Camp* in Calabria with orienteering, rock-climbing, trekking and cruising discovers

Based on the *Needs Mapping* method (Manfreda, 2024) within the *Action Community Learning* approach (Manfreda, 2021), this work incorporates elements of action research, allowing for iterative refinement of the intervention based on ongoing observations and feedback. A longitudinal component tracked long-term effects, making sure all *helices* are properly and harmoniously moved within the *Territorial Cohesion Ecosystem* strategy (Russo et al., 2025).

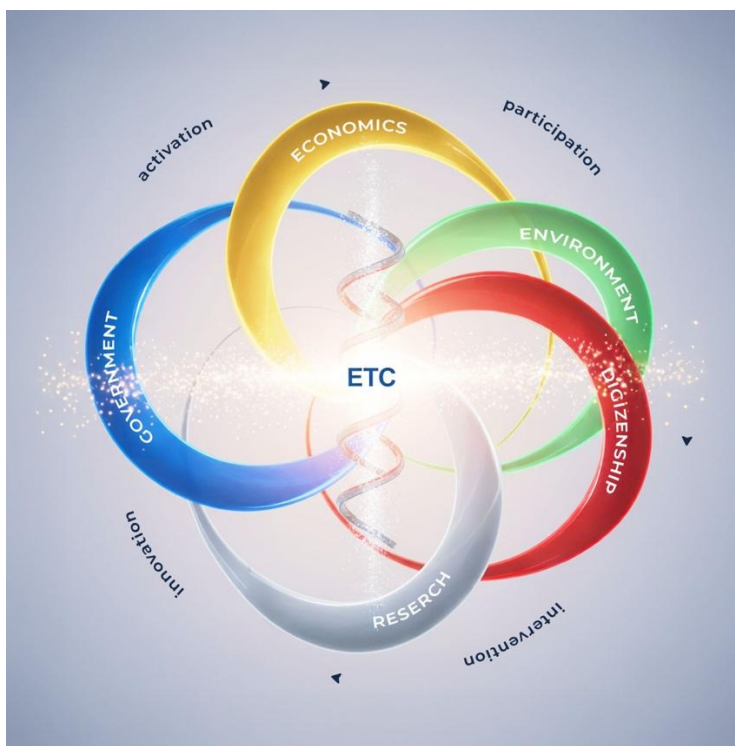


Figure 1. The Ecosystem of Territorial Cohesion strategy

1.2 Used Techniques and methods

Intervention Program

The structured multi-activity program has been implemented in Salento and Calabria natural areas. Activities were all adapted to ensure accessibility and safety for minors with disabilities.

The overall project-program run for a total duration of 18 months, with research-interventions implemented from spring to fall in 2024 and 2025 and structured on summer camps all over main natural resources of Salento plus a special dedicated 3 days camp initiative into the National Park of Pollino and Regional Park of Cedri Riviera in Calabria.

In 2024 n. 3 Camps have been deployed in the southern Salento's are, implemented in collaboration with Astronomica San Lorenzo APS from Casarano, SMARE' SSD from Santa Maria di Leuca and Proloco ODV from Poggiardo, involving a total of n. 65 minors aged 6-17 with disadvantaged backgrounds, particularly low income, migration, physical and cognitive disabilities, entrusted to social services.

The first one managed by Astronomica San Lorenzo APS and named "*Space & Science*" offered a 10 days program in June and July 2024 as follows:

- DAY1: *Geology and Karst Formations*. Bus trip with a walk along the "Cipolliane Trail" and a guided visit to the famous Cipolliane Caves in Novaglie.
- DAY2: *Prehistory and Fossils*. Bus trip and guided educational activities at the Museum of Prehistory in Nardò, managed by the University of Salento.
- DAY3: *Salento Archaeoastronomy*. Activities at the San Lorenzo Astronomical Park, including a guided tour of the reconstructed archaeoastronomical path and a walk on the hill.
- DAY4: *Water and Marine Biodiversity*. Bus trip and guided visit to the Alimini Lakes wetland area ("Alimini Grande" and "Alimini Piccolo") in Otranto.
- DAY5: Excursion to *Leuca Piccola* in Morciano di Leuca with visit to its underground olive press and dormitory on the holy way of the medieval pilgrims to Jerusalem.
- DAY6: *Botany and Natural Landscapes*. Bus trip with a walk through the regional natural park of Porto Selvaggio and the Palude del Capitano (a protected area).
- DAY7: *Archaeology and Anthropology*. Bus trip and guided visit to the "Sigismondo Castromediano" regional archaeological museum in Lecce.
- DAY8: *The Science of Agriculture*. Meet at the San Lorenzo Astronomical Park and walk to the educational farm "SeminAzioni" (in the Manfio district).
- DAY9: *Clay and Materials Science*. Bus trip with a terracotta processing and decoration workshop, followed by a guided walk through an old quarry in Cutrofiano.
- DAY10: *Space and Rocketry*. Activities at the San Lorenzo Astronomical Park, including a live demonstration and launch of a rocket (a launch test) by the "SanLorenzo Space Lab."

The second camp managed by SMARE' SSD in Santa Maria di Leuca in June 2024 was a full week immersion campus including sleeping in tents experiencing sailing at the sea plus swimming at the pool and sea, as well playing soccer, volleyball, tennis, rollerblading, ping-pong, and outdoor fitness. Nature and Culture were experienced through guided historical, artistic and archaeological tours around Leuca's Cape, plus excursions along the trails of the *Otranto-Santa Maria of Leuca Coast and Tricase Woods* Regional Natural Park. Also participative environmental and recreational workshops have been held.

The third one managed by Proloco Poggiardo ODV named "*Little Marmots*" offered theatre, music, sport, yoga and art activities at Villa Piscopo in Poggiardo, plus pasta making, horticulture and animals interaction at "Fattoria Didattica Caroppo" at Specchia Gallone.

In 2025, from the end of July to the first week of September, n. 5 ECO-EXPLORERS Campuses involved a total of n. 268 minors (80 of which in disadvantaged conditions) let them discover the following sites:

- Megalithic Park of The Giants in Giuggianello and the Prehistoric Park “Li Scusi” of Giurdignano
- *Paduli* Natural Park Woods of San Cassiano - Botrugno, the ancient drovers’ roads, cart tracks, and fortification structures
- The “*Conca Sant’Angelo*” sinkhole of Sanarica, one of the most important karst areas of Salento and the ancient crypts of the territory
- Coastal Natural Park of the *Messapian Port* of Vereto (Marina of San Gregorio) and the site of the *Centopietre* in the city of Vereto (today Patù)
- Educational Pinewood Park of *Montevergine* in Palmariggi Natural Park of *Masseria Torcito* in Cannole, with its attached Dove Tower and ancient cart road.

At the end of September 2025 has been the turn of a special full three days trip in Calabria dedicated to n. 12 disadvantaged families from the towns of Casarano, Supersano, Tuglie, Taurisano, Parabita, Ruffano and Tiggiano, set-up as follows:

- DAY1 - *Scavenger Hunt* using QR codes and a photo-based orienteering challenge within the Medieval village of Scalea
- DAY2 - *Rock Climbing* and *Orienteering* at *DidasCalabria* Environmental Education Center "Valle Argentino" in Orsomarso, plus "oriented" trekking by the "Argentino River" State Reserve with visit to Ficara waterfall
- DAY 3 - *Exploration of the Riviera dei Cedri Regional Marine Reserve* on board of a mini-cruise from San Nicola Arcella along its beautiful coastline till reaching Dino Island where trekking is planned with WWF guides

1.2.1 Qualitative Data Collection

Semi-structured interviews have been conducted with participants, their parents/guardians and educators to gather in-depth perspectives on their experiences, perceived benefits, and challenges. Observational notes and field diaries documented interactions, engagement, and specific behaviors during the activities. Focus Groups on selected participants provided rich, detailed insights.

Regarding 2024 Summer Camps, a study supported by UniPegaso-Espero Research Lab, based on semi-structured interviews with staff, concluded that the project had a positive community impact. N. 23 minors were involved in the Space & Science Camp, n. 10 in the Smare’ Camp and n. 13 in the Little Marmots Camp for a total on n. 46 minors.

The *2025 Eco-Explorers' Camps* initiative from the end of July to the first days of August and then from the end of August to the first days of September, involved n. 80 disadvantaged minors and is summarizable in a report that highlights the methodological framework and key observational points took on observational notes and field diaries along the overall experience. The specific intervention leveraged the rich natural and historical landscapes of Salento as a *living classroom*, transforming traditional learning into a tangible, immersive practice.

The core of this intervention lies in a "pedagogy of place," where the unique environments of Salento have been used to directly address the deficits associated with educational poverty. Instead of abstract concepts, students have been immersed in real-world contexts that stimulate curiosity, build confidence and nurture a deeper connection to their own cultural and natural heritage (Depledge et al., 2019). The observational notes and field diaries were designed to capture this transformative process by focusing on three key areas: student engagement, skill development, and the unique role of the environment.

The methodology employed in the *Calabria Outdoor Trip* involved n. 18 minors and 16 parents as target plus n. 9 minors as brothers and sisters and was a combination of semi-structured interviews and focus groups to capture both individual and collective experiences related to the program's activities. The activities included a QR code-based scavenger hunt in the medieval village of Scalea, rock climbing and orienteering at the "Valle Argentino" Environmental Education Center and a mini-cruise and trekking exploration of the Riviera dei Cedri Regional Marine Reserve.

Relating activity with education goals:

- **Orienteering** with map-reading and navigation exercises to develop spatial awareness and problem-solving skills
- **Adventure Park Experiences** with rope courses and ziplines to build physical coordination, courage, and trust;
- **Rock Climbing** introducing to climbing on low-level natural rock formations, adapted with safety harnesses and experienced instructors
- **Trekking** with guided hikes to explore biodiversity, fostering physical endurance and ecological awareness
- **Cruises** with a guided boat tour of a natural reserve's coastline to introduce marine biology and geological features.

The semi-structured interview protocol was crafted to gather in-depth, personal insights from the participants. The interviews were scheduled at key junctures to create a narrative of personal growth throughout the program. An initial pre-program interview established a baseline of the minors' expectations and prior experiences. Following each day's activities, brief check-ins probed for immediate

reactions, challenges faced, and new discoveries. The final, comprehensive debriefing session aimed to capture the overall impact, focusing on self-perceived changes in skills such as communication and problem-solving, and any shifts in their attitudes toward nature and historical places.

In complement to the individual interviews, focus groups were designed to explore the social and collaborative aspects of the experience. Questions have been structured to facilitate group discussion, encouraging participants to compare and contrast their experiences and reflect on how they worked together. The focus group guide covered topics such as collaborative problem-solving during the scavenger hunt, navigating group challenges during the rock climbing and trekking and their collective perceptions of the different natural environments explored. This methodology was crucial for understanding group dynamics, shared moments of triumph, and the development of social skills within a peer-supported context. In conclusion, this two-pronged qualitative approach ensured a rich and comprehensive dataset (Maulik and Kallakuri, 2018). The semi-structured interviews provided a deep, personal account of each minor's journey, while the focus groups offered insights into the shared experiences and the development of collective skills. Together, these methodologies provided a robust basis for evaluating the effectiveness of the intervention in fostering resilience, confidence and a new perspective on learning outside of a traditional classroom.

1.2.2 Population

Participants have been recruited from inner marginal areas of Southern Salento, Province of Lecce, Apulia, Italy, through collaboration with local schools, social services, and non-profit organizations. Municipalities involved have been Casarano, Supersano, Taurisano, Tuglie, Parabita, Ruffano and Tiggiano.

A total size of 144 direct beneficiary participants have been targeted and n. 16 among these were minors, particularly with efforts to include a diverse representation of disabilities and socio-economic backgrounds.

Inclusion criteria were age 6-17, documented disability (e.g., mild cognitive impairments, mild physical disabilities, or specific learning disabilities) or designation as being from a disadvantaged cultural and socioeconomic background, particularly those experiencing educational poverty, all resident in the target area. Specifically, the *2024 Summer Camps* welcomed n. 46 disadvantaged minors in total, with particular focus on absolute poverty, migration and social assisted background. The *Eco-Explorers 2025 Camps* involved n. 80 minors in relative poverty plus reading, writing, numeracy, problem-solving, and civic competences to be enhanced. The Outdoor Calabria Campa involved 6 minors entrusted to social

services and with low income, 4 with Autism Spectrum Disorder (ASD), 3 with Specific Learning Disorders (SLD), 2 with Attention-Deficit/Hyperactivity Disorder (ADHD), 2 in absolute poverty, 1 with migration background.

Ethical approval was obtained from the institutional review board and informed consent was secured from parents/guardians, with participant assent obtained directly from the minors, involving in the individuation process the Casarano Social District and the Social Services Office of the Municipality of Tiggiano.

2. Expected and obtained results

Based on the theoretical underpinnings of nature-based education, significant positive outcomes were worth it to be anticipated. We expect to observe substantial improvements in participants' socio-emotional competencies, including enhanced self-esteem, improved social interaction skills, and better emotional regulation (Mann et al., 2022). Physically, participants were expected to show increased motor coordination, balance, and overall physical well-being. Cognitively, greater curiosity, problem-solving abilities, and engagement with learning tasks could be anticipated. Furthermore, the program was expected to foster a stronger sense of belonging and inclusion, reducing feelings of alienation and promoting resilience among these vulnerable youth (Pendergast et al., 2018). Crucially, a measurable increase in environmental awareness and the adoption of pro-environmental behaviors could be anticipated. Preliminary observations from initial pilot sessions indicate high levels of participant engagement, positive peer interactions and an immediate sense of joy and connection with the natural environment, suggesting a promising trajectory for the full intervention.

Based on the research design described, this work was expected to produce rich, nuanced qualitative data. The in-depth responses can therefore be anticipated to provide significant insight into several key areas:

- *Refined Understanding of Learning*: The study is expected to reveal how learning and skill acquisition can occur outside of a traditional classroom, particularly through *embodied interaction* and a focus on "attentional anchors" within the natural environment.
- *Narrative of Change and Agency*: By encouraging participants to describe their experiences in detail, the interviews were expected to reveal whether the nature-based setting provided a greater sense of agency and emotional comfort compared to their usual educational environments.
- *Emergent Themes on Well-being and Social Connection*: The data will likely illuminate how specific interactions with the natural and historical sites contributed to improvements in participants' mental and social well-being.

This may include emergent themes related to feelings of belonging and the development of an "ecological identity".

2.1 Key findings

Qualitative data from interviews and field observations corroborated interesting findings and key themes emerged from the thematic analysis as follows.

- *Sense of Belonging*: Participants consistently reported feeling a strong sense of community and acceptance within the program, contrasting with experiences of marginalization in other settings.
- *Overcoming Challenges*: Interviews revealed that participants felt a great sense of accomplishment from overcoming physical and emotional challenges, such as completing a difficult climbing route or navigating a complex orienteering course.
- *Connection with Nature*: Many participants expressed a newfound appreciation for the natural environment, describing it as a "safe and calming place" and expressing a desire to protect it.

Specifically, key findings emerged as follows.

- *Activities*: The camps offered a wide range of activities, featuring sports, sailing, astronomy, local history, science (including rocketry), arts and culture (yoga, music, theater) and nature-based activities.
- *Skill Development*: Participants showed improvements in kinesthetic skills, socialization, teamwork, communication, creativity and an appreciation for nature and culture.
- *Social Dynamics*: The program successfully integrated children from diverse backgrounds, with initial language barriers overcome through shared activities. While there was some initial separation between boys and girls, joint activities fostered greater integration.
- *Positive Changes*: Participants demonstrated increased confidence and self-esteem, improved social skills, and greater motivation and engagement in learning.

2.2 Expected and Obtained Results by Activity

Overall, the summer camps offered a wide variety of activities, including sports, sailing, astronomy, local history and science, as well as arts and nature-based activities. Participants showed significant development in skills like motor coordination, socialization, teamwork, and communication. The program was successful in integrating children from different cultural and linguistic backgrounds, with initial barriers overcome through shared activities. Participants demonstrated increased confidence and self-esteem, improved people skills, and greater

motivation. The study noted a few challenges and made recommendations, including the need for continuous language support, attention to individual emotional needs and bridging the positive learning environment of the camps with formal schooling. In conclusion, the MOVE-IT! programs created a supportive environment that fostered personal growth, social development and a love for learning, with ongoing attention to these recommendations poised to enhance their positive impact further (Russo, 2025b).

- **Expected Outcomes:** The overall project aimed for improvements in well-being, social competence, and environmental connection.
- **Obtained Results:**
 - The project had a positive community impact.
 - Participants showed significant development in skills such as motor coordination, socialization, teamwork, and communication.
 - The program was successful in integrating children from different cultural and linguistic backgrounds, overcoming initial barriers through shared activities.
 - Participants demonstrated increased confidence and self-esteem, improved social skills, and greater motivation.
 - Challenges included the need for continuous language support, attention to individual emotional needs, and bridging the camp's positive learning environment with formal schooling.
 - The programs successfully created a supportive environment that fostered personal growth, social development, and a love for learning.

Our field observations focused on how the outdoor settings activated student participation in ways that are often not possible in a traditional classroom. At sites like the *Megalithic Park of The Giants*, students moved from passive observers to active archaeologists, asking questions about scale and effort, and even creating their own narratives. This transition was a key indicator of developing critical thinking and a sense of wonder. Furthermore, the activities are intentionally designed to develop skills that build resilience and adaptability. Navigating the *Paduli Natural Park Woods* or exploring the geological formations of the *Conca Sant'Angelo* sinkhole provided a direct challenge that required problem-solving and collaboration. These moments revealed how students handle frustration and work together, offering valuable insights into their social and emotional development. The historical context of ancient drovers' roads and Messapian ports connected these experiences to a broader understanding of human history and ingenuity, directly linking personal effort to a shared cultural narrative.

The diverse landscapes of Salento were not merely backdrops, they were integral to the pedagogical method. The contrasting environments—from the rugged coast of the *Port of Vereto* to the quiet, agricultural history of *Masseria Torcito*—allowed for a comprehensive exploration of local ecosystems, trade and traditional ways of life. By interacting with these spaces, students gained a sense of ownership and belonging that directly counters the feeling of alienation often associated with educational poverty. The field diaries captured this shift, documenting moments where immersed in biodiversity or cultivated a heightened respect for culture inscribed in ancient monuments like the *Centopietre*. In summary, this research-intervention treated the natural and cultural heritage of Salento as a primary resource for combating educational poverty. The field diaries and observational notes provided a robust framework for documenting how direct engagement with these places fosters curiosity, resilience, and a sense of purpose, empowering students and providing a tangible pathway to educational and personal growth.

- **Expected Outcomes:** The program was designed to use the natural and historical landscapes of Salento as a "living classroom" to address the deficits of educational poverty. The expectation was that this "pedagogy of place" would stimulate curiosity, build confidence and foster a deeper connection to cultural and natural heritage.
- **Obtained Results:**
 - Students transitioned from passive observers to active participants, for example, asking questions and creating their own narratives at the Megalithic Park of The Giants. This transition was a key indicator of developing critical thinking and a sense of wonder.
 - Navigating challenging environments required problem-solving and collaboration, offering valuable insights into students' social and emotional development.
 - The diverse landscapes were integral to the method, allowing for a comprehensive exploration of local ecosystems and traditional ways of life.
 - Students gained a sense of ownership and belonging, which directly countered feelings of alienation. Field diaries documented moments where students connected with local flora and fauna and gained a new appreciation for history.
 - Direct engagement with these places fostered curiosity, resilience, and a sense of purpose, empowering students and providing a tangible pathway to educational and personal growth.

About the Outdoor Camp in Calabria, the following specific expectations and output were obtained.

- **Expected Outcomes:** The program was expected to use a combination of activities to develop spatial awareness, problem-solving skills, physical coordination, courage, trust, physical endurance and ecological awareness.
- **Obtained Results:**
 - The two-pronged qualitative methodology provided a robust basis for evaluation.
 - Semi-structured interviews provided a deep, personal account of each minor's journey, allowing for the creation of a narrative of personal growth.
 - Focus groups complemented the interviews by exploring social and collaborative aspects, helping researchers understand group dynamics, shared moments of triumph, and the development of social skills within a peer-supported context.
 - The program was effective in fostering resilience, confidence and a new perspective on learning outside of a traditional classroom.

Specifically, the Calabria Outdoor Experience has been a blast of surprising achievements. Just to mention some, the group of very shy and hesitant kids, used to completely refuse social interaction, showed first teamwork playing after orienteering, respect of forest rules after trekking, while also sharing snacks with peers for the first time in their lives.

3. Discussion and Results interpretation

Language Barriers: While initial barriers were overcome, continuous language support is recommended for non-native Italian speakers.

- *Individual Needs:* Ongoing attention to individual needs, such as shyness or homesickness, is crucial.
- *School Engagement:* The study suggests exploring ways to bridge the positive learning environment of the summer camp with the formal school setting to improve academic engagement.

Families in dramatic psychological and social disadvantages, demonstrated critical needs of one-to-one support in carrying out the most basic daily personal satisfactions.

3.1 Potential Findings from Similar Research

While the current study is unique, existing qualitative research on similar populations and interventions suggests several potential findings that may be reflected in the collected data:

- *Improved Well-being and Social Outcomes:* Other nature-based interventions for youth have shown positive results, with participants reporting enhanced mental, physical, and social well-being. Specific themes

that emerged from thematic analysis of other studies include: improved physical activity, a sense of structure and routine, skill development, social belonging, and meaningful participation.

- *Unprompted Trauma Disclosure*: At-risk youth have been shown to use the interview process as an opportunity to "unburden themselves" and share personal stories of trauma, even when the initial questions do not directly prompt this. This indicates that the interview itself can be a psychologically significant event for the participant.
- *Desire for Self-Improvement*: Qualitative studies with at-risk youth in mentoring programs found that participants identified a need for help and a desire to "become a better person". This was expressed through goals such as increasing education and finding adequate employment. The present study's data may reflect similar aspirations.
- *Identity and Reflection*: Research on inclusive teaching found that a key component of learning and growth is continuous self-reflection and an acknowledgment of how one's identity impacts their environment. This suggests that participants in the current study may demonstrate increased self-awareness and a deeper understanding of their own place in the world.

The qualitative design of this research-intervention, centered on the semi-structured interview guide, the focus groups and the observation and field diaries, has been critical for achieving the study's objectives. Unlike quantitative studies that rely on numerical data, this approach allowed for the collection of rich qualitative data that captured the complexity of human experience. By using open-ended questions and encouraging participants to elaborate, the interviews provided a window into the nuanced feelings and perceptions of minors from educational poverty backgrounds, a group for whom a traditional, deficit-based educational model may not be sufficient.

The expected outcomes, such as a refined understanding of learning outside the classroom and narratives of change, were designed to directly explore the synecological framework. For example, by asking participants to describe what they saw, heard, and felt in a given environment, the research revealed the process of "attunement"—how they became more sensitive to new information in their surroundings. The analysis also looked for evidence that the natural environment, with its new "affordances" and opportunities for "embodied interaction", provided a less constrained system for learning than the school environment, which can sometimes be a "complex adaptive system" with "contradictory intentions" that hinder progress. The interviews also served a purpose beyond data collection by providing a space for participants to "unburden themselves of their story" which in itself contributed to their well-being. In conducting the interviews, the researchers remained mindful of their own positionality and the power dynamics inherent in

the relationship to ensure the process is empathetic and does not reinforce inequities. The ultimate goal was to generate "a deep discussion of the potentially radical changes" in educational systems.

The findings of this study provided compelling evidence that structured, inclusive, nature-based interventions can effectively address the multifaceted challenges faced by marginalized youth (Zheng, et al., 2021). The significant improvements in socio-emotional well-being, self-esteem and resilience can be attributed to the *synecological framework* of the program, where the dynamic interaction between participants, the natural environment, and carefully designed activities fostered a profound and lasting developmental impact. The program created a supportive and challenging environment that allowed participants to test their limits, build trust and develop a sense of agency—all within a context that was inherently non-judgmental and conducive to personal growth. The observed increase in ecological awareness highlights the dual benefit of such programs: they not only foster individual well-being but also cultivate a new generation of environmentally conscious citizens.

This special pedagogy research-intervention training, utilizing a synecological approach in the natural landscapes of Salento and Calabria, Italy, has demonstrated significant positive outcomes for marginalized youth. The findings from the various activities—Summer Camps, Eco-Explorers' Camps and the Calabria Outdoor Camp—consistently corroborate the initial expectations of the study. The data, collected through a qualitative methodology that included semi-structured interviews, focus groups, and field diaries, provided a rich, nuanced understanding of the participants' experiences and development (Friedensen et al., 2017).

The project successfully addressed key challenges faced by vulnerable populations, such as educational poverty, social inequalities, and a sense of alienation. The "pedagogy of place" approach, where the environment itself became a "living classroom," was highly effective in transforming passive observers into active participants. This is a critical finding, as it suggests that outdoor experiential learning can be a powerful antidote to the abstract and often disengaging nature of traditional education. The physical and emotional challenges inherent in activities like rock climbing and navigating natural landscapes directly fostered problem-solving, collaboration and resilience, skills that are difficult to cultivate in a conventional school setting.

The family-focused nature of the Calabria camp, which included parents, underscored the importance of a holistic, community-based approach to

intervention. It showed how engaging the entire family unit can strengthen social bonds and extend the benefits of the program beyond the individual minor.

While the intervention yielded significant positive results, it also brought to light important considerations for future programs. The study identified the need for continuous language support for non-native Italian speakers and a greater focus on bridging the positive experiences of the camps with the formal schooling environment (Harris et al., 2023). These recommendations are crucial for ensuring the long-term, sustainable impact of such initiatives. The intervention's success in fostering a sense of belonging, a newfound connection with nature and increased confidence points, to a promising model for addressing educational disparities and promoting well-being among marginalized youth.

Conclusions

The semi-structured interview guide was a thoughtfully crafted instrument designed to go beyond simple data collection and tap into the profound, embodied experiences of a vulnerable youth population. The research was poised to contribute a valuable new perspective to the fields of special pedagogy and human-environment studies by examining how nature-based interventions can foster inclusive learning and well-being. By focusing on the synecological dynamics between participants and their environment, the study aimed to provide concrete insights that can inform future pedagogical practices and policy development. The final analysis not only identified emergent themes related to well-being, social connection, and a sense of place, but it also offered a nuanced understanding of how such an intervention can support the development of a resilient and "adaptive expertise" in youth facing educational poverty.

This study contributed to the theoretical understanding of nature-based education as a synecological and transformative learning process, particularly for vulnerable populations. It reinforced theories linking direct nature experiences to holistic development, resilience, and ecological responsibility, offering empirical evidence from a unique context. The research also deepened insights into pedagogical models that effectively integrate nature into education for inclusivity and accessibility.

This study validated the *synecological perspective* as a valuable framework for understanding and designing effective educational interventions. It provided empirical evidence supporting the notion that human development is a distributed process, co-constructed through an individual's interaction with their environment.

The findings contributed to the growing body of literature on nature-based education and therapeutic interventions, particularly in the context of special needs and social inclusion.

The findings provided a replicable and adaptable model for designing and implementing inclusive nature-based interventions for marginalized youth, especially those with disabilities and from disadvantaged backgrounds. This model can inform policy-making regarding educational strategies in disadvantaged areas of Southern Salento and beyond. Recommendations can be therefore formulated from this work for teacher training and curriculum development to integrate outdoor learning, emphasizing strategies for special needs education. The study will underscore the importance of leveraging local natural reserves as valuable educational resources, promoting sustainable learning and contributing to the Sustainable Development Goals outlined in the United Nations' 2030 Agenda.

The pedagogical model developed and evaluated in this study, offers a replicable blueprint for educators, policymakers, and community organizations aiming to support vulnerable youth. Recommendations include:

- *Policy Integration*: Integrating nature-based education into formal and non-formal educational curricula, particularly in regions facing high rates of educational poverty.
- *Resource Utilization*: Encouraging the strategic use of local natural reserves as accessible and valuable educational resources.
- *Teacher Training*: Developing specialized training programs for educators and youth workers on how to facilitate inclusive outdoor learning and manage multi-activity programs safely and effectively. The findings underscore the importance of leveraging natural environments as a resource for implementing the Sustainable Development Goals (SDGs) related to quality education and well-being.
- *Limitations and Future Research*: The study's limitations include its quasi-experimental design, which, while robust, may be susceptible to selection bias. Future research should consider a larger sample size and a randomized controlled trial design. Long-term follow-up studies are also needed to assess the sustained impact of the intervention on participants' educational and professional trajectories.

Based on the research and outcomes, several additional key conclusions can be drawn:

1. Nature-based education is a highly effective tool for inclusive learning. The multi-activity program successfully promoted socialization, teamwork and communication among a diverse group of minors with disabilities and

disadvantaged backgrounds. It directly countered feelings of alienation by fostering a strong sense of belonging and community.

2. The synecological approach fosters holistic development. The intervention's focus on the interrelationships between individuals, environments and activities led to significant improvements in motor skills, emotional regulation and cognitive abilities. The experiences instilled resilience, confidence, and a sense of purpose, providing a tangible pathway to personal and educational growth.
3. Experiential learning with nature is a powerful catalyst for change. Activities like the Eco-Explorers' Camps transformed learning from an abstract concept into an immersive, tangible practice. This direct engagement with the environment fostered a measurable increase in environmental awareness and a newfound appreciation for the natural world.
4. The model is replicable and scalable. The research provides a robust pedagogical model for accessible and inclusive outdoor learning tailored to the specific needs of vulnerable populations. The qualitative data offers a clear roadmap for replicating these programs, with the identified challenges providing valuable insights for future refinement.

In conclusion, this research-intervention training demonstrates the profound potential of using nature and experiential learning to combat educational poverty and promote well-being among marginalized youth. The findings underscore the importance of moving beyond traditional classroom settings to create dynamic, inclusive and empowering learning environments that foster personal growth and a deeper connection to both community and the natural world.

References

- Brantlinger, E., Jimenez, R., Klingner, J., Pugach, M., & Richardson, V. (2005). *Qualitative studies in special education*. *Exceptional Children*, 71(2), 195-207. Arlington: Council for Exceptional Children.
- Depledge, M. H., Stone, R. J., & Bird, W. J. (2019). *Nurtured by nature*. *Monitor on Psychology*, 50(10), 40–44. Washington D.C.: American Psychological Association (APA).
- Friedensen, R. E., McCrae, B. P., & Kimball, E. (2017). *Using qualitative research to document variations in student experience*. *American Journal of Evaluation*, 38(3), 391–406. Thousand Oaks: SAGE.

- Harris, D. X., et al. (2023). *A creative ecological approach to supporting young people with mental health challenges in schools*. *Pastoral Care in Education*, 41(2), 177–193. London: Goodall.
- Hofman-Bergholm, M. (2024). *Nature-based education for facilitating resilience and well-being among youth—A Nordic perspective*. *Education Sciences*, 14(1), 43. New York City: Quay Publishing.
- Manfreda A. (2021). *Il modello Action Community Learning come framework per la promozione delle comunità e l'innovazione sociale sostenibile*. *Nuova Secondaria*, vol. 1, p. 337-347. Roma: Studium.
- Manfreda A. (2024). *Mappatura dei bisogni educativi. Questioni metodologiche e casi di studio*. Torino: L'Harmattan ITALIA.
- Mann, J., Gray, T., Truong, S., Brymer, E., Passy, R., Ho, S., Sahlberg, P., Ward, K., Bentsen, P., Curry, C., & Cowper, R. (2022). *Getting out of the classroom and into nature: A systematic review of nature-specific outdoor learning on school children's learning and development*. *Frontiers in Public Health*, 10, Article 877058. Lausanne: Frontiers Media S.A. Publisher.
- Maulik, P. K., & Kallakuri, V. (2018). *The challenges of qualitative research in special education*. *Journal of Qualitative Research*, 5(2), 12–21. New Delhi: Sociology Research Center.
- Pendergast, D., et al. (2018). *Engaging Marginalized, "At-Risk" Middle-Level Students: A Focus on the Importance of a Sense of Belonging at School*. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 91(2), 52–58. London: Routledge.
- Russo, C. (2025a). *Decolonization and Continuous Learning: A challenge to economic and social inequalities from participatory mobilization in the marginal communities of Southern Salento*. *Lifelong Lifewide Learning*, 23(46), 130-150. Florence: Edaforum.
- Russo (2025b). *Longlife Learning and participative planning for an ecosystemic strategy of territorial cohesion in southern Salento*. *Dada Review of Post-Global Antropology*, special n. 1, Ecomusei, pp. 261-278.
- Russo, C., Colazzo, S., & Ratta, M. (2025). *Enhancing digital citizenship awareness through participatory mobilization of marginal communities in South Salento*. *Italian Journal of Health Education, Sports and Inclusive Didactics*. Rome: EUR.
- Shanahan, D. F., et al. (2019). *Nature-Based Interventions for Improving Health and Wellbeing: The Purpose, the People and the Outcomes*. *Journal of the American Medical Association*, 321(1), 101–102. Chicago: Bauchner.
- Zheng, C., Sprague, N. L., & Ekenga, C. C. (2021). *The impact of nature-based education on health-related quality of life among low-income youth: Results from an intervention study*. *Journal of School Health*, 91(4), 305–312. Hoboken: Wiley-Blackwell.