

YOUNG PEOPLE CO-AGENCY IN A VIRTUAL HERITAGE VR ESCAPE ROOM WITH AI AGENTS FOR SUSTAINABLE FASHION LEARNING

DIANA SARAI HERNANDEZ MANZO

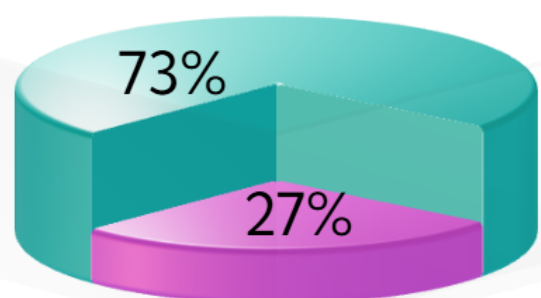
d.hernandez-manzo@rgu.ac.uk

ROBERT GORDON UNIVERSITY

This poster presents a young people centred virtual heritage VR escape room designed to support sustainable fashion learning. The design emphasises young people agency actively exploring, questioning, and making decisions during gameplay and co-agency, where learning emerges through collaboration between users and the AI system. The experience combines immersive exploration, gamified problem solving, and conversational interaction to encourage engagement with sustainability concepts in fashion.

MOTIVATION & BACKGROUND

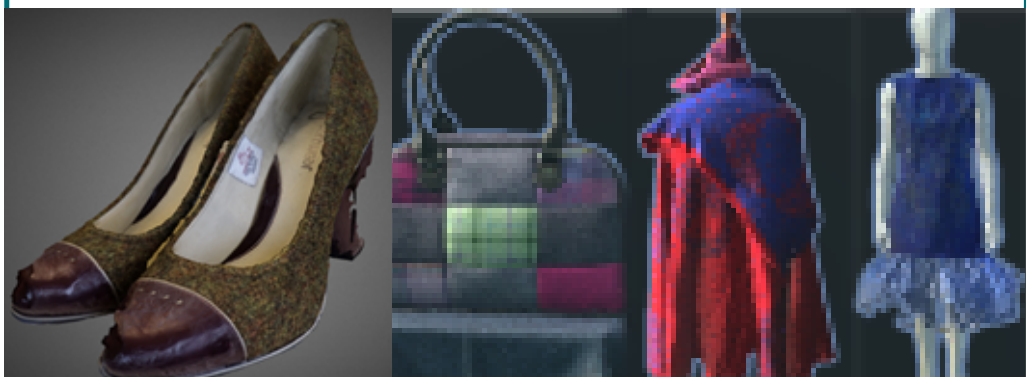
Every year, millions of tons of textiles end up in landfills; in the EU, 73% of discarded textiles are sent to landfill or incineration (EEA, 2022). This waste represents unsustainable use of natural and energy resources, highlighting the need for innovative educational strategies to raise awareness about sustainable fashion.



Tons of textiles ended in landfills (1960-2018) [1]

VIRTUAL HERITAGE CONTEXT

Traditional fashion, such as Harris Tweed textiles, represents tangible and intangible cultural heritage that is at risk of being forgotten. Integrating virtual heritage into educational experiences allows users to explore historical and cultural value while promoting sustainable practices.



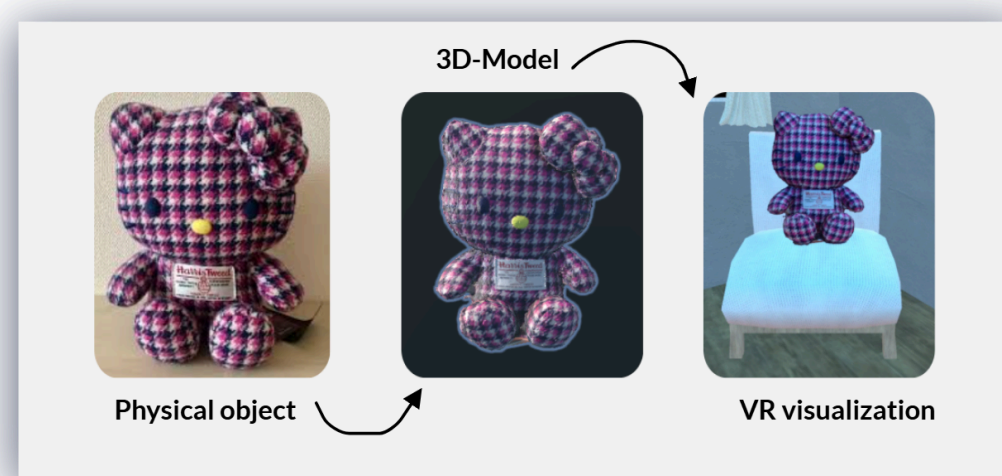
DESIGN AND IMPLEMENTATION



Development of an immersive VR escape room where users discover sustainable garments and learn about their production and history. Players solve interactive puzzles that reveal educational content and encourage conscious decisions about fashion and sustainability.

3D MODELS OF HARRIS TWEED GARMENTS

High-fidelity digital models allow inspection of textures, materials, and artisanal details of traditional garments.

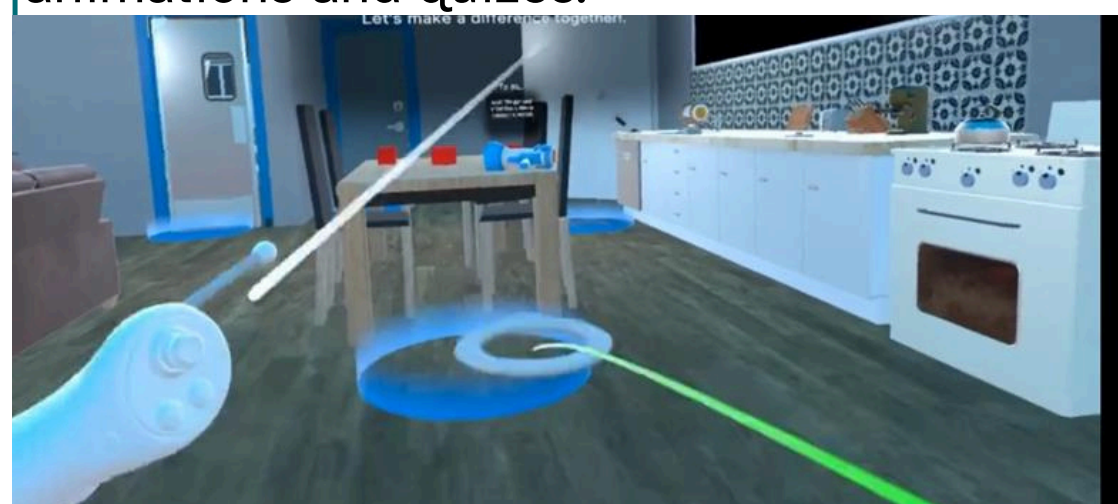


AI CONVERSATIONAL AGENT

Integration of Voice Assistant (Convai) a conversational agent to provide real-time guidance, answer questions, and offer hints during gameplay.

GAMIFICATION DESIGN

The Sustainable Fashion Escape Room integrates a variety of mini-games and interactive challenges that promote active learning, engagement, and exploration including gamified mechanics such as: hidden objects, interactions, videos, animations and quizzes.



USER EVALUATION

Participants actively explored the VR environment, interacted with the AI conversational agent, and completed the escape room challenges. High levels of engagement were observed, with most users completing all puzzles and interacting with the AI agent multiple times. The SUS score resulted in an average of 79.5 placing the VR escape room within the "good to excellent" usability category, according to standard SUS benchmarks.

PARTICIPANT	CHANGE IN SCORE
1	22.6
2	16
3	0
4	56
5	29.3
6	41.3
7	25.3
8	17.3
9	6.6
10	6.6

METHODOLOGY

Sample: 20 young participants

Approach: Mix-method research strategy qualitative and quantitative evaluation.

Tools: Pre and post survey design to measure the effectiveness of the VR escape room in promoting sustainable fashion awareness.

ETHICS

Participants (young people) provided informed consent before participation. Data collection followed institutional guidelines for research voluntary participation, anonymised data storage, and the right to withdraw at any time.

CONCLUSION

Comparison of pre- and post-survey results indicates an increase in understanding of sustainable fashion concepts. Users demonstrated improved awareness of ethical clothing production, including material origin, artisans involved, and the environmental impact of mass-produced garments.

REFERENCES

- [1] European Environment Agency (EEA). (2022). Share of textile waste sent to incineration or landfill in the EU.
- [2] Hernandez Manzo, D.S., Munir, V., Isaacs, J. (2026). A Virtual Learning Experience in Sustainable Fashion: Escape Room. In: De Paolis, L.T., Arpaia, P., Sacco, M. (eds) Extended Reality. XR Salento 2025. Lecture Notes in Computer Science, vol 15741. Springer, Cham. https://doi.org/10.1007/978-3-031-97775-6_25