RESPONSEABLE

Serious and applied games

Work Package 5

Deliverable 5.8

March 2018

Project coordinator:

ACTeon
environment
research & consultancy

Project beneficiaries:

G·R·I·D ARENDAL | OÉ Gaillimh NUI Galway | proSea marine education | UNIVERSIDADE LUSÓFONA | INCDDD TULCEA | NIVA Norwegian Institute for Water Research | CSP

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Serious and Applied Games

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Description of the game

In this deliverable, we present the first release of the ResponSEAble learning game. We have a strong need to tell a story in order to involve citizens, tourists, stakeholder as main actors of a process that requires behaviour changing and increase of awareness.

For these reason the applied games seems one of the best tools to engaging people for learning more about the impact of human behaviours on the oceans and also how ocean's impact on our everyday life.

The Serious Game is a mobile device app designed to run on multiple platforms. The game is a Learning Board Game that has the main aim to make people more ocean literate. Winning is determined by a player's ability to answer to ocean-related questions.

Figure 1: Game on different devices

The game implements mutual learning in that users question responses are collected and sent to a central database where they can then be made available for analysis. For this reason, the data collected through the monitoring and the analytics produced by the online application will be very critical for the project. All the data will be collected respecting the privacy of the players.

The game allows players to share their achievement with their friends on the social media channels to create a vibrant community

The game also allows the players that finish the game to become part of the REsponSEAblers' CREW, putting their nickname and selfie on a specific web page. This webpage will be a sub-domain like http://game.responseable.eu where the game is presented and described.

The first 100-500 winners of the game will receive their placeholder made of printed 3D recycled plastic, made in collaboration with the "MARE IN 3D" project (http://ilmarein3d.scuoladirobotica.it/).

The game is designed to present randomly the questions and situations, in order to be played more than once

Short description of the Game

The object of the game is to move around the board by correctly answering questions to gain all the badges: you gain a badge for every Key Story.

The Board will be represented like an archipelago or group of islands.

Questions are split into categories, with each one having its own colour to readily identify itself: the categories are the key stories.

After choosing a placeholder, the player will start from the first island/box and after answer correctly to the first question, he/she will be able to freely move on the board choosing where to go on the board.

The boxes/islands on the board are different. They can be:

- Neutral
- Learn point
- Topic
- Boss
- Prize

The players must gain learning points in order to move freely on the board.

During the "navigation" of the game, special events could happen, that could be positive or not.

When the players have completed the questions related to a single topic/ colour for gaining the badge she/he have to face a "boss" boxes – in which a special exercise is presented like a scenario in order to put in place what she/he learned in the previous phases

The game ends when the player has collected all the badges. After this, the player can decide to become part of the "ResponSEAblers Crew" adding his/her name and photos on the ResponSEAblers Leaders board and accepting the pledge for protecting our Ocean.

Technical and detailed description

The online learning game has been developed as a multiplatform application using the Adobe Air framework. This choice is justified by the availability of a visual editor making the maintenance and develop flexible and also in order to guarantee the best performance on multiple platform. It will be made available on Google Play and Apple Store, for Tablet and Smartphone. Additionally, it will be possible also to download the game to play in on PC Windows 10 and Mac.

There follows the description of the Game Screens.

Splash (Launch) Screen

When the app is launched, this screen will show up with 4 buttons: "start", "instructions", "settings" and when the game is completed "final score".

- Once the game is started, the button "start" will change to "continue".
- By pressing "start" button (when available), the player moves to the screen called "Choose the pawn"
- By pressing "continue" button (when available), the player moves to the screen called "Game Map"
- By pressing "instruction" button, the player moves to the screen called "Instruction"
- By pressing "settings" button, the player moves to the screen called "Settings"
- By pressing "final score" button, the player moves to the screen called "Final Score"

Figure 2: Start Screen

Instruction Screen

This screen will briefly explain the mechanics and the purpose of the game. By pressing the "continue" button, player will return to the "Launch" screen

Settings Screen

In this screen the player can choose the level of graphic detail and - if implemented - set preferences for notifications. A notification has a cost as they have to be implemented on cloud services but the aim is to recall the players information after a they have not played for a while.

By pressing "continue" the player will return to the "Launch" screen.

Choose the placeholder screen

In this screen, the player can choose and select the nickname, genre and age of his/her character.

Moreover, the player will select a placeholder among the ones presented (TBD: number and features).

The placeholder will be studied so that as the player proceeds in the game its shape will change, grows and evolves (TBD: number and type of evolution of the pawn)- ex, a little dolphin will become stronger and adult.

Figure 3: Game Character

Board Screen

The Board /game map is the heart of the game.

It is structured as a board where every box is linked to each other in multiple ways (graphically it was thought to represent it as an archipelago).

Figure 4: Game Map

The player will start from a neutral box (the starting point) and can move in any direction allowed based on how the map will be represented (for example, the player may decide to move forward or back if there any possibility to do. The idea is not having a fixed path but having the possibility of choosing where is more convenient to go more like Trivial Pursuit and Monopoly.

The player can move thanks to the moving points collected unlocking boxes or answering exactly to the "topic" boxes (discussed in the next paragraphs). (TBD if the player has always at least one point to move or when he/she runs out of points will have to wait another day to continue playing.)

Depending on the movement points the player owns, he/she can then move one or more boxes at a time by choosing in which boxes to land.

Generally, when the player arrives for a first time on a box type, a small help/tutorial will be activated in order to explain the meaning of the box. The board's boxes can be of the following types:

Neutral: like the starting box and some joining boxes. In this type of box, nothing happens.

Learn point: There are 6 boxes of this type (or 5 TBD), one for each topic discussed (Key stories). Boxes of this type are special because they must be the first to be reached, and then unlocked, by the player, otherwise, he/she will not be able to access the following topic boxes (see next paragraph).Each subject will be identified by a precise colour (TBD). These boxes contain multimedia or textual elements that illustrate and instruct the player on the subject they represent. Once unlocked, these boxes can be viewed at any time without having to go back over.

Topic: There are 3 boxes of this type for each topic (overall 18) positioned on the map in a heterogeneous way. When the player reaches this type of box, obviously having

first unlocked the corresponding "learning point", he/she can handle the exercise held in the box. Exercises can be of three types, to which three templates correspond: (i) Displaying a multimedia item (video/image) and multiple choice answers with one or more correct answers (ii) Sorting images according to a natural or predetermined logic (iii) Text quiz and multiple choice answers (even in this case with the possibility of having one or more correct answers).

Special Event When a player has finished dealing with a box, a special event could happen. Special events is a bonus or penalty that the player can choose to accept or not (of course before knowing whether it's a bonus or a penalty): bonuses could give the player additional movement points, move the player to a box she/he do not have yet visited etc, while a penalty will do the opposite (TBD). When the player solves all three boxes linked to a topic, it will be unlocked a fourth special box, that "boss" (see next point).

"Boss": There are 6 boxes of this type, one for each topic covered. These boxes are unlocked when the player completes the correspondents "topic boxes". In this box, the player will have to face a special named exercise "Scenario". In the scenario, the player will have to choose how to react according to a specific situation but each choice will have a consequence and will take it on one different narrative binary then eventually rejoin. The **Erreur ! Source du renvoi introuvable.** illustrates this concept. If the player, according to the choices he makes, reaches the "good ending" box, the goal is reached and she/he will get a badge of the colour to which it refers. This badge will allow you to access the "prize" box (see next point). When the player passes the "boss" box, the placeholders evolve at the next stage.

"Prize": these boxes are unlocked only once the badge has been obtained and contain a game. Once you unlock a prize badge, you can play as many times as you want without having to reach the box again. The games will be very simple, unrelated to the subject matter, (TBD) and will be memory type, puzzle, find it, Simon, differences, and fifteen.
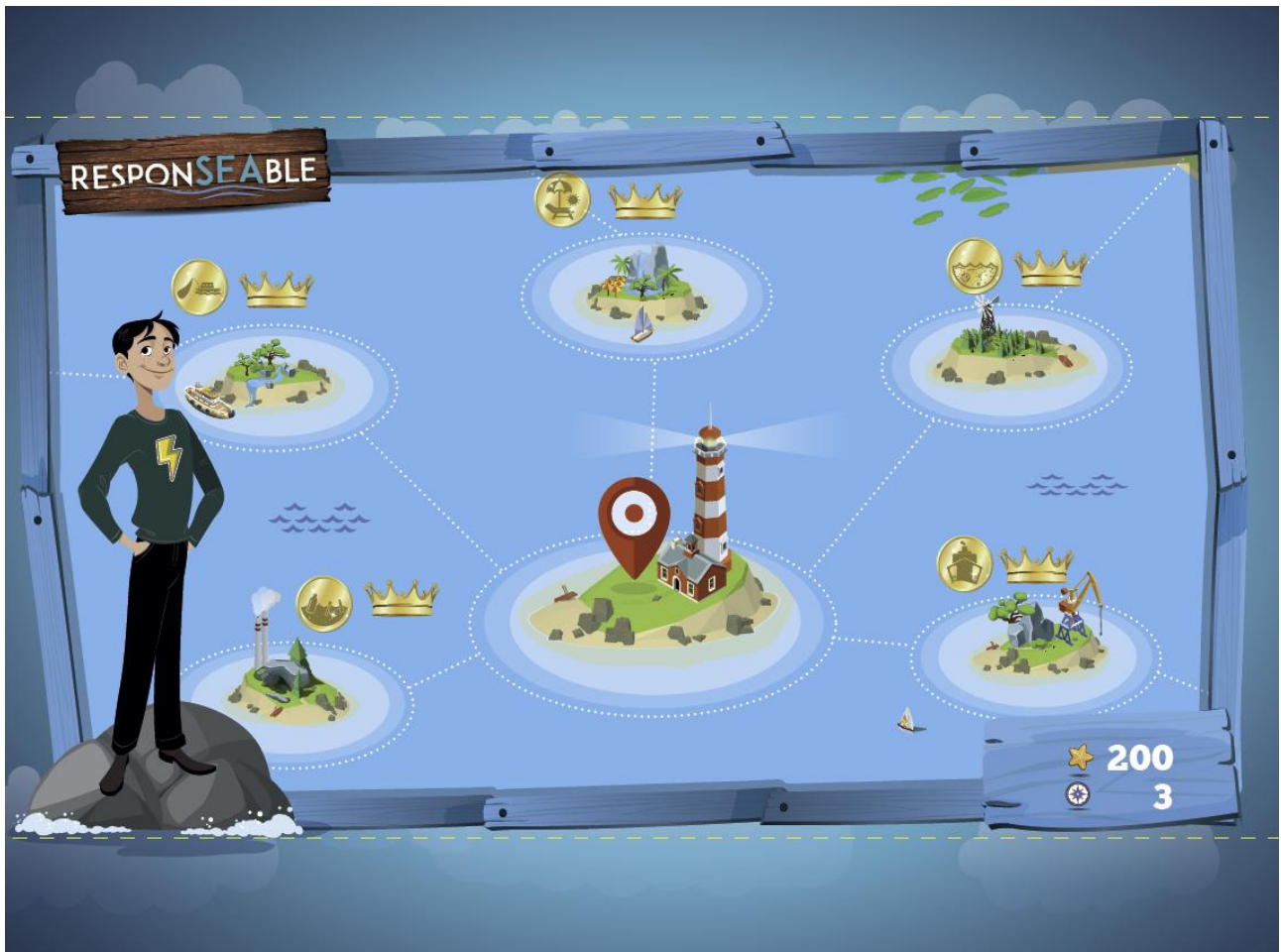
Figure 5: Playing Game

The game ends when all 6 badges have been successfully collected and passed **to "Final score"** screen.

Figure 6: Question

Final score screen

The final Score Screen is automatically accessed at the end of the game or later by the "Launch" screen by pressing the related choice. In this section, the player will be able to get a selfie and send photos and score to the special register of sea ambassadors. – "ResponSEAblers Crew".

The register will show this data on a special page that gathers all the ambassadors (The application will send data to an endpoint but will not handle or manage these.
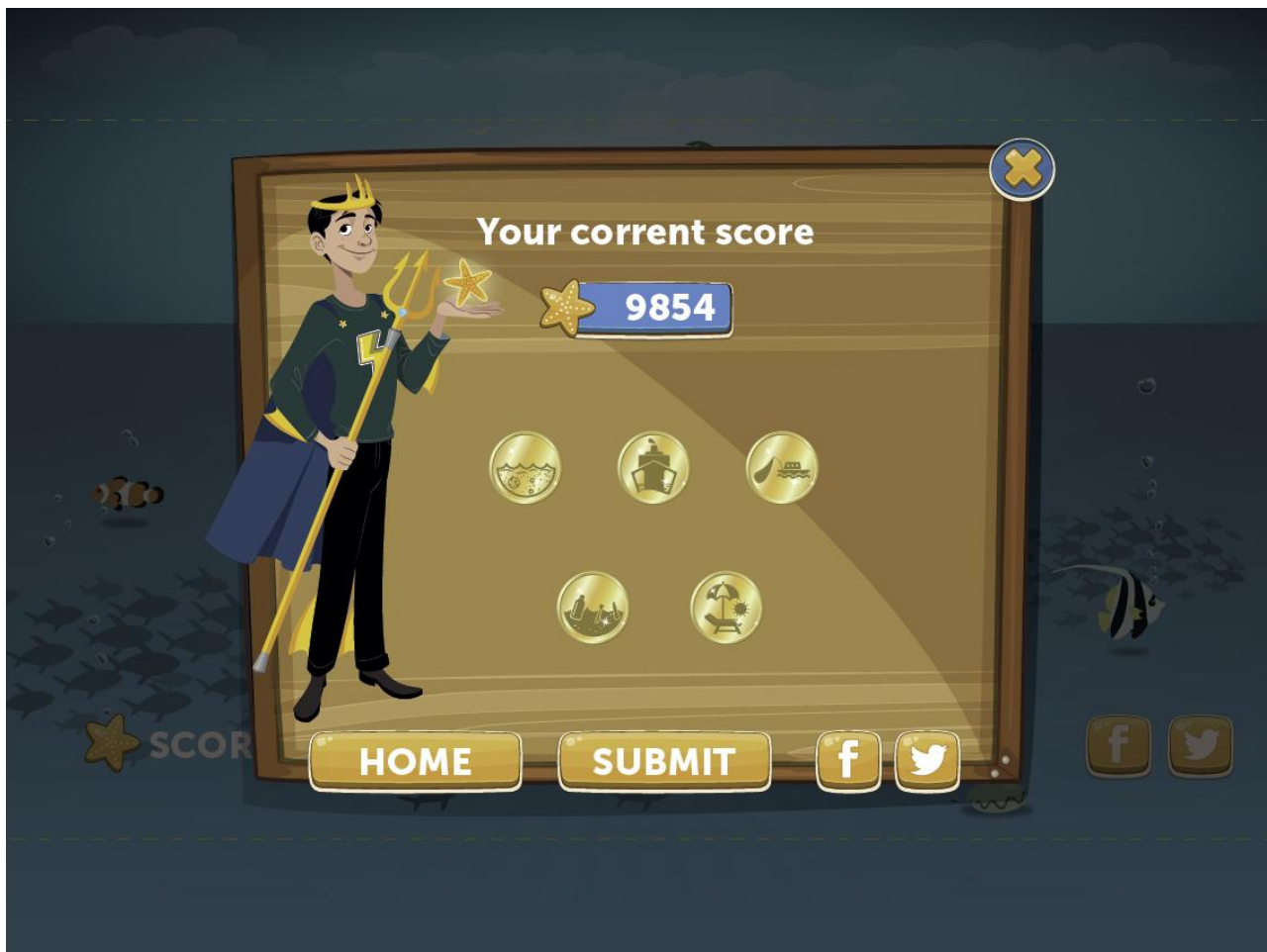
Figure 7: Final Score

Figure 8: Final Score Screen

Additional Features of the application

ANONYMOUS TRACING AND STATISTICS
Through Google Analytics, it is possible to track users' behaviour anonymously and to get aggregated users' data about gender, age group, geographical and the actions taken in the game.

NOTIFICATION
 It is possible to implement a system of notifications that remind the user to play each day creating greater engagement.

DESKTOP VERSION
 It is possible to produce a desktop (Windows and Mac) version of the application (without notifications service). In order to allow an integration on the Interactive Platforms, that could be managed in an off-line modality, a special windows version can be implemented that when started it will use defined parameters in order to a exhibit different behaviour than the usual app showing only games.

Target Audience

The serious game is aimed primarily at young people between the ages of 15-25, but it may also appeal to older and younger people.

Ocean Literacy Goals

The Ocean Literacy Goals are to increase the users Awareness and Knowledge of the information contained in the ResponSeable Key Stories. This will be achieved by the use of questions and allowing the users to learn as they progress through the game.

Design and development process

From the first month of 2017, the project discussed the serious game concept and approach. The first approaches were discussed in a specific session during the second annual partner meeting in Jurmala. Many ideas arose during the brainstorming session, mostly related to the concept of a "day in the life of..", to a better understanding of our "footprint" and our connection with the sea.

The main character of the game, equipped with resources (economic or enviromental),   would take decisions and choices, connected to the key stories and interacting with other characters. At the end of day on the basis of the actions carried out, the game would return the impact on the environment. It was clear that it would require the collaboration of numerous partners and groups in order to deliver and test the game, and to collect and analyse the resulting data.

The brainstorming sessions, however, didn't take into account the limited resources and sub-contracting budget for game development. CSP then looked at mapping to an existing game on the topic of ocean literacy. Based on this mapping and other online meetings with the WP leader, CSP present a proposal for a learning game in the WP5 Interactive Group Meeting Berlin in June 2017.

Based on the discussion in that meeting and also following online discussion, at the end of July CSP elaborated a final proposal that was agreed and was the basis for the selection of the subcontracting agency. In the following paragraph the description of the game at this stage.
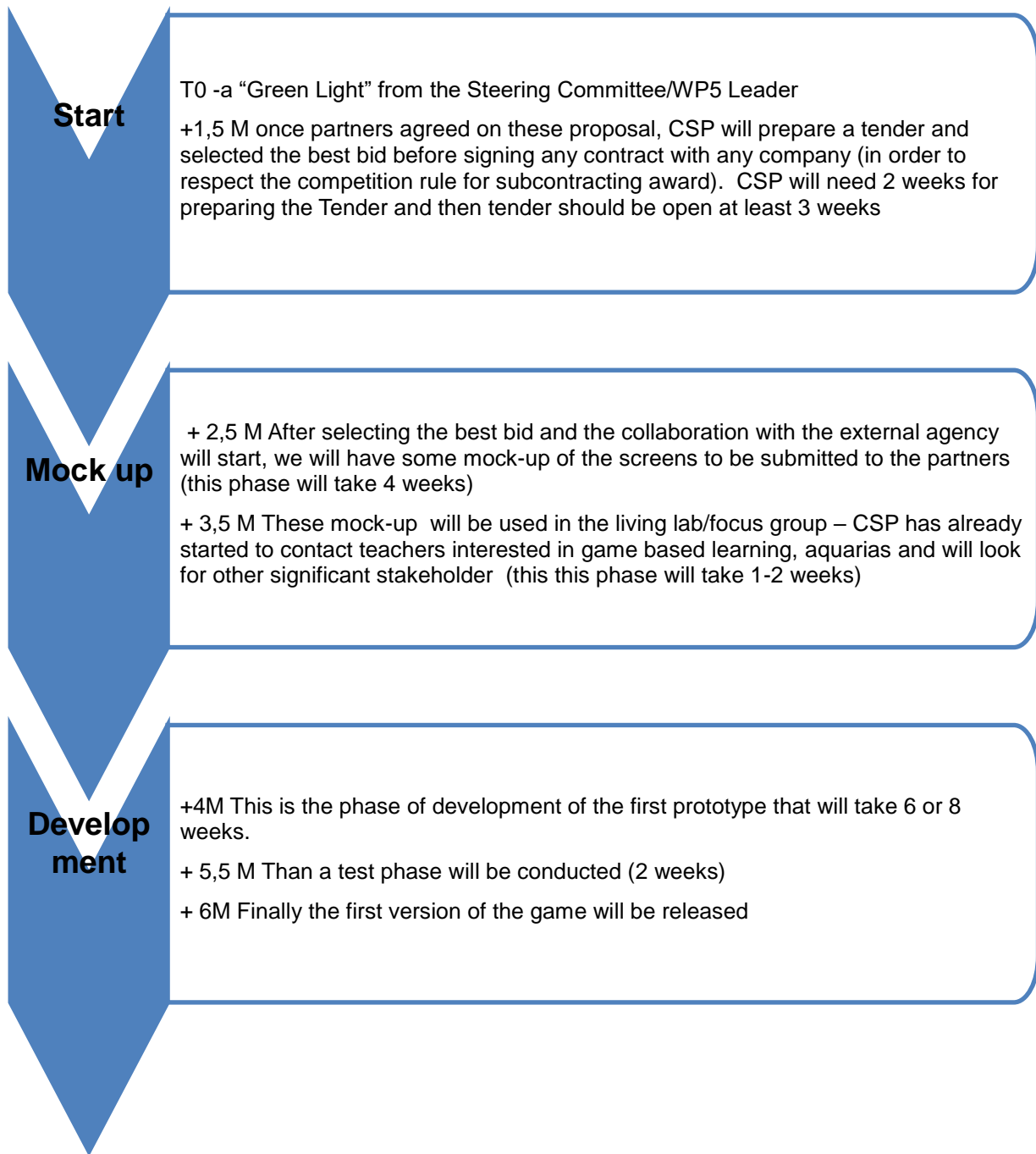
The description of the game

Starting from the points presented in Berlin on 13th June 2017, where CSP presented the idea of a Board game, and following further online meetings and discussion, we arrived in July 2017 at the agreed proposal of developing an online board game.

The project timeline

For carrying out this hypothesis we the following timeline was proposed

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Start	T0 -a "Green Light" from the Steering Committee/WP5 Leader
	+1,5 M once partners agreed on these proposal, CSP will prepare a tender and selected the best bid before signing any contract with any company (in order to respect the competition rule for subcontracting award). CSP will need 2 weeks for preparing the Tender and then tender should be open at least 3 weeks
Mock up	+ 2,5 M After selecting the best bid and the collaboration with the external agency will start, we will have some mock-up of the screens to be submitted to the partners (this phase will take 4 weeks)
	+ 3,5 M These mock-up will be used in the living lab/focus group – CSP has already started to contact teachers interested in game based learning, aquarias and will look for other significant stakeholder (this this phase will take 1-2 weeks)
Develop ment	+4M This is the phase of development of the first prototype that will take 6 or 8 weeks.
	+ 5,5 M Than a test phase will be conducted (2 weeks)
	+ 6M Finally the first version of the game will be released

The selection of the subcontractor

After the approval of the general design of the game, in order to respect the competition rule to select the subcontracting agency, a tender was issued. Three companies were invited to present their best offer:

3x1010 s.r.l. Corso Germano Sommeiller, 23 - 10128 Torino Italy
IDEA DOCET Via Vela 14, 07026, Olbia(OT) – Italy
Levity via Claudio Monteverdi 3, - 20131 Milano Italy

To each of them, CSP sent an invitation letter and the Learning Game Specification (see Annex 1). CSP received only two offers. The internal evaluation assigned the contract to 3x1010: in the following table the evaluation results.

LEVITY	3x1010
The proposed game is not a board game. The game architecture is a quiz and answer game and not seems to be very engaging - It appears not correctly addressed to a 13+ audience	The proposed game is a digital board game. The architecture of the game is designed in order to achieve an increased level of difficulties. It's a strategy game, proposing a different type of questions, challenges and scenario for the six key stories. It is a more adult approach
The source code is not released - they didn't provide any details about the data collections and the integration with other OL tools of the project	The source code is released- they provided details about the possibility of collecting data about the demographics of the users.
There is some limitation in the use of the content library and copyright restriction	The games are provided for multiple platforms, for mobile environment and also a specific edition for the interactive application for ferry and museums is provided
They provide a specific platform for interacting with the content providers. But this could mean another platform to learn	They suggest using google spreadsheet to collect the data
They didn't provide technical details about the technology used and the platform	They provided technical details about the tools they use for the development.
The proposal doesn't implement the overall design of the learning game	THE PROPOSAL IMPLEMENT THE OVERALL DESIGN OF THE LEARNING GAME

Once the process of selection was completed and before starting any kind of activity, a meeting was organised in **Torino in October 2017**, to discuss the game in details with the agency. During this meeting the concept of the game was discussed and refined, with a clear focus on measurement of changing behaviour.

In the end the following decisions were taken:

The game have to be multilingual. A first English version in March will be developed, and localisation in French and Italian will follow; the translation will be on charge of the consortium; the agency will made an estimation of costs per language but an initial additional cost is necessary to make the game working in different languages.

The player will access a starter question first and then the learning material;

A modification on the idea of the archipelago: non only island but also continents should be represented in order to reflect the human-ocean relationship, as per picture (picture of flipchart to be included), for example island with harbour, agriculture, tourism etc.. Partners are requested to specify the objects they want to see.

Sound effects for movement/success

/failure can be added.

A single web service endpoint is requested by the agency to sent all the indicators and usage data. NUIG and UPM will work on the schema and the interface; NUiG will provide the server and web service and database and analytics.

At the end of the game, players are allowed to take selfie and to publish it on a ResponSEAble website page. Need to consider the development of a website / page as a home for the game (+ the other products). Perhaps move from a project website to a thematic (ocean literacy issues) website

After completion of the degree, a pledges in the game will be added

Only ask for personal information (e.g. age range , gender,..) after they have played.

Content (questions)creation (led by Acteon) - start with one story first in order to clarify the type and objectives of content, level of complexity, etc..

Content (learning material) also has to be created. e.g. 'describe eutrophication in 30 seconds'

IPR of WP5 products has to be discussed, and who is going to maintain it afterwards.

In order to start the game in the multilingual version, the agency requested to have an extra budget: after an internal discussion, NUIG agreed to pass to CSP this amount from their budget.

At the **end of December 2017** this process was completed and the agency started with the development.

At the **end of January 2018** we approved the first graphics.

At the **end of March 2018** we'll have a first prototype but some development is still in progress:

- The included mini games –rewards for completing a badge will be completed.
- The feedback reporting system is done, the end point is missing to send you the JSON.
- The notification will be ready – the configuration on IOS/Android Store is completed.
- The offline version for Pc and Mac will be ready later, when the game is fully completed.
- Questions still must be developed.
- The language content for the different language versions.

The Living lab approach

For the design and development of the game, the methodology of Living Lab approach was adopted: this means to engage users in co-design, test and evaluation of a narration games.

CSP organized the first meeting on the 11th on December. CSP invited teachers, researchers, game developers and opinion leaders with a personalized inviting; the meeting was initially planned for the 23 of November but in order to get more participants postponed on December

The program of the meeting was the following

- welcome of the participants and presentations 10 min
- icebreaking activity 45 min
- what does "ocean literacy" mean to you and how you would translate it into Italian 15
- what are your favourite videogames or the ones you use/know; tell us about one serious game that you know / like; 15 min
- using videogames in teaching and learning 15 min
- presentation of the ResponSEAble project - objectives and objectives by ACTeon - 20 minutes
- presentation of ResponSEAble game concept- by 3x1010 - 20 min
- activity: discussion on the game – using Jam Today cards - 30 minutes
- contest: give a name to the game. - 20 minutes

- closing and upcoming appointments

During the panel we had the participation of two teachers from a Secondary School in ASTI and Franco Borgogno, a journalist and activist for protection of the SEA (5Gyres, Ocean Literacy Italia) and author of the book "Mare di Plastica" (A sea made of plastic), and Marco Lago – a game designer from T-union Association. From the organization 3x1010 that presented the ResponSEAble game concept were Paolo Nicoletti and Andrea Miletto, Gloria de Paoli from Acteon, Gian Luca Matteucci and Eleonora Pantò from CSP.

All the participants were actively engaged and gave their visions on the game and its possible effectiveness: they was generally positive about the game and interested in being more involved in the testing phase. Teachers suggested not to penalize players in case of errors.

Figure 9: The Participants of the ResponSEAble Living Lab 1st meeting in Torino
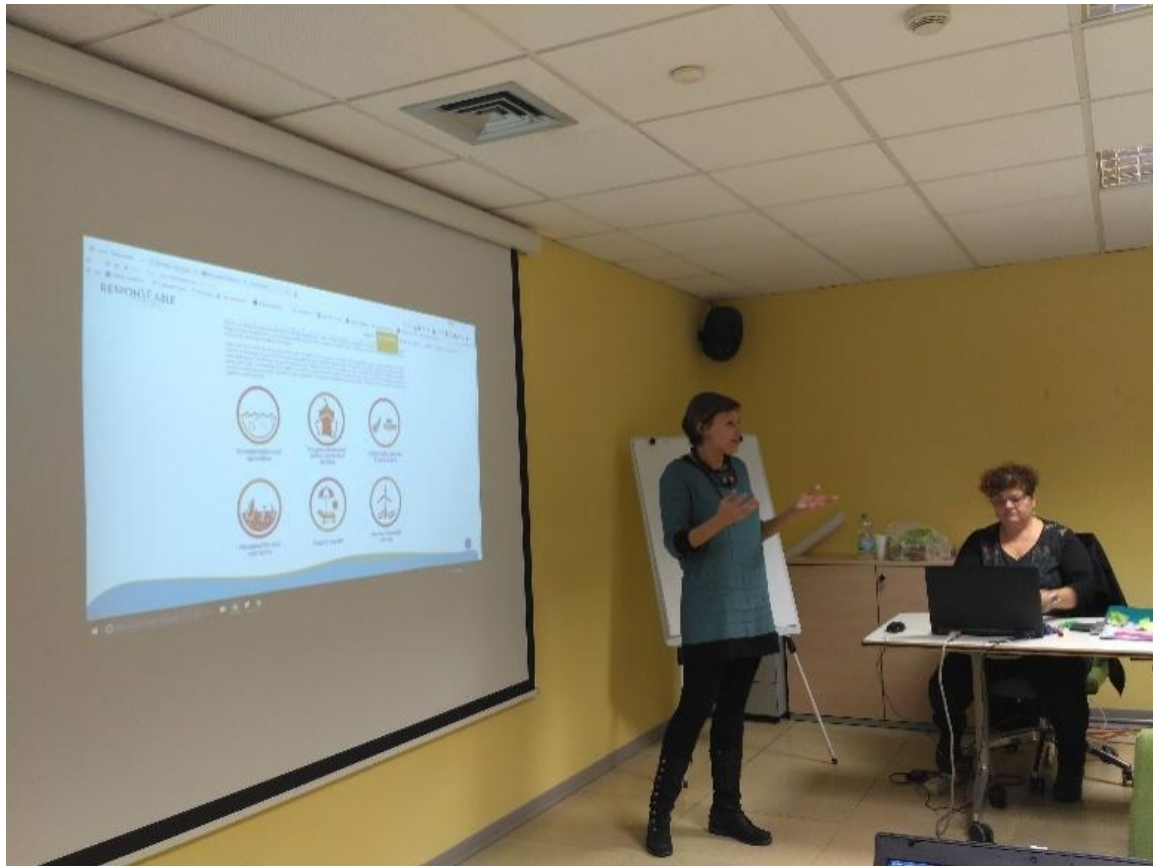
Figure 10: The Presentation of ResponSEAble project

How effectiveness is monitored and evaluated

The responses to the questions given by the players will be collected and transmitted to a central server hosted by NUIG for analysis. The questions will be constructed as per the framework described in Chapter 6 of Deliverable 5.9.

The response data is transmitted as JSON data to a Web service endpoint and stored in a relational (MySQL) database.

Figure 11: The ResponSEAble Ocean Literacy Framework

By linking each question to the framework, we can ensure each question is mapped to a specific:

- Key Story
- Topic / Causal Link in the DAPSIWR
- Ocean Literacy Level
- Ocean Literacy Principle

The Evaluation System will receive question responses from the serious game in JSON format. The information contained in the JSON responses from the serious game will be: language, gender, age, time, player, and a list of individual responses to questions. Each of the questions in the serious game will be set up on the evaluation system so the system will be able to receive and store the responses to the different types of questions. The four types of question responses being sent from the serious game are:

- "Open response" where the user has entered text in response to a question
- "Single response" where the user chooses a response to a question
- "Multiple responses" where the user chooses multiple responses to a question
- "Prioritize or order list" where the user has chosen a sequence in relation to a question e.g. prioritizing or ordering a list.
-

In the following example of JSON data being sent from the serious game, question "A.1" is an open response, question "B.23" is a single response, "C.22" is a multiple response, and "D.12" is a prioritize or order list response.

Serious Game JSON Response

```json
{
    "language": "it",
    "gender": "male",
    "age": 25,
    "time": "2018-02-27T17:38:00Z",
    "player": "Player Unique Nick",
    "answers" : [
        {
            "question": "A.1",
            "text": "Risposta lunga."
        },
        {
            "question": "B.23",
            "choice": 2
        },
        {
            "question": "C.22",
            "choices": [3,1]
        },
        {
            "question": "D.12",
            "sequence": [3, 1, 2]
        }
    ]
}
```
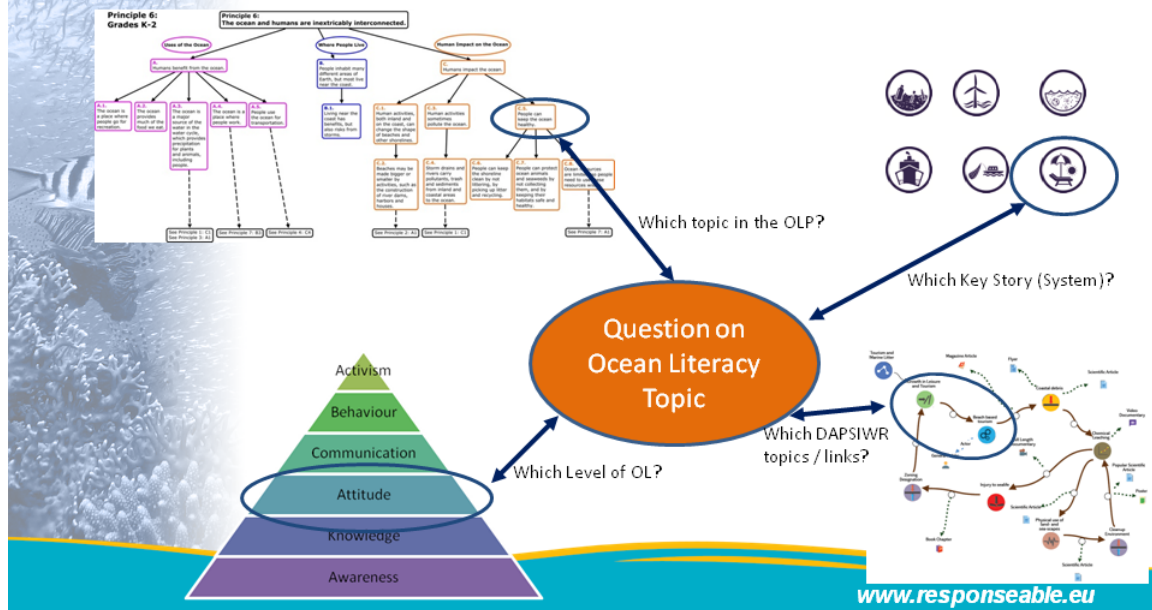
Figure 12: How Questions Are Classified in the Framework

Testing carried out to date

Testing will commence in April 2018.

Planning for the next phase of WP5: the wider dissemination and evaluation of the OL tools

In the next phase of WP5 the following tasks will be carried out:

- Generation of question library
- Population of the game with questions
- Localisation of the game content (French & Italian in addition to the English version).
- Distribution of the game on Apple Store and Google Play
- Generation of publicity for the game on social and other media
- Design and execution of controlled testing with specific user groups in different regions
- Collection and Analysis of gaming data