Immersive Experiences for Sustainability & Industry 4.0

Funded by the European Union

Interaction Seeds

GAIA

Domain:
Climate Action and Environment

Place:
Bilbao, Spain

Duration:
Long-term

Target audience:
Art and research community, local authorities

Mission

Sustainability transitions often rely on complex, invisible, or highly technical concepts that are difficult for organisations and the public to grasp. Through artistis approaches, immersive content can transform these abstract sustainability and industrial ideas into interactive, engaging and accessible SDG-aligned experiences for non-profits, educators, cultural institutions, and Industry 4.0 actors.

Engagement activities

An immersive room, developed in GAIA's infrastructure, acts as a hub for experimentation and cross-sectoral innovation. The integration of immersive storytelling combined with AR/VR allows to introduce participants to the potential of immersive technologies, while experiencing SDG storytelling in practice, and contributing to co-creation sessions to explore applications in their own contexts.

Artistic activities

Immersive experiences have been developed alongside artists experienced in immersive storytelling and willinged to collaborate with industrial and educational partners. Their involvement ensures that technological innovation is complemented by creative insight, producing experiences that are both visually compelling and conceptually engaging.

IMPACT

- Capacity building and skills transfer
- Definiton of tailored SDG-aligned practices
- Sustained cross-sector collaborations
- Supporting S+T+ARTS principle of diffusion of innovative practices

WHAT HAPPENED?

Developed by GAIA in collaboration with the Basque Government, the Basque District of Culture and Creativity (BDCC), ColaBoraBora (driving social innovation and Agenda 2030 principles), Emakunde (Basque Institute for Women), Euskalit, Last Tour and universities, this interaction responded to the growing demand for interactive, SDG-focused tools capable of making complex systems accessible and engaging for citizens, industry professionals, and public-sector workers.
Pilot activities were also conducted in Colombia and Mexico, integrating diverse cultural, industrial, and educational contexts. Co-creation sessions, international knowledge exchange, and immersive demonstrations fostered cross-fertilisation between art and technology.

The core challenge was to transform educational, industrial, and cultural experiences by combining VR/AR/XR technologies with artistic creativity. This approach introduced new forms of interaction, storytelling, training, and visualisation, addressing the increasing need for engaging tools in Industry 4.0, education, and cultural sectors.

PARTICIPANTS ENGAGEMENT

Participants engaged in structured activities designed to highlight the scientific and technological relevance of immersive technologies. They learned about the potential of AR/VR/XR, experienced immersive SDG storytelling, and engaged in hands-on sessions to experiment with interactive content. Co-creation workshops provided practical opportunities to explore applications relevant to their organisations.

The GAIA Virtualisation Laboratory's immersive room enabled participants to design and implement content, gaining technical skills and insights into immersive environments. Educators discovered innovative methods for enhancing learning and engagement, while industry stakeholders explored new possibilities for training, visualisation, and customer interaction.

Artistic activities

At the heart of the interaction is the installation of an immersive room, integrated within the strategic virtualisation efforts of GAIA, in their premises. This immersive room serves as a hub where cutting-edge digital content is created by a multidisciplinary team of artists, technologists, and creators.
A VR/XR artistic storytelling piece was designed to translate complex sustainability and Industry 4.0 concepts into an intuitive, emotional, and visually engaging journey. Participants entered an immersive 360º environment where artists used abstract visual metaphors, soundscapes, animated data flows, and symbolic representations of industrial and environmental systems to illustrate how digital transformation, resource use, and sustainability challenges are interconnected.

The experience followed a simple narrative sequence:

1. Introduction to interconnected systems using light and geometric forms.
2. Artistic visualisation of Industry 4.0 processes, shown as living, dynamic structures.
3. Environmental pressures and SDG challenges, expressed through evolving textures, colors, and sound.
4. Co-creation moment, where participants influenced elements of the scene (colors, flows, directions), symbolising the impact of human decisions on industrial and environmental outcomes.

The piece was not a technical simulation but an art-driven immersive journey that helped participants feel and understand sustainability concepts from a new perspective. It combined VR content, artistic mediation, and short co-creation interactions, enabling industry professionals, educators, and cultural actors to reflect on future scenarios and the role of creativity in sustainable innovation.

Multidisciplinary collaboration is another core strength. The convergence of artists, engineers, designers, and creators ensures that the content produced is not only visually and conceptually compelling but also technically aligned with the practical needs of the industries involved. The resulting digital content is immersive, engaging, and designed to be replicable across diverse sectors.

Operating across Spain, Colombia, and Mexico, the project facilitates global exchange and learning, enabling a rich flow of ideas and practices from different cultural and industrial contexts. This international perspective enriches both the artistic and technological aspects of the work, ensuring innovative and culturally resonant experiences.

Impact of the interaction

The interaction generated significant outcomes across multiple levels, fully aligning with the European Commission's S+T+ARTS initiative. Participants reported increased awareness of the SDGs, particularly gender equality (SDG 5), industry and innovation (SDG 9), sustainable cities and communities (SDG 11), and climate action (SDG 13).
A key component of the project is the cross-fertilisation between art and industry. The initiative harnesses the creative potential of the arts to inspire innovation within traditional industrial contexts. Through immersive artistic storytelling, complex sustainability challenges became tangible and directly connected to participants' daily activities and institutional strategies.

Cross-sectoral collaboration was strengthened as creative professionals engaged with stakeholders from advanced manufacturing, public administration, and education. This exchange allowed artists to understand industrial processes and constraints, while industry and educational actors explored how artistic approaches can drive innovation, problem-solving, and effective communication.

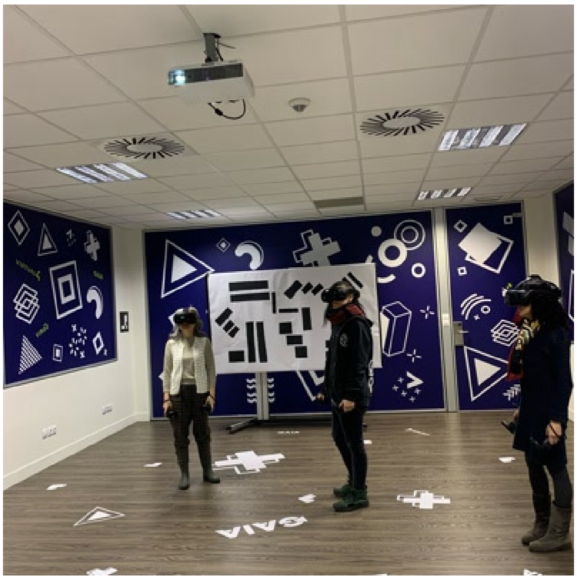
The project also enhanced education and professional development. Immersive simulations, interactive exhibits, and storytelling enabled students, professionals, and public sector workers to engage deeply with complex systems. Educators discovered new ways to make learning more engaging and effective, while industry participants explored the potential for immersive technologies in training, simulation, and visualization. By providing hands-on experience and practical skills, the project equipped participants to apply immersive content in a range of professional contexts.

The seed demonstrated a model for systemic innovation, showing how art-driven immersive technologies can improve user experiences while contributing to broader objectives in digital transformation, education modernization, and cultural enrichment. Gender equality and inclusion were actively promoted, with strategies designed to involve underrepresented groups such as women and youth. Finally, the project strengthened the Basque innovation and cultural ecosystem, creating a network of artists, technologists, educators, and policymakers committed to leveraging immersive experiences for sustainable development, creative economy growth, and cross-cultural dialogue.

Good practices for replication

To ensure the successful replication of its innovative approach, GAIA highlights five essential strategies:

- Involve representatives from various sectors from the outset (creative industries, Industry 4.0, education, and public administration), ensuring co-creation reflects diverse needs and priorities.
- If permanent technical facilities and immersive infrastructure such as immersive rooms or VR/AR labs are unacessible, mobile or temporary setups can be used for experimentation.
- Include professional artists experienced in immersive storytelling to bridge creativity and technology, enhancing user experience and innovation.
- Align content with societal challenges to strengthen relevance and facilitate public support.
- Incorporate hands-on workshops and training that equip participants with practical skills in immersive content creation and application.



Resources

GAIA providing the meeting room in the BBF and also the contacts and management of the Virtual Lab. BDCC providing the network for the artists and the negotiation of the fees.

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