





Article

Do It Yourself! Collaborative Processes for Inclusive Design and Capacity Building in Louisiana (USA)

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Abstract: This paper delves into integrating technological and social innovations in design through a community-oriented, resilient approach, emphasizing care and sustainability. It explores resource management's application to the local environment and education, focusing on adaptable spaces, active collaboration, and innovative solutions for environmental and social challenges. Developed within the EU Marie Curie-funded TREN D project, it combines 'transition' and 'resilience-building' processes, framing co-creation solutions and tailored innovation policies. The research group conducted theoretical and empirical research in the EU and USA, introducing a place-sensitive approach in managing transition through technological diversification. A case study in Ruston (LA, USA), Camp Alabama, exemplifies inclusive design through circular design and low-tech construction, creating adaptable pavilions for the community. Collaborating with MedCamps of Louisiana, the project designs a shared and inclusive space within budget constraints, emphasizing the pivotal role of architecture in advancing community well-being. Employing a bottom-up approach, the practice engages users, students, teachers, and local stakeholders in co-design, resulting in a people-based citadel of care. Outcomes feature high-design technological projects produced through a "low-tech" approach, allowing adaptability in urban regeneration. The 2023 project received awards, showcasing progress and the potential for replication through standardized methodology. Additional outcomes include educational benefits, training architects for societal needs, and regenerating urban areas by exploiting local resources.

Keywords: circular city; co-design; socio-technical innovation



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1. Introduction

The increasing need to implement inclusive, sustainable, and intelligent settlement models to address the serious problems related to climate change and reduce greenhouse gas emissions finds a successful response in the integration of the technological innovation-social innovation binomial. This integration is essential for establishing a technologically anthropologically suitable culture [1,2], which seeks new design methods to address the emerging challenges of the built environment and its associated communities. The definition of sustainability originally highlighted back in 1987 by the Report of the World Commission on Environment and Development: Our Common Future—also known as Brundtland Report—and its implementations in multiple UN Agendas encourage combining environmental, social and economic dimensions in order to deal with human settlement needs. The complex interaction of these components of sustainability crosses the different

aspects of spatial planning as well as capacity building initiatives able to raise awareness regarding environmental challenges. The current climate crisis is upping the ante, asking for integrated policies and changing mindsets [3].

According to this premise, current environmental challenges invite us to deeply revise policies, governance models, and resource management toolkits towards systemic and circular approaches in order to contribute to carbon a climate neutral scenarios for 2030 and 2050, meeting Sustainable Development Goals (SDGs) requirements. The well-known UN SDGs initiatives are the reference for encouraging the implementation of sustainable policies, strategies, programs, and projects by combining global awareness and local actions. Under the umbrella of each sustainable development goal, scholars highlighted the need for a systemic perspective to reverse a command-and-control approach to environmental protection into a proactive and collaborative planning of resources in terms of ecosystem services and environmentally aware lifestyles [4]. An essential cultural and technological strategy places the creative process and relationships at its core, employing an innovative approach that establishes conditions for envisioning sustainable and resilient cities. It integrates ecology, society, and technology as eco-socio-technical systems. This strategy acknowledges the ethical and cultural significance in shaping the future of the urban environment, promoting a plural and collaborative design thinking. From these challenges arises a complex and diverse system of bottom-up demands aimed at adapting urban spaces [5,6], influencing the forms and ways of living. By implementing these collaborative and adaptive design approaches, the urban planning process can be more effective and compatible with environmental and societal challenges, promoting the envisioned transition towards resilient communities. Considering the need to overcome an approach to local development based exclusively on competition among cities and/or regions within the global context, a place-based approach is pursued in order to favor the exploitation of endogenous resources to survive the continuous shocks and to provide socially acceptable living conditions for everyone [7]. The urban and regional planning challenges include the need to capture emerging bottom-up demands by envisioning a differently habitable world. In this complex and multi-scale transition, design serves as an essential catalyst, critically engaging with the complex dynamics of society, economy, and production [8]. The interaction with the built environment extends beyond human needs, encompassing resources and considering nature and local availability through systematic management to address challenges related to energy consumption, vulnerability of natural resources, and greenhouse gas emissions (GHG). From this perspective, planning and design act as mediators between different and interacting systems, natural and artificial, guided by a culture of multidimensional entanglements involving humans, machines, and nature in all its forms [9]. It is crucial to emphasize that the synergy between heuristic knowledge, technological expertise, and collaborative design processes acts as a catalyst for solutions that are not only innovative, adaptable, and sustainable but also socially responsible, emphasizing the significance assigned to the role of the social dimension of sustainability. This complexity involves multidisciplinary fields of knowledge dynamically cross-pollinating theoretical and practical knowledge. It needs to consider multiple planning scales, according to the local institutional framework, the EU guidelines, and the requirements of the transition towards resilience. A “Community-Led Local Development” able to enhance civic engagement and to capture local needs within local growth strategies relies on the collaborative approach among local authorities, civil society, and business partners, encouraged by the 2021–2027 EU Cohesion Policy framework [10].

According to this critical perspective, incorporating various aspects and parameters, it becomes necessary to define the characteristics of transformative processes in the environment as well as identify the design role within resilience-led planning strategies. It involves identifying new co-evolution processes supported by a design attitude that allows for “repairing” and, where necessary, “rebuilding” the lost connections among anthropogenic products, communities, and nature through holistic, creative, interactive, and sustainable processes [11]. This approach addresses specific local needs and expectations, attributing

intrinsic value to the concept of resilience while elevating the design process as a driver of social innovation [12,13]. This process is fueled by active collaboration among various stakeholders, each contributing with diverse sensitivities, knowledge, and skills [14].

The context of these premises engages the work carried out by the research group developing the exchange of theoretical and empirical research activities in the EU and USA as part of the EU RISE Marie Curie-funded TRENd project. The Marie Skłodowska-Curie Actions (MSCA), aimed at developing talents while advancing research under the Excellence Science pillar of EU Horizon 2020, fund projects for the training and mobility of researchers. Specifically, the Research and Innovation Staff Exchange (RISE) Program promotes international and cross-sectoral collaboration, through staff secondments, based on a joint research and innovation project for the purpose of sharing advanced knowledge and best practices. Short-term international and inter-sectoral exchanges of staff members involved in research and innovation activities of participating universities and research centers encourage mutual learning experiences by supporting early stage researchers (mainly PhD candidates and Post-Doc scholars) secondments between organizations in EU Member States and Associated Countries with non-associated Third Countries. “The aim is to develop sustainable collaborative projects between different organizations from the academic and non-academic sectors (in particular SMEs), based in Europe and beyond. Exchanged staff benefit from new knowledge, skills and career development perspectives, while participating organizations increase their research and innovation capacities” [15].

Within this framework, the Transition with Resilience for Evolutionary Development (TRENd) project developed a four-year research process across the EU (Italy, Greece and The Netherlands) and USA (Louisiana and Massachusetts) challenged by the coronavirus pandemics. Scholars from the European partner organizations developed secondments in USA universities, sharing knowledge and developing fieldwork in order to explore how to integrate ‘transition’ and ‘resilience-building’ processes, framing co-creation solutions and tailored innovation policies. The research process focused on how to increase the preparedness of EU territories and cities to address challenges of transition development and how to design a more tailored, place-sensitive approach to planning and design, [16]. This aim is pursued by unveiling unexploited potentials of endogenous territorial resources, engaging communities and territorial players in re-shaping human scale development trajectories.

A mutual learning process has been enhanced throughout the secondments in the USA. By combining an evolutionary approach and a collaborative-design approach, the interdisciplinary joint research group from Italy developed a mixed method research approach, aiming at triggering knowledge-based entrepreneurial initiatives as well as community practices and social inclusion initiatives both in Ruston (Louisiana) and Boston (Massachusetts). This research group has undertaken activities aimed at introducing a place-sensitive approach to managing transition through technological diversification. Several case studies have been purposely selected in order to unveil the different aspects of the project rationale.

This article reports on a case study conducted in Ruston (LA, USA), specifically Camp Alabama, which exemplifies inclusive design through circular design principles and low-tech construction methods. This practice is relevant in terms of the following features:

- The collaboration among different territorial players (universities, businesses, social enterprises, care associations, and communities);
- The potential of collaborative design in exploiting the use of low-technology solutions;
- The educational value in creating new professionals with skills and sensibility in dealing with environmental and social challenges;
- The effect on the long term in enhancing community engagement in urban planning initiatives and capacity building.

The paper is organized as follows: after setting the theoretical context in the introduction, the Section 2 is dedicated to introducing the research methodology and the case study approach. The discussion and limitations of the results (§3) offers the opportunity to reflect

on the generalization of opportunities and comparison with the European context. The conclusions include the expected follow-ups (§4).

2. Materials and Methods

2.1. Resilience in the Production of Physical Space and Knowledge Transfer to the Territory

Resilience in the production of physical space emerges as a dynamically connected process rooted in continuous experiential learning [12]. From this perspective, time plays a crucial and positive role, framing the project as an incremental process that acts as an interface among technology, human beings, and the environment in defining a constructive system. Heuristic and collaborative principles extend the concept of resilience beyond mere preparedness for emergency situations. In this context, resilience manifests through the dissemination of knowledge transfer actions to the territory and the subsequent conscious management and maximization of local resources.

In this light, the concept of “collaborative” takes shape as a practice of responsible sharing, generating a renewed “sense of community” that, placed at the center of decisions, not only influences the physical configuration of spaces but also opens the way to new domains of collaborative problem-setting [17,18]. Community participation and environmental attention emerge as key elements in integrating resilience into the educational realm, promoting flexibility and diversification of teaching and learning methods [19]. Education thus becomes a catalyst for enhancing the ethical dimension of human technical power over the environment, embracing the perspective of the “culture of limits” [20]. In this context, the responsibility of the designer becomes a crucial dimension, interpreting technical needs and procedural dynamics. Such a meticulous approach contributes to building an integrated and coherent vision, reflecting attention, responsibility, inclusion, care, and collaboration as key values throughout the design process. Discussing about how to implement resilience-oriented approaches and tools within planning and design processes in order to pursue sustainable human and more-than-human settlements, mutual learning among designers and users is a preliminary condition of success. Raising awareness, capacity building, and community engagement and empowerment are as important as technology enhancement and transfer in order to engage public interest [21].

According to the “ladder of citizen participation” designed by Arnstein [22] and the following massive theoretical debate on the topic of participatory and collaborative planning across disciplines, such as architecture, anthropology, psychology, economics, and sociology, methods were developed and refined that helped to incorporate the users’ perceptions and needs into the spatial design processes [23,24]. In order to address co-design practices with the aim of understanding the cooperation mechanisms and the capacity building potentialities, a case study approach has been chosen [25]. With a “linear but iterative process” (ivi: xxvi), a comprehensive and systematic outline for undertaking the case study is presented, highlighting the specificities and the potential elements of transferability.

The case study selection criteria includes practices combining the following:

- Social innovation and environmental awareness aims;
- Multi-actor experiences with cooperation of different territorial players;
- Collaborative design approach;
- Capacity-building opportunities.

The research group of the Italian unit, in collaboration with scholars from the hosting institution, explored practices and projects in the North Louisiana territory, fitting the different disciplines involved and the main aims of the TREN D project. The interdisciplinary unit of experts in design, architecture technologies, and urban and environmental planning adopted a mixed methodology to develop the selected case study, including the following: (1) A phase of active observation of the site and its premises; (2) Interviews with the local players and the coordinator of the project, as well as of the other participants to the action; and (3) Analysis of the design methodology and the construction phases, technological evaluation of the life-cycle of the project, and the timeline of the initiative. The relevant practices selection has been developed during the US secondments in Fall 2022, and

the case study presented in this paper has been delivered between November 2022 and December 2023.

As noted in the Introduction section, the “Camp Alabama” project has been selected as case study as it meets the selection criteria and offers opportunity of knowledge transfer. The research and education project developed by the School of Design of the Louisiana Tech University focuses on creating adaptable pavilions for the community in collaboration with MedCamps of Louisiana [26]. The Camp is located in the territory of the city of Ruston, Louisiana, briefly introduced in the next paragraph.

2.2. City of Ruston, LA, USA

Ruston, situated in Louisiana’s Lincoln Parish in the northern part of the United States, offers an interesting area of study in the realm of urban planning and socio-economic development. Established in 1883, this urban center currently identifies itself as a historical and developmental crossroads, featuring an urban structure classified as a rural city with a population of approximately 20,000 residents outside an urban area, according to the USDA’s rural–urban continuum categorization [27]. This classification serves as the foundation for analyzing the peculiarities of Ruston, particularly considering its strategic position at the intersection of crucial road arteries, significantly impacting its connectivity and accessibility, Figure 1.



Figure 1. Territorial framing.

In terms of natural resources, the area around Ruston benefits from rich diversity. Louisiana is renowned for its abundance of water resources, and Ruston is no exception. The presence of lakes nearby, such as Lake D’Arbonne, Lake Claiborne, Lake Bistineau, and Lake Caney, provides opportunities for recreational activities like fishing, kayaking, and other water-related activities. Additionally, the region is characterized by high biodiversity, with pine forests, oak groves, and other tree species prevalent in the area.

The economic development of the Ruston area is closely tied to the presence of Louisiana Tech University. This institution not only serves as a hub of academic excellence but also acts as a driving force for technological innovation, serving as an exemplary model of how higher education institutions can act as catalysts for technology-based economic development in rural communities [27]. The university collaborates closely with the city of Ruston, the nearby Grambling State University, and the local campus of the Louisiana Delta Community College to enable students to benefit from the resources of all three campuses, providing not only a fertile ground for advanced education but also an environment that

stimulates the creation of technology-based businesses through the Innovation Enterprise at Louisiana Tech Headquarters. This innovation incubator, intertwined with the academic environment, serves as a vital bridge between education and businesses, significantly contributing to local economic growth. This synergy between educational institutions and businesses has created a fertile ecosystem where students not only receive high-level education but are also involved in concrete projects and collaborations with companies. Tech Pointe, with its role as a student business accelerator and prototyping center, serves as the physical and relational space where academic theory merges with practical application, preparing students to face the challenges of the professional world through a series of initiatives and programs, including entrepreneurship programs, business technical assistance, technology transfer, and community engagement.

The social dimension of the city, characterized by a welcoming atmosphere and interpersonal relationships, is reflected in cultural events and festivals that celebrate the rich identity of the city [28]. A city dedicated to concepts of care and inclusion is evident in projects and initiatives aimed at adapting open spaces and in entities and organizations. Ruston is home to the Louisiana Center for the Blind, which provides services such as independence-oriented training, education, social support, and rehabilitation services for the visually impaired.

In this context of rural north Louisiana exists Camp Alabama, a summer camp facility originally built in the 1940s and managed by a local charity since 2014, MedCamps of Louisiana, Inc., West Monroe, Louisiana. This organization, the mission of which is to improve the health and wellness of people living with chronic illnesses and disabilities through recreational and educational camping experiences, is based in Louisiana and accredited by the American Camp Association. With the constant support of the community, businesses, and civic organizations, the camp aims to offer an inclusive experience at no cost, emphasizing the fundamental role of such initiatives in the context of holistic urban development. Ruston, therefore, represents a relevant subject of study to understand the dynamics of urban growth, with particular attention to the socio-economic impacts and synergistic connections among technological development, education, and social inclusion.

2.3. Camp Alabama—Case Study

Camp Alabama's revitalization in recent years is the result of the cooperation between the ARCH 335 Design Build studio from the School of Design (SOD) at Louisiana Tech University (LA, USA), MedCamps of Louisiana, Inc. and the social and entrepreneurial context of North Louisiana. The design process associated with the experiential learning laboratory in the ARCH 335 Studio proves to be intriguing. Since 2013, the studio, offered in the 3rd year of the undergraduate architecture degree, has engaged an average of 25 students annually, tasked with the design and implementation of a small-scale permanent project in collaboration with MedCamps of Louisiana. This initiative takes place at Camp Alabama, a 80-acre wooded property in the rolling hills of North Central Louisiana, Figure 2.

The facility is located 5 miles north of the I-20 corridor, between Monroe and Ruston, in Sibley, Louisiana. Camp Alabama is a property of the Presbytery of the Pines and operated in partnership with MedCamps of Louisiana. It features comfortable accommodations, paved pathways, a lake with canoes, paddleboats, and facilities including a wheelchair-accessible swimming pool. Activities include fishing, boating, arts and crafts, archery, nature hikes, music, drama, canoeing and swimming.

Throughout a year-long observation and analysis of the model from November 2022 to November 2023, the case study has been carried out by combining active observations of the territorial context in terms of urban pattern, rural-urban relationships, and care-related conviviality traditions. As per usual in the USA context, care facilities are initiated and managed via social initiatives and donations. The Lincoln Parish follows this tradition with several practices, including the Alabama Camp. Site visits and interviews were been conducted in November–December 2022 and September–November 2023. These semi-structured interviews were specifically conducted with professor Pasquale De Paola, Head

of the School, in December 2022 and professors of the Studio Brad Deal and Roberts Brooks in September and November 2023 and January 2024. Alongside the activities of the fall semester of 2023, semi-structured and informal interviews were administered to former students of design-build laboratory, some of whom currently hold teaching roles within the design school. The European researchers, in order to better understand the perceptions regarding the education-research-capacity building process developed by the SOD team, collected the (anonymized) students' reflections on the laboratory experience in the pre-coronavirus pandemic period: 10 each in 2016 and 2017 and 12 in 2018. A simulation of the activities has been conducted by visiting the laboratories at Louisiana Tech in order to understand the starting point of the activities, the basic equipment and tools, and the sketch model procedure, Figure 3.

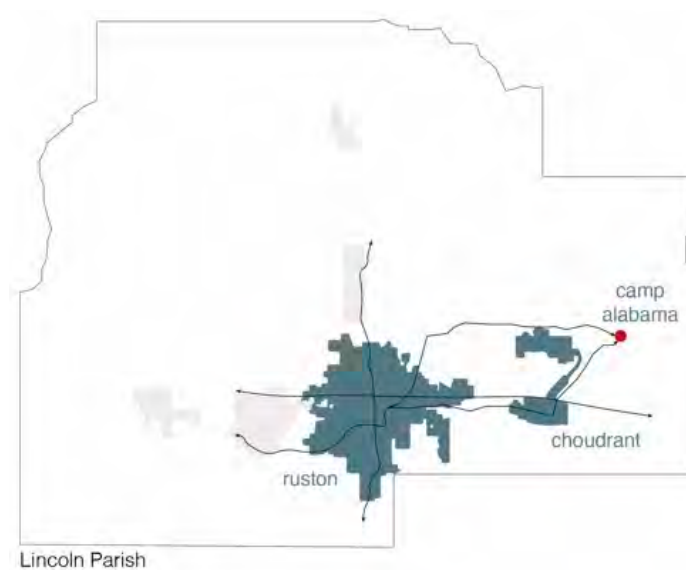


Figure 2. Camp Alabama, spatialization.

Since 2014, the 10-week design-build laboratory at the SOD has been dedicated to conceiving a project aimed at satisfying specific activities or needs of the camp, constructing pavilions to create a common and inclusive physical space to promote positive activities and experiences for users, Figure 4.

The Alabama Camp project has been the focus point of a learning process based on collaboration and mutual learning. While the first and second year design curriculum at Louisiana Tech focuses on traditional individual assignments to allow design students to build foundational competencies, strong work ethics, time management, and a well-rounded set of basic design skills, the Winter quarter of the third year has been historically organized around team or partner projects, the first of which is the design-build studio sequence: ARCH 325 and 335. The main achievements are the development of a more robust design process and production skills as well as team-work abilities. In addition, the interactions of the LA Tech SOD design team with the stakeholders—i.e., potential users of the Camp, volunteers from different building sectors, and communities involved—supported a highly collaborative practice. In the aims of the project, architecture plays a central role in cultivating awareness and self-sufficiency in project realization, enhancing correct environmental behaviors throughout the building phases as well as contributing to the community well-being, thus addressing environmental and social challenges at small scale.

This aligns with a masterplan developed by the studio in 2020 that considers the camp's expansion in 2018 following a donation of approximately 18 hectares to MedCamps of Louisiana, Figure 5.

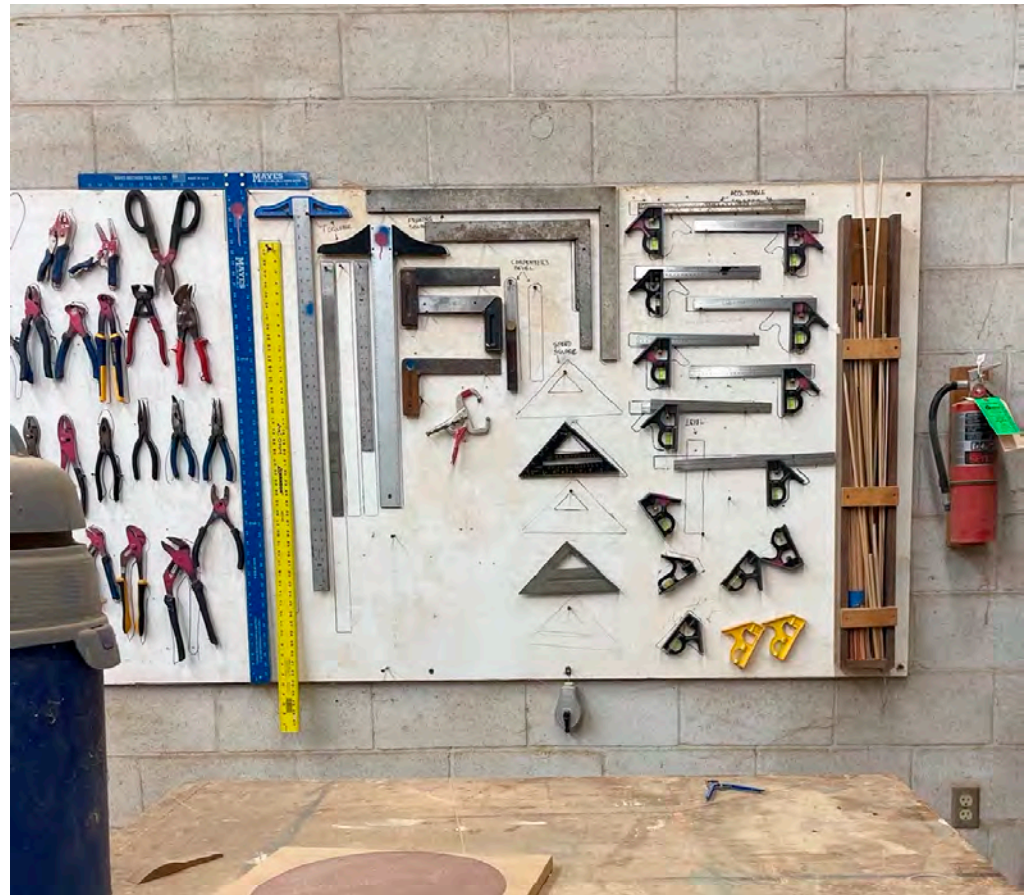


Figure 3. Construction laboratory at Louisiana Tech. Photo credit: Federica Paragliola.



Figure 4. The Alabama Camp Projects timeline.

The annual budget allocated for the construction of various pavilion scale projects typically ranges from \$15,000 to \$30,000 US and is sourced from a network of donations from local businesses or associations provided in direct funding and/or materials, Table 1.

Each year, a limited number of material resources are made available to students to build the project, typically incorporating reused metal from the oil and gas industry, wood, or upcycled materials of various kinds, Table 2 and Figure 4. An illustrative example is the Pisces bridge project, completed in the year 2017, Table 3. The construction required the design of a floating modular platform system that was constructed by repurposing detergent containers from regional carwash facilities, Figures 6 and 7. Another frequently used method involves building gabion walls. These walls, also known as retaining walls, are crafted by stacking metal cages filled with stones and bound together with wire. The materials used are sourced from recycled metal cages, incorporating inert substances from the remains of past constructions in the camp or surrounding areas, Figures 8 and 9.



Figure 5. Masterplan developed by ARCH 335 2020. Courtesy of the instructors Brad Deal & Robert Brooks.

Table 1. Alabama Camp at a glance.

Categories	Field of Application
Location	Camp Alabama, Ruston, Louisiana (USA)
Extension	40 acres
Starter date	Spring 2013
Duration	10 weeks per year
Involved people	<ul style="list-style-type: none"> - ARCH 335 Louisiana Tech University Design Build Studio (about 25 students) - Prof. Brad Deal (LATech University, SOD) - Prof. Robert Brook (LATech University, SOD)
Involved institutions	<ul style="list-style-type: none"> - MedCamps of Louisiana, non-profit charity organization - Louisiana Tech University, School of Design
Others involved partners	<p>Donors; external companies.</p> <p>The number of people involved in design and construction activities varies from year to year and from project to project. Typically, these activities are undertaken by students and professors alone, but occasionally external companies are involved to conclude or enhance certain aspects of the project. An example is the testing of the 2018 project, “Peregrine Zip Line”.</p>
Annual budget	\$15,000–\$30,000 US dollars
User engagement strategies	Variable-geometry neighborhood process, born out of needs. Volunteering.
Design technologies and tools	Rhino (major) & Grasshopper Autocad 2D Revit

Table 2. Summary table of the categories of co-designed pavilions.

Pavilion	Location	Material Reuse	Program	Year of Completion	# of Students	Budget	Calendar Time
Gibbs Pavilion	Developed area	Drill stem and rod	Event space/gatherings	2014	24	\$30,000	3 months
		Masonry rubble					
Archery Range	Wooded site	Drill stem and rod	Shooting sports	2015	17	\$15,000	3 months
Boat Launch	Open lake	Drill Stem and rod	Boating	2016	16	\$24,000	3 months
Pisces Bridge	Open lake	Drill Stem and rod	Circulation and fishing	2017	17	\$17,000	3 months
		Plastic storage drums					
Peregrine Zipline	Wooded site	Drill Stem and rod	Zipline and tower climb	2018	28	\$30,000	3 months
Stroud Store	Developed area	Renovation of existing structure	Concessions	2019	19	\$15,000	3 months
		Drill stem and rod					
		1865 bronze bell					
Entry	Developed area	Drill Stem and rod	Entry/security	2021	21	\$12,000	6 months
Art Cabin	Developed area	Renovation of existing structure	Arts and crafts	2022	23	\$40,000	6 months
		Drill Stem and rod					
Amphitheater	Wooded site	Drill Stem and rod	Event space/gatherings	2023	19	\$25,000	6 months

Table 3. Projects co-designed by SOD students and community within the Camp Alabama Masterplan.

Projects (pavilions) activities and functions	<p>2014 LARKIN GIBBS MEMORIAL PAVILION. Designed as a barrier-free space large enough to accommodate the multiple daily gatherings at a summer camp facility for children with special needs (100+ people).</p> <p>2015 CHIASMUS ARCHERY RANGE. Outdoor shooting range. The project features custom designed shooting stations that hold counterweight youth-sized compound bows, making the sport of archery accessible to those who cannot hold and draw the bow in the traditional manner.</p> <p>2016 HERO'S LAUNCH. A fully accessible canoe and paddleboat launch. With its prominent position on the water, the gesturing roofline and bright red threshold act as a beacon that calls the campers to explore the open water and the unknown areas of the camp.</p> <p>2017 PISCES BRIDGE. A bridge that connects the summer camp and creates an variety of opportunities for one of their camp activities: fishing. Two shade structures inspired by the form of fish jumping from the water create a gathering space equipped with lowered guardrails and rod holders to accommodate fishing.</p> <p>2018 PEREGRINE ZIPLINE & TREEHOUSE. Special needs-oriented zip line launch and landing structures including a "tree house" and climbing tower.</p> <p>At the "launch", dramatic steel walls gesture skyward, visually obscuring and revealing the zip-line. The varied deck facilitates safe loading, and a pivoting swing-arm allows wheelchair bound campers to be hoisted up, swiveled into position, and transferred onto the zip line. Riders unload at the "tree house", which extends horizontally as the land falls away.</p> <p>2019 STROUD STORE. This renovation of a 200 sf block structure offers refreshments during the week and operate as a camp gift store on the weekends. A humble block building, built in the early 1950s, served as a concession store for a children's summer camp for nearly three decades. The roof was removed from the existing structure, and all salvageable material was reclaimed and re-used on the interior. Custom trusses were fabricated from discarded steel from the local gas industry. Fixed shelving and a movable partition/merchandise display were fabricated from new and reclaimed material. A new entry gate and bell tower for a donated 1865 bronze church bell were also built from the reclaimed steel.</p> <p>2020 MASTERPLAN. A plan for the future growth of the facility and future projects for the studio was developed in response to the 2018 donation of additional adjacent land.</p> <p>2021 HERO'S ORIGIN ENTRY. A new entry court, including a signal tower, vehicular gate, and entry portal constructed with materials reclaimed from an onsite collapsed barn structure.</p> <p>2022 MOSAIC. Mosaic art cabin.</p> <p>Adaptive reuse of an existing structure at a summer camp for children with special needs into an arts and crafts "maker" space. The design task was to create immersive experiences, foster creative expression, and amplify the joy of making within the timeless traditions of summer camp.</p> <p>2023 IMAGO. The design task was to create a gathering space for ceremonies, talent shows, and other events that mark the timeless tradition of summer camp.</p>
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Figure 6. PISCES BRIDGE on its final night of construction. Photo credit: Brad Deal.

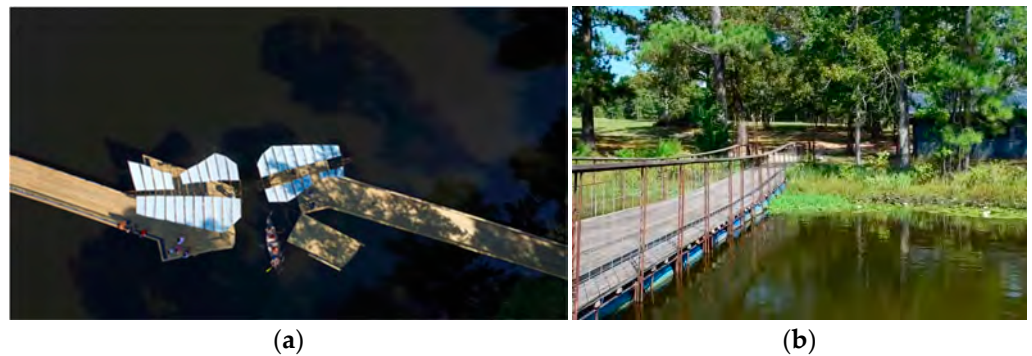


Figure 7. (a) PISCES BRIDGE, top view. Photo credit: Brad Deal. (b) Floating platform made of reclaimed plastic drums and steel rods for access across the pond. Courtesy of the author Federica Paragliola.



Figure 8. LARKIN GIBBS MEMORIAL PAVILION. Photo credit: Henry McCoy.

Overall, the constructions delivered each year are characterized as high-design technological projects produced through a “low-tech” approach, enabling adaptability, flexibility, and greater control, Figures 10 and 11. The trust placed by faculty and stakeholders in the students’ capabilities, evidenced by the allocation of significant resources, ensures that their design work is adequately supported until completion. As a testament to the continual improvement resulting from the ongoing adjustment of techniques and choices over the

years, in 2023, the project was honored with the Member’s Choice Award and Honor Award at the AIA LA ‘23 Conference on Architecture Awards Program, Figures 12 and 13.



Figure 9. (a) LARKIN GIBBS MEMORIAL PAVILION. Courtesy of the authors Brad Deal, Robert Brooks, MedCamps of Louisiana. (b) Walls formed by reused metal cages containing inert materials from the end-of-life of previous constructions within the camp or nearby areas. Courtesy of the author Federica Paragliola.



Figure 10. (a) Self-construction and “low-tech” student preparing to weld the shade structure of the Pisces Bridge. Photo credit Michael Tolar. (b) PEREGRINE zip line student demonstrating the tree house floor hatch. Photo credit, Brad Deal.



Figure 11. (a) Kids experiencing PEREGRINE zip line. Photo credit Brad Deal. (b) PEREGRINE zip line, details, photo credit Brad Deal.



Figure 12. (a) IMAGO, Member's Choice Award and Honor Award at the AIA LA '23 Conference on Architecture Awards Program. Courtesy of the author Federica Paragliola. (b) IMAGO, Member's Choice Award and Honor Award at the AIA LA '23 Conference on Architecture Awards Program. Courtesy of the author Federica Paragliola.



Figure 13. IMAGO, Member's Choice Award and Honor Award at the AIA LA '23 Conference on Architecture Awards Program. Photo credit, Brad Deal.

2.4. Results

Following a year-long observation and analysis of the model from November 2022 to November 2023, a synthesis of the results obtained from site visits and interviews has been carried out by the international team. The analytical setting comes from the selection criteria established in the starting point of the empirical phase: potentialities in terms of social innovation and environmental awareness; cooperation of different territorial players within a multi-actor experiences; collaborative design approach; and capacity-building opportunities.

Regarding the social innovation highlights, the Camp Alabama model, made by ARCH 335 Design-Build studio, promotes a culture of positivity and care for innovative, community-oriented architectural projects. Drawing inspiration and conceptual heritage from the work carried out by Rural Studio, a renowned architectural study project founded at Auburn University in Alabama, USA [29], the Alabama Camp Model actively involves students in the design and construction process to create customized solutions for the specific needs of the community. This educational pedagogy fosters experiential learning and mutual knowledge exchange through a design process that improves year by year through practice and collaboration between students and faculty. Louisiana Tech students are encouraged to directly participate in the life cycle of projects, from ideation

to realization, promoting the development of new, consciously aware professional roles within architecture.

The multi-actor co-design process is testified by a model that embraces an experimental approach, emphasizing trial and error and the processes of self-construction and self-learning as collective attitudes to improve the systematization and problem-solving definition of research fields. This approach underscores the crucial function of architecture and physical space design in promoting collective well-being in communities, addressing environmental and social issues, and developing attention and capabilities related to the use and reuse of local resources in terms of economic and ecological efficiency.

The cooperation between the ARCH 335 Studio and MedCamps, a specialized institution of care, is the key concept of the case study, enlightening the co-design purposes. The 10 plus years of experience designing, building, and sharing spaces for care, according to the needs of the community, meets the TREN conceptualization at different levels.

Regarding the users of the project, MedCamps' philosophy is to provide the participants, regardless of medical or special needs, with a meaningful life experiences, considering that "camping is an American tradition which epitomizes normalcy and provides participants with a sense of well-being, belonging, accomplishment and self-worth", Figure 14. According to this approach, the organization "supports growth in the physical, social and emotional aspects of the life of a young person with special needs" by providing at no charge a medically supervised residential camping experience. Each project has different program, producing a variety of opportunities to support outdoor activities for the community of campers and volunteers. Beginning with small efforts, the initiative has expanded, now reaching 450 children during a 12-week period in 2019 and addressing over 16 chronic illnesses.



Figure 14. MedCamps' participants enjoying Camp Alabama projects. Courtesy of the authors Brad Deal, Robert Brooks, MedCamps of Louisiana.

Regarding the capacity-building results, the project teams have gained new professional sensibilities, combining the caring approach for people with the care for the city and the environment. Hundreds of students, prospective architects, discovered the possibilities of reuse and recycle materials throughout the self-construction process. By combining creativity, environmental awareness, and a caring approach, innovative education results have been achieved. Iterations ad infinitum is the key concept for evaluating these results. In the earliest project phases, students are tasked with delivering multiple site plans and sketch models for every class meeting. With a body of fifty to seventy items to discuss at each session, the reviews and critiques are fast-paced marathons considering a wide variety of project directions and elements, Figure 15. The goal is to quickly identify which ideas resonate with the group and why. The explicit verbal interaction regarding the work brings the often elusive, internal design thinking dialogue into an open discussion format.



Figure 15. Sketch models from each round of classes. Photo credit: Brad Deal.

In most meetings, the conversation itself rather than the design work turns out to be the most valuable outcome. The class will arrive at a collective understanding of why a series of design decisions, materials, or circulation strategies are more appealing or appropriate than others through evaluation and consensus rather than subconscious whims. When run as intended, students begin to learn to speak candidly yet professionally, to defend their choices, to give and receive constructive criticism, and to consider the discussion more when creating their next iteration. Presenting ideas and work to their peers daily becomes routine and practiced rather than the dreaded and occasional mid-term and final reviews. By the end of the process, 200+ sketch models and proposals have been explored and utilized to distill the best ideas from the team. At each step in the process, discussions of program, structure, budget, poetics, appropriateness, etc. are explored exhaustively. The encouragement to produce and then evaluate iterations as a means of moving forward reinforces the value of a rigorous iterative process for them in the future. The second high-value outcome from class-wide collaboration emerges when the interactions with the “client” starts, preparing drawings, renderings, physical models, and presentations to better cooperate with non-technical stakeholders.

The feedback received by the participating students is relevant in understanding how deep the seeds of collaborative and environmentally aware practices go into training future architect and design professional figures. The mentioned reports from 2016–2018 experiences highlighted the skills developed and the confidence reached in controlling the design-to-build experience as well as the interaction with the communities in collecting the users demand.

The apparently limited contribution to the environmental sustainability, represented by the reuse of discarded materials and the use of renewable resources, is upgraded if considering the results in term of spreading environmental awareness and contributing in building renewed eco-compatible design skills and sensibilities. The potential butterfly-effect of the experience as a whole regards the care-led approach developed in the spatial

planning [30] as well as the community engagement toward the still niche topic of social and environmental resilience [31].

3. Discussion and Limitations

The case-study developed by the European researchers in collaboration with the embedded scholars of the hosting institution in Louisiana showed interesting results to be discussed and implemented within the TRENd project toolkit.

The co-design model, initiated in 2013, received awards, highlighting progress and the potential for replication through standardized methodology. Additional benefits encompass educational advantages, the training of architects to meet societal needs, and the regeneration of urban areas by leveraging local resources [32].

Despite budget constraints, the initiative emphasizes the pivotal role of architecture in advancing community well-being. Employing a bottom-up approach, the practice engages users, students, teachers, and local stakeholders in co-design, resulting in a people-based citadel of care. The outcomes include high-design technological projects produced through a “low-tech” approach, allowing for adaptability in urban regeneration. This very point appears relevant to address key questions regarding how to improve “preparedness” in order to increase local resilience regarding not only environmental hazard but also everyday life social challenges [33,34]. Allowing communities and technicians to work together applying low-tech, available solutions to everyday practices provides a big momentum in supporting transferability. This means enhancing inclusive planning practices to be implemented in different geo-political areas, despite different development rate levels such as marginalized areas in the seven continents [10]. Enabling building technologies, self-construction skills and capacity building tools, if combined, could produce the next frontier for social innovation and resilience implementation.

Experiences such as Valldaura Self-sufficient Labs, in Barcelona, Spain [35] and Design + Make program at AA’s Hooke Park campus in Dorset (UK) [36], offer the opportunity to discuss about the absence of similar activities within the standard curriculum of architecture degrees in Europe. These initiatives, typically associated with specialized programs or master’s degrees, are not integrated into the regular architecture curriculum. The limited availability of suitable spaces near architecture schools, often situated in densely populated urban areas, may contribute to this gap. While such initiatives are often affiliated with institutions that own forested areas, it is essential to ensure broader public access and involvement to encourage wider community engagement and collaboration.

While the presented design model boasts a comprehensive overall intervention plan, a notable gap emerges as it overlooks a specific program dedicated to the maintenance or demolition of the constructed artifacts. This gap represents a practical opportunity that could provide the project with a more advanced perspective, directing it toward intelligent conception and sustainable resource optimization in the long term, right from the initial phases of design and construction. An interesting aspect to consider is end-of-life-oriented design, a practice that, if integrated from the early stages of the design process, could trigger a smarter and more sustainable approach [37]. This perspective, aiming to understand the entire life cycle of interventions, could prove crucial for resource optimization and the creation of more resilient projects in harmony with environmental and social dynamics.

Another gap is evident in the absence of the involvement of digital technologies (e.g., digital app for materials and data exchange, users interaction, etc.) within this process. In a future perspective, engaging users and stakeholders through digital technologies could serve as a driver in creating an informative database on resources, both material and immaterial, correlated to user needs. These interventions not only influence material and energy flows but also act on social relationships, operating on a scale that, through the use of networks and enabling technologies, could encompass both neighborhood and global dimensions in a systemic vision.

This reflection is embedded in a broader context where the project evolves as a continuously transforming process, aiming to respond flexibly and adaptably to the evolving

needs of society and the surrounding environment. Collaborative design, understood as an approach to renew problem-solving through dialogue and experience-sharing, underscores the active involvement of users and communities in the design processes. Innovative solutions emerge from processes of co-production and co-governance, integrating material and immaterial dimensions as well as cognitive and operational aspects. Lastly, the integration of the economic, social, and technical dimension within the design process, promoting a holistic approach to urban development, represents a key to unlocking essential sustainable solutions to address climate challenges, including climate change.

4. Conclusions

The contribution aims to highlight the replicability potential of an action-research process that combines education, training, collaborative design, and capacity-building, bringing together an university institution that is close to the territory, stakeholders that are active part of the community, and business able to donate time and resources: the ARCH 335 studio model.

The standardization of the process, a fundamental pillar of the innovative approach, proves to be an essential factor in ensuring methodological coherence and the effective transferability of the adopted principles. The standardization of the method introduces a new design system focused on territorial attention, characterized by a site-specific approach closely connected to the social environment and oriented towards the care of the surrounding context. Particularly significant is the observed formative impact, manifested in the shaping of a new generation of architects. This innovative educational perspective, which uniquely integrates theory and practice, molds architects equipped not only with advanced and sensitive design skills but also with a profound understanding and engagement with the operational and manual aspects of the process. This educational model responds to the needs dictated by contemporary society, emphasizing the principles of flexibility and adaptation necessary to operate in diverse contexts and meet the multiple and plural needs of the design demand. Active participation in construction, framed within the design and testing process, emerges as a crucial practice to ensure coherence between design and realization. The proposed innovative process design translates concretely into the promotion of resilience, understood not only as adaptation to contingent challenges but as the capacity for self-regulation and proactive response. This innovative and resilience-rooted design aims to make the involved communities self-sufficient in the design and realization of space. The concept of self-sufficiency translates into increased community capacity to autonomously manage their resources, develop solutions suitable for local contexts, and promote a sustainable and responsible approach.

The transferability of sustainable and resilient approaches to users, facilitated by active engagement and education through students, sometimes translates into a process of collective self-learning adaptable over time. This perspective does not aim to replace traditional models of vertical research but emphasizes the importance of new cognitive habitats, fostering the construction of design solutions tailored to specific contexts and promoting shared knowledge through iterative co-creation processes involving designers and stakeholders.

The validity and replicability of the resilience-oriented design model are underscored. The standardization of the process, territorial attention, innovation in architect training, and the promotion of community self-sufficiency outline a comprehensive and integrated framework promising to revolutionize how we conceive and realize physical spaces. Specifically in Europe, this kind of approach could find fertile ground in the regeneration of peri-urban areas, focusing on the relationship among uses, resources, and values that characterize these territories. In conclusion, this theoretical framework promotes a design approach that not only addresses the practical and functional needs of physical spaces but also actively engages in constructing sensitive environments capable of adapting and thriving in response to the changing dynamics of society and the environment.

Furthermore, it is noteworthy that in Europe there is an absence of similar activities included in the standard curriculum of architecture degree programs. Although occasional workshops take place in educational institutions at times, they appear to be more exceptions than the norm. One possible explanation could be the lack of suitable spaces near architecture schools, which are often situated in densely populated urban contexts. When such activities occur, they are frequently linked to specialized schools or second-level master's programs, supported by promoters who are also owners of wooded or forested areas, thus limiting accessibility to the public or collaborative nature. In this scenario, community and local stakeholder involvement is lacking.

Another research perspective could focus on analyzing the dynamics resulting from exchanges among students, academic institutions, and stakeholders to assess the possibility of successfully replicating the proposed model in European contexts. A careful analysis of these dynamics could help identify challenges and opportunities that may affect the effectiveness and sustainability of the model in different academic and geographical settings.

In conclusion, the ARCH 335 projects at camp Alabama, as a case study, addresses the topic of self-organization and bottom-up initiatives on the one hand and the topic of capacity building and transition strategies on the other. By combining these topics and testing the results within a long-term and successful practices, the research group added a notch in the ladder towards a resilience-led/transition-worth policy design, the aims of which are to produce inclusive, adaptive, and regenerative planning processes.

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