



Art, Virtual Exchange, and the SDGs in Global Collaborations

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Abstract

This chapter explores the transformative power of digital and sustainable visual art applications in global collaborations using virtual exchange programs. This chapter focuses on a collaborative storytelling project involving

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participants from the USA, Malaysia, and Cuba who repurposed waste materials into narrative visual art projects between fall 2024 and spring 2025. Through observations and conversations, how global collaboration using virtual exchange fostered impactful skill-building in the visual arts as well as intercultural cooperation, friendships, and global citizenship was explored. Aligning with the United Nation's Sustainable Development Goals (SDGs), the collaboration weaved environmental themes into digital storytelling using the visual arts, photography, and multimedia to document the participants' artistic and narrative journeys from what is referred to as "*Waste to Wow*." Virtual art collaborations are shown to expand disciplinary knowledge, bridge geographical divides, nurture networks of empathy, and equip learners with the ability to respond to global challenges creatively. The chapter reflects on lessons from facilitating these exchanges, offering insights for educators aiming to merge art, sustainability, and digital connectivity in their classrooms.

Keywords

Art · SDGs · Storytelling · Narrative · Collaboration · Global citizenship · Virtual exchange

Introduction

Using visual art and design as a framework, this chapter explores the impact and the relevance of art, sustainability, and global storytelling on virtual exchange. Integrating the Sustainable Development Goals (SDGs) and global citizenship through the visual arts discipline has created unique and impactful virtual exchange (VE) opportunities for hundreds of learners.

Background

The focus of this collaboration was on disciplinary learning in the visual arts and sustainability. The arts model used included foundational lessons in art and design (the language and use of elements and principles of art and design, color schemes, and symbolism). The UN SDGs were introduced as a vehicle to explore the concept and connection of art as a sustainable practice. Various visual arts media, materials, and practices were utilized, from which global citizenship was explored, along with shared goals and common interests that transcend geographical, cultural, linguistic, and religious differences. Together, the disciplinary center was an innovative, arts-integrated teaching strategy for allowing students an opportunity to learn about visual art and its applications through a global lens.

Project Description: *Waste to Wow*

Waste to Wow became a large endeavor as the scaled project crossed new borders and language barriers. The goal was to enhance participant understanding of the visual arts, as applied to SDGs through design thinking strategies and creative arts-based activities, while fostering global citizenship, cultural appreciation, and common values rooted in empathy. The project aimed to develop communication, critical thinking, and collaboration through cross-cultural virtual and physical artistic exchange, while simultaneously allowing participants to develop a deeper understanding of the disciplinary tools and methodologies being utilized. The collaborative curiosity allowed new themes and connections to emerge, such as the impact of design thinking on virtual arts-based collaborative projects, and the impact on the creative process that different cultural perspectives might provide.

Literature Review

The integration of visual arts into COIL and virtual exchange represents a pedagogical shift toward what scholars describe as “connected art practice” (Gurnon et al. 2013). The integration of visual art practices in VE creates multimodal spaces for intercultural disciplinary learning, empathy-building, and engagement with the SDGs. This review explores the theoretical underpinnings of VE in the arts, the role of the visual arts and sustainability as a cross-disciplinary framework, and the evolution of “hybrid materiality” in international collaboration.

Virtual Exchange in the Arts

The literature suggests that VE in the arts functions on two primary levels: the functional level, where students learn the mechanics of global design collaboration (Amaral et al. 2023), and the philosophical/political level, where artistic exchange becomes a catalyst for aesthetic exploration and activist intervention (Holm and Tilley 2023). Together, these perspectives highlight that virtual exchange in creative disciplines transcends mere screen-sharing, facilitating deep cognitive and emotional connections through the act of making. Traditional art education has long relied on the signature pedagogy of the physical studio. However, in 2020, the concept of the Global Digital Studio emerged, redefining how creative authority and disciplinary learning are managed across borders. Amaral et al. (2023) suggest that VE frameworks allow art and design education to move beyond technical mastery toward collaborative problem-solving.

Evolution of Hybrid Materiality in International Collaboration

Hybrid materiality, the interplay between physical creation and digital exchange, is becoming a key discussion in art pedagogy. The evolution of hybrid materiality in

international collaboration signifies a shift from viewing the digital and physical as distinct realms to treating them as an integrated, distributed creative process. This addresses the limitations of the screen by reintroducing tactile exploration, while leveraging technology to maintain international connectivity. This literature review highlights how technologies, like digital media, are no longer just tools, but are fundamental to how knowledge is exchanged and art is created globally. The literature indicates an evolutionary trajectory from physical materiality (Vanada 2019), focused on tactile cognition, to digital hybridity (Zhang et al. 2025), focused on pedagogical accessibility. Speculative post-digitality (Díaz-Kommonen et al. 2024) was also introduced, where hybrid materiality serves as a collaborative framework for complex, cross-border disciplinary learning.

Visual Arts and Sustainability as a Cross-Disciplinary Framework

The literature identifies visual arts' influence on identity, emotional engagement, and narrative framing as methods by which environmental behavior is shifted (Gbeve et al. 2025). A related article shows that artistic activism promotes three major forms of sustainability transformation: cognitive reframing, emotional mobilization, and political imagination, which are pathways that move audiences from awareness to collective possibility (Rodriguez-Labajos 2022). These insights position visual art within VE as more than identity scaffolding, as it can reframe sustainability narratives, engage empathy, and open political horizons, which are preconditions for SDG-aligned action.

Visual arts serve as a critical bridge in transdisciplinary sustainability research, transforming abstract ecological data into understandable narratives that promote public engagement. Ricci and Li (2024) highlight the visual arts' capacity to communicate complex environmental sciences, while Horvath et al. (2025) emphasize arts-based interventions as essential tools for navigating the experiential dimensions of sustainability-focused work. This framework extends beyond communication into business and societal structures, where art functions as a catalyst for systemic shifts and theoretical reframing of sustainable development (Lehtimäki et al. 2024). The efficacy of this cross-disciplinary approach is grounded in its ability to generate and support pro-environmental behaviors and cultivate community agency. Gbeve et al. (2025) demonstrate through a scoping review that specific visual research designs can significantly influence behavioral outcomes by making ecological crises tangible. This is exemplified in socially engaged climate art, such as the *Plan(T)* project, which utilizes participatory artistic practices to convert passive audiences into active "change agents" within their local communities (Roberti et al. 2025). Together, these perspectives position the visual arts not merely as a reflective medium, but as an active, interventionist component of global sustainability strategy (see Fig. 1).

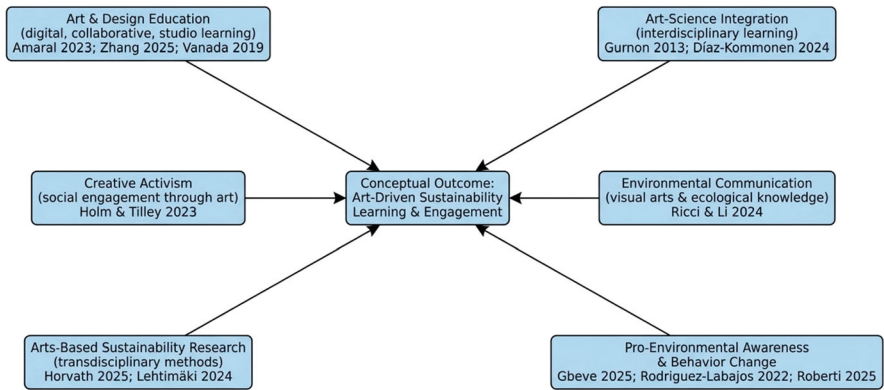


Fig. 1 Visual summary of literature review

Research Design and Methods

None of the participants in any of the global collaborations were “art majors” or “artists,” which created an experientially equitable playing field when visual arts and design thinking processes were introduced. In the first VE project, the groups created cohesive, educational, and visually appealing mural designs that addressed SDGs and global citizenship. Students from both institutions worked together in small groups to select one of the SDGs that resonated with all group members, as they explored cultural and geographical similarities and differences throughout the decision-making process. Then, they codesigned digital murals that exemplified their chosen SDG theme in an aesthetically pleasing and educational format. They developed the final mural images as they worked through the creative design process together. They started with conceptual discussions over zoom, shared work via email, communicated via WhatsApp, and collaborated through web-based digital design programs and applications. One long-term goal established was to create a physical mural at both institutions. In the meantime, other ways to facilitate meaningful collaboration through visual arts mediums and methods were explored.

In the fall term of 2023, the collaboration shifted the visual art focus from mural designs that only existed in a digital format to developing methodologies of cocreating actual, tangible pieces of original artwork that could be exhibited. In this second collaboration iteration, students were asked to identify an SDG that they were passionate about, and that SDG was used as a focus for their work. The learners were introduced to assemblage and mixed media techniques, as well as abstract methods of representation through color theory using traditional visual arts media. The challenge that the groups were presented with was creating a finished piece of physical artwork, in both countries, that reflected their chosen SDG. The final pieces of artwork also needed to incorporate the artwork of their international partners. This type of physical artistic exchange was made possible by the use of and access to technology, including cameras, scanners, and printers. The group members from

each institution collaborated to develop a background that their international group mates used in their mixed media projects. The backgrounds were printed and used as substrates, on which the other group members created an image with a focal point that related to their group's selected SDG.

This approach to a tangible and literal artistic exchange through a VE-based project allowed the students to engage and collaborate with each other in a deep and meaningful way. There were challenges with the project design, including exhibition of the final projects, which became difficult due to the variety of sizes and dimensions of the finished artworks.

Having experienced the opportunities and limitations of a more direct application of visual artmaking with non-arts majors across international borders and datelines, the third iteration of the visual arts-based COIL series began in the summer of 2024. With foundation and institutional support, the *Waste to Wow* project took place between July 2024 and March 2025. This COIL project went beyond the walls of university classrooms and into communities, incorporating an expanded pool of participants from the USA, Malaysia, and Cuba.

The authors created the *Waste to Wow* iteration of their visual arts-based COIL projects as a pilot, to explore how their arts-integrated teaching strategy based on design thinking might enhance disciplinary learning in the visual arts and sustainability through virtual exchange. While the project was not structured using a specific research design, general and cumulative observations were gathered to share impressions about the perceived impact of the visual-arts based VE model. The process most closely resembled a qualitative, nonparticipant, unstructured, naturalistic observational model.

Disciplinary Tools of Observations in Art

Qualitative, naturalistic observations and interpretations are something frequently used in the visual arts, as artists themselves are trained to observe nature (among other subjects) to create studies that consider art and design elements such as colors, shapes, and textures, as applied to their subject. A landscape painting, for example, might require the artist to observe the natural environment and use those observations to create a detailed representation of what they are looking at. More specifically, an artist might choose to observe a tree and take note of the colors of the leaves, the trunk, and the ground, but also of the sky around it. Artists notice the shapes of the leaves and also the shapes in the negative spaces of sky showing through the branches. Artists would also observe the differences in textures, between the trunk, the leaves, the ground, and the atmosphere to better understand the compositional elements involved in the subjects' structure.

Being familiar with naturalistic observation, the authors applied that process to their visual arts-based VE methodologies. They developed the impression that using visual arts as a means to educate and raise awareness about SDGs leads to specific disciplinary knowledge that otherwise might not have been encountered.

Sample Descriptions

A total of 86 individuals participated in the *Waste to Wow* collaboration, with 42 from Malaysia, 39 from the USA, and 5 from Cuba. *Waste to Wow* encouraged small groups of international participants to collaborate throughout the creative process, using the SDGs as a way to explore connections, commonalities, and shared interests. There were 20 groups, overall, with group sizes ranging from 4 to 6 participants. The groups were asked to source recycled/upcycled materials to create the subject matter and focal point of their artworks on substrates designed by their international group partners. This time, unlike the previous iteration, the final artworks were standardized by format and size guidelines. As an additional caveat, the groups were asked to conduct a waste audit on the recycled and reclaimed materials used in their projects. Participants weighed, measured, and recorded the recycled materials they used in a spreadsheet to track the overall environmental impact of their newly learned sustainable artmaking practices, which served to visualize and quantify the impact of working with reclaimed materials to create art. At the culmination of the project, the collaborative artworks were presented in physical exhibitions in all three countries, as well as a virtual exhibition hosted on a dedicated website, to reach a wider global audience (see Fig. 2).

Through observations about the process, new connections emerged about disciplinary learning in virtual exchange projects. There were surprising insights that they had not anticipated when the work began, including prominent topics of collective interest, cross-cultural considerations with the application of symbolism, and creative use of materials. After reviewing and refining observations, themes emerged that contained findings about the disciplinary impact of the *Waste to Wow* collaboration.

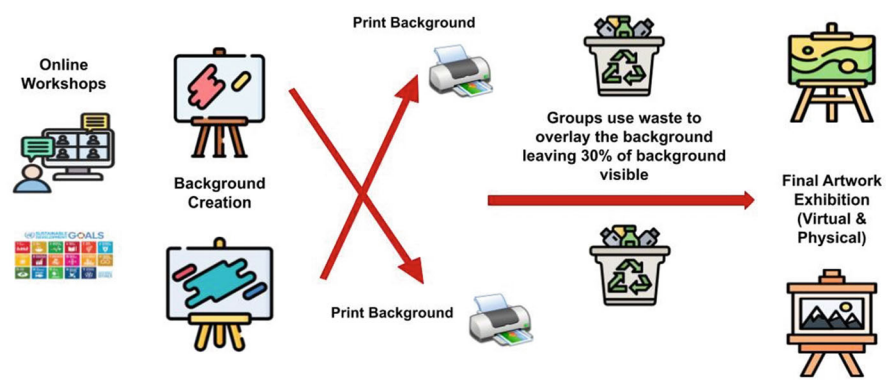


Fig. 2 *Waste to Wow* global collaboration process

Results

Pre-arts Integration Observations

Since none of the participants were art majors, nor self-proclaimed artists, this general lack of experience in the visual arts discipline allowed the observations to start from a relatively leveled field, and focus on the introductions of design thinking, a developmental, nonlinear, and iterative process. Design thinking fosters artistic development through rapid experimentation and learning, translating initial ideas into practical solutions. Beyond project applications, design thinking establishes developmental processes for teams and organizations, fostering a mindset of creativity, collaboration, and adaptability.

The authors wanted to introduce new artistic applications and practices that would encourage creativity, enhance critical thinking, and improve design skills. They also hoped that participants would develop effective online communication skills to be able to collaborate and network with a global cohort who shared similar visions and interests about sustainability and art.

The groups created visual arts-based compositions that educated and spread awareness about global issues, sustainability, and the beauty of waste, with the idea that the final art projects might inspire others to engage with sustainable artmaking practices. The aim of the *Waste to Wow* collaboration was to encourage personal and academic growth, while enhancing disciplinary learning and artistic collaborations.

Analysis of the Art Projects

Once the groups determined what SDG topic their projects would be built around, the authors introduced new visual arts practices and applications for different elements of the project. One of the focuses on artistic practice and disciplinary learning was how to use traditional/analog art media to develop the backgrounds for the final artworks. While the selected SDG topics were loosely considered for inspiration in the development of color schemes and patterns, emphasis was placed on exploration of the materials. Watercolor paints, colored pencils, and crayons were used to experiment with mark-making and media interactions. Materials used were generally universal art supplies, accessible and affordable to all participants. Participants seemed to display comfort and familiarity with the materials, which created an easier entry point to artmaking processes for nonartists. They were also encouraged to use digital media applications and utilized accessible and free software as a tool and method to develop their backgrounds, which was a creative alternative.

This pivot to digital media applications exemplified a valuable arts lesson within the VE environment: adaptability and flexibility. Instead of being focused on attempts that the groups seemed to deem unsatisfactory, participants were encouraged to look at the situation as an opportunity to learn and explore a new art medium, merging the analog experiences with a new digital application.

The *Waste to Wow* participants actively met and collaborated on their projects for a period of 12 weeks, from September through December 2024. Collectively, they created 42 finished pieces of recycled artwork, with each final piece of art containing the artistic contributions of 4–6 international partners.

Observations on the Use of Materials and Techniques

Artistic development and application of design thinking involved figuring out how to use recycled materials to create subject matter that established a narrative and illustrated the selected SDG. Most of the participants had never used alternative or recycled materials to create artwork before. The authors introduced the art form of assemblage, and collage techniques were reviewed as another approach to utilizing a variety of materials and media to create a composition that tells a story. These artmaking methods were utilized and expanded upon, as the groups developed compositions with cultural consideration of color, symbology, structural application, and material use.

One of the observations was on how disciplinary learning was enhanced through VE through the choice of materials and symbolic representations in the final artworks. The materials between the groups' respective artworks indicated a connection, showing consideration and communication regarding the images and narratives constructed. There were oftentimes repeated patterns, symbolic motifs, and parallel color palettes that appeared in both of the groups' final pieces of art.

While viewing the collection of finished artworks, repeated elements of art were identified in the final pieces, such as line, shape, color, space, and value. The application of design principles was also evident and included repetition, balance, and unity. A mix of literal and abstract symbolism represented the selected SDGs. The most repeated literal symbol in the artworks appeared to be flowers and trees, which were interpreted as representing growth, prosperity, and the resilience of nature reclaiming urban spaces. Abstract symbolism was exemplified through representations of the collaborative fabric of society, showing that just as trash can be turned into art, inequality can be reshaped into equality.

The requirement to use recycled materials in the *Waste to Wow* project seemed to act as a creative catalyst rather than a limitation. While using only recycled or reclaimed materials created artistic limitations, the constraints seemed to encourage collaboration and creative problem-solving within the international groups. One of the recognized benefits of applying visual artmaking processes in a virtual format was allowing the participants to explore the realities and limitations of the various artmaking methods, and adapting hybrid approaches through communication and collaboration to find a result that seemed to collectively satisfy all group members. The final pieces were made from different types of recycled materials, which led to an enlightened perspective on what constitutes art supplies.

It appeared that various papers, plastics, and cardboard were the most frequently used recycled materials in the final art projects. Other observed materials included wrappers, foil, straws, rubber bands, aluminum, cork, metal, glass, and Styrofoam. The participants appeared to consider the reclaimed materials as a medium for

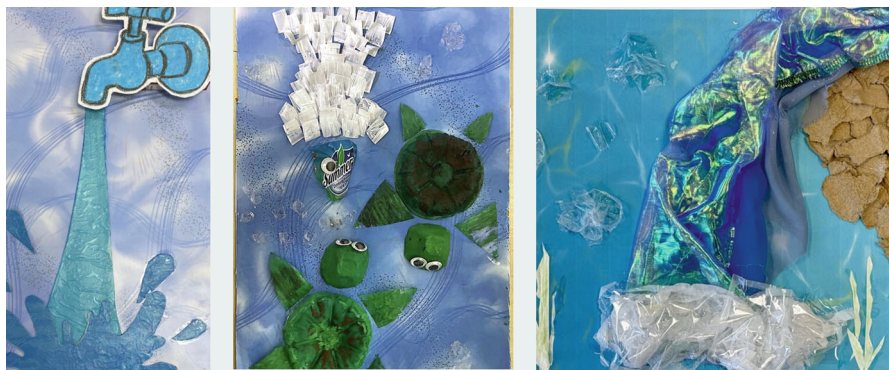


Fig. 3 Final artworks focusing on SDG 6: Clean Water and Sanitation

symbolic and textural expression, not as waste. Translucent plastics became water or bubbles, shredded plastic bags became greenhouse gases, stomachs, or smoke. Old corks and cardboard were transformed into tree stumps or rocky cliffs, and plastic bottles morphed into sustainable energy sources. The materials themselves seemed to exemplify an understanding about the SDGs. A beautiful waterfall built out of scraps of recycled fabric and plastic packaging seemed to relay the understanding that artwork can convey ironic commentary as a form of education and expression centered on the SDGs.

Upon completion of the visual artmaking aspects, the *Waste to Wow* project culminated with exhibitions of collaborative artworks in the three different countries between November 2024 and April 2025. Nine examples of final artworks inspired by four different SDGs are included in Figs. 3, 4, 5, and 6 (photo credit courtesy of the authors).

Post-project Observations

The environmental impact and awareness of the participants were increased through learned sustainable artmaking methods. The resulting 42 pieces of artwork made from recycled and reclaimed materials illustrated the success of the core idea to use the visual arts as a method of implementing sustainable practices and raising awareness about the impact of the SDGs.

The frequency at which certain SDGs were chosen by the groups showed a focus on environmental and educational goals. Climate Action, SDG 13, and Quality Education, SDG 4, were the most popular choices. Life Below Water, SDG 14, was the next most popular choice; and SDG 3, Good Health, and SDG 5, Gender Equality, were also popular choices. This observation illustrated that while there was a wide range of interests and concerns, climate action, life below water, and quality education were collectively the most important SDGs for the groups (see Fig. 7).

One of the interesting and unexpected observations by the authors was the distribution of SDG concerns across the three primary pillars of sustainable



Fig. 4 Final artworks focusing on SDG 5: Gender Equality



Fig. 5 Final artworks focusing on SDG 13: Climate Action



Fig. 6 Final artworks focusing on SDG 15: Life on Land

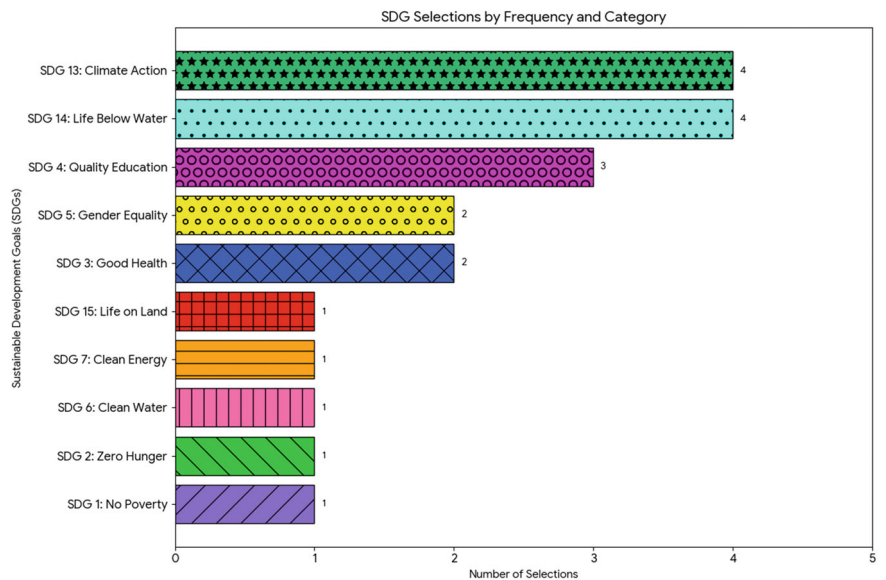


Fig. 7 Visual representation of SDGs chosen by groups

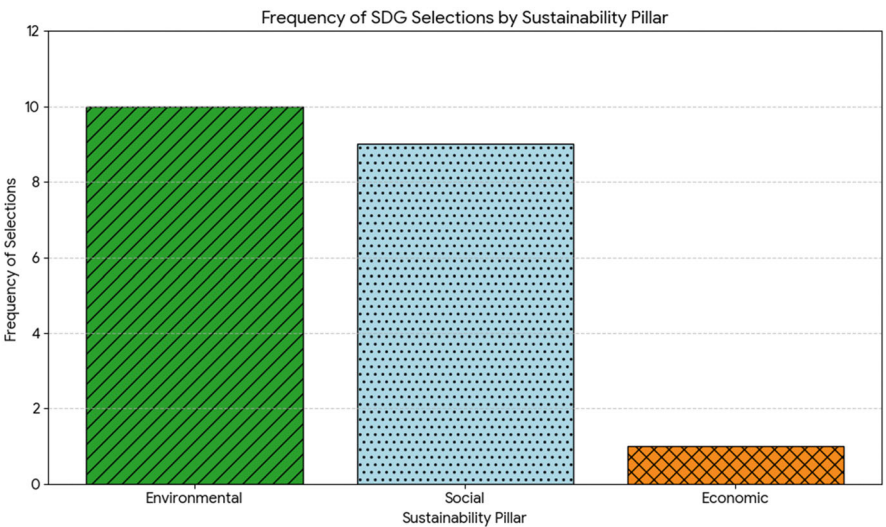


Fig. 8 SDGs chosen grouped by pillar of sustainable development

development: environmental, social, and economic. The graph below visually demonstrates a seeming dual-priority between protecting the planet’s biosphere and ensuring the well-being of its people, with environmental issues holding the highest level of concern (see Fig. 8).

Conclusion

The *Waste to Wow* project represented an intersection of environmental advocacy, international partnership, and visual arts methodologies, bridging the gap between environmental theory and creative practice. The utilization of visual arts-based learning models established a common language that helped translate complex SDGs into tangible outcomes. One of the most significant achievements was cultivating a perceived shift among perspectives, from participants seeing waste as liability or trash to viewing it as a potential artmaking material and creative resource.

The collaborative elements of the *Waste to Wow* project provided a realistic simulation of the modern professional world. The project appeared to transform more than just physical materials; the observations showed a transformation of the mindsets of students regarding the disciplines of visual art and sustainability. By fostering a deeper appreciation for environmental stewardship and building a foundation using design thinking, the participants developed final projects that supported the idea that learning about SDGs is most effective when it is collaborative, creative, and interest-driven.

Cross-References

- ▶ [Crafting Knowledge in Virtual Studios: Enhancing Disciplinary Understanding Through Global Academic Networks](#)
- ▶ [Cultural Identity and Representation: A Cross-Border Collaboration Through Visual Media](#)
- ▶ [Design Studio: Dialogue for Cross-Cultural Exploration in Action](#)
- ▶ [Virtual Exchange and the Story Circle Method: Fostering Intercultural and Disciplinary Learning in Applied Humanities Among Participants from Spain, the USA, Morocco, and Beyond](#)
- ▶ [Virtual Global Engagement: Global Teaching and Learning for a Sustainable World](#)

Competing Interest Declaration The author(s) has no competing interests to declare that are relevant to the content of this manuscript.

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