EMISSION FREE EUROPEAN UNIVERSITIES

Strategic Development of Students' Sustainability Competencies:

Best Practices in Module Adoption, Transfer and Co-creation

Work Package #5

Student and Staff involvement – taking students and staff to universities´ emission neutrality

EFEU Serious Game Book of Characters

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About this Publication

This publication presents the Book of Characters developed within the framework of Work Package 5 (WP5) – Student and Staff Involvement: Taking Students and Staff to Universities' Emission Neutrality of the Erasmus+ project Emission Free European Universities (EFEU). It forms part of Activity 5.2, which focuses on the co-creation and implementation of the EFEU Serious Game—an innovative educational tool designed to foster sustainability awareness and behavioural change in higher education.

The Book of Characters serves as an essential pedagogical resource for facilitators and players of the EFEU Serious Game. It provides a detailed overview of the fictional characters that participants embody during gameplay, outlining their personal lifestyles, mobility habits, consumption patterns, and resulting carbon footprints. Each character represents a realistic profile drawn from diverse European contexts—students, staff, and professionals—illustrating the complex interactions between individual behaviours and institutional sustainability goals. These profiles are informed by empirical data, including carbon footprint simulations (using ADEME's Nos Gestes Climat model) and findings from WP2 and WP4, which analysed university-related emissions and mobility practices.

The publication's primary purpose is to support the pedagogical and sustainability objectives of the EFEU Serious Game. By enabling participants to adopt different roles and negotiate pathways toward emission reduction, the characters create a dynamic and relatable learning environment. This experiential approach enhances understanding of systemic challenges in achieving carbon neutrality, stimulates empathy and critical reflection, and empowers learners to explore feasible actions for reducing emissions in their personal and professional contexts.

- Within the broader framework of Work Package 5, the Book of Characters contributes to key objectives:
- Engaging students and staff in interactive, co-created learning processes that link everyday decisions to institutional emission goals;
- Applying game-based learning to strengthen sustainability competencies such as systems thinking, collaboration, and ethical reasoning; and
- Supporting innovative digital education formats that reduce the environmental footprint of teaching while maintaining accessibility and inclusiveness.

Aligned with the overall EFEU project objectives, the Book of Characters advances the strategic aim of integrating sustainability into engineering and management education across Europe. It also reflects the Erasmus+ priorities of environmental sustainability, digitalisation, and innovation in teaching. By merging educational design with scientific accuracy, it ensures that complex climate and energy issues are made tangible and actionable for learners.

Intended for use by educators, facilitators, and higher education institutions, the publication complements the full EFEU Serious Game package—including facilitator guidelines and gameplay scenarios—and is freely accessible through the project website at www.dhbw-stuttgart.de/efeu. Its open-access format encourages adaptation and replication across universities, fostering a wider European community of practice around sustainability education and the transition toward emission-free universities.

The online version of this report can be obtained from the project's website:
https://www.dhbw-stuttgart.de/efeu

1. Introduction

The *Book of Characters* is a central component of the **EFEU Serious Game**, developed under *Activity 5.2* of **Work Package 5 – Student and Staff Involvement: Taking Students and Staff to Universities' Emission Neutrality**. Within the broader context of the Erasmus+ project *Emission Free European Universities (EFEU)*, the Serious Game promotes learning through role-play to strengthen sustainability awareness and behavioural change among students and staff in higher education.

The EFEU project brings together four European higher education institutions—Duale Hochschule Baden-Württemberg Stuttgart (Germany), Université Polytechnique Hauts-de-France (France), Instituto Politécnico de Leiria (Portugal), and Metropolia University of Applied Sciences (Finland)—to jointly advance the transition of universities toward carbon neutrality. Building on the European Green Deal and the EU Climate Law, the project aims to integrate sustainability into the teaching and learning processes of engineering and applied sciences. It focuses on developing and disseminating innovative teaching formats that not only reduce the environmental footprint of higher education but also equip future engineers and professionals with the competencies required to act as drivers of sustainable transformation.

In this context, the *EFEU Serious Game* was conceived as a collaborative, experiential learning tool to help participants understand the complexity of achieving emission neutrality in academic and personal life. Based on the adaptation of the French educational game *Ma Terre en 180 minutes*, it challenges players to collectively reduce their virtual characters' carbon footprints by 50%, negotiating trade-offs between professional, social, and environmental choices. The *Book of Characters* provides the narrative foundation for this process. It introduces realistic personas—students, staff, and professionals—from different cultural and disciplinary backgrounds, each with distinct habits, motivations, and emission profiles. Through these characters, participants explore how everyday decisions about mobility, food, energy use, and consumption influence overall carbon performance.

The use of characters transforms abstract climate data into relatable human stories, fostering empathy, systems thinking, and cooperative problem-solving. Players are encouraged to identify with their assigned roles, debate priorities, and develop collective strategies that balance individual convenience with societal responsibility. In this way, the Serious Game functions as both an educational and transformative instrument—linking knowledge to action and bridging the gap between awareness and behavioural change.

The *Book of Characters* also reflects the pedagogical philosophy of the EFEU project: **learning through participation, reflection, and co-creation**. Each character profile was co-developed by the project partners and tested during the pilot implementation of the Serious Game at the

EFEU Summer School 2025 in Stuttgart. The diversity of the characters mirrors the consortium's European scope and highlights cultural and contextual variations in sustainability practices.

By engaging participants in an immersive simulation grounded in real-world data and interdisciplinary perspectives, the *Book of Characters* contributes directly to the EFEU project's overarching goal—to foster emission-free universities through education that empowers students and staff to think critically, act responsibly, and collaborate effectively in addressing the global climate challenge.

2. Creating Personas/Characters - Methodology

This chapter outlines the methodological approach used to develop the personas that form the foundation of the Book of Characters for the EFEU Serious Game, created under Work Package 5 – Student and Staff Involvement of the Erasmus+ project Emission Free European Universities (EFEU). The methodological framework combines elements of user-centered design, design thinking, and co-creation to ensure that each character authentically represents the diversity of student and staff experiences within European higher education.

The process of creating personas was guided by the EFEU project's overarching objectives—to promote sustainability competencies, stimulate behavioural reflection, and support the transition of universities toward emission neutrality. Within this pedagogical context, the personas serve both as narrative devices for the serious game and as didactic tools for facilitating critical thinking and empathy regarding individual and collective contributions to carbon emissions.

2.1 Conceptual Framework

The use of personas in educational design is rooted in user-centered and experiential learning principles. Personas are archetypical representations of user groups, constructed from empirical and qualitative data to capture motivations, attitudes, and behaviours (Cooper, 1999). In the EFEU context, they embody representative European students and staff members whose daily practices—mobility, food consumption, energy use, and digital habits—affect their individual carbon footprints.

Adopting personas as a learning and design tool aligns with the Education for Sustainable Development (ESD) framework promoted by UNESCO (2017) and the constructivist learning paradigm (Kolb, 2015), both of which emphasise active participation and reflection. By engaging participants in role-play through these personas, the EFEU Serious Game operationalises the concept of transformative learning (Mezirow, 2000): players experience the complexity of sustainability dilemmas, confront trade-offs, and negotiate collective decisions.

The methodological approach also draws on Design Thinking (Brown, 2009; Ramaswamy & Ozcan, 2018), which advocates empathy, iteration, and co-creation. Within the EFEU project, the persona development process followed the design thinking stages of empathise, define, ideate, prototype, and test, ensuring that each character profile reflects authentic real-world challenges faced by students and staff navigating sustainability in higher education.

2.2 Methodological Approach

The persona development process combined empirical data analysis, creative synthesis, and stakeholder validation. It was conducted collaboratively by the project partners—Duale Hochschule Baden-Württemberg Stuttgart (Germany), Université Polytechnique Hauts-de-France (France), Instituto Politécnico de Leiria (Portugal), and Metropolia University of Applied Sciences (Finland)—between October 2023 and April 2025. The process followed five main steps:

1. Data Collection and Analysis

- The foundation of each persona was built on quantitative and qualitative data derived from:
- The EFEU Sustainability Awareness Survey (WP2), capturing students' and staff's mobility habits, digital practices, and environmental awareness levels;
- The Mobility and Carbon Footprint Assessments (WP4), which provided empirical insight into emission sources linked to academic life; and
- Literature and statistical data on European higher education lifestyles, energy use, and consumption behaviours.

Supplementary insights were gathered through focus group discussions with students and staff during co-creation workshops in Stuttgart, Valenciennes, Leiria, and Helsinki.

2. Definition of Character Criteria

Based on the data, criteria were established to ensure that the personas reflected a representative and educationally meaningful spectrum of lifestyles. The selected dimensions included:

- Academic and professional role (student, lecturer, administrative staff);
- Geographical and institutional context (reflecting the four partner countries);
- Behavioural patterns (mobility, diet, consumption, leisure);
- Environmental attitudes and awareness levels; and
- Carbon footprint range (measured in CO_2eq per year using the ADEME "Nos Gestes Climat" simulator).

This ensured that the set of characters collectively illustrated both high- and low-impact lifestyles and covered different degrees of sustainability awareness and engagement.

3. Co-Creation and Character Development

Character narratives were co-developed through collaborative design workshops involving project partners, student assistants, and facilitators trained in the original Ma Terre en 180 Minutes game methodology. Each partner university created profiles reflecting their national

and institutional context, which were then refined through peer review. The co-creation process emphasised authenticity, relatability, and diversity of perspectives, avoiding stereotypes while preserving educational clarity.

4. Validation and Calibration

To ensure educational relevance and scientific accuracy, all character profiles underwent validation through three mechanisms:

- Cross-review among partners to check narrative consistency and alignment with EFEU learning goals;
- Carbon footprint verification using ADEME's online simulation tool, linking lifestyle data to measurable CO_2 values; and
- Pilot testing during the EFEU Summer School 2025 in Stuttgart, where students and staff evaluated the clarity, realism, and pedagogical impact of the personas.

Feedback from the pilot was used to adjust the tone, complexity, and balance between quantitative and qualitative elements in each character profile.

5. Integration and Formatting

Validated personas were integrated into the Book of Characters according to a standardised template including biographical description, behavioural attributes, quantified emission data, and links to learning outcomes. Each character was visually and narratively distinct, enabling facilitators to assign roles easily during game sessions. The book was designed for both print and digital use, ensuring accessibility and adaptability for future iterations.

2.3 Integration with the EFEU Serious Game

The personas serve as core components of the EFEU Serious Game, functioning at the intersection of narrative design, educational psychology, and sustainability science. Each player adopts a persona and navigates the simulated decision-making process of reducing emissions by 50%. The distinct character backgrounds create a socially diverse learning environment, mirroring the heterogeneity of European university communities.

By role-playing individuals with varying awareness levels, privileges, and constraints, participants experience the systemic nature of emission reduction—understanding how mobility, diet, energy use, and consumer behaviour interact. This structure supports several EFEU educational objectives:

- Enhancing engagement: Personas foster emotional connection and immersion, increasing motivation and participation.

- Promoting empathy and systems thinking: Players consider multiple perspectives and interdependencies when negotiating solutions.
- Encouraging reflection: Post-game debriefings link the simulated experiences to real-life habits and institutional practices.
- Supporting measurable learning outcomes: The use of quantified emission data allows comparison between characters and tangible assessment of sustainability impact.

In this way, the personas transform abstract sustainability data into experiential learning scenarios, enabling players to connect cognitive understanding with behavioural insight.

The methodological design of the Book of Characters combines scientific accuracy with pedagogical innovation. By applying user-centered and co-creation methodologies, the EFEU consortium developed a set of realistic and engaging personas that embody the diversity of European academic life while providing a rigorous foundation for experiential learning.

This approach ensures that the EFEU Serious Game not only functions as an engaging activity but also as a research-informed, transferable educational tool that advances sustainability competencies in higher education. The methodology can be replicated or adapted by other institutions seeking to integrate serious gaming, persona-based learning, and sustainability education within their curricula, contributing to the broader European goal of achieving emission-free universities.

3 Characters

The following section presents the personas developed for the EFEU Serious Game, representing the diversity of lifestyles, motivations, and sustainability attitudes found in the European higher education context. Each character enables players to explore realistic sustainability dilemmas and supports experiential learning aligned with the objectives of Work Package 5 – Student and Staff Involvement.

Felix (Germany)

Role: Undergraduate Student, Electrical Engineering – DHBW Stuttgart, Germany

Attribute	Description
Profile Summary	19-year-old student living in a suburban area near Stuttgart. Commutes 30 minutes by train daily and lives with his parents. Plays football twice a week and travels to matches by car. Represents the balance between convenience, leisure, and emerging sustainability awareness.
Motivations & Goals	Efficiency and social interaction. Curious about technology but not yet proactive on sustainability. Seeks practical ways to save time and energy.
Behavioral Traits	**Food:** Omnivorous diet. **Mobility:** Train for commuting; car for leisure. **Leisure:** Football, streaming, digital gaming. **Decision Style:** Pragmatic and time-oriented.
Sustainability Challenge / Dilemma	High reliance on car transport for sports versus awareness of emission reduction.
Learning Relevance	Highlights the need to consider low-carbon transport in daily life decisions. Demonstrates how small shifts in habits can have cumulative environmental effects.
Annual CO_2 Emissions	**10.7 t CO_2eq**
Carbon Footprint Link (ADEME)	https://nosgestesclimat.fr/partage?total=10690

François (France)

Role: Graduate Student, Electrical Engineering – Université Polytechnique Hauts-de-France

Attribute	Description
Profile Summary	24-year-old energy engineering student commuting 50 km to campus. Participated in mobility programs in Indonesia and Canada. Represents internationally active students with high carbon-intensive lifestyles.
Motivations & Goals	Professional growth and global exposure. Intends to apply sustainability principles but struggles with carbon-intensive travel.
Behavioral Traits	**Food:** Mixed, includes imported produce. **Mobility:** Train commuting; weekly car trips; annual international flights. **Leisure:** Gaming, travel, socialising. **Decision Style:** Analytical, career-focused.
Sustainability Challenge / Dilemma	Balancing international experience with emission reduction commitments.
Learning Relevance	Encourages reflection on sustainable academic mobility and the trade-offs of global collaboration.
Annual CO_2 Emissions	**15.4 t CO_2eq**
Carbon Footprint Link (ADEME)	https://nosgestesclimat.fr/partage?total=15447

Alex (Portugal)

Role: Working Student, Mechanical Engineering – Instituto Politécnico de Leiria, Portugal

Attribute	Description
Profile Summary	24-year-old working student balancing full-time employment and evening studies. Uses a car daily due to limited public transport. Typical of non-residential students facing structural barriers to sustainable mobility.
Motivations & Goals	Career advancement and financial stability. Seeks efficient and cost-effective solutions over ideal sustainability choices.
Behavioral Traits	**Food:** Meat-based at lunch, vegetarian dinner. **Mobility:** Car commuting (120 km/week), occasional bus to hometown. **Leisure:** Mountain biking (BTT), socialising locally.
Sustainability Challenge / Dilemma	Limited transport alternatives make emissions difficult to reduce.
Learning Relevance	Illustrates equity issues and the need for institutional solutions in sustainable campus mobility.
Annual CO_2 Emissions	**8.4 t CO_2eq**
Carbon Footprint Link (ADEME)	https://nosgestesclimat.fr/partage?total=8441

Maria (Portugal)

Role: Bachelor Student, Management – Instituto Politécnico de Leiria, Portugal

Attribute	Description
Profile Summary	20-year-old management student commuting 12 km to campus. Alternates between carpooling and public transport. Enjoys surfing and local leisure travel. Demonstrates partial adoption of sustainable lifestyle choices.
Motivations & Goals	To live sustainably while maintaining an active social life. Prefers local products and moderate consumption.
Behavioral Traits	**Food:** Omnivorous, prefers local organic food. **Mobility:** Bus, carpooling, and short-distance driving. **Leisure:** Surfing, outdoor activities, streaming.
Sustainability Challenge / Dilemma	Balancing environmental ideals with convenience and social habits.
Learning Relevance	Encourages reflection on lifestyle-based sustainability and consumer choices.
Annual CO_2 Emissions	**7.3 t CO_2eq**
Carbon Footprint Link (ADEME)	https://nosgestesclimat.fr/partage?total=7343

Sabrina (France)

Role: Student Activist, Green Business & Management – Université Polytechnique Hauts-de-France

Attribute	Description
Profile Summary	22-year-old business student actively involved in climate activism and sustainable campus initiatives. Follows a vegan lifestyle and promotes ethical consumption. Embodies high awareness and strong advocacy.
Motivations & Goals	Driving collective behavioural change and institutional responsibility.
Behavioral Traits	**Food:** Vegan, local, seasonal. **Mobility:** Bicycle, tram, and train. **Leisure:** Environmental activism, volunteering.
Sustainability Challenge / Dilemma	Reconciling activism with dialogue and compromise in institutional contexts.
Learning Relevance	Highlights values-based leadership and the social dimension of sustainability.
Annual CO_2 Emissions	**3.7 t CO_2eq**
Carbon Footprint Link (ADEME)	https://nosgestesclimat.fr/partage?total=3664

Lewis (France)

Role: Administrative Staff, Head of International Affairs – Université Polytechnique Hauts-de-France

Attribute	Description
Profile Summary	45-year-old senior administrator managing international partnerships. Travels frequently to Asia and Europe. Embodies the institutional dimension of sustainability management and globalisation.
Motivations & Goals	Expanding partnerships and institutional reputation. Aware of emissions but perceives travel as necessary for success.
Behavioral Traits	**Food:** Omnivorous, convenience-focused. **Mobility:** SUV for commuting; long-haul flights. **Leisure:** Technology, fashion, streaming.
Sustainability Challenge / Dilemma	Managing institutional growth while reducing travel-related emissions.
Learning Relevance	Promotes discussion on leadership, responsibility, and sustainable policy design.
Annual CO_2 Emissions	**23.4 t CO_2eq**
Carbon Footprint Link (ADEME)	https://nosgestesclimat.fr/partage?total=23364

Eero (Finland)

Role: Master Student, Civil Engineering – Metropolia UAS, Finland

Attribute	Description
Profile Summary	26-year-old civil engineering student specialising in sustainable infrastructure. Lives near campus and cycles most of the year. Integrates sustainability principles into study and daily life.
Motivations & Goals	Developing expertise in sustainable design and infrastructure. Values nature and efficiency.
Behavioral Traits	**Food:** Pescatarian, locally sourced. **Mobility:** Cycling, metro, occasional flights. **Leisure:** Outdoor recreation, documentaries.
Sustainability Challenge / Dilemma	Managing low-carbon living while engaging in international study activities.
Learning Relevance	Encourages reflection on consistency between sustainability knowledge and personal behaviour.
Annual CO_2 Emissions	**7.2 t CO_2eq**
Carbon Footprint Link (ADEME)	https://nosgestesclimat.fr/partage?total=7200

Veera (Finland)

Role: Bachelor Student, Civil Engineering – Metropolia UAS, Finland

Attribute	Description
Profile Summary	21-year-old student living on campus, passionate about environmental activism. Embodies minimalism and sustainable consumption. Inspires peers but experiences frustration over collective inaction.
Motivations & Goals	Leading by example and promoting systemic change in student communities.
Behavioral Traits	**Food:** Vegan, locally grown. **Mobility:** Walking and train. **Leisure:** Music streaming, volunteering.
Sustainability Challenge / Dilemma	Coping with eco-anxiety and sustaining motivation when collective engagement is low.
Learning Relevance	Enables reflection on emotional and ethical aspects of sustainability learning.
Annual CO_2 Emissions	**5.1 t CO_2eq**
Carbon Footprint Link (ADEME)	https://nosgestesclimat.fr/partage?total=5100

4 Overall Summary

Total Annual Emissions (8 Characters)	**≈ 81.2 t CO_2eq**
Average per Character	**≈ 10.15 t CO_2eq**
Lowest Emission Persona	Sabrina (3.7 t CO_2eq)
Highest Emission Persona	Lewis (23.4 t CO_2eq)

Interpretation:

The diversity of emission levels across characters mirrors real-world differences within higher education institutions. These variations encourage participants to explore equity, accountability, and behavioural strategies for emission reduction in the pursuit of university-level carbon neutrality.

Pedagogical Use

Facilitators are encouraged to:

- Assign personas to participants before the game session.
- Encourage players to familiarise themselves with each character's values and constraints.
- Use the *Book of Characters* during debriefing to discuss the systemic links between lifestyle choices, institutional practices, and global sustainability goals.

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