DESIGNING WITH COMMUNITIES:
A FRAMEWORK FOR UNDERGRADUATE RESEARCH IN SUSTAINABLE FASHION

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THE FASHION INDUSTRY EXEMPLIFIES UNSUSTAINABLE PRODUCTION AND CONSUMPTION, GENERATING SEVERE ECOLOGICAL DAMAGE AND PERPETUATING EXPLOITATIVE LABOR PRACTICES. RECENT GLOBAL ANALYSES ESTIMATE THAT THE SECTOR CONTRIBUTES NEARLY 10% OF GLOBAL CARBON EMISSIONS, DISPOSES OF A TRUCKLOAD OF TEXTILES EVERY SECOND THROUGH LANDFILLING OR INCINERATION, AND RECYCLES LESS THAN 1% OF DISCARDED GARMENTS INTO NEW CLOTHING. THESE ALARMING FIGURES UNDERSCORE THE URGENCY OF RETHINKING HOW FUTURE DESIGNERS AND RESEARCHERS ARE EDUCATED. HIGHER EDUCATION INSTITUTIONS, PARTICULARLY DESIGN SCHOOLS, ARE POSITIONED TO PREPARE GRADUATES WHO CAN NAVIGATE THE INTERTWINED CHALLENGES OF SUSTAINABILITY AND SOCIAL JUSTICE. THIS PAPER PROPOSES THAT UNDERGRADUATE RESEARCH IN SUSTAINABLE FASHION, WHEN STRUCTURED AS A COMMUNITY-CENTERED PRACTICE, PROVIDES A POWERFUL PEDAGOGY FOR CULTIVATING SOCIALLY RESPONSIBLE DESIGN RESEARCHERS. DRAWING ON SUSTAINABLE FASHION STUDIES, PARTICIPATORY AND CO-DESIGN TRADITIONS, INDIAN KNOWLEDGE SYSTEMS (IKS), AND DESIGN JUSTICE, IT DEVELOPS A FIVE-PHASE FRAMEWORK—ENGAGEMENT, EXPLORATION, EMPATHY, EXPERIMENTATION, AND EVOLUTION. EACH PHASE SPECIFIES INPUTS, COMPETENCIES, OUTPUTS, AND MEASURABLE SOCIAL OUTCOMES, MOVING BEYOND ABSTRACT IDEALS TO ACTIONABLE PEDAGOGY. A MINI-CASE AND A 14-WEEK SEMESTER MAP DEMONSTRATE CLASSROOM INTEGRATION. BY POSITIONING COMMUNITIES AS EQUAL PARTNERS, THE FRAMEWORK CHALLENGES EXTRACTIVE MODELS OF DESIGN RESEARCH WHILE ALIGNING WITH GLOBAL SUSTAINABILITY AGENDAS, INCLUDING THE SDGS AND CIRCULAR ECONOMY.

KEYWORDS: SUSTAINABLE FASHION, UNDERGRADUATE RESEARCH, COMMUNITY-CENTERED DESIGN, INDIAN KNOWLEDGE SYSTEMS, DESIGN JUSTICE

INTRODUCTION

FASHION'S SUSTAINABILITY CRISIS

The global fashion industry stands at the intersection of environmental catastrophe and social inequality. According to the United Nations (2019), the sector is responsible for 8–10% of global greenhouse gas emissions—more than international aviation and shipping combined. According to the Ellen MacArthur Foundation (2017), the equivalent of one garbage truck of textiles is landfilled or burned every second, while less than 1% of discarded clothing is recycled into new garments. Water use, chemical pollution, and textile waste all contribute to an industry-wide footprint that is profoundly unsustainable.

Alongside environmental pressures are deep social crises. Global South garment workers face unsafe working conditions, poverty wages, and minimal labor protections (Clean Clothes Campaign, 2020). Simultaneously, artisanal knowledge systems and craft livelihoods are being erased under the onslaught of industrialized fast fashion (Dastkar, 2018). These twin erasures—of ecology and of culture—demand not only technological fixes but also a reimagining of fashion education and research.

THE ROLE OF YOUTH AND EDUCATION

Amid these crises, counter-narratives are emerging. Youth movements, exemplified by school strikes for climate and campus divestment campaigns, have expanded into fashion activism, reflecting a generational shift in sustainability consciousness (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2019). Teen Vogue—once a glossy lifestyle magazine—now routinely publishes editorials on sustainability, labor justice, and climate action, signaling how youth culture increasingly aligns with climate awareness. In the higher education sector, pioneering institutions such as the Centre for Sustainable Fashion (2021) at the London College of Fashion have developed sustainability-focused curricula and participatory research projects. These initiatives reflect a broader recognition: students are not passive recipients of knowledge but active agents of change.

For design education in particular, undergraduate research is a crucial pedagogical tool. It offers students the opportunity to investigate pressing issues while developing skills in critical inquiry, collaboration, and reflexivity, grounded in principles of experiential and participatory learning (Dewey, 1938; Freire, 1970; Kolb, 1984). Yet, undergraduate research in fashion is too often framed as individualistic, outcome-driven, and disconnected from the lived realities of communities most affected by fashion's externalities (Henninger et al., 2022). This paper argues for a different orientation: one in which undergraduate research is designed with—and not merely about—communities.

TOWARDS COMMUNITY–CENTERED PEDAGOGY

Design education has long valorized creativity and innovation, but it often privileges the designer's perspective over that of communities. Community-Centered research seeks to rebalance this by treating communities not as subjects but as co-researchers, knowledge holders, and co-authors of outcomes (Sanders & Stappers, 2008). Participatory traditions in design, from Scandinavian workplace democracy projects in the 1970s to contemporary co-design methodologies, offer precedents for such engagement (Björgvinsson et al., 2012). In fashion studies, sustainable design thinkers like Fletcher (2013) and Gwilt (2015) have argued that change requires slowing down, recentering relationships, and valuing vernacular knowledge.

Within the Indian context, this approach resonates with Indian Knowledge Systems (IKS), which emphasize harmony with nature, continuity of traditions, and interdependence of livelihoods. The Ministry of Education's (2022) Framework for Training Faculty on IKS underscores how indigenous epistemologies can be embedded into higher education curricula to foreground cultural continuity and ecological balance. Similarly, Singh (2023) reinforces that integrating IKS into education under National Education Policy (NEP) 2020 fosters ecological awareness and sustainable, context-sensitive learning. Besides, Escobar (2018) has called for a pluriverse of design approaches that validate diverse epistemologies rather than imposing a single universal model.

Community-Centered pedagogy is thus not only an ethical imperative but also a methodological necessity for sustainability transitions. It creates opportunities for mutual learning, strengthens the agency of marginalized communities, and equips students with competencies that go beyond technical skills (Costanza-Chock, 2020; Akama et al., 2020).

LINKING COMMUNITY–CENTERED PEDAGOGY TO UNDERGRADUATE RESEARCH

Community-Centered pedagogy extends beyond participation; it is a mode of learning rooted in reciprocity and collective inquiry. Building on Dewey's (1938) principle that education must grow from experience and Freire's (1970) view of learning as a dialogic and emancipatory process, such pedagogy situates knowledge creation within lived realities rather than abstract instruction. It aligns with Kolb's (1984) experiential learning cycle—concrete experience, reflective observation, abstract conceptualization, and active experimentation—by allowing students to move between learning about communities and learning with them.

For undergraduate research, this pedagogical orientation provides both ethical grounding and methodological scaffolding. Undergraduate students are often in formative stages of disciplinary learning; thus, they benefit from guided frameworks that help them navigate complexity without reproducing extractive power dynamics. Community-Centered pedagogy offers such a structure by framing research as co-learning: students act as facilitators and learners rather than as experts. Methodologically, this translates into phased engagement—trust-building, co-investigation, reflection, and co-dissemination—mirroring the design research process itself.

In this sense, community-centered pedagogy becomes not merely a teaching philosophy but a methodological infrastructure for undergraduate research. It enables students to cultivate competencies in systems thinking, reflexivity, and ethical collaboration, while positioning communities as co-authors of knowledge. This mutual exchange transforms research from a unidirectional process into a dialogic and socially situated practice, reinforcing the broader goals of sustainability and justice-oriented design education.

THE EDUCATIONAL GAP

Despite promising experiments, there is limited systematic research on how to embed community-centered approaches into undergraduate fashion research. Frameworks exist for graduate-level participatory action research or community-based design projects, but few address the undergraduate level, where competencies are still developing and pedagogical scaffolding is critical. Students need structured pathways to move from theoretical learning to applied community engagement, without reproducing extractive or paternalistic relationships.

Emerging international initiatives demonstrate how such pathways are being cultivated across diverse design education contexts. Niinimäki (2018) describes how Aalto University integrates community collaboration into sustainability curricula through iterative studio-based projects that combine systems thinking with experiential learning. Comparable pedagogical models have emerged globally, where design students co-create with local artisans to address social and ecological challenges. Berger (2020) documents collaborative projects that empower artisans through participatory design, highlighting mutual learning and equitable authorship. Similarly, Garcia Martinez (2023) presents a model of cultural inclusion developed through partnerships between product-design students and Mexican artisans, emphasizing heritage preservation, sustainable material use, and social innovation. These comparative cases illustrate how community-engaged design pedagogy can foster socially responsive research competencies, providing valuable parallels for contextualizing the proposed Indian framework within a broader global dialogue on design education and sustainability.

This paper therefore, asks: How can undergraduate research—explicitly designed around community engagement—function as a structured pedagogy for social impact in fashion design education?

By addressing this question, the paper contributes to both fashion education and the broader field of sustainability pedagogy. It proposes a conceptual framework grounded in interdisciplinary scholarship, specifies competencies and outputs for each stage, and illustrates curricular applications. In doing so, it positions undergraduate research not as a peripheral activity but as a central pedagogical strategy for training the next generation of socially responsible design researchers.

THEORETICAL BACKGROUND

The conceptual underpinnings of this paper draw from five overlapping strands of scholarship: design for social innovation, participatory and co-design traditions, sustainable fashion studies, undergraduate research in design education, and pluriversal approaches rooted in IKS.

DEFINING DESIGN RESEARCH IN UNDERGRADUATE EDUCATION

Design research has been variously defined across creative disciplines, but most frameworks converge on its dual role as both a mode of inquiry and a mode of practice. Christopher Frayling (1993) identified three core strands—research into, through and for design—distinguishing empirical study of design phenomena from inquiry conducted through creative practice itself. Subsequent scholars such as Bruce Archer (1995) and Nigel Cross (2006) emphasized that design constitutes a distinct epistemological domain, grounded in abductive reasoning and the generation of designerly ways of knowing.

Within undergraduate education, design research functions pedagogically as a means of cultivating reflective practitioners who can articulate, test, and communicate ideas systematically. Jonas (2007) and Koskinen et al. (2012) extend this view by positioning design research as an integrative activity that bridges theory, making, and social context. Building on these traditions, this paper conceptualizes design research not merely as academic inquiry but as a situated, community-responsive process—a way of generating knowledge with communities rather than about them. In this sense, designing with communities locates design research at the intersection of creative exploration, social innovation, and participatory pedagogy.

Taken together, these literatures inform the proposed pedagogical framework and provide a foundation for integrating community engagement into undergraduate fashion research.

DESIGN FOR SOCIAL INNOVATION

Design for social innovation is understood as an orientation toward small, local, and distributed solutions that generate value within communities rather than extract from them (Manzini, 2022). Rather than focusing exclusively on technological novelty, this approach emphasizes relationships, collaboration, and resilience. Recent studies have extended Manzini's ideas through empirical projects linking social design, education, and sustainability transitions. Jégou and Manzini (2008) highlight how living labs and distributed innovation ecosystems foster collective problem-solving in local contexts. In the context of fashion education, this approach encourages students to see design not only as product development but as a catalyst for systems-level change. Social innovation frames research as a collaborative journey with communities—one that is iterative, reflexive, and attentive to local contexts.

PARTICIPATORY AND CO-DESIGN TRADITIONS

Participatory design has its roots in Scandinavian workplace democracy projects of the 1970s, where designers worked alongside workers to ensure that new technologies served democratic and equitable ends. Sanders and Stappers (2008) expanded this into co-creation, highlighting the role of users and communities as active participants in generating ideas, not simply evaluating finished solutions. Björgvinsson et al. (2012) extended this perspective with the notion of infrastructuring, where participatory design creates ongoing platforms for collaboration rather than one-off interventions. Recent scholarship further broadens these foundations, integrating participatory design with sustainability transitions and systems thinking. Akama et al. (2020) discuss design with communities and more-than-human participation, emphasizing relational accountability. Similarly, Manzini (2022) reframes participation as a civic infrastructure that supports collective care and localized innovation. Together, these perspectives highlight how participatory and co-design traditions have evolved from democratic engagement to frameworks for long-term social and ecological transformation.

For undergraduate research, these traditions underscore the importance of shared authorship, iterative feedback, and mutual learning. More recent scholarship has extended participatory design toward justice- and ecology-centered perspectives. Costanza-Chock (2020) frames design justice as a community-led methodology that redistributes design agency and challenges structural inequities within systems of production. Akama et al. (2020) expand this discourse to include more-than-human participation, advocating for co-design practices that acknowledge ecological actors and interdependence. Manzini (2022) similarly argues for livable proximity—a relational approach that values small-scale collaboration, care, and situated engagement as foundations for sustainable transformation. Collectively, these perspectives enrich participatory traditions by connecting them to environmental ethics and social justice, reinforcing their pedagogical relevance within contemporary design education.

They also provide a set of tools—workshops, co-mapping exercises and participatory prototyping—that can be adapted to classroom and field contexts. When linked to fashion education,

participatory design ensures that sustainability projects respond to community-defined priorities rather than externally imposed agendas.

PLURIVERSAL DESIGN AND IKS

Arturo Escobar (2018) introduces the concept of the pluriverse—a world in which multiple epistemologies coexist, challenging the dominance of Western, industrial modernity. For design, this means recognizing that local and indigenous knowledge systems are not archaic remnants but living frameworks that offer critical alternatives.

In India, IKS provides a rich foundation for rethinking sustainability. Singh (2023) shows how traditional craft practices embody ecological balance, resource frugality, and intergenerational knowledge transfer. These systems illustrate models of circularity that predate contemporary sustainability discourses. Incorporating IKS into undergraduate fashion research not only grounds students in local contexts but also resists the erasure of cultural heritage.

CONCEPTUAL GAP

Despite these diverse contributions, a clear gap remains. Existing scholarship rarely specifies how undergraduate students—still in formative stages of learning—can systematically engage communities in research. While participatory action research and graduate-level community-based projects provide models, they often assume advanced methodological skills. Undergraduate pedagogy requires scaffolding: staged processes, clear competencies, and assessment rubrics. This paper addresses this gap by proposing a five-phase conceptual framework that integrates sustainable fashion, participatory design, and IKS into undergraduate research practice.

RESEARCH PROBLEM AND OBJECTIVES

RESEARCH QUESTION

How can undergraduate research in sustainable fashion, grounded in community engagement, be structured as a pedagogy for social impact?

OBJECTIVES

1. Integrate theories of sustainability, participatory design, and IKS into undergraduate research practices.
2. Propose a conceptual framework—derived from experiential and participatory learning models—for community-centered pedagogy in sustainable fashion, detailing competencies, activities, and outputs.
3. Demonstrate curricular applications through an illustrative vignette and a semester-long implementation map.

METHODOLOGY, SCOPE, AND APPROACH

LITERATURE SYNTHESIS

This study is a conceptual paper employing an integrative review and conceptual model building. Unlike empirical research, conceptual inquiry synthesizes multiple bodies of literature to propose new theoretical or pedagogical models. The methodology proceeds in three steps: literature synthesis, analytical framing, and framework construction.

Sources were identified through structured searches in Scopus, JSTOR, and Google Scholar, supplemented by targeted citation tracing from seminal authors in design research and sustainability. The search covered the years 2000–2025, capturing both foundational theories and recent pedagogical developments. Search strings combined keywords across four domains—(a) "sustainable fashion" OR "sustainability pedagogy," (b) "participatory design" OR "co-design," (c) "undergraduate research" OR "design education," and (d) "Indian Knowledge Systems" OR "indigenous knowledge." Filters were applied to include peer-reviewed journal articles, edited books, and official policy reports.

The inclusion criteria focused on works that explicitly addressed themes of design, sustainability, pedagogy, or community engagement, ensuring relevance to the research question. Studies were selected if they were directly related to fashion or creative-practice education and provided either an empirical or conceptual contribution published in English.

Conversely, papers were excluded if they were purely technical or materials-science oriented without a social or educational dimension. Grey literature lacking peer review was also omitted, along with works published prior to 2000, except for historically foundational texts such as Frayling (1993) and Freire (1970), which were retained to provide theoretical grounding.

A total of 33 sources were reviewed, of which 28 peer-reviewed articles and 5 books or policy reports were analyzed in depth (Appendix A). Each text was coded thematically using three analytical lenses—sustainability orientation, participatory methodology, and pedagogical contribution—to identify convergences and gaps. These themes subsequently informed the analytical framing and the construction of the five-phase pedagogical model.

To illustrate the coding process, the following examples demonstrate how individual sources were analyzed across the three lenses. Fletcher (2013) was coded under sustainability orientation for its emphasis on slow fashion and ecological limits, with no participatory methodology, and categorized as a pedagogical contribution for framing reflexivity and material consciousness in design curricula. Björgvinsson, Ehn, and Hillgren (2012) was coded as strongly oriented toward participatory methodology, particularly infrastructuring and long-term collaboration, while its sustainability orientation was indirect; pedagogically, it contributed tools for shared authorship and co-creation. Conversely, Niinimäki (2018) combined sustainability orientation (circular economy, ecosystem thinking) with a pedagogical contribution through its model of integrative sustainability education, but contained no explicit participatory method. These coded distinctions allowed the research team to map convergences—such as shared emphasis on reflexivity, collaboration, and systems thinking—and identify gaps, notably the lack of undergraduate-focused frameworks that integrate all three lenses simultaneously.

ANALYTICAL FRAMING

The analytical lens combines three perspectives:

1. Community-Centered design ethics emphasize reciprocity, equity, and shared authorship.
2. Justice-oriented pedagogy, influenced by Costanza-Chock's (2020) design justice framework, which centers marginalized voices.
3. IKS and pluriversal approaches, which situate sustainability within cultural continuity and ecological balance.

These lenses informed both the interpretation of existing scholarship and the construction of the proposed framework. The synthesis process followed an iterative approach. Insights from the coded literature were mapped into thematic clusters using visual affinity diagrams. Cross-comparison among clusters enabled the identification of overlapping constructs—sustainability, participation, reflexivity, and indigenous knowledge—which became the conceptual anchors of the framework (Figure 1). Preliminary validation was achieved through peer discussion with two design-education faculty members and one community practitioner, ensuring face validity and pedagogical coherence

FRAMEWORK CONSTRUCTION

Based on the synthesis and analytical framing, the authors developed a five-phase pedagogical model—Engagement, Exploration, Empathy, Experimentation, and Evolution—that translates community-centered pedagogy into an actionable research process for undergraduate fashion education.

The construction of the model followed an iterative conceptual mapping process. Key themes emerging from the literature—participation, reflexivity, systems thinking, and ethical collaboration—were visually organized using affinity diagrams and flow charts (Figure 2). Each theme was then aligned with specific stages of research practice observed in sustainable design and community engagement literature. This comparative synthesis produced five recurrent learning moments, which became the structural phases of the framework.

To enhance rigor and applicability, the preliminary model was presented to three design-education faculty members and two community partners familiar with participatory fashion projects. Their feedback informed adjustments to the sequence of phases (e.g., separating Engagement from Exploration) and to competency definitions. In addition, alignment with the Sustainable Development Goals (SDGs) and UNESCO's (2019) Education for Sustainable Development framework was used as an external benchmark to ensure global relevance.

The resulting framework specifies, for each phase, the expected inputs, student competencies, outputs, and measurable social outcomes. While conceptual, it was designed for direct classroom integration and future empirical testing through pilot studies. Its robustness lies in triangulating three data sources—literature synthesis, expert review, and practice-based reflection—thereby strengthening validity and transferability across contexts. To ensure methodological transparency and replicability, the mini-case component employed multiple qualitative data collection techniques, including participant observation, reflexive journals, semi-structured interviews, focus-group discussions, photo documentation, and co-design workshop notes.

MINI–CASE STUDY METHODOLOGY

The mini-case was developed as a replicable model of undergraduate community-engaged research within a sustainable fashion curriculum. It was implemented in the course "Design Research for Sustainable Fashion," offered to second-year Bachelor of Design (B.Des) students at IILM University, Gurugram. The course follows a studio-field hybrid modality, combining classroom-based instruction, experiential learning, and community immersion. Students engaged in the project for four hours per week over a 14-week semester.

The mini-case was implemented with a cohort of undergraduate fashion design students working under the supervision of one faculty member and in partnership with a community organization—specifically, a women's cooperative of textile waste pickers based in Delhi. Students worked in small teams, while cooperative members participated as community experts, co-investigators, and co-designers. The faculty member provided methodological scaffolding, coordinated ethical protocols, and ensured alignment between course objectives and community needs.

PARTICIPANT ROLES

The mini-case involved a cohort of 15 undergraduate students, one faculty facilitator, and 10 community members from the partner textile-waste cooperative. Students conducted field visits, mapped material flows, facilitated co-design workshops, generated prototypes, and maintained reflexive journals documenting their evolving positionality and insights. Community members shared experiential knowledge on waste economies and labor practices, evaluated design ideas, contributed to prototyping, and co-authored the final outputs. Faculty guided the research structure, ensured ethical compliance, supported data interpretation, and facilitated evaluation and dissemination activities.

DATA COLLECTION TECHNIQUES

To enable systematic analysis and replicability, the mini-case used multiple qualitative data collection methods:

1. Reflexive journals maintained weekly by students.
2. Participant observation notes during cooperative visits and workshops.
3. Semi-structured interviews with cooperative members on livelihood practices.
4. Focus-group discussions mid-semester to reflect on co-design progress.
5. Photo and video documentation of sorting processes, workshops, and prototypes.
6. Artefact and material analysis tracking prototype evolution across iterations.

DATA ANALYSIS

Data were analyzed using thematic coding, following the broader analytical lenses used in the conceptual framework: sustainability orientation, participatory methodology, and pedagogical contribution. Visual materials—including workshop boards, prototypes, and process photographs—were evaluated through visual analysis techniques to identify patterns in material choices and co-design interactions. To strengthen validity, a peer-review triangulation process was conducted with three faculty reviewers. Member-checking sessions with community collaborators ensured that interpretations accurately represented their experiences and contributions. This structured and transparent methodology enables the mini-case to be replicated across undergraduate design programs seeking to embed community engagement, participatory design, and sustainability-driven pedagogy into fashion education.

RESULTS AND DISCUSSION

THE FIVE–PHASE FRAMEWORK

The proposed framework advances five interconnected phases: Engagement, Exploration, Empathy, Experimentation, and Evolution. Each phase includes inputs, activities, competencies, outputs, and measurable social outcomes. The interconnections among these stages are illustrated in Figure 3, which visualizes the cyclical and iterative nature of the framework. Students and community partners move continuously between phases, reflecting a co-learning process that builds trust, insight, creativity, and social impact.

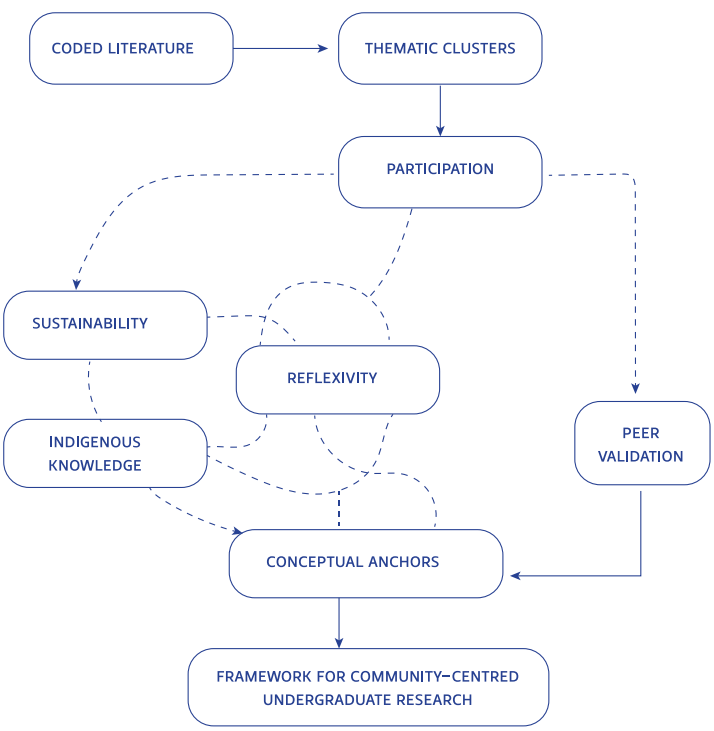


FIGURE 1. Conceptual synthesis through affinity mapping. The diagram illustrates how coded themes from the reviewed literature were clustered into four key constructs—sustainability, participation, reflexivity, and indigenous knowledge—which served as the conceptual anchors for the proposed five-phase pedagogical framework. Arrows indicate the iterative synthesis process from literature coding to framework development.

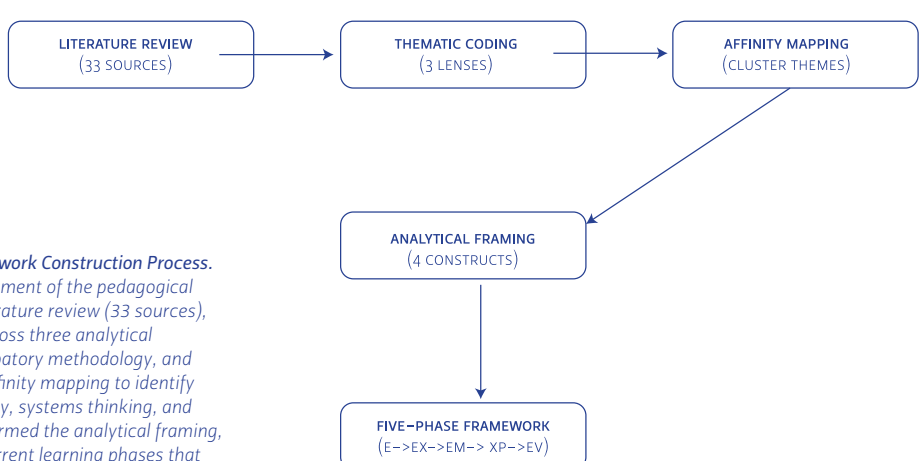
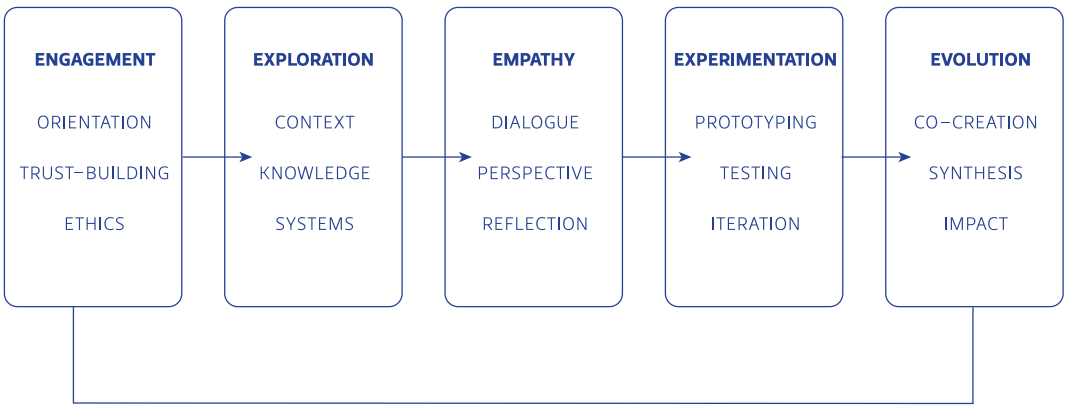


FIGURE 2. Conceptual Mapping and Framework Construction Process. This figure visualizes the iterative development of the pedagogical model. Beginning with an integrative literature review (33 sources), the process involved thematic coding across three analytical lenses (sustainability orientation, participatory methodology, and pedagogical contribution), followed by affinity mapping to identify clustered themes (participation, reflexivity, systems thinking, and ethical collaboration). These clusters informed the analytical framing, which subsequently shaped the five recurrent learning phases that form the structural foundation of the proposed framework.



FIVE–PHASE FRAMEWORK FOR COMMUNITY–CENTRED UNDERGRADUATE RESEARCH

FIGURE 3. Five-Phase Framework for Community-Centered Undergraduate Research.
This figure illustrates the cyclical relationship among the five phases—Engagement, Exploration, Empathy, Experimentation, and Evolution—showing how students and communities co-learn through iterative engagement and reflection.

TABLE 1. FIVE–PHASE FRAMEWORK FOR UNDERGRADUATE RESEARCH IN SUSTAINABLE FASHION

PHASE	PEDAGOGICAL ROLE	STUDENT COMPETENCIES	PEDAGOGICAL ROLE
Engagement	Establishes ethical foundations and mutual trust through orientation sessions, initial community meetings, and signing of Memoranda of Understanding (MoUs). Students co-define project scope and consent protocols with partners.	Ethics, communication.	Communities exercise agency in setting research agendas and partnership terms.
Exploration	Builds analytical grounding via annotated bibliographies, secondary data review, and mapping of ecological and social systems. Research becomes context-specific rather than theoretical.	Systems thinking, analytical inquiry.	Community contexts shape the research focus, ensuring relevance and authenticity.
Empathy	Deepens understanding through immersion, participant observation, and reflexive journaling. Students practice listening and perspective-taking.	Reflexivity, cultural sensitivity.	Community narratives are centered, promoting mu-tual respect and knowledge exchange.
Experimentation	Facilitates co-design and iterative prototyping in workshops where students and community members collaboratively create and test solutions.	Collaboration, creativity.	Shared authorship and skill transfer occur be-tween students and community partners.
Evolution	Consolidates learning through joint exhibitions, feedback sessions, and dissemination workshops. Students evaluate and communicate outcomes.	Evaluation, dissemination.	Community satisfaction assessed; co-authored outputs disseminated in accessible formats.

COMMUNITIES AS CO-CREATORS, ETHICS AND POSITIONALITY

No framework for community-centered research is complete without explicit attention to ethics. Community engagement is often discussed in design education but rarely operationalized in ways that ensure equity and reciprocity. In this framework, communities are positioned as co-creators rather than as mere subjects of research. This reorientation addresses two critical concerns: the extraction of community knowledge without recognition or benefit and the superficiality of participation when communities are consulted only at the end of projects.

Björgvinsson et al. (2012) remind us that participatory design is about infrastructuring—creating platforms for ongoing collaboration rather than short-term interventions. For undergraduates, this translates into learning how to share authorship, negotiate expectations, and co-define project goals with partners. This experiential process not only generates stronger design outcomes but also inculcates ethical responsibility in early-stage researchers.

Undergraduate students, in particular, require guidance in navigating power imbalances, intellectual property rights, and issues of consent. As Costanza-Chock (2020) argues, design justice requires redistributing power and authorship to those most affected by design outcomes, making ethical reflexivity central to practice. Similarly, UNESCO (2019) emphasizes that education for sustainable development must integrate ethical and socio-emotional dimensions alongside cognitive competencies. Ethics training must therefore be embedded in the curriculum from the outset. The key ethical principles outlined were defined through a synthesis of community-based research frameworks, participatory design literature, and international guidelines on responsible research (Costanza-Chock, 2020; UNESCO, 2019; Fry, 2009). These sources collectively emphasize reciprocity, transparency, and accountability as foundational values for equitable collaboration. In the context of undergraduate research, these principles were adapted to ensure pedagogical clarity—transforming broad ethical commitments into actionable learning standards that guide student-community partnerships.

Key principles include:

1. **Informed consent**. Communities must understand and agree to the scope, risks, and benefits of research.
2. **Recognition of community knowledge**. Students must credit and cite community contributions, resisting the erasure of informal expertise.
3. **Fair compensation**. Time, labor, and intellectual property must be recognized and remunerated.
4. **Shared authorship**. Communities should be credited as co-authors or collaborators wherever appropriate.

Equally important is positionality: students must learn to reflect critically on their own privilege, cultural background, and institutional location. Faculty mentors play a crucial role in scaffolding reflexivity, ensuring that students neither romanticize nor patronize communities. Instead, positionality becomes a tool for transparency and humility in research practice.

TRAINING CRITICAL COMPETENCIES

The five-phase framework is designed not only to structure research but also to scaffold competency development in students. These three competencies were defined through a synthesis of interdisciplinary literature spanning sustainability education, participatory design, and experiential learning. Across these fields, a consistent pattern emerges: effective community-centered research requires the capacity to think systemically, act reflexively, and engage ethically. Systems thinking was selected as it underpins sustainability transitions by connecting ecological, social, and economic dimensions (Walker, 2014). Reflexivity reflects the pedagogical emphasis on critical self-awareness within design and social inquiry, drawing from Schön's (1983) reflective practitioner and Freire's (1970) dialogic education. Ethical responsibility arises from design justice and futuring frameworks that foreground community agency and anticipatory care (Costanza-Chock, 2020; Fry, 2009). Collectively, these competencies represent the minimal but sufficient set of capabilities that enable students to conduct design research with both intellectual depth and social accountability, aligning with UNESCO's (2019) call for integrated cognitive, socio-emotional, and ethical learning outcomes.

Three competencies are foregrounded:

1. **Systems Thinking**. The ability to see interconnections across ecological, social, and economic domains. In design education, systems thinking is increasingly recognized as a foundation for sustainability transitions. Irwin et al. (2020) identify systems literacy as a prerequisite for addressing complex, interdependent challenges, calling for design curricula that integrate socio-technical, ecological, and ethical dimensions. Walker (2014) similarly argues that cultivating a systemic perspective enables designers to move beyond problem-solving toward transformative, regenerative practice. Embedding systems thinking within undergraduate research allows students to contextualize fashion and design processes within wider socio-ecological networks, fostering a mindset oriented toward long-term sustainability rather than short-term innovation. Linked to the Exploration phase, this competency requires students to analyze supply chains, waste streams, and community contexts holistically.
2. **Reflexivity**. The practice of examining one's own positionality, biases, and assumptions. This is emphasized in the Empathy phase, where students maintain reflexive journals and engage in facilitated debriefs. Reflexivity deepens the Empathy phase by encouraging students to question how their own values, privileges, and assumptions shape research outcomes. Schön (1983) introduces the concept of the reflective practitioner, positioning reflection-in-action as central to professional learning and ethical responsiveness. Similarly, Freire (1970) frames education as a dialogic process of conscientização—critical self-awareness developed through reciprocal engagement. Within community-based design pedagogy, reflexivity transforms research into a shared process of inquiry, allowing students to confront biases and co-create meaning with participants rather than impose interpretations upon them.
3. **Ethical Responsibility**. The recognition of community agency, fair labor practices, and shared authorship. This spans the Engagement and Evolution phases, where students establish agreements and co-author outputs. Ethical responsibility grounds the Engagement and Evolution phases in transparency, reciprocity, and

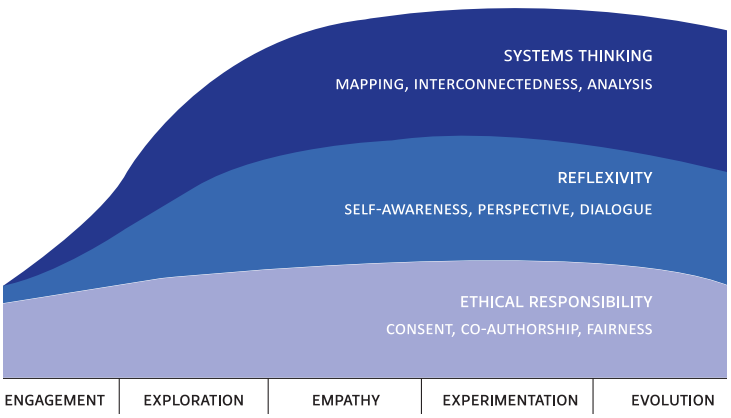


FIGURE 4. Competency Development Map for the Five-Phase Framework.
This figure depicts how systems thinking, reflexivity, and ethical responsibility evolve progressively through the five phases—Engagement, Exploration, Empathy, Experimentation, and Evolution—illustrating cumulative growth in student capability and ethical awareness.

FIGURE 5. Initial Field Visit and Orientation.
Students participated in an on-site orientation at the textile waste-sorting facility, observing material flows and learning about cooperative operations. This engagement established the foundations for ethical and collaborative research.

FIGURE 6. Exploring Material Flows Inside the Sorting Unit.
Students documented the scale of discarded textiles and learned about sorting practices, waste categorization, and labor conditions inside the facility.

FIGURE 7. Immersion and Dialogue with Women Waste Workers.
During the immersion phase, students observed fabric-sorting techniques and engaged in contextual conversations with waste workers to understand daily challenges and skill-based knowledge systems.

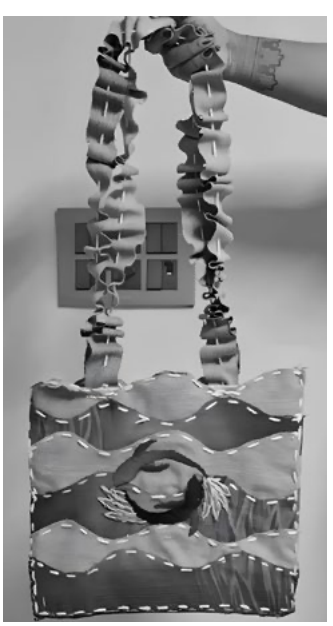


FIGURE 8. Prototype Samples Produced in Experimentation Phase.

accountability. Costanza-Chock (2020) situates design justice as a practice that redistributes power, ensuring those most affected by design decisions hold meaningful authorship and agency. Fry (2009) extends this ethic toward design futuring, calling for anticipatory responsibility that safeguards ecological and social continuity. Within undergraduate research, embedding such ethics means treating communities not as subjects of study but as co-authors of knowledge. This approach aligns with contemporary sustainability education, where ethical literacy is inseparable from creative and methodological competence.

By explicitly linking competencies to phases, the framework ensures that learning outcomes are measurable and progressive rather than incidental. This developmental relationship is further illustrated in Figure 4, which maps how the three key competencies—systems thinking, reflexivity, and ethical responsibility—evolve progressively through the five phases. The figure highlights how each competency strengthens across sequential stages, reinforcing students' growth from analytical understanding to ethical, co-creative practice.

A MINI-CASE: WASTE-PICKERS AND FASHION STUDENTS

Fashion, often dismissed as frivolous or consumerist, is reimagined here as a medium for social transformation. Costanza-Chock's (2020) framework of design justice underscores that design must redistribute its benefits and burdens, centering marginalized voices. Undergraduate projects in fashion can thus become vehicles for advocacy.

To illustrate, consider a pilot engagement between undergraduate fashion students in Delhi and a women's cooperative of textile waste pickers. The cooperative specializes in sorting and selling fabric remnants collected from garment factories. Students partnered with the women to co-create upcycled fashion accessories.

The process began with engagement, where students visited the cooperative, learned about the women's livelihoods, and established agreements around intellectual property and profit-sharing (Appendix B). During Exploration stage, students conducted a literature review on informal waste economies, mapping the socio-economic challenges faced by waste pickers. The Empathy phase involved shadowing cooperative members and maintaining reflexive journals on positionality and bias. In Experimentation, students and waste pickers co-developed prototypes—bags and home accessories—that incorporated discarded fabrics. Finally, in Evolution, prototypes were showcased in a joint exhibition, with both students and cooperative members credited as co-authors (Figures 5–8).

This vignette illustrates reciprocity: students learned about informal economies and systems thinking, while the women's collective expanded its product portfolio and gained visibility. Beyond producing garments, the project contributed to visibility campaigns demanding better labor protections. Students learned how design can amplify marginalized voices and how fashion research can intervene in public discourse. Evidence of these outcomes emerged from student reflection journals, post-project debriefs, and feedback from cooperative members, who reported increased sales and local market interest. Similar educational collaborations have been shown to enhance both student competencies and community capacities in sustainable design contexts (UNESCO, 2019). Such collaborations reveal how undergraduate research can generate social impact when communities are engaged as partners.

CONCLUSION AND IMPLICATIONS

Undergraduate research in sustainable fashion extends far beyond the boundaries of academic inquiry. It functions as a training ground for socially responsible researchers, equipping students with the tools to question, critique, and reimagine fashion as a vehicle for change. The central insight is that communities are not passive subjects of study but active partners in knowledge creation. By recognizing communities as co-creators, students learn to navigate the ethical, cultural, and social dimensions of sustainability in more grounded and impactful ways.

The article advances a theoretical contribution through the framework of Designing with Communities, which repositions undergraduate research as a pedagogical model for social impact. This model emphasizes iterative phases of engagement, exploration, empathy, experimentation, and evolution, guiding students to connect research with lived realities.

Implications emerge on three levels:

1. **For design schools**. Integrating community-based research methods within curricula ensures that undergraduate programs cultivate critical competencies in sustainability, ethics, and collaboration.
2. **For policy**. Aligning fashion education with the Sustainable Development Goals (SDGs) and circular economy priorities can strengthen the role of higher education in achieving global sustainability agendas.
3. **For future research**. Empirical testing and refinement of the proposed five-phase framework can establish evidence-based pathways for embedding social responsibility.

This paper has proposed a conceptual framework for embedding community engagement into undergraduate research in a sustainable fashion. By integrating insights from sustainable fashion studies, participatory design traditions, IKS, and design justice, the framework offers a five-phase pedagogy—Engagement, Exploration, Empathy, Experimentation, and Evolution—that scaffolds student learning while ensuring reciprocity with communities. The contribution is threefold. For academic programs, the framework provides a structured pathway to embed community research within undergraduate curricula, making research central to learning rather than a peripheral exercise. For policy and institutional leaders, it demonstrates how higher education can align with calls for participatory and IKS-driven approaches in sustainability education (UNESCO, 2019). For communities, it offers a model where partnerships with universities result in tangible outcomes such as skill transfer, shared authorship, and enhanced visibility. At the same time, limitations remain. The framework is conceptual and requires empirical validation across multiple institutional and cultural contexts. It also primarily draws on Indian examples; adaptation will be needed in other geographies. Future research should pilot this framework in classrooms, measuring student competency growth (e.g., reflexivity, systems thinking) alongside community outcomes (e.g., livelihoods supported, waste diverted, satisfaction surveys). By positioning communities as equal partners in knowledge creation, undergraduate research in sustainable fashion can move beyond extractive models of design education. It can cultivate socially responsible design researchers prepared to address fashion's intertwined ecological and social crises, contributing to sustainability transitions aligned with the Sustainable Development Goals (SDGs) and circular economy principles.

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TABLE 1. APPENDIX A. LITERATURE SUMMARY TABLE

	AUTHOR(S)	YEAR	TITLE	SOURCE / PUBLISHER	THEME
1	Akama, Y., Light, A., & Kami-hira, T.	2020	Expanding participa-tion to design with more-than-human concerns	Proceedings of the 16th Participatory Design Conference 2020, ACM	Participatory de-sign; ethics
2	Archer, B.	1995	The nature of re-search	Co-Design Journal	Design research
3	Berger, E.	2020	Empowering artisans through design	DRS International Conference 2020	Participatory craft design
4	Björgvinsson, E., Ehn, P., & Hillgren, P. A.	2012	Design things and design thinking	Design Issues	Participatory design
5	Centre For Sustainable Fashion	2021	Education For Sus-Tainability Transfor-Mation Report	London College Of Fashion	Sustainability Edu-Cation
6	Clean Clothes Campaign	2020	Underpaid In The Pandemic	Clean Clothes Campaign	Labour Rights
7	Costanza-Chock, S.	2020	Design Justice	Mit Press	Design Justice
8	Cross, N.	2006	Designerly Ways Of Knowing	Springer	Design Epistemolo-Gy
9	Dastkar	2018	Crafting Sustainable Livelihoods	Dastkar	Artisan Livelihoods
10	Dewey, J.	1938	Experience And Edu-Cation	Macmillan	Experiential Learn-Ing
11	Ellen Macarthur Foundation	2017	A New Textiles Economy	Emf	Circular Fashion
12	Escobar, A.	2018	Designs For The Plu-Riverse	Duke University Press	Pluriversal Design
13	Fletcher, K.	2013	Sustainable Fashion And Textiles	Routledge	Sustainable Fashion
14	Fletcher, K., & Tham, M.	2019	Earth Logic	Jj Charitable Trust	Degrowth Fashion
15	Freire, P.	1970	Pedagogy Of The Oppressed	Herder & Herder	Critical Pedagogy
16	Fry, T.	2009	Design Futuring	Berg	Design Ethics
17	Garcia Martinez, M.	2023	Cultural Inclusion Model	E&Pde Conference	Artisan–Student Collaboration
18	Gwilt, A.	2015	Fashion Design For Living	Routledge	Sustainable Fashion Pedagogy
19	Henninger, C. E., Niinimäki, K., Blazquez, M., & Jones, C.	2022	Sustainable Fashion Management	Routledge	Sustainability Sys-Tems
20	Irwin, T., Tonkinwise, C., & Kossoff, G.	2020	Transition Design Framework	Cuadernos Del Cen-Tro	Systems Transitions
21	Jégou, F., & Manzini, E.	2008	Collaborative Ser-Vices	Poli.design	Social Innovation
22	Jonas, W.	2007	Design Research And Its Meaning	Birkhäuser	Design Methodolo-Gy
23	Kolb, D. A.	1984	Experiential Learn-Ing	Prentice Hall	Experiential Learn-Ing Cycle
24	Koskinen Et Al.	2012	Design Research Through Practice	Elsevier	Design Inquiry
25	Manzini, E.	2022	Livable Proximity	Bocconi University Press	Community-Centered Design
26	Ministry of Education (IKS Divi-sion)	2022	Training of Faculty on Indian Knowledge Systems	MoE India	Indian Knowledge Systems
27	Niinimäki, K.	2018	Sustainable Fashion in a Circular Econ-omy	Aalto ARTS Books	Circular fashion
28	Sanders, E. B. N., & Stappers, P. J.	2008	Co-creation and the New Landscapes of Design	CoDesign	Co-design
29	Schön, D. A.	1983	The Reflective Prac-titioner	Basic Books	Reflexive practice
30	Singh, D. P.	2023	Revisiting Indian Knowledge Systems	NJESR	IKS and NEP 2020
31	United Nations	2019	ActNow for Zero-Waste Fashion	UN Sustainable Development	Sustainability
32	UNESCO	2019	Education for Sus-tainable Develop-ment Beyond 2019	UNESCO	Sustainability edu-cation
33	Walker, S.	2014	Designing Sustaina-bility	Routledge	Sustainability thinking

APPENDIX B. CONSENT FORM

CONSENT AND PARTNERSHIP AGREEMENT

(For educational and community-based design research projects)

STUDENT–COMMUNITY PARTNERSHIP AGREEMENT

Project Title:
Institution:

Course:
Faculty Supervisor:
Industry or Community Partner:
Location:
Date:

1. PURPOSE OF THE AGREEMENt

This agreement establishes the terms of collaboration between undergraduate students from the Department of Design and the partner organization for an educational project involving field immersion, observational research, co-design activities, and prototype development using textile waste materials.
The purpose is to ensure:

- Ethical and transparent engagement
- Respect for community expertise
- Clear terms for documentation and data use
- Safe, voluntary participation
- Protection of confidential information

2. NATURE OF ACTIVITIES

Participating students may engage in the following activities at the partner organization premises:

- Guided field visits
- Observation of textile-waste sorting processes
- Conversations/interactions with staff or workers
- Co-design or material experimentation sessions
- Documentation of materials and processes (with permission)
- Prototype development using discarded textiles

All activities will be supervised by faculty and coordinated with the partner organization representatives.

3. VOLUNTARY PARTICIPATION & CONSENT

- Participation in this project is entirely voluntary for all staff or community members who engage with students.
- The partner organization may withdraw permission for visits or interaction at any time.
- No identifiable personal information about workers or staff will be collected, stored, or published.

4. CONFIDENTIALITY & DATA PROTECTION

Students and faculty agree to:

- Maintain strict confidentiality regarding any operational details identified as sensitive by the partner organization.
- Avoid recording names, photographs of identifiable individuals, or proprietary processes unless written permission is granted.
- Use documentation (photos, notes, materials) only for academic purposes.
- Anonymize all references to individuals or internal operations in any project output.
- The partner organization may request removal of any image, prototype, or written content at any time.

5. PHOTOGRAPHY, RECORDING, AND DOCUMENTATION

Students will seek explicit permission before:

- Taking photographs
- Recording videos
- Collecting samples
- Documenting workflows or workspaces

Only non-identifying, ethically approved images may be used in academic submissions or exhibitions.

6. INTELLECTUAL PROPERTY AND USE OF OUTPUTS

- Co-created prototypes remain shared learning outputs for educational use.
- No commercial use of designs, images, or materials will occur without a separate written agreement.
- Students will credit the partner organization for collaboration in any academic dissemination (with their approval).

7. SAFETY AND CONDUCT

Students will adhere to all safety instructions provided by the partner organization and faculty. Faculty will ensure that visits do not disrupt workplace operations.

8. CONTACT POINTS

Faculty Supervisor
Name:
Email:

The partner organization representative:
Name:
Designation:
Email:

9. AGREEMENT & SIGNATURES

By signing below, both parties confirm their understanding of the collaboration and agree to the terms outlined above.

For the Partner Organization:
Name:
Signature:
Date:

For the Educational Institution:
Faculty Supervisor:
Signature:
Date:

For the Student Group (Representative):
Name:
Signature:
Date:

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