

Design as a tool for experiential food education: Research into practice through a proximity-based therapeutic garden



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This paper examines the role of design as a catalyst in experiential food education through the Curortò project, a therapeutic garden established within the G. Di Cristina Children's Hospital. Grounded in a theoretical framework that integrates experiential learning, participatory pedagogy, and sustainability, the study reinterprets food as a vital medium for reconnecting individuals with their environment and local heritage. Employing a participatory action research methodology, the project involved hospitalised children, healthcare professionals, educators, and local community actors in a collaborative design process aimed at transforming the conventional hospital setting into a dynamic educational ecosystem. The intervention, inspired by local traditions and historical practices of urban agriculture, utilised recovered materials and hands-on cultivation activities to foster agroecological awareness and enhance cognitive, emotional, and social well-being. Detailed observation, field diaries, and qualitative interviews provided evidence of significant improvements in children's understanding of seasonal food cycles, resource management, and circular economy principles, accompanied by reduced stress levels and increased operational autonomy. The project further demonstrated the potential of design to mediate complex interactions between food, nature, and social innovation, thereby fostering collective responsibility and community resilience. As a contribution to the literature, the research proposes a comprehensive, multidimensional conceptual model that articulates how design can reconfigure care environments and promote sustainable food practices. This model encapsulates the transformative processes observed within the Curortò project and offers valuable theoretical insights for future applications in contexts characterised by vulnerability and the need for social innovation.

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1 Introduction

In the relationship between humans and nature, the consequences of each party's actions reverberate directly or indirectly upon the other. Food occupies a pivotal position in this connection because it permeates every aspect of social life, from cultural to economic domains (Steel, 2021), and is considered one of the leading drivers of climate change. At the global level, food systems place considerable pressure on water resources, accounting for 70 % of freshwater withdrawals (FAO, 2019), and contribute between 21 % and 37 % of greenhouse gas emissions (Arneth & Denton, 2019), as well as to biodiversity loss and land-use changes (Alexandratos & Bruinsma, 2012). In order to mitigate climate change, the international community established limitations under the 2015 Paris Agreement, aiming to keep warming within 1.5 °C. The urgency for a paradigm shifts in the agri-food supply chain has also been articulated in the European Farm to Fork 2020 directives, in the UN 2030 agenda, and by the FAO. In its Urban Food Agenda, the FAO identifies five ways governments can contribute to reinforcing the human–nature relationship: supporting urban agriculture, promoting more sustainable diets, preventing and reducing waste, and expanding green urban areas (FAO, 2020). To begin addressing environmental challenges and to build more equitable and resilient societies, we must once again assign proper value to food (Steel, 2021). This priority involves reversing the trajectory set by industrialization and cultivating citizens who are knowledgeable about how cities are nourished and about where and how food is produced, processed, and distributed (Steel, 2013). These considerations underscore the importance of discussing food to safeguard the planet and of analyzing it within a systemic framework. According to the Organisation for Economic Co-operation and Development (OECD), viewing food through a systemic lens involves examining the elements and activities structured in phases: production, transformation, distribution, consumption, and waste management. Each phase corresponds to a series of public policies (Busetti, 2020) designed to guide system operations and limit environmental, economic, and social impacts. One reason why food may be deemed a priority lies in the projection that, by 2050, the global population will reach 10 billion (UN, 2019). This demographic growth will increase food demand, thereby requiring better distribution strategies and a reduction in food waste. Education for sustainability has also been incorporated into recent Sustainable Development policies (UNESCO, 2017), and education itself is recognized in the Sustainable Development Goals under target 4.7 (UN, 2015). It is thus imperative to focus on healthy lifestyles and to instill in new generations, starting from childhood, the awareness that planetary resources are finite. Drawing on Bruno (Munari, 1966) insight that children are the adults of tomorrow, this work highlights the urgency of educating them to become responsible stewards of their environment. Through food understood as a complex system integrating production, processing, consumption, and waste management (Busetti, 2020), it becomes possible to educate younger

generations to interpret the ecological and social dynamics of our time. This contribution aims to investigate design-related interactions between food and nature in order to propose strategies capable of fostering synergies between humans and nature (Descola, 2005) and advancing collaborative scenarios. To this end, the study focuses on the significance of sustainability education through food, with the objective of nurturing environmental stewardship in those who will care for it in the future. The Curortò project exemplifies this approach by transforming a therapeutic garden at the G. Di Cristina Children's Hospital (Palermo) into an adaptive educational ecosystem. In collaboration with ARPA Sicilia, the project integrates design methodologies with hands-on agricultural practices, engaging young patients, healthcare professionals, educators, and community members in a process that reconfigures the relationship between human well-being and environmental integrity. By translating principles of environmental and nutritional sustainability into tangible, experiential learning, the project reinforces the social and ecological interdependencies that underpin resilient communities. Based on these premises, this study is guided by the following research questions:

RQ1) In what ways can food be conceptualized as an educational vector for imparting principles of proximity, sustainability, and responsible lifestyles, while concurrently elucidating the interdependent dynamics between human well-being and ecological integrity in hospital settings?

RQ2) How can design methodologies be mobilised to construct an educational framework grounded in local and sustainable food systems, aimed at reinforcing the interconnection between human health and environmental resilience, particularly within contexts marked by structural fragility?

This investigation seeks to contribute to the evolving discourse on design for food sustainability by articulating a comprehensive framework in which design becomes a pivotal instrument for driving systemic change at the intersection of food, nature, and society. This theoretical configuration lays the foundation for the design model formulated at the intersection of research findings and conceptual synthesis. Developed as an outcome of the investigation, the model operationalises experiential food education through a set of design principles and spatial devices anchored in proximity, care, and systemic coherence. Its articulation will be presented in the concluding sections, where theoretical insights and empirical evidence converge into a structured proposal for context-responsive educational environments.

2 Theoretical framework

In consideration of the research questions that have guided this study, the establishment of a therapeutic and educational garden can be regarded as a

privileged ground for the exploration of the relationships between food, sustainability, and educational processes. This investigative space facilitates the examination of two central inquiries: firstly, the understanding of how food can serve as an educational foundation for the transmission of values of proximity and sustainability (RQ1); and secondly, the analysis of how design can facilitate food education rooted in tangible experience, even in fragile contexts (RQ2). The theoretical framework of this study is grounded in an interdisciplinary convergence of design for social innovation, experiential pedagogy, green therapies, and food studies, thereby constructing an analytical lens in which food operates as an educational and relational vector—capable of bridging therapeutic and design dimensions through place-based processes of care, learning, and civic engagement. This perspective is situated at the intersection of therapeutic and design dimensions, aligning with the principles of the 2030 Agenda and agri-food sustainability policies (FAO, 2020).

2.1 *Experiential learning*

The paradigm of experiential learning, as formulated by Kolb (1984), conceives learning not as a mere transfer of information but as a dynamic and transformative process rooted in direct experience and critical reflection. His experiential learning model delineates a cyclical structure in which learners proceed from immediate, embodied experience to reflective observation, thereby initiating a process of meaning-making that culminates in abstract conceptualisation and, subsequently, in active experimentation. Far from being a passive phase, reflection serves as the epistemic fulcrum of this cycle, enabling individuals to distil significance from experience and to rearticulate it into actionable insights. Experience alone is insufficient to be called experiential education, and it is the reflection process which turns experience into experiential education (Joplin, 1995). In this view, experiential education is neither anecdotal nor intuitive: it is a rigorously structured process grounded in the iterative interplay between perception, cognition and practice (Kolb, 1984). Durkheim's systemic perspective (1956) further highlights the role of institutions and social norms in shaping individual development, situating territorial and relational dimensions within a broader and interdependent structure. Dewey (1938; 1981) through his pedagogical activism anchored in the principles of learning by doing and learning by thinking, challenges the conception of the student as a passive subject, instead defining them as an epistemic agent who constructs knowledge through experience. As a key component of their situated learning model, Brown et al. (1989) introduce *cognitive apprenticeship*, which seeks to immerse students in authentic practices through activity and social interaction, akin to traditional craft apprenticeship. Closely linked to the notion of knowledge as a tool, cognitive apprenticeship facilitates learning by enabling students to acquire, develop, and apply cognitive tools within authentic domain activities. The theory of situated learning underscores that knowledge is not an abstract and decontextualized

set of notions but rather the outcome of active participation in a specific context, where interaction with peers and the surrounding environment plays a fundamental role (Lave & Wenger, 1991). The model of “Situated Learning Episodes” (EAS) builds upon this premise, offering a pedagogical methodology particularly effective due to its temporal structuring and application to specific contexts (McLellan, 1996).

A significant strand within educational philosophy, emerging from experiential and critical pedagogies, is feminist pedagogy, grounded in the work of Chodorow (1978) and Gilligan (1982) on women’s developmental theories. Feminist pedagogies enrich experiential education by foregrounding embodied, affective, relational, and subjective modes of learning (Belenky et al., 1986). As Maher (1987) argues, knowledge inherently entails an emotional dimension, shaped by the learner’s sense of purpose, connection to the material, and situated context. Feminist educators further emphasise the creation of “learning communities” as generative environments in which students articulate their voices and co-construct knowledge through both individual and shared experience (Shrewsbury, 1987). This perspective has its antecedents in Maria Montessori’s approach, which, as early as the early twentieth century, criticized the artificial mediation of natural experiences, identifying direct engagement with the environment as an essential element for child development (Montessori, 1912). To this end, she introduced educational tools, such as school gardens, designed to promote an empirical understanding of biological cycles, and small animal husbandry, conceived to develop observational and relational skills towards other forms of life (Montessori, 1912). More recently, outdoor education has emerged as a pedagogical approach that prioritizes active, situated learning in environments beyond the traditional classroom. This educational paradigm emphasizes direct and contextual experience, adapting to the territorial, social, and cultural specificities in which it is applied (Higgins et al., 1997). Consequently, the learning environment is increasingly recognized as a crucial factor: interdisciplinary research across multiple scales of analysis highlights the importance of designing educational spaces rich in sensory stimuli, which enhance cognitive abilities (Barrett, 2010; Barrett & Barrett, 2010).

2.2 *Green therapies*

Wilson’s (1984) biophilia hypothesis further reinforces the idea that human beings possess an innate predisposition to connect with nature—a thesis confirmed by empirical evidence showing that biophilic design enhances concentration, creativity, and emotional well-being (Zhong et al., 2022). The integration of natural elements into learning environments also reduces stress and supports attentional capacities, contributing to more effective cognitive engagement (Louv, 2008). Within this perspective, interaction

with nature is framed as a strategic resource for cognitive and psychophysical development. Green therapies, including horticultural therapy, therapeutic gardens, and pet therapy, have been widely investigated for their positive effects on psychological, physical, and social well-being (Relf, 1990). The Human Issues in Horticulture (HIH) framework, developed by Relf (1992), adopts a multidisciplinary perspective to explore the psychological, social, and ecological benefits of horticulture while providing a foundation for the design of spaces that foster meaningful interactions between people and the natural environment. Urban horticulture, in particular, has proven to be effective in rehabilitation and support contexts for vulnerable groups due to its established educational value. Numerous studies demonstrate how outdoor education fosters cognitive development by stimulating intelligence and enhancing concentration, attention, critical reflection, and memory (Basile, 2000; Hartig et al., 2003). This theoretical framework highlights the value of situated educational practices, centering the analysis on learning processes that unfold outside traditional institutional settings. In particular, it emphasizes the role of green spaces as both educational and therapeutic devices, capable of integrating cognitive, emotional, and social dimensions through immersive experiences rich in sensory stimuli. European projects such as HORTIS and URBAN GREEN TRAIN, funded by the European Union and coordinated by ResCUE-AB, serve as emblematic examples of initiatives that have systematized experiences and developed innovative educational materials aimed at promoting environmental sustainability and food security, strengthening the link between education, urban agriculture, and psychophysical well-being. Among the concrete applications of these principles, the therapeutic garden of the Meyer Pediatric Hospital, active since 2009, stands out as a model of play therapy, where hospitalized children actively participate in care activities and in cultivating a vegetable garden. This direct contact with nature fosters resilience and enhances psychological well-being. The therapeutic value of engagement with the natural environment also emerges in the case of *Un giardino per rivivere*, inaugurated in 2013 at the IRCCS San Camillo in Venice. Designed by landscape architect Paolo Sgaravatti and designer Benedetta Piccolomini, this space integrates elements of neurorehabilitation, leveraging the bioenergetic properties of mature plants alongside the multisensory effects of aromatic essences and tactile surfaces. From this perspective, the garden is not conceived as a mere passive environment but rather as an active therapeutic device, where gardening and horticulture contribute to stimulating motor, cognitive, and emotional skills. Another example of biophilic design aimed at psychophysical well-being is the rooftop garden of the IRCCS Ca' Granda Policlinico in Milan, designed by Stefano Boeri (Figure 1), which integrates therapeutic and aesthetic dimensions to provide a regenerative space for both patients and healthcare professionals.



Figure 1 The Giardino terapeutico project in IRCCS Ca' Granda Policlinico in Milan; photo credit: Stefano Boeri Architetti.

2.3 Design for social innovation

Social innovation often takes shape within contexts marked by institutional fragility, socio-economic precarity, and fragmented ecologies. In such environments, vulnerability should not be perceived as a deficit, but rather, drawing on Haraway's insights (1988), as a condition of epistemic openness: a generative state that invites experimentation and fosters the emergence of unforeseen relational configurations (Escobar, 2018). In Morin's systemic perspective (2007), fragile contexts are not to be understood as mere voids or failures, but rather as complex relational ecologies whose coherence must be interpreted from within, through the recognition and cultivation of situated interdependencies. In the *States of Fragility 2025* report, the OECD reconceptualises fragility as the result of an interaction between exposure to diverse risks and the limited capacity of a state, system, or community to manage, absorb, or mitigate those risks. Rather than applying the politically sensitive and binary label of "fragile states", the report adopts a more systemic and graduated perspective, recognising fragility as a universal condition that manifests in varying degrees and forms across all contexts (OECD, 2025). Within this perspective, a capabilities-oriented approach to social innovation reorients attention away from the mere provision of services, and towards the creation of enabling conditions that support people's autonomous flourishing. It acknowledges the heterogeneity of needs, aspirations, and situated

knowledges that constitute the social complexity of everyday life. Rather than seeking to replace public institutions, it can enhance their capacity to respond adaptively, to engage with marginalised knowledge systems, and to evolve through sustained dialogue with local communities (Hillgren et al., 2011; Moulaert et al., 2005). This form of engagement demands a design posture grounded in humility, care, and critical reflexivity, in which the designer acts not as an expert imposing solutions, but as a facilitator, connector, or accompanist (Tjahja & Yee, 2022; Warwick & Young, 2016). This resonates with a conception of design as a social practice that transcends industrial or object-oriented definitions, positioning itself instead as a relational, enabling infrastructure for collective action and sustainable transformation (Brown and Wyatt, 2009; Meroni et al., 2013). Within this framework, design for social innovation encompasses the full spectrum of design's potential to recognise, sustain, and amplify emerging social practices that mobilise collective resources, foster civic agency, and support transitions towards more inclusive and sustainable modes of living (Muratovski, 2023; Gaziulusoy et al., 2021). It does not represent a discrete disciplinary field, but rather a transversal orientation in which design operates as a connective and enabling system—capable of bridging communities, institutions, and knowledge domains across diverse socio-cultural settings (Cipolla et al., 2015). Its effectiveness does not lie in the delivery of predefined solutions, but in a situated and processual engagement with the social fabric, wherein designers and communities co-shape futures that are materially and symbolically anchored in the lived experience of place (Meroni, 2007; Vezzoli et al., 2014).

From this vantage point, design is not a linear act of problem-solving but a generative practice of care, dialogue, and mutual learning. Its transformative capacity resides in the activation of diverse epistemologies, the cultivation of trust over time, and the creation of shared spaces for negotiation—spaces in which emergent values, imaginaries, and social desires can be collectively articulated and enacted (Haraway, 1988, 2018; Robertson & Simonsen, 2012; Sennett, 2012). Within such ecologies, informal interactions and relational infrastructures play a central role, as they sustain the conditions for reciprocity, experimentation, and systemic transformation (Capra, 1997; Ingold, 2013). Furthermore, the outcomes of design for social innovation cannot be assessed solely through deliverables or quantifiable impact metrics. Their significance lies in the capacity to sustain long-term relational processes, to foster institutional learning, and to support the collective construction of meaning, identity, and political subjectivity (Amatullo et al., 2021; Chick, 2012; Moulaert et al., 2013). This also requires attending to the challenge of scale, not merely in terms of quantitative growth, but as a qualitative expansion of reach, accessibility, and systemic resonance (Moore et al., 2015). In this respect, the design process itself becomes a site of civic agency—a space in which roles, responsibilities, and imaginaries are reconfigured through situated practices of co-creation. The concept of proximity emerges here as a critical analytical

construct. As articulated by Boschma (2005), proximity encompasses multiple dimensions—geographical, social, cognitive, organisational, and institutional—whose dynamic interplay shapes the quality and efficacy of collaborative processes. These dimensions do not possess intrinsic value; rather, their effects depend on context and balance. Building on this framework, Manzini (2021) reconceptualises proximity as a socio-material infrastructure that underpins conviviality, cooperation, and care (de la Bellacasa, 2017). No longer reducible to spatial adjacency, proximity is reframed as a relational and ethical condition—one that enables communities to inhabit complexity, co-construct significance, and cultivate forms of mutual responsibility. It supports what Manzini defines as “diversified proximity”: an urban configuration in which functional interdependence and relational density coexist within shared territories, thereby fostering the emergence of local commons and collaborative capabilities. In contexts characterised by systemic breakdown, institutional fragility, and socio-environmental vulnerability, the role of proximity becomes even more pronounced. As Manzini (2021) observes, it is precisely within these fragmented and unstable ecologies that the generative potential of proximity can be activated, sustaining practices of maintenance, mutual aid, and civic reconfiguration. In such settings, design interventions are not directed towards stabilisation through top-down control, but towards the activation of enabling conditions, what Manzini terms “systems of proximity”, that enhance civic agency, regenerate situated meanings, and support the emergence of locally viable modes of collective life. Within these environments, proximity becomes both the site and the medium of transformation. Proximity-based systems, when cultivated within such fragile ecologies, nurture the emergence of commons-oriented economies and care-centred institutions, where value is co-produced through cooperation, reciprocity, and territorial embeddedness. In this context, design acts as a catalyst for alliance-building and a mediator between heterogeneous knowledge systems, enabling the co-construction of symbolic and material infrastructures that sustain long-term social and ecological transitions (Jégou & Manzini, 2008; Manzini, 2014; Vezzoli et al., 2014).

2.4 Design for sustainable food systems

In recent years, food has assumed an increasingly prominent role as both an interpretative and operative lens through which to understand and transform the systemic dynamics shaping contemporary societies. The analysis conducted by the OECD (Busetti, 2020) demonstrates that every phase of the agri-food chain—production, processing, distribution, consumption, and waste management—is profoundly interlinked with public policies aimed at mitigating environmental and social impacts. As such, the agri-food system emerges as a critical infrastructure, embedded within the broader configurations of environmental, economic, and social governance. This structural interdependence underscores the need to adopt integrated and systemic approaches capable of simultaneously addressing the challenges of sustainability and food security,

while countering the disintegrative effects associated with industrial-scale production and centralised distribution systems (Steel, 2021). This awareness is reflected in the principal international policy frameworks, which place food at the heart of strategies for ecological and social transition. The United Nations' New Urban Agenda (UN-HABITAT, 2016) and the 2030 Agenda for Sustainable Development (UN, 2015)—particularly through SDG 2 “Zero Hunger” and SDG 11 “Sustainable Cities and Communities”—acknowledge food systems as critical levers for constructing inclusive, resilient cities oriented towards collective well-being.

Despite this growing institutional recognition, global food systems continue to exhibit profound structural fragilities, which have been rendered particularly visible by the ongoing expansion of food insecurity. According to the most recent estimates, in 2023 over 2.3 billion people—representing 28.9 % of the global population—experienced moderate or severe food insecurity, while more than 860 million were subjected to prolonged and extreme conditions of deprivation (FAO et al., 2024). These figures reveal the entanglement of environmental vulnerability, malnutrition, poverty, and health inequality, factors that mutually reinforce one another, generating cumulative effects capable of undermining stable access to nutritious, sustainable, and culturally meaningful diets (FAO et al., 2024). Far from being an episodic emergency, food insecurity constitutes a symptom of a broader systemic crisis, triggered by processes of globalisation, urbanisation, and industrial intensification that have progressively eroded the cultural, relational, and ecological centrality of food in local contexts (Steel, 2021). Sen (1982) has argued that hunger is not primarily caused by a lack of food, but rather by the inability of certain individuals or groups to access the food that is available, due to unfavourable economic, social, legal, or political conditions. His entitlements approach contributed to shifting the analytical focus away from policies centred on food supply, towards institutional configurations grounded in equitable and sustainable access to food resources, thereby illuminating the relationships between distributive justice, livelihood security, and socio-political inclusion (Sen, 1982). Food insecurity, therefore, cannot be understood solely in terms of resource scarcity, but must be analysed in light of the structural inequalities that shape people's effective capabilities to access adequate nourishment.

Building upon this theoretical reframing, several international organisations have developed converging visions aimed at a systemic rethinking of agri-food models. Both the High Level Panel of Experts on Food Security and Nutrition (HLPE, 2020) and Frison (2016) underscore the urgency of moving beyond extractive, centralised, and input-intensive paradigms, advocating instead for a transition towards polycentric, agroecological, and territorially grounded configurations. In this direction, the United Nations Food Systems Summit (UN, 2021) has reinforced the imperative to reconfigure dominant models of production, distribution, and consumption according to principles

of social justice, environmental sustainability, and systemic resilience. Within this framework, local economies, community knowledge, and civic infrastructures are identified as enabling factors of territorial cohesion and the transformative potential of food systems (UNEP, 2016). According to Frison (2016, p. 3), such transformation entails a strategic shift capable of fostering ecological regeneration, social inclusion, and sustainable food security through proximity-based relations and participatory decision-making processes. However, despite the crucial role of food, innovation in the food sector has often been centered on products and technologies, overlooking the educational sphere, the deeper needs of consumers, and the broader social impacts (Belasco, 2008; Warde, 2016). This reductionist perspective has progressively revealed its limitations, highlighting the necessity for an approach that regards food not merely as a commodity to be optimised through technological advancements, but as a fundamental element within the cultural, economic, and relational dynamics of contemporary societies. Agri-food configurations function as active infrastructures that shape the everyday practices through which sustainability is enacted, particularly in fragile contexts. Steel's (2021) concept of *Sitopia* positions food as an analytical and transformative medium capable of reconfiguring the relations between human life, ecological systems, and spatial arrangements. She argues that eating practices have a direct impact on collective well-being, environmental interdependencies, and urban design. In this light, community gardens, vertical farming, and urban regeneration are conceived as structural components of a spatial paradigm oriented towards resilience and liveability (Steel, 2021). Food education transcends the mere transmission of nutritional knowledge, constituting instead an ecological and political process that reconfigures individual and collective orientations towards more equitable and resilient socio-environmental systems. This orientation resonates with the logic of proximity economies, as outlined by Tasch and Petrini, who advocate for educational practices rooted in the value of slowness and territorial rootedness, conceived "as if food, farms and fertility mattered" (Tasch & Petrini, 2010).

The sociocultural dimension of food reinforces its generative role within processes of identity construction, symbolic classification, and community-making. Fischler (1988) identifies food as a critical vehicle of social cohesion and cultural memory, highlighting its role in forming a shared sense of belonging, while (Lévi-Strauss, 1969) interprets culinary systems as expressions of symbolic orders that structure collective life. Within the *Social Food Forum*, John Thackara conceptualizes food as a trigger for social relationships and environmental change, emphasizing its capacity to generate more resilient community models (Thackara, 2019). This perspective converges with a broader recognition of the transformative potential of design as a lever for reorganizing food systems. Margolin (2013) has emphasized the need to connect design research with food studies, highlighting that this epistemological convergence has only recently been consolidated in a more structured and

coherent manner. The plurality of approaches encompassed within the so-called *food design* field (Massari, 2017, 2021) reflects this perspective, acknowledging the complexity of food-related challenges and their ecological, cultural, and ethical implications (Belasco, 2008; Fischler, 1988; Bonacho et al., 2020; Eidler & Bonacho, 2025; Massari, 2021). In this paradigm shift, the focus in design studies moves from food itself to the broader set of social practices it activates, acknowledging that such practices are neither isolated phenomena nor reducible solely to material dimensions. On the contrary, they unfold within networks of actors, value systems, and collective processes that configure new forms of community cohesion and cooperation. Drawing also from sociological contributions, the concept of community—an increasingly central notion in design studies—is closely linked to the structure and dynamics of complex systems. According to Durkheim (1956), human nature is conceived as plastic, meaning that it is susceptible to being shaped by the social conditions in which the individual is embedded, attesting to the formative power that society, pre-existing the individual, exerts on processes of identity and collective construction. From this perspective, a community is not a static entity but a social construct that evolves through continuous interactions between individuals, context, and shared values (Gusfield, 1975; Tönnies & Loomis, 1999). This approach is essential in addressing the challenges posed by complex systems—such as those related to food, welfare, and education—where change cannot be imposed from above but must emerge through collaborative and distributed processes. In this sense, Munari's (1966) perspective on the need to cultivate informed and responsible citizens aligns with the vision of design for social innovation as a collective and highly contextualised practice, capable of fostering relationships that catalyse sustainable transformations. Within this interpretative framework, food is no longer approached as an abstract commodity to be optimised through efficiency, but rather as a relational device embedded in ecological cycles and civic infrastructures. Consistent with the principles previously discussed, it is redefined as a medium capable of generating situated responses to environmental, social, and cultural challenges, and as an educational lever that fosters shared responsibility, interdependence, and locally grounded knowledge.

2.5 Theoretical synthesis

The conceptualisations articulated across the four preceding sections gives rise to an integrated theoretical framework in which experiential learning, green therapies, design for social innovation, and sustainable food systems coalesce as interdependent epistemological domains. These dimensions intersect to delineate a conceptual field wherein experiential food education emerges as a structured and generative locus of inquiry. Within this field, educational practices are situated within broader ecological, relational, and territorial matrices, and take form through design as a modality of infrastructural reconfiguration and institutional reorientation. Figure 2 renders this convergence

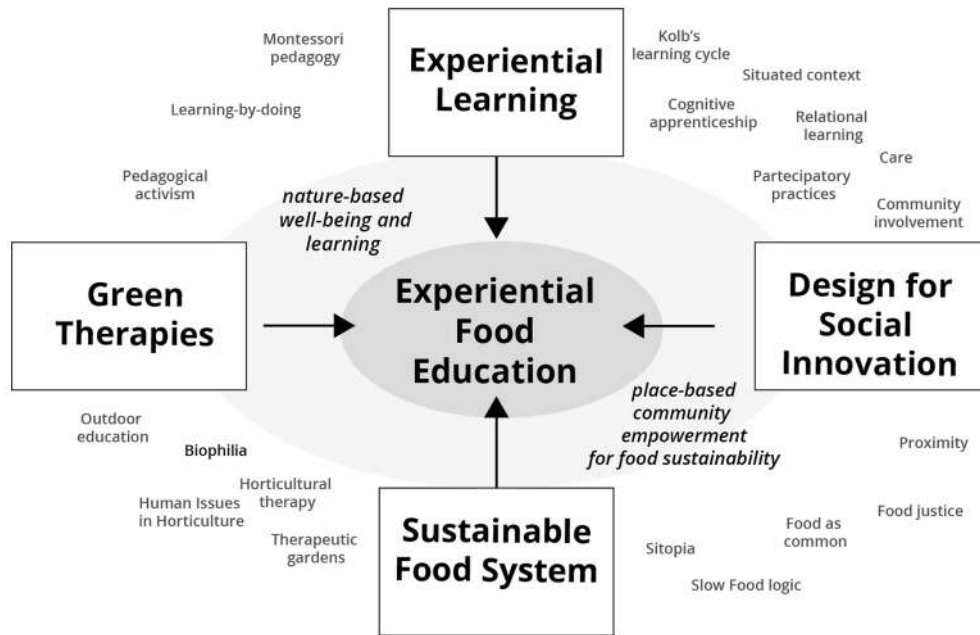


Figure 2 Conceptual map of Experiential Food Education as a transdisciplinary field shaped by four epistemological domains. The model is structured along two generative axes—nature-based well-being and learning and community empowerment for food sustainability—which define the relational and systemic logic of the educational process.

through a conceptual map in which the four domains coalesce to give form to food education as a situated, systemic, and relational practice. Experiential food education, as articulated through this synthesis, constitutes a transdisciplinary field anchored in proximity-based learning, ecological interdependence, and civic co-production. It delineates a space of situated action in which knowledge is not transmitted but co-generated, institutions evolve as adaptive configurations, and food operates as a vector of pedagogical, relational, and systemic transformation. Within this framework, design affirms its generative role by formalising the conditions for cooperation, fostering the emergence of shared infrastructures, and orienting learning environments toward inclusive and regenerative futures.

The internal architecture of this configuration is further articulated in Figure 3, which formalises the framework a structured progression that connects the four epistemological domains to two intermediate constructs and the research questions. These constructs organise the conceptual space within which experiential food education takes form as a transdisciplinary infrastructure. The framework defines a design-enabled configuration that aligns pedagogical, ecological, and institutional dimensions. It provides a coherent analytical structure for investigating context-responsive educational models grounded in care, cooperation, and territorial embeddedness. This integrated theoretical synthesis lays the groundwork for the conceptual model developed

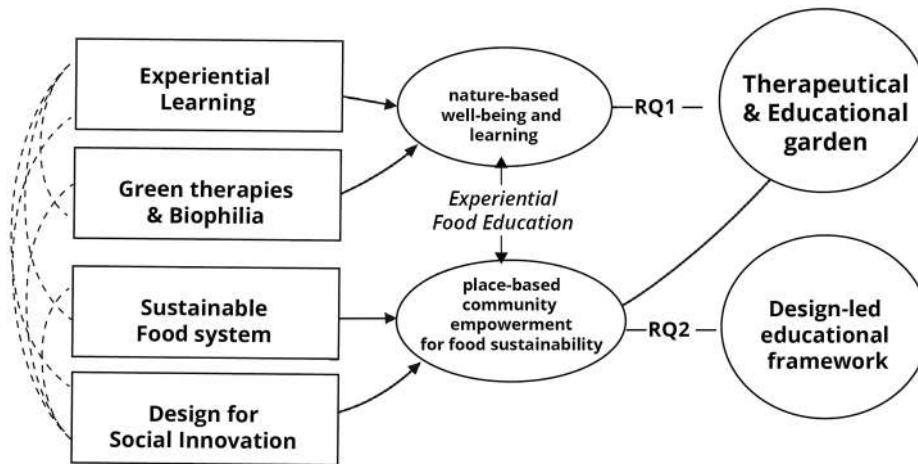


Figure 3 Conceptual framework of the research.

in the findings and discussion sections, where design is formalised as a mediating infrastructure across educational, therapeutic, and civic domains.

3 Methodology

The research was conducted within the *Design per l'Agroalimentare* course “Ballarò Mercato Circolare e Interculturale”, as part of the Master’s Degree Programme in *Design e Cultura del territorio* at the University of Palermo. The study employed a participatory action research (PAR) methodology, conceptualised as a transformative approach rooted in collaborative and co-creative processes (Reason & Bradbury, 2008), structured through an iterative cycle of planning, action, observation, and reflection (Adelman, 1993; Lewin, 1946). The research involved a multidisciplinary team of design students, ARPA Sicilia, educators, local associations, scholars, researchers, and health-care professionals, fostering a transdisciplinary dialogue on the role of food as an educational vector and its potential to mediate principles of proximity, sustainability, and responsible lifestyles within contexts of fragility (Figure 4).

The preliminary field of investigation was the Albergheria district, one of the most socially and culturally stratified areas of Palermo, where the historic market of Ballarò serves as a central hub for interactions between food practices, local commerce, and food cultures. Observation of food-related dynamics, proximity networks, and traditional food practices led to an exploration of how food functions as an educational vector, fostering sustainability and responsible lifestyles, while highlighting the relationship between human well-being and ecological integrity. This raised questions on how design can support educational approaches based on local food systems, particularly in fragile contexts (RQ1; RQ2). The Curortò project emerged as an applied response to these inquiries, developed at G. Di Cristina Children’s Hospital

in the Albergheria district (Figure 5). The following sections offer a detailed articulation of the project's phases, including the territorial analysis of the Albergheria district, the structuring of the project, the implementation of context-specific activities, and the observation and documentation protocols adopted to evaluate its pedagogical and psychosocial outcomes.

3.1 Context analysis: the Albergheria district

The neighbourhood was studied as a territorial system rich in meanings and tensions, characterised by a stratified complexity of social, cultural, and economic dynamics. The Ballarò market was identified as a central node of interaction, and the complexity of this system was addressed by adopting systemic design tools (Bistagnino, 2011) to map interdependencies between local actors and available resources, and to identify opportunities to activate educational processes. This analysis combined historical, social, and territorial perspectives, utilizing archival sources and qualitative interviews. A significant contribution was provided by the journalist Gaetano Basile, who reconstructed the cultural and symbolic roots of the neighbourhood, with particular attention to the historical presence of urban gardens (Basile, 2015). The context analysis enabled the construction of a solid narrative foundation for the symbolic recovery of ancient gardens, creating a connection between the historical heritage of the Albergheria district and contemporary sustainability perspectives. The garden was selected as a design device, capable of integrating symbolic and material dimensions through an experiential and participatory approach. The eggplant was chosen as the primary cultivated plant, a choice that is supported by the interview with Gaetano Basile and is deeply rooted in the historical role of the eggplant in the territory, introduced by the Carmelite Fathers in the 13th century (Basile, 2015). This decision guided the project toward the valorisation of local cultural capital, reinforcing the link between food, heritage, and community engagement (Figure 6).

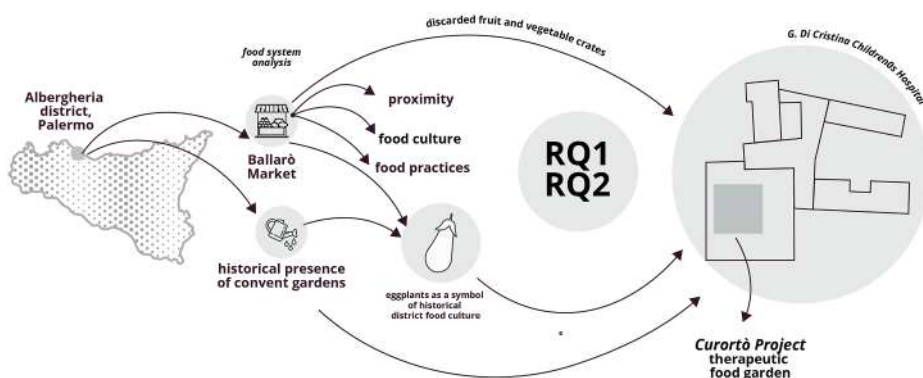


Figure 6 Diagram illustrating the connections between Albergheria district, Palermo and the Curortò Project at G. Di Cristina Children's Hospital.

3.2 Design framework and educational approach of the Curortò project

Curortò is a therapeutic food garden, designed to integrate nutrition, environmental awareness, and holistic well-being within the hospital setting. Inspired by the district's long-standing tradition of convent gardens, the project reimagines care, incorporating food cultivation as a tool for education, prevention, and resilience. The initiative engaged hospitalised children in a participatory design process, encouraging interaction with food cultivation as a means of nourishment, sensory experience, and ecological responsibility. The project is rooted in a theoretical framework that explores value co-creation and participatory design (Sanders & Stappers, 2008; Stickdorn et al., 2018; Manzini, 2019) in relation to food, education, and sustainability. The educational approach is based on the principles of learning by doing (Kolb, 1984), fostering an experiential learning process where knowledge is co-constructed through dialogue and direct interaction. Design played a central role in shaping this educational ecosystem, shifting from a logic of designing for or about something to a radically collaborative dimension of designing with someone (Ingold, 2013; Sennett, 2012; Manzini, 2015; Manzini & D'Alena, 2024). Within this systemic perspective, the project is conceived as an open and adaptive system, capable of activating participatory processes of social, environmental, and educational transformation. The activation of local ecosystems that support social innovation was a key element of the project (Manzini, 2015; Meroni & Sangiorgi, 2011), where community engagement in defining activities reinforced the idea that sustainability is a relational process, built upon active participation (Meroni, 2007). The entire design process was also guided by the principles of Agenda 2030, with specific reference to the Sustainable Development Goals (SDGs 2, 3, 4, 11, & 12), which informed the design and implementation of educational activities aimed at raising awareness on agri-food sustainability, environmental education, and social well-being. In the case of Curortò, these principles materialise in the creation of an environment where hospitalised children take an active role in managing a therapeutic garden, developing situated skills and establishing a direct relationship with food and the local agricultural context.

3.3 Implementation process and activities of the Curortò project

The project was implemented between May and October 2022, following an operational schedule closely aligned with agronomic cycles and the seasonality of eggplant cultivation. This temporal planning ensured a coherent integration with natural processes while fostering hands-on learning related to plant life cycles. The implementation phase involved a transdisciplinary group of actors, each contributing specific expertise to support the design, educational, and therapeutic dimensions of the project. These included hospitalised children as primary beneficiaries, design students and researchers from the University

of Palermo, school educators, healthcare professionals, environmental educators from ARPA Sicilia, members of local associations, and family caregivers. The collaboration between these diverse actor groups enabled a process of continuous negotiation and iterative adaptation of the design interventions across the different phases of the project. A quantitative synopsis of the participant structure and the functions attributed to each actor group is provided in [Table 1](#).

The initiative was preceded by two macro-phase meta-designs, each conceived to incorporate key concepts identified during the research phase and to generate a tangible impact on the educational and therapeutic dimensions. The initial phase was conducted in the Albergheria district, where the team of facilitators explored the neighbourhood, mapped local resources, and repurposed discarded materials, such as unused crates, to be transformed into functional components for the garden ([Figure 7](#)). This phase demonstrated the efficacy of embedding the reuse of local resources in a participatory approach, where the involved actors collaborate to transform otherwise discarded materials into educational and symbolic tools. The second phase of the project, which was conducted at the G. Di Cristina Children's Hospital, placed education at its core. The children participated in educational

Table 1 Actors engaged in the Curortò project

<i>Category</i>	<i>n</i>	<i>Primary roles and functions</i>
Hospitalised children (6–14 yrs)	8/16 (initial)	Direct beneficiaries; daily horticultural tasks
Master's students in design (University of Palermo)/Design researcher	11	Workshop facilitation; documentation; iterative adaptation of design artefacts
School educators/teachers	1	Scheduling of learning sessions; maintenance of field diaries; formative assessment of learning outcomes
Health-care professionals (paediatricians, therapists, nurses)	4	Clinical supervision; alignment of therapeutic goals with gardening activities; monitoring of patient well-being
Environmental educators (ARPA Sicilia)	1	Delivery of scientific content on biodiversity, water management and circular economy across 15 workshops
Local association representatives	6	Logistical support; mediation with the Ballarò market community; provision of territorial knowledge
Family caregivers	8	Motivation and psycho-social support; transfer of sustainable food practices to home settings



Figure 7 Step-by-step transformation of discarded wooden crates from Ballarò Market into repurposed planters for the Curortò Project. The process includes cleaning, painting, waterproofing, and final installation within the hospital garden.

workshops where they learned about food sustainability, the circular economy and proximity-based food systems (Figures 8 and 9).

These sessions, which were led by therapists and educators, made use of materials collected in the neighbourhood to introduce the participants to the practical and symbolic dimensions of cultivation. The participatory approach was adapted into interactive modalities, allowing children, despite their inability to directly engage in the explorations, to contribute to the narrative and operational construction of the project. Co-design emerged as a transversal process, involving children, parents, and healthcare professionals in a continuous collaboration that enriched the experience for all participants. Following these preparatory phases, the operational phase of the project commenced in May, involving the preparation of cultivation spaces. The facilitation team oversaw the children's active involvement in the assembly of planting crates, the preparation of substrate (comprising a waterproof sheet, clay, and soil), and the arrangement of seeds. This stage was pivotal in introducing participants to circular economy principles and cultivating practical skills related to resource management. Subsequent sessions focused on regular plant care, encompassing irrigation activities, growth monitoring, and substrate management. These sessions fostered continuous engagement, reinforcing both horticultural skills and a direct connection with natural cycles while supporting the therapeutic dimension of the garden experience. The objective of these sessions was to facilitate experiential educational opportunities, to impart fundamental agronomic concepts to children. These concepts encompassed the water requirements of plants, the importance of light, and the principles of sustainable soil management. The weekly watering activities were



Figure 8 Workshops engaging hospitalized children in the Curortò Project. The first image shows an educational session introducing the use of repurposed wooden crates, while the second captures children actively participating in planting activities within the hospital garden.

designed to encourage participants to develop a sense of responsibility and care for the plants.

A key component of the project was the educational workshops, which were organised in collaboration with the Regional Agency for Environmental Protection of Sicily (ARPA Sicilia) and other local associations ([Figure 10](#)). A total of 15 workshops were conducted, engaging hospitalised children, their families, local associations, and community members. These sessions addressed overarching themes pertaining to environmental sustainability, food education, and plant life cycles. The activities were meticulously structured to be interactive and participatory, encompassing hands-on workshops, sensory pathways focused on aromatic plants, and guided discussions on the significance of the local agri-food system. The collaboration with ARPA Sicilia enriched the educational content by providing participants with scientific insights on environmental issues, such as water resource management and biodiversity. The final phase of the project, coinciding with the harvest period, represented the culmination of the learning experience. The children



Figure 9 Workshops engaging hospitalized children in the Curortò Project. The first image shows an educational session introducing the use of repurposed wooden crates, while the second captures children actively participating in planting activities within the hospital garden.



Figure 10 The images depict the growth of planted crops and the monitoring of the therapeutic gardening process.

participated actively in the harvest of eggplants and other crops, gaining first-hand understanding of the food production cycle. This moment offered a unique opportunity to reflect on the importance of patience, care, and sustainable resource management. The harvest was accompanied by educational activities that emphasised the concept of proximity and the cultural value of

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Figure 11 Timeline of the project, illustrating the growth stages of eggplant (sowing, germination, blooming, fruiting) and related activities, including a cooking workshop and a final conference.

food, thereby creating symbolic connections between the cultivated crops and the agricultural traditions of the Ballarò district (Figure 11).

3.4 Observation, tools and documentation

Observation and documentation constituted the central phase of the data collection process, providing both qualitative and quantitative insights essential for evaluating the educational and therapeutic impact of the garden. The adopted approach was participatory and immersive, allowing for real-time data collection on learning dynamics, children's engagement, and their interactions with the garden and other participants. The constructs examined through the documentation and observation protocols included environmental awareness, experiential learning, sense of responsibility, collaborative behaviors, and perceived psychosocial well-being. These were analysed in relation to the design activities and the therapeutic functions of the garden. To ensure effective monitoring, a variety of documentation tools were employed (Table 2). The analysis of the field diaries compiled by teachers constituted a fundamental resource for understanding children's learning dynamics and interaction modalities within the garden. These documentation tools provided a detailed account of activities, emotions, and cognitive processes activated through direct engagement with nature. The use of field diaries enabled the tracking of participation over time, revealing how children's involvement and curiosity evolved throughout the weeks, while offering a qualitative perspective that complemented the observational and quantitative data collected through other methodologies. The analysis of these textual narratives, enriched with images and educational reflections, further facilitated the identification of recurring patterns in informal learning practices and the

Table 2 Methods of observation and documentation in the Curortò project

<i>Method</i>	<i>Description</i>	<i>Objective</i>
Participant observation	Systematic recording of children's behaviors, interactions, and engagement in garden activities.	To assess learning processes, autonomy, and social interactions.
Field diaries	Facilitators' notes on children's progress, attitudes, and key reflections.	To track longitudinal changes and emerging patterns.
Photo & video documentation	Visual records capturing engagement levels and group dynamics.	To analyze non-verbal interactions and contextual learning.
Audio recordings	Capturing verbal interactions and spontaneous expressions during activities.	To examine cognitive strategies and collaborative behaviors.
Semi-structured interviews	Conducted with educators, healthcare staff, and parents on perceived project outcomes.	To gather qualitative insights into educational and therapeutic impacts.
Questionnaire	Pre/post instrument co-designed with educators and aligned with workshop goals. It includes three items on food seasonality, local food interest, and sustainable practices.	To trace perceptual and cognitive changes in children over time and support data triangulation with qualitative findings.

construction of meanings related to nature and plant life cycles (Figure 12). In addition, a pre/post questionnaire composed of three questions was designed and administered to evaluate the educational and behavioural impacts of the

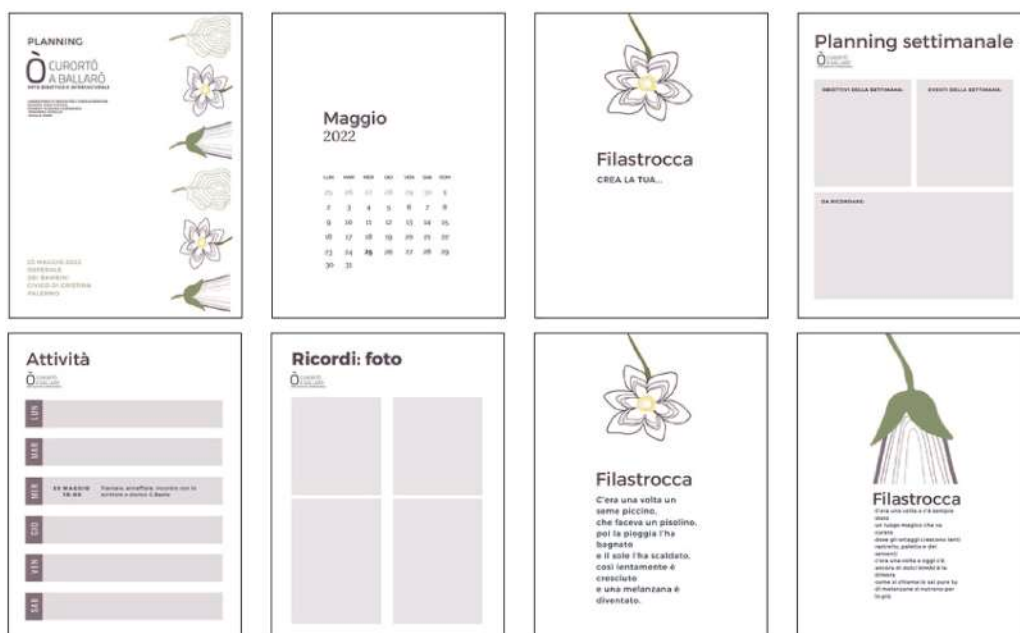


Figure 12 Educational and planning materials developed for the Curortò Project, including a calendar, weekly planner, activity log, photo memories, and rhyming exercises. These tools support therapeutic gardening activities and engagement with hospitalized children.

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project on hospitalised children. The instrument was developed in collaboration with environmental educators (Arpa Sicilia) and educators from the design team and was aligned with the educational goals of the workshops. It was administered at the beginning and at the end of the programme to all children who participated in the full set of activities. The questionnaire investigated key learning constructs such as recognition of food seasonality, interest in local and zero-kilometre food systems, and the ability to identify sustainable food practices. Responses were collected anonymously, and the data were used to trace perceptual and cognitive shifts over time. The questionnaire served as a complementary tool to the qualitative data gathered through diaries and observation. All research activities adhered to ethical standards for studies involving minors and vulnerable groups. Informed consent was obtained from the children's parents and from all adult participants. Anonymity and confidentiality were ensured in the collection, processing, and dissemination of data, including photographic and audio-visual materials.

4 Results

The Curortò project unfolds through a systemic interpretation of the design relationships between food and education, highlighting the role of design as a catalyst for care practices and proximity within vulnerable contexts. The empirical focus was placed on the project's capacity to generate tangible and transformative impacts, analyzing data collected through field observations, interviews with the various actors involved, and a qualitative assessment of the implemented practices.

The results have been organized into two main areas:

- The perception and lived experience of hospitalized children in relation to the project;
- The role of design as a facilitator of food education and a promoter of sustainability.

Table 3 Comparison of key indicators before and after the project

<i>Indicator</i>	<i>Before the Project (%)</i>	<i>After the Project (%)</i>
Children recognizing the seasonality of food products	22 %	85 %
Interest in local food	30 %	78 %
Ability to distinguish between zero-kilometer and non-local products	18 %	95 %

4.1 Perception and lived experience of hospitalized children in relation to the project

The analysis of on-site dynamics revealed that the horticultural device functioned not only as a therapeutic tool but also as a catalyst for situated learning processes, fostering the internalization of complex concepts such as seasonality, short food supply chains, circular economy, and resource regeneration (Table 3). The use of recovered materials, such as market crates from Ballarò, emerged as a key element in the educational process, translating circular economy principles and creative reuse into direct experience. An emblematic example of this process was observed during the soil preparation phase, where children—initially guided by facilitators—gradually developed the ability to self-organize, distributing tasks among themselves and collaborating to achieve a common goal. The qualitative analysis of interactions demonstrated that the horticultural context stimulated increasing operational autonomy, with a progressive refinement of practical skills related to sowing, irrigation, and plant management. Responses to pre- and post-intervention questionnaires confirmed a significant increase in agroecological knowledge and critical awareness of the food life cycle. Furthermore, participant observation indicated that as the activities progressed, children developed a stronger ability to associate food with the environmental conditions of its production, marking a notable evolution from an initial perception of food as a mere consumer product (see Table 4).

The therapeutic-educational garden proved to be a powerful tool for transforming the traditional care paradigm, overturning the conventional model of hospitalization and enabling children to transition from a passive condition to an active role in managing natural resources. This shift allowed them to move from being the recipients of care to actively caring for something, with significant effects on their psychophysical well-being. This experience generated a dual impact: on one hand, it fostered a process of ecological and food literacy; while on the other, it functioned as a symbolic medium through which children could reframe their experience of illness, reinterpreting hospitalization through a lens of agency and active care. The analysis conducted through interviews with Dr. Salviato, head of the Health and Well-being Department, highlighted a significant reduction in stress levels among the

Table 4 Observed effects of the ‘Curortò’ project

<i>Observed Effects</i>	<i>Description</i>
Increased autonomy	90 % of children completed care activities without direct support.
Stimulated socialization	Interactions among children increased by 65 % compared to traditional activities.
Reduced hospital stress	Children who completed the full program (8) expressed enthusiasm and a sense of well-being.
Family involvement	Mothers reported an improvement in their children’s mood and interest.

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participating children, which was attributed to immersion in an agricultural system that stimulates multisensory and cognitive skills. This phenomenon aligns with existing scientific literature, which correlates exposure to natural environments with positive modulation of neuropsychological and behavioural dynamics. Beyond its psychophysiological benefits, the therapeutic garden acted as a catalyst for cooperative and relational processes, fostering the development of a more aware and participatory social posture. The experiential learning linked to cultivation enabled children to internalize values such as responsibility and autonomous resource management, contributing to a broader redefinition of care and reciprocity. Additionally, the garden functioned as an interface connecting participants to the surrounding territorial context, strengthening the link between food education and local cultural heritage. The reference to Ballarò's agricultural traditions rooted the experience within an identity- and community-based framework, enhancing the value of proximity not only in geographical terms but also in symbolic and epistemic dimensions. The qualitative analysis of interactions revealed the emergence of mutual support dynamics among children, marked by an increase in cooperation and spontaneous task distribution, suggesting a reinforcement of socio-relational skills and coordination abilities in shared activities.

4.2 The role of design as a facilitator of food education

One of the key research questions concerned the role of design in activating knowledge processes related to food proximity, even in fragile contexts. The analysis highlighted that the project contributed to increasing awareness of the relationship between food, territory, and community, allowing hospitalized children to develop a deeper understanding of the value of local food. Interviews with facilitators revealed that the project generated an impact beyond the physical space of the garden, producing a multiplier effect on children's dietary and social habits. This was particularly evident in the interest expressed by participants in involving their families in sustainable food practices, demonstrating how the initiative fostered a broader cultural shift toward food awareness. Children, initially passive within the hospital setting, gradually assumed an active role in managing natural resources, reversing their perception of food from a mere consumable item to a tool for knowledge and care. In this scenario, the designer acted as a mediator between heterogeneous competencies, facilitating the convergence of diverse actors, including educators, healthcare professionals, researchers, and local communities, into a collaborative ecosystem aimed at cultural transformation. By designing experiential educational tools, the project enabled the activation of situated learning processes, making complex concepts such as seasonality, circular economy, and short food supply chains accessible through hands-on practice. The participatory design approach facilitated synergistic interaction among all stakeholders, promoting the creation of collective knowledge, where food functioned as both an educational medium and a social catalyst. The

integration of participatory design methodologies enhanced awareness of food education, with a measurable increase in knowledge and practices related to resource management.

Additionally, the garden served as a bridge between food education and territorial identity, rooting learning within a local cultural framework. Within the Curortò context, design was not merely a vehicle for knowledge transfer; rather, it played an enabling role, creating the conditions for experiential learning embedded in local practices. In this perspective, design can be understood as a process of activating collaborative networks (Manzini, 2015), capable of integrating the educational and productive dimensions of the food system. This vision aligns with research on design for social innovation, where design does not act solely on the materiality of space but functions as a facilitator of new interaction models among heterogeneous actors (Meroni & Sangiorgi, 2011). These findings informed the emergence of a conceptual configuration, subsequently formalised as a multi-level model (Figure 13), which articulates the enabling role of design across three interconnected layers: design determinants, transformative processes, and socio-educational impacts. This framework encapsulates the mechanisms observed throughout the Curortò project and serves as an interpretive tool to support future applications of design-driven interventions for experiential food education in fragile contexts.

Design as a Tool for Experiential Food Education

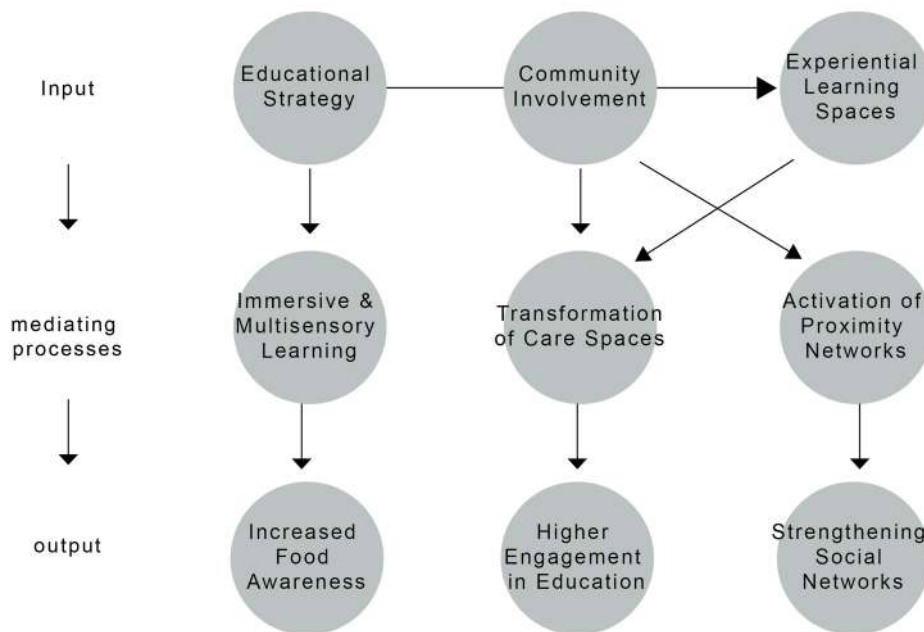


Figure 13 Conceptual model illustrating the role of design in experiential food education.

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5 Discussion

The analysis of the data and dynamics observed indicates that the Curortò project, despite being developed within a specific hospital and territorial context, offers broader insights into the processes through which design can facilitate food education and stimulate social innovation practices. The results, which are relevant from an educational, therapeutic and cultural point of view, demonstrate that the vegetable garden has operated not only as a tool for promoting food sustainability in fragile contexts, generating situated and transformative learning, but also as a tool that has made complex concepts accessible through tangible experiences, encouraging the activation of food proximity networks. In this regard, the results align with [Steel's \(2021\)](#) assertion which emphasises the recognition of food as a complex and transformative system for urban communities. The findings substantiate that an environment designed on the basis of territorial proximity and participatory methodologies can assume a strategic function, both in terms of individual well-being and the cultivation of a sense of collective responsibility. The adoption of a participatory approach in the project resulted in the establishment of a relational ecosystem, wherein design transcends the conventional boundaries of educational activities, promoting interaction and co-creation among heterogeneous actors such as children, educators, health workers and local communities. The geographic and cultural proximity of the area, symbolised by the historic Ballarò market, and the valorisation of materials recovered from the neighbourhood, served to strengthen the participants' identity bond, thereby transforming the educational experience into a multisensory and immersive process. In this process, food becomes a "living heritage" intimately linked to the culture of the area.

Based on these insights and the multifaceted outcomes observed, we propose an emergent model that synthesizes the dynamics at play in the Curortò project. In other words, while the analysis above demonstrates how tangible experiences in a context of territorial proximity and participatory design can activate transformative learning and foster a multisensory engagement with food as a "living heritage", these findings also lay the groundwork for a more structured interpretative framework. By formalising the relationship between educational design inputs, mediating dynamics, and socio-educational outcomes, the model offers theoretical clarity and operational guidance for practitioners seeking to replicate or adapt similar interventions in other institutional settings. Its multilevel configuration ensures scalability and adaptability across a range of fragile contexts. The framework integrates the observed educational, therapeutic, and cultural impacts by identifying three interrelated dimensions: design determinants (input variables), transformative processes (mediating dynamics), and socio-educational impacts (output variables). The model thus captures how design operates not only as a facilitator

of food education but also as a catalyst for broader social innovation, bridging individual well-being and community resilience.

5.1 A conceptual model for the role of design in experiential food education

The emerging model from the Curortò project can be described as a conceptual model in which design acts as an enabler of educational, therapeutic, and community processes, generating an impact both at the individual and territorial scales (Figure 13). The model draws on foundational contributions from experiential learning theory (Kolb, 1984), biophilic design and green therapies (Relf, 1992), food studies (Steel, 2021) and design for social innovation field, while integrating them into a unified framework that responds specifically to the complexity of fragile contexts. In doing so, it expands the scope of food education models by articulating their interdependence with relational, environmental, and systemic design dimensions.

At the first level, which can be defined as the plane of design determinants (input variables), the focus is on three key elements: design as an educational strategy, active participation of local communities, and the creation of experiential learning environments. The idea of design as an educational strategy originates from the principles of learning by doing (Dewey, 1938) and situated knowledge (Haraway, 1988). From this perspective, designing participatory devices, such as therapeutic gardens and co-created workshops with local actors, fosters an immersive and multisensory learning context (Kolb, 1984). At the same time, community participation encourages the convergence of heterogeneous knowledge systems and stimulates the sharing of values and practices that reflect territorial identity (Meroni & Sangiorgi, 2011). The creation of experiential environments reinforces the connection between food, urban space, and socialization processes, generating fertile ground for the co-production of knowledge.

The second level pertains to ‘transformative processes’ (mediating processes), where design acts as a catalyst for cognitive, social, and environmental interactions. The reconfiguration of care spaces into participatory learning environments constitutes a key turning point: the hospital, traditionally perceived as a site of passivity, transforms into an ecosystem of situated practices (Haraway, 1988) where children, healthcare professionals, designers, and educators collaborate in managing a garden. This transformation, aligned with Manzini’s vision of design for social innovation (Manzini, 2015), enhances the agency of participants, redistributing roles and responsibilities. In this context, an immersive and multisensory learning approach allows for the acquisition of agronomic and environmental knowledge through everyday practice, legitimizing food as both a subject of study and a relational medium (Steel, 2013). Moreover, the activation of local proximity networks (Manzini,

2021) around the garden triggers new forms of care (de la Bellacasa, 2017), collaboration between families, healthcare institutions, associations, and the local community, creating open ecosystems that connect food education with territorial dynamics.

The third level describes the ‘socio-educational impacts’ (output variables), highlighting how the synergy between design determinants and transformative processes leads to tangible changes. First, the project fosters forms of ecological and food literacy: children develop a systemic understanding of food, from production to consumption, with a significant increase in awareness of seasonality, short food supply chains, and circular economy principles (Busetti, 2020). At the same time, a reduction in stress and an improvement in psychophysical well-being are observed, aligning with literature on green therapies and the effectiveness of horticulture in therapeutic contexts (Relf, 1992). At the community level, the creation of proximity networks fosters the construction of relational capital, positioning food as a catalyst for collaborative practices. Families and local associations are encouraged to extend the experience beyond the hospital setting, transferring skills, tools, and approaches to external spaces beyond the therapeutic garden. This confirms the hypothesis that a design-driven approach can contribute to the development of more resilient and integrated ecosystems, where eating habits, care practices, and territorial valorization reinforce one another.

Considering these three dimensions (input, mediating processes, and output), the resulting model offers a systemic perspective on the role of design in facilitating experiential food education. The model that emerges challenges the idea of food education as an isolated disciplinary entity, instead presenting it as a situated process, deeply interwoven with local cultures, daily practices, and social support infrastructures. Conceived in this way, the therapeutic garden functions as a living laboratory, where direct experience with food generates shared knowledge, shaping behaviors and values oriented toward sustainability and care, for oneself but also for the surrounding territory.

6 Conclusion

This research represents an evolution beyond existing studies on therapeutic gardens, which are widely recognized for their role in promoting psychophysical well-being. Within this context, the garden is reimagined through a broader perspective, integrating educational and cultural objectives closely connected to the territorial context and the challenges of food sustainability. The findings highlight how design, when oriented toward a systemic and participatory approach, can facilitate experiential learning and foster proximity-based processes within care environments traditionally marked by passive spatial engagement. Exploring food as an educational medium and a

meaning-making device, with its intrinsic connection to territorial dimensions, has enabled participants to develop a deeper understanding of the ecological and social implications of agri-food systems, while simultaneously emphasizing the therapeutic and transformative value of contact with nature. The adoption of a participatory model, based on co-design with children, families, educators, medical staff, and the local community, has proven crucial in activating pathways of empowerment and collective responsibility. Through shared care of green spaces and the rediscovery of practices related to local food chains, it has been possible to strengthen agroecological knowledge, operational skills, and relational competencies, generating a multi-scalar impact that has influenced both individual and community dimensions. The transition from a hospital conceived as a site of passive care reception to a space for experimentation and learning further demonstrates how the centrality of food, when framed within principles of circularity and seasonality, can activate sustainability education processes that extend beyond the clinical experience. The integration of immersive pedagogical practices, design approaches for social innovation, and local knowledge emerges as a fertile perspective for regenerating relationships with the environment and strengthening proximity networks. The importance of placing food at the core of a multilayered educational system, capable of incorporating scientific knowledge, cultural dimensions, and participatory processes, is confirmed as a promising avenue for fostering lasting change. The conceptual model proposed formalises this multi-layered ecosystem, offering a structured framework through which experiential food education can be activated and scaled in a variety of fragile contexts. Its applicability beyond the specific setting of Curortò positions it as a valuable tool for both theoretical advancement and practical intervention in the field of design for social innovation. The collected evidence suggests the need to further explore this direction, particularly regarding the scalability and adaptability of the model, as well as the longitudinal developments of an intervention that, by intertwining therapeutic and social dimensions, contributes to a more integrated understanding of the relationship between humans, food, and nature.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data availability

Data will be made available on request.

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