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Institut für Hochschul- und Bildungsforschung der DHBW Mosbach

Climate Fresk

Applied Gamification To Stimulate Sustainability In Engineering Disciplines

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Gamification in Teaching + The EFEU Project

Project Context

- Erasmus+ Strategic Partnership Project
- Duration: 31.12.2022 – 30.05.2025
- Focus: Strategic Development of Students' Sustainability Competencies in Engineering Sciences
- Objective: The Delivery of New Content to Existing Engineer Curricula And Modules that aim to:
  - Encourage Eco-friendly and Innovative Teaching and Learning Activities,
  - Raise Sustainability Awareness among Students & Staff, and
  - Increase Competencies and Skills in the Fields of Sustainability and Engineering

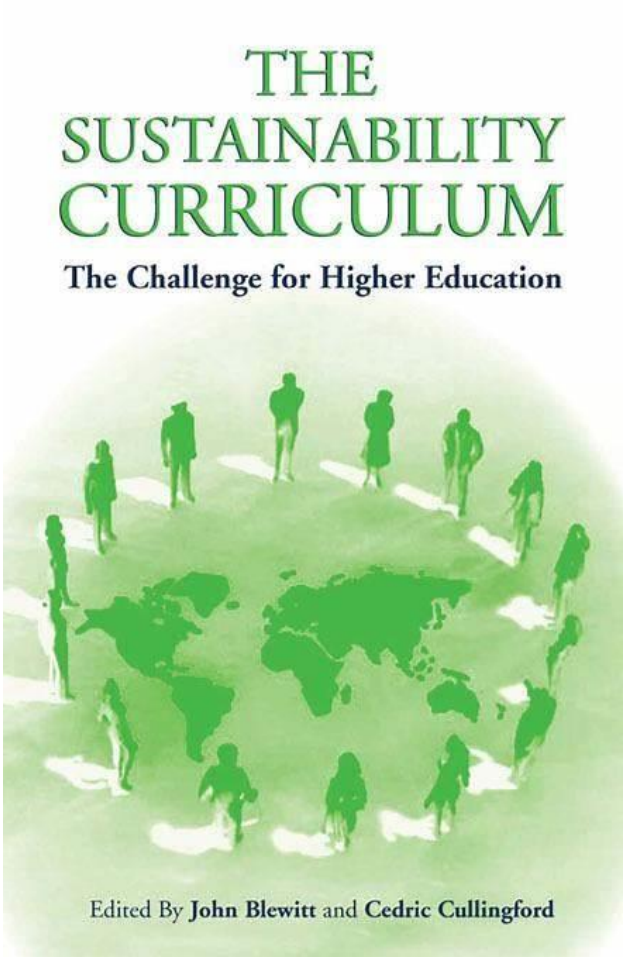
EFEU + SDGs

- **SDG 4 Quality Education**
  - Target 4.7:
    By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.
  - SDG 4 is understood to be a critical goal that must be achieved in order for the other 16 SDGs to be achieved.

Role of Higher Education Institutions

- Foster a sustainability mindset by helping users develop the knowledge, skills and attitudes to think, plan and act with empathy, responsibility, and care for our planet
- Incorporate the SDGs into their (graduate and undergraduate) teaching and research
- Become society-transforming agent, contributing to fulfilling the 2030 Agenda
- Implement policies, educational programs, modules, and practices that promote sustainability

Problem Definition



- Many HEIs have adopted policies, educational programs, modules, and practices to promote sustainability.

- Nevertheless, studies have shown that university campuses still have significant carbon footprints, bear other substantial negative environmental impacts and are slow in meeting the mandates of the 2030 Agenda on education.

Contributions of EFEU Project

Reduce the carbon footprint of partner universities

- Develop a Harmonised Tool and Methodology to Calculate Carbon Footprint of Partner Universities
- Conduct a Carbon Footprint Assessment of Each University's Campus
- Implement Sustainability Awareness/Mobility Survey

Support European HEIs on their way to carbon neutrality

- New Content to Existing Engineering Curricula and Modules
- Implement Eco-friendly and Innovative Teaching and Learning Activities
- Raise Sustainability Awareness among Students & Staff
- Increase Competencies and Skills in the Fields of Sustainability and Engineering

Strengthen European universities' social responsibility

- Raise the Sustainability profile of Higher Education Institutions
- Create Research Opportunities
- Engender International Cooperation
- Generate Knowledge-transfer Opportunities

The Application of Gamification to Stimulate Sustainability Learning in Engineering Disciplines

https://climatefresk.org/world/

Climate Fresk - Background

- Climate Fresk founder:
  Cédric Ringenbach.
- An engineer, lecturer and consultant specialised in energy transition for companies and organisations
- Founded Climate Fresk NGO in 2018
- “Everyone has something to learn, especially from each other.”
  Cédric Ringenbach, founder of Climate Fresk.

Climate Fresk – The Game

- Teaches about the causes and consequences of climate change
- Systematic nature of challenges
- Participative, Collaborative learning.

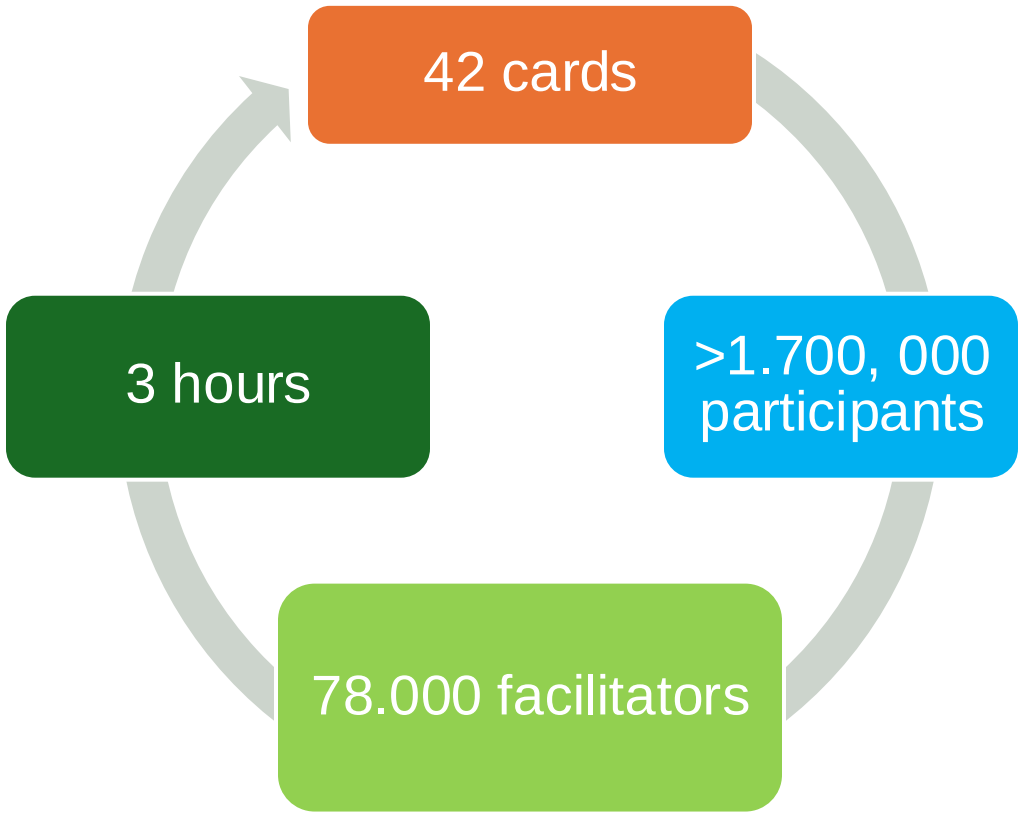
Climate Fresk – The Game

- Raise awareness on the topic of climate change
- Open and positive conversation about climate solutions - Personally and Professionally
- Establish clear links between learning innovations and climate action

Climate Fresk – The Game

- Scientific: Based on findings by IPCC
- Neutral and objective: presents only established scientific facts
- Develop collective intelligence through serious play

Climate Fresk – The Game



Climate Fresk Association, 2024

- ‘Recognised for making significant inroads in helping individuals understand the climate emergency because of its highly immersive nature.’

  World Economic Forum, 2023

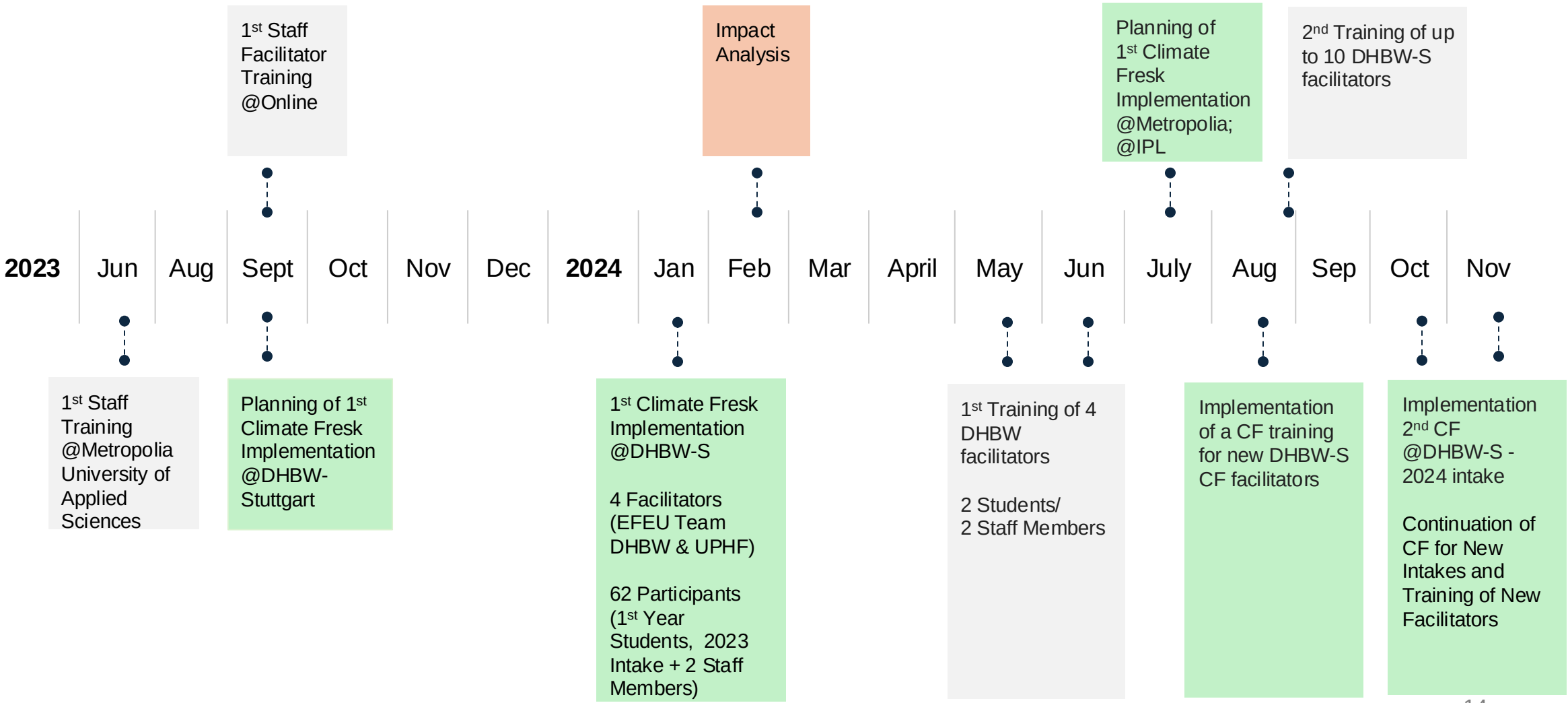
- ‘Praised for its number of ancillary benefits’

  Leimbach and Milstein, 2022

Climate Fresk – Implementation

- Facilitated by: Emission Free European Universities (EFEU) Team
- Location: School of Engineering – DHBW Stuttgart
- Date: 25th and 26th January 2024
- Facilitators: Four Climate Fresk facilitators from EFEU team
- Participants: 62 participants, constituting students and faculty members

Climate Fresk – Timeline



Climate Fresk – Impact Analysis

Two surveys were designed; paper format

Aim: To gauge the perceptions, experiences and learning of participants

Results analysed – Questionpro and Microsoft Excel

Impact Analysis - Results

Participants' views on the effectiveness of serious games as effective tools for addressing complex and intricate topics like climate change

Before the game:
66% of participants

After the game:
89% of participants

Impact Analysis - Results

Participants considered themselves well-informed about climate change

Before the game:
33% of participants

After the game:
82% of participants

Impact Analysis - Results

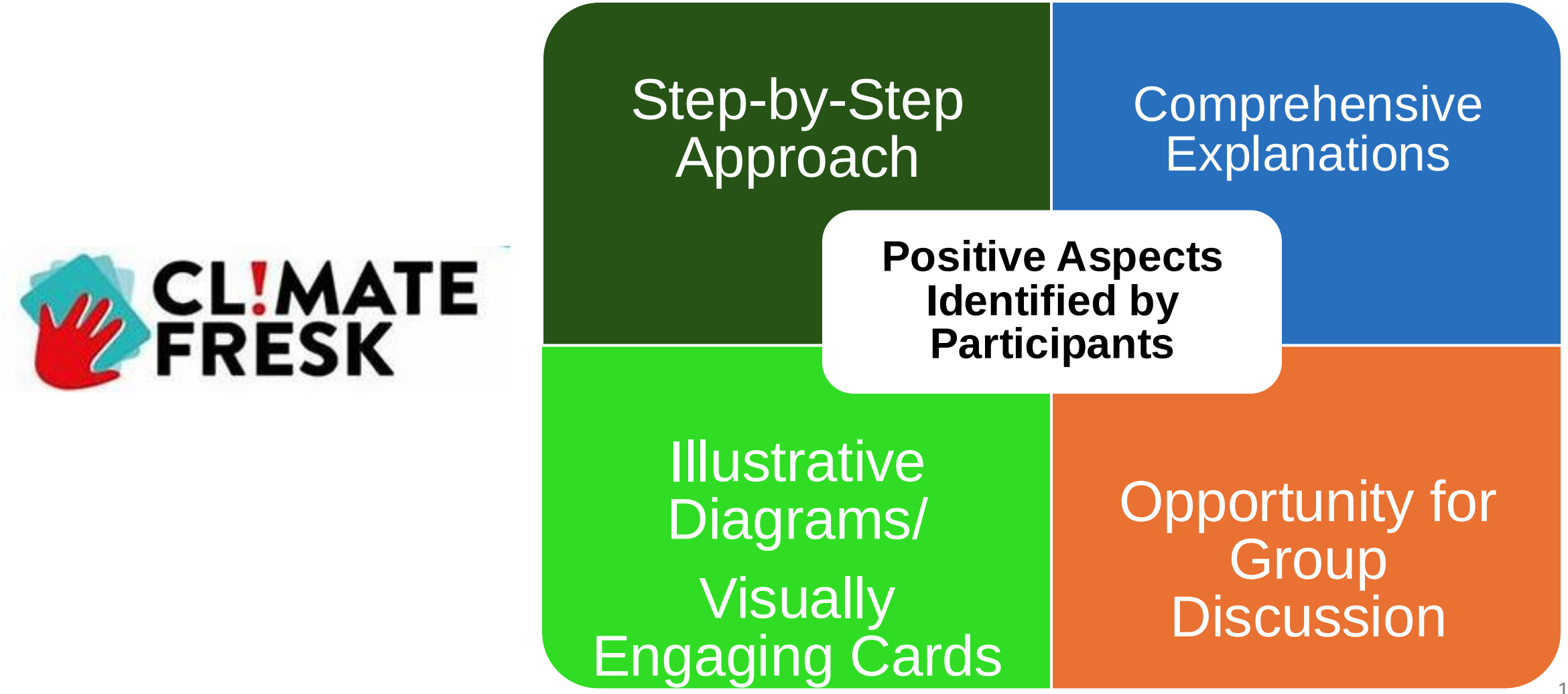
Participants felt prepared to make personal changes to combat climate change

66% of the participants

Participants thought the knowledge of climate change will be useful in their future careers

69% of participants

Impact Analysis - Results



Impact Analysis - Conclusions

Relevance

- Implementation underscores the effectiveness of serious games

Proven

- Noteworthy effect of serious games on student motivation, attitudes towards sustainability, learning and behavioural changes (Manzano et al., 2021, Nordin and Wahlström, 2022, and Oliveira et al., 2021)

Replicate

- Continuation of the Climate Fresk installation to support substantive behavioural changes and closely aligns with the demands of the future careers of students

The Climate Fresk Snow-Ball Dissemination Strategy

Objective: To Increase Learning On The Topic Of Climate Change Through The Application Of Climate Fresk

Audience	Activity	Goal	Frequency	Responsible
1st Year Students; Staff	Climate Fresk Implementation	100% of All Study Programs; 10 Staff Members	Every Intake	In-house Climate Fresk Facilitators
Campus Wide	Climate Fresk Facilitator Training	10 – 15% of Trained Students and Staff Members	After Climate Fresk Implementation	Online Training through the Climate Fresk Association
External Community	Climate Fresk Implementation	–	As Needed	In-house Climate Fresk Facilitators
All Participants	Impact Study	100 % of Participants	After Climate Fresk Implementation	Research Office – DHWB Stuttgart

Thank You!
Danke! Merci!
Obrigado! Kiitos!