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Intellectual Output 3
The ACTiFE Serious Game Design

Leading Organization

CIVIC COMPUTING LTD

Revision History

Version	Date	Author	Description	Action	Pages
1.0	13/06/2019	CIVIC Computing	Creation of the document	C	13

(*) Action: C = Creation, I = Insert, U = Update, R = Replace, D = Delete

Referenced Documents

ID	Reference		Title
1	2018-1-UK01-KA204-048177		ACTiFE Proposal
2			

Applicable Documents

ID	Reference	Title
1	2018-1-UK01-KA204-048177	ACTiFE Proposal

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1. Introduction

The scope of the project

Towards the enhancement of key competences that are important for personal fulfilment and development of active citizens in Europe as well as for the prosperity of European economies, the project ACTiFE aims to motivate and engage young adults with STEM and Entrepreneurship related fields that can help them pursue alternative work careers and ensure a better future for them.

To that end, ACTiFE promotes a positive attitude towards Coding, Ubiquitous computing and Sciences as well as a responsible entrepreneurial attitude towards the environment. In order to establish this attitude, the project addresses the benefits of deploying state of the art tools and innovative methodologies to create 'smart', effective and cost-efficient working environments with a strong eco-friendly character.

The target groups

The project foresees to enhance the skills of adult learners that attend Lifelong Learning courses, Adult (Second Chance) Schools or Vocational training (VET) courses and even more those that are unemployed and/or at risk of exclusion.

The Intellectual Outputs

In order to increase the attractiveness and sense of creativity through STEM related skills derived from Coding, Computation Thinking and IoT related processes, the ACTiFE project plans on developing three main intellectual outputs:

- Learning Methodologies Framework
- ACTiFE Serious Game
- Instructional Support Content

The following schema (schema 1) depicts the exact activities to be deployed during each phase in order to establish the above outputs:

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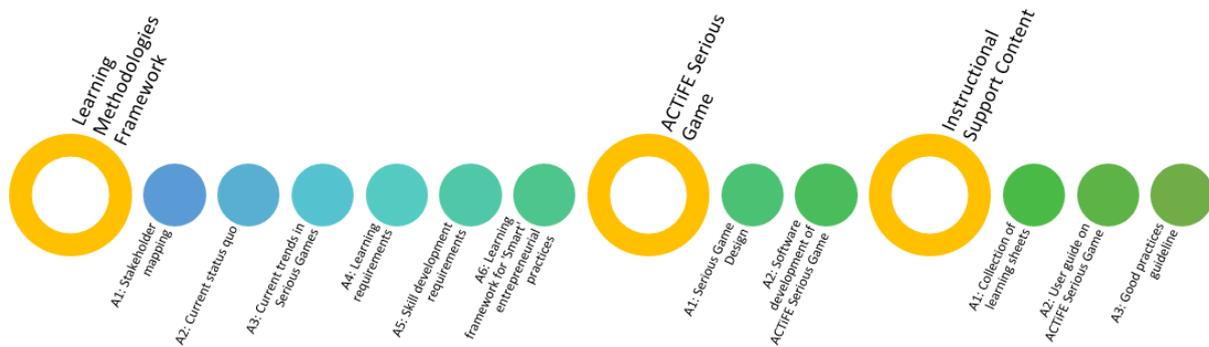
SCHEMA 1. THE INTELLECTUAL OUTPUTS AND ACTIVITIES

2. ACTiFE Serious Game Design

Game Short Description

This application is focused on creating a digital agriculture micro-environment, with a specific set of rules and requirements. The game will have a user-friendly interface that will contain all the information required for the player to develop his management skills and a motivational environment with 3D objects that will depict the actual actions that the players takes.

The application will be developed in Unity engine, a powerful game engine used in game development with great success. The game will be a standalone Windows application.

The game will be structured as a scenario-based campaign with a linear progression and different levels of difficulty. Due to the fact that main focus is to create a learning tool suitable for a specific age range, the gamification aspect of the project has a high priority in the development process.

For motivating the young players to learn and compete, a system of achievements will be implemented in the game.

The gameplay will be divided into three main sections: **The agriculture land module** where the player will have all the information regarding the "health" of the land and all its parameters so he can understand what action to take. This module will have three subsystems:

- Terrain (with a set of visual/logical features and description that will determine the overall complexity of the simulation)

- Crops (with their unique set of visual/logical component)

- Weather (with a set of visual and/logical features)

All three subcomponents will be interconnected to produce a simulation of a natural field of crops without human intervention.

The tools module will consist of all the instruments, vehicles and buildings required to develop the land and grow the crops with higher productivity. This will present to the player the entire set of tools for developing and growing his agricultural business and better understand the flow and the required "web" for creating a stable micro-system. This module will have the following subcomponents:

- Agricultural vehicles (required for working the terrain and increase productivity)

- Agricultural buildings (buildings that have specific passive functions for increasing productivity)

- Agricultural technologies (this will represent a high-level depiction of present and future technologies that will have a high impact on the way agriculture is done)

The final module represented by **the market** focuses on the economics of the game and teaches the player how to become an entrepreneur and grow his business. This module will represent the long-term goal of the player to grow his business. The market will be divided into two subcomponents:

- Export module (where the player needs to sell its crops on the free market and balance offer and demand with other competitors)

- Specialized agricultural market (where the player can buy different vehicles and buildings for optimizing his business)

All three components will be linked together so the final game will be a representative simulation of the actual requirements needed to run an agricultural business.

Generic Guidelines

The screen size is **1920x1080px 16: 9** with space for the player to interact **1440x1080px 4: 3** at the center of the screen.

The main panel of each screen is about **1120x920px**. It does not have to be just that, but it covers most of the 4: 3 behind it, leaving space on it for the Player info panel.

All panels can be **stretched** + -50% of its size horizontally or vertically, so we follow the **9-segment** logic as much as possible.

Between the main panel and the rest of the images behind it, a semi-transparent dark image comes in with a little blur for the player to focus on the panel rather than on the background. There is a generic screen that we use, but it can also fit in with the other graphics.

All the texts, AND the title will be dynamically filled into **Unity**, so we artically avoid artistic that we cannot replicate, unless it is agreed to something in the image eg Logo instead of text title.

Also, the font to be used should be **Unicode** and as far as it supports the familiar European languages, with all the characters and symbols and not any strange demo that is missing.

All **sprites** are **png 24-bit, 72dpi, transparent, uncompressed**.

Intro Screen

The background image is **1920x1080** and **common** in all game screens, only the main panels are changed. The environment should display an agricultural environment. Some recommendations and examples are displayed below:

The **Intro Panel** follows the generic guidelines.

The project logo and project number together with the Erasmus+ logo and disclaimer will be visible in the Intro screen.

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The title of the game will be **The ACTiFE Serious Game**.

Within the Intro Screen Settings, a button for **Multilingual functionality** will be added. The game should be available in:

- English (EN)
- Greek (GR)
- Italian (IT)
- Spanish (ES)

Gameplay Screen

The game will have 3 different modules for the users to select:

- The agriculture land module

- The tools module

- The market module

Every module will contain 24 scenario-based questions covering different sectors as described below (see Game Short Description).

The user will also be able to select 1-4 characters as well as the difficulty level. Character names will also change, while the characters should be:

- Adults / Young learners

- 2 men

- 2 women

Suggested character names are:

- Jorje (male)

- Joseph (male)

- Mary (female)

- Olivia (female)

Some recommendations and examples are displayed below:

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Player deck

Player Deck is the place where the event cards and questions and player pawns are originally placed.

The tiles will be **24.**

Player Deck is the place where the players are initially placed together with the cards with their back side turned.

The **Player Hand** is the place where the character cards are placed from their front side.

The **Turn Counter** counts the time, ie the remaining rounds until the game is over.

The **Stamp Counter** counts how many stamps the player has collected. Examples of stamps are:

including either the project logo or just the title ACTiFE.

The main screen of the game will contain:
- Board (24 tiles, including START / FINISH tiles). The number of tiles that the player can move to is highlighted.
- Character pawns (player pawn (s))
- A hand player that includes the portraits of each character, with movements (+1, +2, -1, -2, ...) highlighted. The number of character cards in the player hand will correspond to the characters playing.
- Turn counter
- Stamp counter. If the player proceeds to a tile containing a stamp, the stamp counter is highlighted.
- Event deck and event counter. If the player moves to a tile containing an event card, the event cards deck is highlighted.
- Question deck and question counter
Items temporarily displayed on the main screen:
- Spinner
- Question cards
- Event cards
- Information panels
- Pause panels

Whenever the player hovers the mouse over the character card, the card will be zoomed in by giving information about the character's moves.

Clicking on a question card displays the question.

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Answers will be Yes / No, True / False, while images or animations can accompany the questions/scenarios.

Settings Screen

The **Settings Panel** follows the generic guidelines.

Results Screen

The Results Panel follows the generic guidelines.
Here are displayed:
- The number of correct answers
- The number of wrong answers
- The MVP with the number of correct answers
- The number of stamps collected

Serious Game Development Stages

1. Game specification and architecture

Based on previous IO results regarding game features, rules, gameplay, the game specifications and platform architecture will be elaborated.

The scope of work will require the following core features to be developed:

- Targeted platform
    - Standalone Windows app
- External Database
    - Game Profiles
    - Achievements

2. Game GUI wireframe and flow

In this task using game specifications and architecture from previous task, will be developed the Graphic User Interface (GUI) and the game flow for the entire application. At the same time, we will address all of the unique specifications that come with developing an application for a specific age group of users.The GUI must be focused on giving the required information to the user in the most visual way possible, avoiding adding a large content of data at once. The GUI will be divided in elements:

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- Main menu interface
- Main game control panels
- Agriculture module
- Tools module
- Market module

3. Game Frontend development

In this task, we will develop the actual game in Unity engine. The user profile module, scenarios-based content, game logics, 3D objects and motivational and gamification workflow together with the GUI will be implemented.

The game will have the following features:

- Scenarios
    - Land Simulation Questionnaire
    - Weather Simulation Questionnaire
    - Entrepreneurship Simulation Questionnaire
- User profile
    - Game profiles
    - Achievements
    - Statistics – Report

4. Game Backend development

The backend will contain the user's progression/achievements profile. It is critical for the gamification of the e-learning platform to give the users a sense of award depending on their progress. For this, the application will have an achievements module that will be unlocked when specific tasks/events will be resolved by the users.

List of deliverables/milestones

1. **Land Module**

    - Model 3d environment
    - Implement 3d environment
    - Implement state machine for the land simulation

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2. **Weather Module**

   - Particle System for weather effects
   - Implement wheatear editor (input data for land state machine)

3. **Tools Module**

   - 3D models
   - Implement 3d vehicles and buildings
   - Particle System
   - Implement tools editor (input data for land and crops)

4. **Crops Module**

   - 3D models
   - Implement 3d crops
   - Implement crops editor (input data for the market)

5. **Market Module**

   - Implement state machine for the market simulation
   - Implement market editor (output data for the player as game currency)

6. **Game GUI**

   - Concept and Wireframe
   - Main Menu Design
   - Ingame Design
   - Modules Design

7. **Scenarios Module**

   - Level design
   - Mission objectives, achievements

8. **Player Profile**

   - Local player profile
   - Achievements