inLife platform

ICEBERG:
smart learning for smart environment
Use Case I

Whitepaper 2

Co-funded by the Horizon 2020 Framework
Programme of the European Union
InLife - Grant Agreement 732184

Authors on behalf of InLife H2020 Project:
Vanessa De Luca, SUPSI Laboratory of Visual Culture, Switzerland
Victor Ortega, Five Flame Mobile, Spain
Jeronimo Hinojosa Valenzuela and Angela Rivada Rodriguez, Agencia de Innovación y Desarrollo Económico de Valladolid, Spain

Graphic Design:
Valentina Meldi, SUPSI Laboratory of Visual Culture, Switzerland

02 november 2018

Index

Preface..... 5

1. The state of game-based learning..... 6

2. Summary of the iceberg's features
the iceberg serious game..... 7

3. Supported eco-responsible actions..... 9

4. Summary of the iceberg's features 10

5. Summary of the iceberg's features 11

Preface

We all know that students' engagement is important for an effective learning and serious games are promoting a significant change in this sector. Serious games have become valuable tools to motivate and support students' learning by providing an effective balance between structured progress and fun. The game-based learning approach can be effective for building new skills, knowledge and behaviours. Serious Games find their application in various educational domains as well as in enterprises, for improving employees' performance, achieving business goals and for analysing the company progress through an easy-to-use incentive system.

The InLife Platform is an innovative tool that proposes an educational framework to facilitate learners' critical thinking and train problem-solving skills, while allowing the analysis of information from multiple sources. The Platform creates an enhanced smart educational environment by merging serious games application and Internet-of-Things (IoT) technology.

By combining a flexible IoT adaptation layer to an easy-to-use Game Configuration System, the InLife Platform offers an engaging, motivating and innovative tool for educators and institutions that aim to boost a sustainable lifestyle.

The InLife Platform links real-life actions to the in-game progresses for enabling an effective and interactive education toward sustainability.

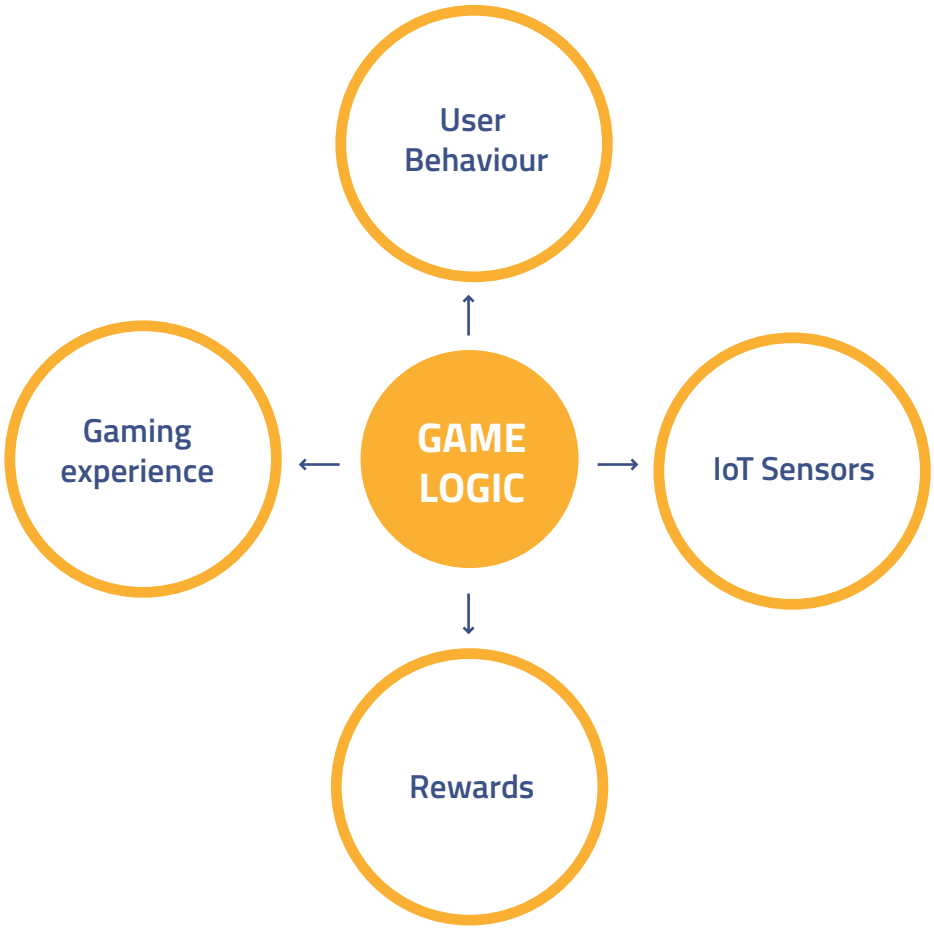
The keystone for reaching a sustainable future is in the design of an educational Platform that engages people in cooperative ecological practices.

1. The state of game-based learning

The gamification approach is relatively new and is defined as the use of game mechanics, dynamics and frameworks to promote (establish) desired behaviours. The largest areas of growth for the application of the emergent tools are in education and training, customers' and citizens' engagement, health, politics, marketing and research. The game-based learning approach focuses on one important aspect: it increases users' involvement by providing an interactive motivation system that works at the same time on cognitive, emotional and social levels.

Supported by InLife Platform, educators and institutions can personalize the learning environment and trigger participants' will on acting with more awareness. Moreover, the automated analytic server offered within the InLife Platform adapts the reward to the learner's progresses and environmental changes maintaining a high games performance. Designed for libraries, public institutions, associations, museums and schools, the InLife approach helps the switch to an ecologically relevant perspective and the participation in a sustainable society.

Figure 1:
Smart games elements



People can play wherever the technology arrives to gamify the environment and teachers can have a flexible tool to guiding, motivating and rewarding students in lifelong learning practices. This convergence of games, learning, and technology provides personalized interventions to place the individual at the center of the action.

2. The iceberg serious game

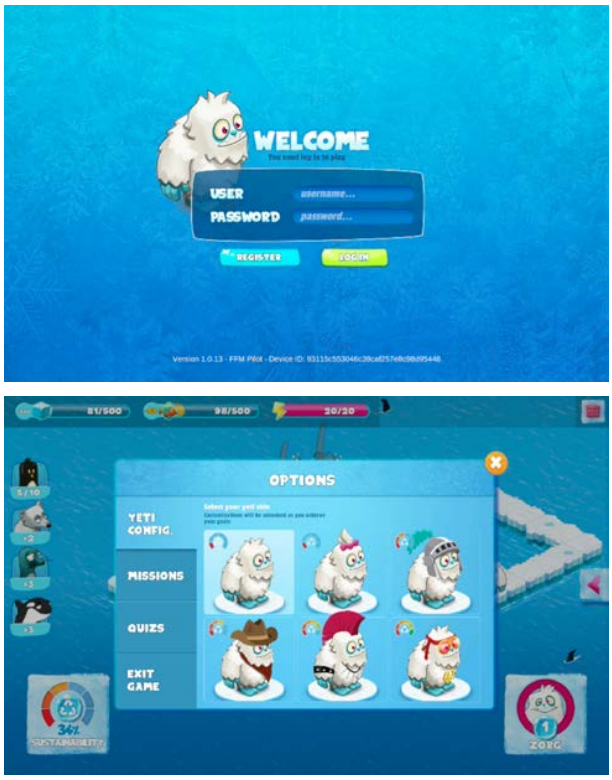
ICEBERG stands for Incubate Changes in Environmental Behaviour through an Educational yet entertaining Game.
The experimental pilot:

Duration: 8 months
Locations:

- **"Adolfo Miaja de la Muela Library", Valladolid - Spain**
- **"AVAG", Les Ulis - France**
- **School of Electrical and Computer Engineering, National Technical University of Athens" Athens - Greece**

involved teachers: 21
involved students: 179 / 8-12 y and 6 / 24-45 y
involved institutions: 5 schools, Agencia de Innovación y Desarrollo Económico de Valladolid and ICCS University

Figure 2: ICEBERG screenshot



Game Concept

ICEBERG is a serious game set in an imaginary world of ice. The game is a combination of a Role-Playing Game (RPG) and a strategy game. The main creatures living in the game environment are the Yetis, along with other non-playing animals, such as penguins, polar bears, orcas, seals, etc. Each player interacts with his/her own Yeti to make the ICEBERG world growing. There are several types of resources to manage in ICEBERG, the most important are the ice blocks, which are produced by the penguins. Other necessary resources are energy, vital for construction or food necessary for the maintenance of animals.

It is responsibility of the player to keep an healthy and growing ice world. When the players' behaviour in the physical environment is respectful and they are trying to be efficient in energy saving (switch off the lights, save water, close the windows when the heating is on etc.), then the system rewards them with new items that increase and improve the ice world. But, if the player's behaviour is not respectful, ICEBERG could start to melt and some penguins could be disappointed and leave.

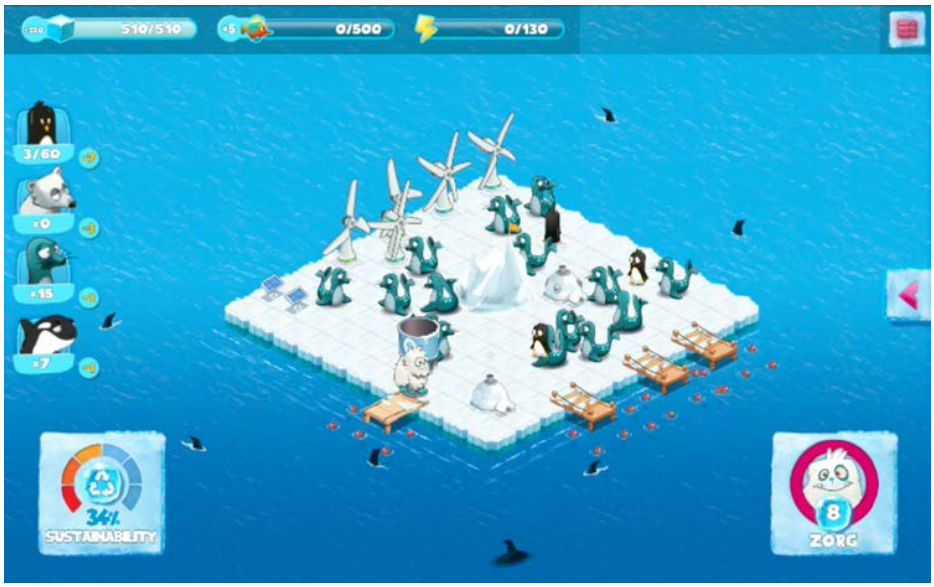


Figure 3:
ICEBERG screenshot

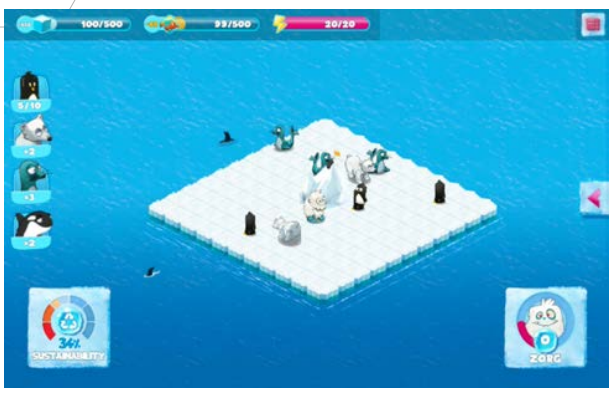


Figure 4:
Non-playing animals populate the iceberg.

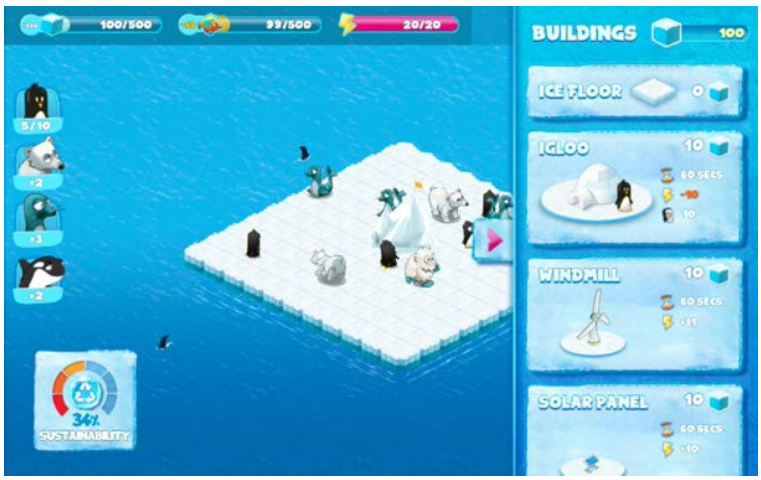
Gameplay

The game world starts with a single ice block module that represents the Jorg's house on the tip of the iceberg environment. By interacting with Jorg and the physical space (such as switching of the lights or using stairs instead the lift), players can gain points and build new items, produce energy, find new friends and increase or decrease the iceberg.

Learners can **create their own island** without limitations in shapes, combinations and size. Smart actions in the real world provide smart resources for the player to use in the game world. Rewards and incentives can be monitored and configured by the incentive servers to further customize the experience.

InLife includes a set of **analytics** for the evaluation of students' progresses as well as tool to check the players' learning goals achievement.

Non-playing animals populate the iceberg.



3. Supported eco-responsible actions

- Actions augmented by IoT
  - Energy saving by more aware consumption (electrical appliances, lights, computers and printers, heath)
  - Wasting reduction of recycling materials (paper, glass, plastic or metal)
  - Supplies reduction (consumed materials)
  - Using more efficient transportations

- Actions supported by the game
  - In-game questionnaires for the self-evaluation of learning
  - Integration of mobility tracking system for CO_2 saving.

- Educators and/or supervisors can create:
  - Sustainable missions (i.e. borrow an e-book instead of paper version)
  - Collaborative actions (i.e. donate books to the library)
  - Community working activities (i.e. clean up the room)
  - Participatory activities (i.e. join a workshops on technology and sustainability)

ICEBERG serious game is an effective customable educational tool to raise the awareness on sustainable lifestyles and pro-environmental behaviours.

4. Summary of the Iceberg's features

In-game mission	Customizable missions to learn by practicing environmentally-friendly actions in a variety of different circumstances
Real-life objectives	Environmentally responsible behaviours: ▪ Saving: energy, natural resources ▪ Reducing: the production of wasting materials, energy consumption, CO2, etc. ▪ Supporting sustainable food system: producing, processing, buying, selling and eating in ways that provide environmental benefits, contributing to thriving local economies. ▪ Promoting sustainable mobility lifestyle: using eco-friendly transport means instead of cars, using stairs instead elevators, etc.
Learning Objectives	▪ Being aware of the impact an environmentally responsible behaviour may have on health (e.g. visual feedback of pollution caused by energy production and waste, measurements etc.) ▪ Allow the adoption of different healthy behaviours: walking, biking, eating vegetables, recycling, etc. ▪ Stimulate curiosity about the climate change, the the environmental impact of human actions on the Earth and ICEBERG eco-systems.
Motivational patterns	Allowing meaningful behaviours toward personalized environments. Enhancing everyday life activities with digital feedback and rewards. Adapting players' progression and learning challenges. Turning education into fun.
Trackable actions	Actions supported by measurements taken in the physical space may include: ▪ Switching off lights ▪ Switching off PCs and screens ▪ Using waste cans ▪ Finding the glass recycling container ▪ Participating to an event ▪ Number of steps, walking/biking kilometres ▪ Localization of bus stops, trash cans for recyclable materials, etc.
Social features	Group cooperation or competition can be considered, as well as simple features having social visibility.
Learning impact	The InLife Platform provides self-evaluation tools to end-users. ▪ An interface for the monitoring of the player's progress is accessible to both player as well as educators. ▪ Statistics to manage groups' progression towards educational goals.
Additional metrics	Statistics and analytics measure the real-life impact of players' behaviours. Additional metrics allowed: Kw/h consumed, CO^2, waste produced.

InLife ICEBERG:

- Enable smart learning by a gamified reality-based environment.
- Train citizens on energy-efficiency and sustainability.
- Activate a behavioural change process in which students can experiment sustainable activities.
- Provide a real-time feedback on players/learners' achievements.
- Make players' progress available to educators and tutors.
- Provide a user-friendly interface that enable educators to customize the gamified experience according with the learning objectives.

Services provided:

- Free InLife SDK
- IoT Server
- Incentive Server
- Game Configuration Engine
- Statistics Server

From a pilot to an educational tool

Active play helps build understanding across physical reality and abstract concepts. It taps into the world of "fun" affecting emotions with the ability to more deeply involve users. By playing educators unlock the potential of technologies to motivate behavior change and heighten the awareness on how real systems function. The InLife Platform provides an innovative educational environment that can incorporate many different game-based activities. The InLife Platform has been released as a free Software Development's Kit (SDK) combined with the IoT server, the Incentive and Statistic servers for educational purpose.

Download for free the SDK and know more about the available packages on www.inlifeplatform.eu

5. Additional support

- Game Customization: InLife Platform service supports the definition, configuration and onboarding of additional IoT missions.

Consulting and Integration

five flames mobile

SYNELIXIS

imaginary

THALES

Looking for flexible, open and advanced gamification Platform for your IoT business?

Learn more about InLife Platform
► www.inlifeplatform.eu

inLife platform

Co-funded by the Horizon 2020 Framework
Programme of the European Union
InLife - Grant Agreement 732184