

GAME BASED LEARNING ON URBAN SUSTAINABILITY: THE "SUSTAIN" PROJECT

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SUSTAIN is an ERASMUS+ project with an innovative perspective on urban sustainability. Its target is to promote the importance of sustainability on the everyday problems of the cities among the students of higher education, which are the policy makers of tomorrow and the ones that will shape the future. In order to achieve its goals, the research team will develop a course that will be based on an interactive game with an analytical style of education. This game will allow students to learn about transportation sustainability and societal metabolism through playing. In addition, the research team will develop small and illustrative simulation models, which will make the definitions more concrete and allow students to experiment in a consequence-free environment. It is a quite innovative and hybrid perspective way of learning, in the sense that it will combine game-based learning with a cognitive and analytical style of education.

Sustain project is oriented on two main directions: urban transportation sustainability (measures and solutions able to tackle mobility challenges that lead to uncontrolled growth of vehicles and downgrading of quality of life) and societal metabolism (models that facilitate the description of flows of material and energy within cities and provide a framework to study the interaction between human and natural systems).

Combining game-based learning with an analytical style of education, SUSTAIN aims to: (i) create small, illustrative simulation models that will make the definitions more concrete and allow students to experiment in a consequence-free environment with scenario exemplars, (ii) create a Serious Game that will allow

students to learn about transportation sustainability and societal metabolism through playing, (iii) create a course, based on the Board Game, dealing with transportation sustainability, societal metabolism and decision making under those contexts. The results of the project are still at an early stage, but there are three Intellectual Outputs that are complete:

Output 1 – Ebook on societal metabolism. It describes the main definitions of societal metabolism and the formal theoretical models, their advantages and disadvantages and how the theoretical notions of flows of energy and material can be translated to elements of everyday life.

Output 2 – Ebook on transportation sustainability. It contains the definitions of sustainable transportation, the theoretical models that describe its behavior and discuss on the state of the art from a theoretical point of view on the research conducted on the issue.

Output 3 – Ebook on decision making in the context of sustainability. Provides the formal mathematics and foundations of decision making especially in the context of sustainability, in order to students understand how the theoretical mathematics of decision making are translated into actual decisions. Linear programming, DEA, PROMETHEE and AHP are being detailed explained.

The SUSTAIN Project will deliver three additional Intellectual Output, one for simulation models, one for the board game that will translate the simulation models of O4 to game elements, mechanics and potential playing scenarios, and one for the board game itself. Taking everything into consideration, SUSTAIN's team will try to boost its sustainable way of thinking, providing solutions through an interactive way of learning. Our goal is to promote the importance of a sustainable future for the urban transportation.

Keywords: Urban Sustainability, Board game, Edutainment, Decision making