



## Innovative Teaching Practices for Environmental Education in Fashion Design

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### Abstract

As the fashion sector continues to face environmental challenges, blending environmental education into fashion design programs has become crucial. This research investigates creative teaching methods aimed at promoting sustainability awareness and critical thinking among upcoming designers. By focusing on interdisciplinary strategies, the study underlines the significance of merging technical design abilities with ethical and environmental considerations. The principal findings indicate that collaboration among educators, industry professionals, and students is vital for creating a productive learning atmosphere that connects theoretical concepts with practical applications. Furthermore, the application of technology, such as artificial intelligence, improves personalized learning opportunities, encouraging greater engagement with sustainability themes. The research also highlights the importance of experiential learning activities, such as using sustainable materials and implementing circular economy practices, in developing a comprehensive understanding of eco-efficient design. Future pathways in environmental education for fashion design point toward a move towards sustainability-focused teaching methods that incorporate collaborative projects, supply chain assessments, and eco-design principles. Global discussions, illustrated by international conferences, also play a role in influencing sustainable design trends. Ultimately, this research promotes a fundamental transformation in fashion education, encouraging educators and institutions to prioritize sustainability through interdisciplinary cooperation, hands-on learning, and alliances with industry participants. By adopting this approach, they can equip the next generation of designers to guide the fashion industry toward a more sustainable future.

**Keywords:** Environmental education, Fashion design, Sustainability, Pedagogical innovation, Circular economy

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### Introduction

In recent years, the imperative to integrate environmental education within fashion design curricula has become increasingly evident, motivated by the pressing challenges of climate change and resource depletion. As the fashion industry is traditionally associated with significant environmental impacts, innovative teaching practices are essential to cultivate a generation of designers who are not only skilled but also environmentally aware. This essay seeks to explore diverse pedagogical approaches that promote sustainability and critical thinking among students, thereby fostering a comprehensive understanding of how design choices affect ecological systems. Through contextualizing environmental education within fashion design, this research underscores the necessity of interdisciplinary strategies that incorporate technical skills with ethical considerations. By engaging students with practical, real-world applications, such as sustainable materials and circular economy practices, the essay aims to demonstrate how education can drive meaningful change in the industry and contribute to broader societal shifts towards sustainability.

#### 1.1 Definition of Environmental Education in Fashion Design

The definition of environmental education in fashion design transcends mere awareness of ecological issues, embodying a comprehensive pedagogy that encourages critical thinking, creativity, and sustainability. It seeks to cultivate a deep understanding among students regarding the interplay between fashion practices and environmental impact, aligning educational experiences with sustainable development goals. As articulated by the Centre for Sustainable Fashion, the transformative potential of fashion lies in fostering connections with ecological, technological, and human elements, prompting students to rethink their design practices through a sustainability lens (Williams *et al.*, 2013). Environmental education thus becomes a catalyst for innovation, encouraging the exploration of eco-efficient product-service systems, which are crucial for advancing sustainable fashion practices (Ceschin *et al.*, 2010). This evolving educational framework not only empowers future designers to challenge normative practices but also inspires a holistic approach to fashion that prioritizes ecological integrity while fostering cultural and aesthetic appreciation.

#### 1.2 Importance of Sustainability in the Fashion Industry

The necessity for sustainability in the fashion industry is underscored by its profound environmental impact, with a significant portion of global textile waste ending up in landfills, as highlighted by. The conventional low-cost, high-turnover business model not only raises ethical concerns but also exacerbates resource depletion and pollution, requiring a paradigm shift towards sustainable practices. This transition is imperative for future fashion professionals, necessitating that educational institutions embrace innovative teaching methodologies to incorporate sustainability into their curricula. For instance, the Centre for Sustainable Fashion emphasizes an interconnected

approach where research, design, and education converge to promote a sustainable mindset and practices among students (Williams *et al.*, 2013). Such measures ensure that upcoming designers are equipped with both the theoretical knowledge and practical skills to address pressing environmental challenges, fostering a new generation capable of innovating within ethical frameworks in the fashion industry.

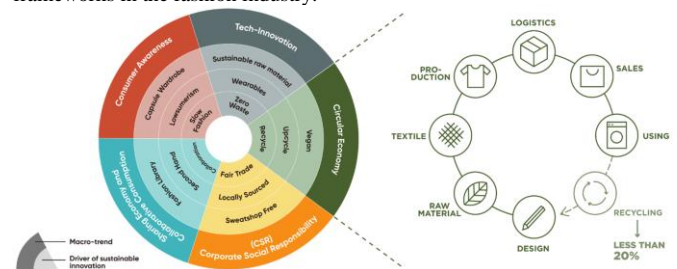


Fig 1. The Figure illustrates the main forces behind sustainable innovation in the fashion industry: CSR (fair trade, local sourcing), Tech-Innovation (sustainable materials, zero waste), Circular Economy (recycling, upcycling), and Consumer Awareness (minimalism, slow fashion). Less than 20% of materials are currently recycled, according to the circular lifecycle from raw materials to recycling, underscoring the necessity of sustainability across the supply chain.

Year	Percentage of Brands with Sustainable Practices	Consumer Awareness (%)	Waste Generated (million tons)	Sustainable Materials Used (%)
2020	54	67	92	18
2021	60	72	95	23
2022	65	75	96	30
2023	70	78	98	35

Table 1: Table shows how the fashion industry's adoption of sustainable practices increased between 2020 and 2023. Consumer awareness rose from 67 percent to 78 percent, and the proportion of brands implementing sustainable practices rose from 54 percent to 70 percent. The use of sustainable materials increased dramatically from 18% to 35%, despite a slight increase in waste generation from 92 to 98 million tons. This indicates the industry's shift toward environmentally friendly production while addressing environmental challenges.

#### 1.3 Overview of Innovative Teaching Practices

Innovative teaching practices in environmental education, particularly within fashion design, necessitate a holistic approach that merges theoretical

understanding with practical application. For instance, the integration of sustainability-focused curriculum interventions is paramount; these initiatives engage students with real-world challenges, thus fostering a critical awareness of fashions ecological footprint. By leveraging frameworks such as the United Nations Principles for Responsible Management Education, educators can instill a sense of corporate social responsibility among students, preparing them to address complex ethical dilemmas in the industry (Radclyffe Thomas *et al.*, 2018). Furthermore, methodologies that promote active learning through case studies and collaborations with sustainability champions exemplify effective educational strategies that enhance student engagement and creative problem-solving skills (e.g., sustainability audits on start-up fashion brands). Such practices not only cultivate a generation of environmentally conscious designers but also reinforce the vital role of aesthetic considerations in enhancing eco-efficient innovations within the industry (Ceschin *et al.*, 2010).

**2. Integrating Sustainability into Fashion Design Curriculum**

Incorporating sustainability into fashion design curricula necessitates a multifaceted approach that not only emphasizes environmental stewardship but also integrates ethical considerations into various pedagogical frameworks. As educators face the pressing challenges posed by the fashion industry's low-cost, high-turnover model, it becomes crucial to cultivate a generation of designers who are equipped to confront these issues with innovative, responsible strategies. Implementing curriculum interventions, such as sustainability audits of existing fashion brands and the introduction of case studies that highlight social enterprise models, fosters critical thinking among students while encouraging them to explore the intersection of economic, social, and environmental sustainability in their work. By ensuring that students engage with practical challenges through hands-on projects, institutions can guide aspiring designers in developing creative solutions that embody a commitment to ethical and sustainable practices tailored for the 21st-century fashion landscape.

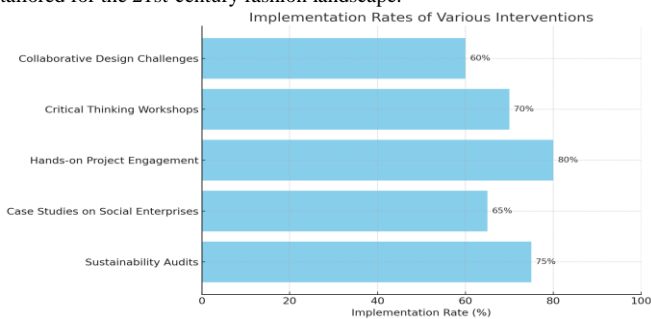


Fig 2: This graph shows the rates at which different interventions targeting distinct focus areas are implemented. The vertical axis represents each intervention, and the horizontal axis shows the implementation percentage. According to the chart, "Hands-on Project Engagement" has the highest implementation rate at 80%, while "Sustainability Audits" comes in second at 75%. At sixty percent, "Collaborative Design Challenges" has the lowest implementation rate.

**2.1 Curriculum Development for Sustainable Practices**

The integration of sustainability into fashion education necessitates a robust curriculum development strategy that emphasizes interdisciplinary collaboration and real-world application, as demonstrated by various innovative teaching practices. Research indicates that an effective curriculum should engage students not only in theoretical understanding but also in practical implementations of sustainable practices through experiential learning. For instance, guest lectures from sustainability advocates, alongside cooperative design studios, can foster an in-depth comprehension of the ethical implications surrounding production and consumption. Moreover, developing student capabilities to assess eco-efficient product-service system (PSS) alternatives can enhance awareness of the barriers to adopting sustainable innovations within the industry. Such curricular interventions encourage students to cultivate a sustainability mindset while addressing the economic, social, and environmental dimensions of fashion, ultimately equipping them to become leaders in promoting sustainable practices within the field.

Year	Curriculum Focus	Percentage Institutions Implementing	Source
2021	Sustainable Materials	58	Sustainable Fashion Education Report
2021	Ethical Labor Practices	47	
2021	Circular Fashion	32	
2021	Waste Reduction Techniques	45	
2021	Sustainable Production Processes	39	
2022	Sustainable Materials	62	

2022	Ethical Labor Practices	50	
2022	Circular Fashion	35	
2022	Waste Reduction Techniques	48	
2022	Sustainable Production Processes	42	

Table 2: The table illustrates how sustainability-related subjects were incorporated into fashion education between 2021 and 2022. While the proportion of institutions teaching Ethical Labor Practices increased from 47 percent to 50 percent, the percentage of institutions concentrating on Sustainable Materials increased from 58 percent to 62 percent. Waste Reduction Techniques rose from 45 percent to 48 percent, while Circular Fashion grew from 32 percent to 35 percent. The percentage of institutions focusing on sustainable production processes increased from 39% to 42%, indicating a growing dedication to training upcoming professionals in sustainable fashion practices. (Source: Sustainable Fashion Education Report)

**2.2 Case Studies of Successful Programs**

The examination of successful programs in environmental education for fashion design reveals a tapestry of innovative practices that engage students with sustainability complexities. A notable case is the integration of additive manufacturing processes, which emphasizes the environmental impact of materials used in fashion design. Investigations into selective laser sintering have shown that utilizing recycled materials not only minimizes waste but also presents a learning opportunity regarding sustainability in production techniques. Furthermore, programs that embrace eco-efficient product-service systems (PSS) illustrate the barriers and potential for implementing sustainable practices in the fashion industry, such as enhancing aesthetic appeal to attract users to sustainable alternatives (Ceschin *et al.*, 2010). These case studies demonstrate how multidimensional approaches not only cultivate awareness about ecological issues within the fashion domain but also empower students to drive change, making them essential in shaping a more responsible and innovative future in fashion education.

Program Name	Location	Year Established	Participants	Key Focus
Sustainable Fashion Challenge	University of Leeds, UK	2020	150	Circular fashion design and sustainability principles
Eco-Fashion Initiative	Parsons School of Design, USA	2018	120	Integration of sustainable practices in design curriculum
Green Fashion Week	Various Cities, Global	2016	300	Showcasing eco-friendly collections and educating designers
Fashion and the Environment	Fashion Institute of Technology, USA	2019	200	Understanding the environmental impact of fashion
Conscious Design Workshop	Royal Academy of Arts, UK	2021	80	Hands-on workshop on sustainable materials and practices

Table 3: Key international initiatives supporting sustainable fashion are shown in the table. With 150 participants, the Sustainable Fashion Challenge (University of Leeds, UK, 2020) focuses on circular fashion design. With 120 participants, the Eco-Fashion Initiative (Parsons School of Design, USA, 2018) incorporates sustainability into the design curriculum. With 300 participants, Green Fashion Week (Global, since 2016) features eco-friendly collections. 200 participants are taught about the environmental impact of fashion in Fashion and the Environment (Fashion Institute of Technology, USA, 2019). For 80 participants, the Conscious Design Workshop (Royal Academy of Arts, UK, 2021) offers practical instruction in sustainable materials.

**2.3 Role of Industry Partnerships in Curriculum Enhancement**

The integration of industry partnerships significantly enhances curricula within fashion design education, particularly concerning innovative teaching practices for environmental education. Collaborations, such as those highlighted in the RE-FRAME FASHION project, exemplify how academic institutions can develop courses to align with industry needs, fostering skill acquisition pertinent to sustainability in fashion (Darpy *et al.*, 2020). These partnerships not only inform the curriculum content but also enrich the learning experience through direct industry engagement, as illustrated by the emphasis on field trips and interactions with experts (Darpy *et al.*, 2020). Moreover, the insights from the revised HEA guide emphasize the importance of creating pedagogical frameworks that embody real-world applications, thereby enhancing student employability and fostering critical thinking. Such collaborative efforts help to bridge the gap between theoretical knowledge and practical industry requirements, thereby producing graduates who are well-equipped to address contemporary challenges in the fashion sector.

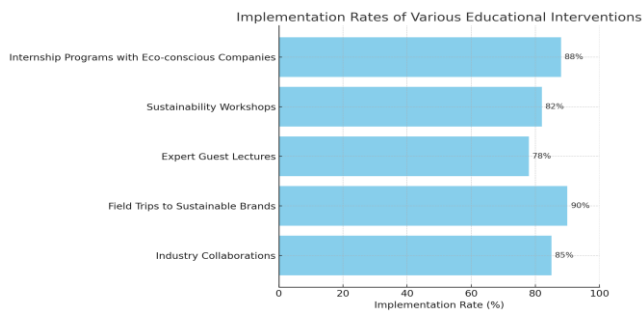


Fig 3: The chart illustrates the implementation rates of various educational interventions. Each intervention is displayed on the vertical axis, while the horizontal axis represents the percentage of implementation. The chart highlights that Field Trips to Sustainable Brands had the highest implementation rate at 90%, followed closely by Internship Programs with Eco-conscious Companies at 88%. Expert Guest Lectures showed the lowest rate at 78%.

### 3. Experiential Learning Approaches

The implementation of experiential learning approaches within environmental education in fashion design not only enhances student engagement but also cultivates critical skills necessary for addressing sustainability challenges in the industry. By integrating real-world scenarios, such as sustainability audits for emerging fashion brands, students can reflect on the ethical dimensions of their design decisions and their impact on environmental outcomes (Radcliffe-Thomas *et al.*, 2018). Moreover, the exploration of Interactive, Connected, and Smart (ICS) materials encourages students to engage with innovative technologies that shape modern design processes (Parisi *et al.*, 2018). Enabling learners to participate in active and collaborative projects fosters an environment where knowledge is constructed through experience, thus promoting deeper understanding of sustainable practices. As students navigate complex issues such as resource management and waste reduction, they develop a sense of agency that empowers them to contribute to a more sustainable fashion future, embodying the principles of responsible design and production.

#### 3.1 Hands-on Workshops and Projects

Hands-on workshops and projects represent an essential pedagogical strategy within innovative teaching practices in environmental education for fashion design, cultivating experiential learning that bridges theoretical knowledge with practical application. These immersive experiences allow students to engage creatively with sustainable materials and practices, enhancing their understanding of eco-efficient product-service systems, which are pivotal in addressing contemporary sustainability challenges within the fashion industry (Ceschin *et al.*, 2010). For instance, projects that involve designing garments from recycled materials not only foster creativity but also instill values of resource conservation and ecological responsibility among learners. Furthermore, such workshops encourage a storytelling approach to design, enabling students to articulate their visions and connect emotionally with their creations, thereby enriching their design narratives (Denaro *et al.*, 2017). As these experiences unfold, they also promote collaboration, critical thinking, and problem-solving skills, vital for preparing future fashion designers to innovate responsibly in an increasingly complex global marketplace.

#### 3.2 Field Trips to Sustainable Fashion Enterprises

Integrating field trips to sustainable fashion enterprises into the curriculum serves as a powerful pedagogical tool within innovative teaching practices for environmental education in fashion design. Such experiential learning opportunities enable students to engage directly with industry practices that prioritize sustainability, fostering a deeper understanding of ethical production methods and eco-efficient design principles. As outlined by the United Nations Principles for Responsible Management Education, exposing students to real-world applications of sustainability not only cultivates their capability as future industry leaders but also instills a commitment to generating sustainable value for society (Radcliffe-Thomas *et al.*, 2018). Moreover, the aesthetic dimensions of sustainable fashion, as highlighted in existing research, can significantly influence consumer acceptance and satisfaction, thus encouraging students to critically assess and innovate within their design processes (Ceschin *et al.*, 2010). This immersion in sustainable practices, combined with reflective learning, ultimately enhances student's capacity to address the multifaceted challenges facing the fashion industry today.

#### 3.3 Collaborative Projects with Environmental Organizations

The integration of collaborative projects with environmental organizations within fashion design education serves as a vital mechanism for fostering innovative teaching practices that underscore sustainability. These partnerships facilitate experiential learning opportunities where students engage directly with ecological issues, such as waste reduction and resource conservation, while also gaining insights from industry professionals

committed to sustainable practices. For instance, initiatives that involve local environmental groups can enable students to participate in real-world challenges, cultivating a deep understanding of eco-efficient product-service system (PSS) innovations and their aesthetic implications, as explored in the works of (Ceschin *et al.*, 2010). Furthermore, such collaborations can amplify the visibility of sustainability efforts through public exhibitions, thus aligning educational objectives with global initiatives for sustainable development. This proactive engagement not only enhances curricular relevance but also inspires a new generation of fashion designers who are equipped to advocate for responsible practices within the industry.

### 4. Technology-Enhanced Learning Tools

The integration of Technology-Enhanced Learning Tools (TELT) into fashion design education significantly transforms the pedagogical landscape, particularly within the framework of environmental education. By employing platforms that facilitate interdisciplinary collaboration and support real-world application, educators can foster a holistic understanding of sustainability practices in fashion. For instance, the use of digital portfolios and online collaborative spaces enables students to engage in experiential learning while showcasing their innovative projects, thus bridging classroom theory with industry standards. Furthermore, the incorporation of AI-driven personalized learning systems can enhance the adaptability of curricula to individual learning paces, ensuring deeper engagement with environmental concepts associated with sustainable design practices (Williams *et al.*, 2013). Such tools not only cultivate essential skills for future leaders in sustainable fashion but also stimulate critical thinking regarding ecological impacts and ethical considerations (Bichard *et al.*, 2011). Hence, embracing TELT provides a robust framework for nurturing informed, proactive practices in environmental fashion education.

#### 4.1 Use of Virtual Reality in Fashion Design Education

The integration of Virtual Reality (VR) in fashion design education represents a significant leap towards enhancing immersive learning experiences that align with innovative teaching practices in environmental education. By simulating real-world environments, VR allows students to engage in sustainable design processes while visualizing the lifecycle of materials from production to disposal, fostering a deeper understanding of ecological impacts. This immersive technology prompts critical thinking regarding sustainable practices, enabling learners to experiment with eco-friendly textiles and design strategies without the constraints of traditional materials and methods. Furthermore, VR facilitates collaborative projects across diverse geographical locations, exemplifying the interdisciplinary cooperation essential for addressing complex environmental challenges in fashion. As highlighted in contemporary literature, such innovative pedagogical approaches not only engage students more effectively but also cultivate a mindset geared towards sustainability ((Bichard *et al.*, 2011); (Caperna *et al.*, 2016)). Ultimately, adopting VR in education prepares emerging designers to navigate and contribute positively to a transforming industry landscape.

#### 4.2 Online Platforms for Sustainable Fashion Resources

Incorporating online platforms into the curriculum of fashion design education significantly enhances the access and dissemination of sustainable fashion resources, fostering a more informed and engaged student body. These platforms serve as invaluable repositories, offering materials ranging from ecological textile databases to guidelines for sustainable production practices. For instance, platforms like the Sustainable Fashion Hub and the Ellen MacArthur Foundation's resources support educators by providing evidence-based content that can be integrated into course frameworks, thereby bridging theoretical knowledge with practical applications (Evans *et al.*, 2005). Moreover, the engagement of the fashion academic community in initiatives such as the Transition UGent underscores the necessity of collaborative knowledge-sharing across disciplines to cultivate sustainability within the fashion domain (Block *et al.*, 2016). This multifaceted approach not only enriches the educational experience but also aligns with the broader goals of cultivating environmentally conscious practitioners who are equipped to innovate within the industry's ecological constraints.

#### 4.3 Incorporating Social Media for Awareness and Engagement

The integration of social media platforms into the curriculum of environmental education in fashion design serves as a dynamic tool for elevating awareness and engagement among students and the broader community. By utilizing channels such as Instagram, TikTok, and Twitter, educators can facilitate real-time conversations on sustainability practices, encourage collaborative projects, and share innovative design solutions. This approach aligns with the need to foster a sustainable culture within the fashion industry, as highlighted by the Sustainable Clothing Roadmap initiative, which emphasizes stakeholder cooperation for improved environmental and social outcomes (Maxwell *et al.*, 2011). Moreover, social media's visual nature is pivotal in communicating the aesthetic appeal of eco-efficient Product-Service Systems (PSS), thereby enhancing user attraction and acceptance (Ceschin *et al.*, 2010). Ultimately, harnessing social media as an educational resource not only democratizes access to

critical information but also cultivates a community of informed designers committed to sustainable practices in fashion.

### Conclusion

In conclusion, the integration of innovative teaching practices within environmental education for fashion design has the potential to fundamentally reshape both pedagogy and industry standards. By fostering a multidimensional understanding of sustainability, educators can equip students to address the ethical challenges highlighted within the fashion sector, particularly in relation to its environmental impact (Radcliffe-Thomas *et al.*, 2018). As contemporary designers navigate the complexities of eco-efficient product-service systems, as elucidated by (Ceschin *et al.*, 2010), it is imperative that curricula reflect these pressing demands. Moreover, the incorporation of practical, hands-on learning experiences cultivates critical thinking and enhances problem-solving abilities, empowering future fashion leaders to champion sustainability as a core business strategy. Ultimately, the quest for sustainable fashion lies not just in implementing new techniques but in fostering a holistic mindset that values ethical practices and innovation, thereby ensuring that emerging designers are prepared to navigate and transform the industry's future.

### 5.1 Summary of Key Findings

The exploration of innovative teaching practices for environmental education in fashion design revealed several key findings that underscore the necessity of integrating sustainability within the curriculum. Notably, interdisciplinary collaboration among educators, industry professionals, and students emerged as a fundamental component for fostering an effective learning environment. This approach not only enriches students' understanding of sustainable practices but also enhances their ability to engage with real-world applications, aligning educational outcomes with industry demands (Olaf Zawacki-Richter *et al.*, 2019). Furthermore, the application of technology, particularly artificial intelligence, facilitates personalized learning experiences that adapt to students' diverse needs, promoting more substantial engagement (Yogesh K. Dwivedi *et al.*, 2021). Such technological integration can streamline assessments and provide innovative learning resources, thereby addressing the challenges of conventional pedagogical frameworks. Ultimately, these findings highlight a transformative shift towards a more sustainable and responsive educational landscape in fashion design, positioning it as a vital contributor to environmental stewardship within the industry.

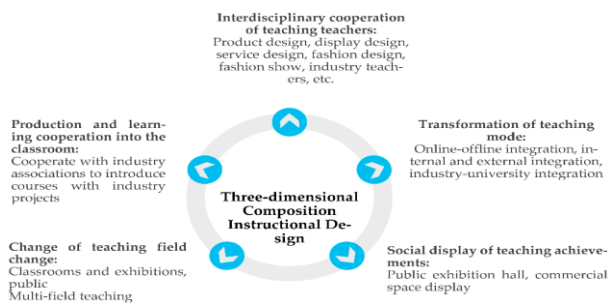


Fig 4: Three-dimensional Composition Instructional Design in Fashion Education is depicted in the diagram with a focus on multi-field teaching (classrooms, exhibitions), industry-classroom integration (real-world projects), interdisciplinary cooperation (collaboration with design and industry experts), blended learning (online-offline, industry-university integration), and public display of work (exhibitions, commercial spaces). This approach combines industry and education to provide hands-on, cooperative learning.

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### 5.2 Future Directions for Environmental Education in Fashion Design

As the fashion industry increasingly grapples with its ecological footprint, the future of environmental education within fashion design must shift toward sustainability-centric pedagogy that embraces interdisciplinary approaches. Innovative teaching practices should incorporate real-world applications, such as collaborative projects with sustainable materials and local artisans, to forge deeper connections between students and the environmental implications of their design choices. Enhancing curriculum content to include comprehensive analyses of supply chains, eco-design principles, and consumer behavior can broaden students' understanding of sustainability in fashion. Furthermore, initiatives such as the biennial conference hosted by the Helen Hamlyn Centre for Design, where international delegates converge to share best practices, are crucial for fostering a global dialogue about sustainable design trends (Richard *et al.*, 2011). Ultimately, integrating these educational strategies into fashion programs can cultivate a generation of designers equipped to lead the industry toward a more sustainable and conscious future.

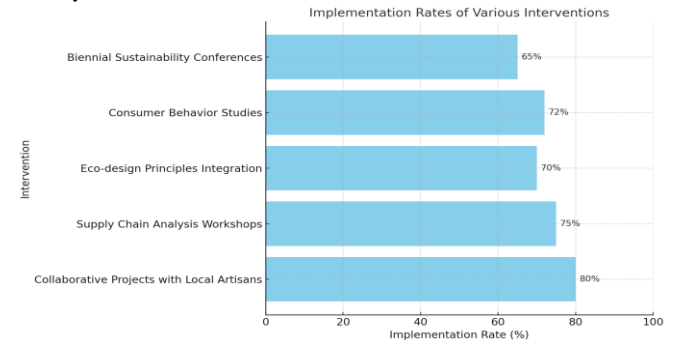


Fig 5: Various sustainability interventions' implementation rates in the fashion industry are depicted in the bar chart. Eighty percent of collaborative projects with local artisans are implemented, followed by workshops on supply chain analysis (75 %) and consumer behavior studies (72 %). Seventy percent of organizations integrate eco-design principles, while the smallest percentage, 65 %, implement biennial sustainability conferences. This reflects a variety of strategies for advancing sustainability.

### 5.3 Call to Action for Educators and Institutions

In addressing the urgent need for environmental education within fashion design, a robust call to action emerges for both educators and institutions. This imperative necessitates a paradigm shift toward embracing innovative pedagogical frameworks that prioritize sustainability, interdisciplinary collaboration, and practical engagement. Educators must integrate environmental principles into their curricula, fostering critical thinking and encouraging students to explore sustainable materials and processes. By establishing partnerships with industry stakeholders, institutions can facilitate real-world applications of sustainable practices, thereby enriching students' learning experiences and reinforcing their commitment to environmental stewardship. Furthermore, incorporating experiential learning opportunities, such as community-based projects and sustainability-focused workshops, can empower students to become change agents in the fashion industry. Collectively, these actions not only enhance educational outcomes but also significantly contribute to shaping a more sustainable future for the fashion sector. The incorporation of clear metrics for evaluating the impact of these practices will further reinforce this transformative educational approach.

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