# beaconing

BREAKING EDUCATIONAL BARRIERS WITH CONTEXTUALISED PERVASIVE AND GAMEFUL LEARNING

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# D6.2 Large-scale Pilot Setup

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**Statement of originality**

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

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## EXECUTIVE SUMMARY

The educational sector around the world is undergoing a transformation and a re-engineering process with the introduction of digital technologies that make the learning process more personal, more efficient and motivating. Educational technologies, such as mobile learning, serious games and geolocation aware services, pervasively connect learning designers, teachers and students beyond the classroom walls. The Internet has made raw knowledge accessible anytime, anywhere and digital coaches and content made skills acquisition available to anyone, sometimes not requiring even a school to attend. Schools are being transformed into establishments where students develop habits of mind and thinking skills for an increasingly obscure future. The lines between subject areas are blurring and most schools adopt an "anti-disciplinary" approach, introducing STEM topics to promote "trans-disciplinary" learning. However, the world is an increasingly populated and competitive place. "In 2015, 58.2 % of 18 to 24 year old early leavers from education and training were either unemployed or inactive. Of the total population of 18 to 24 year olds, 19.1 % were neither in employment nor in any further education or training (NEET) and thus at risk of being excluded from the labour market"[1]. The competency levels that companies and, in return, universities demand from graduates cannot be achieved without investing large amount of time and effort from teachers and students, even with the support of educational technologies.

One way to make this process more of discovery, passion, and joy is to introduce gaming principles and let the students regard learning as a game, rather than, for instance, a tedious test prep process. BEACONING project aims to provide gamified learning paths for individual students (even with disabilities) to follow on their own terms and as a group, while empowering the teachers to help them become masters of their own learning. BEACONING is an innovation action project that will bring this ecosystem of game-based learning over 5000 users across eight countries in large-scale pilots. Three key partners of the project will access school networks and implement the pilots described in this document throughout 2018.

The Spring-term pilots aims at technical and pedagogical evaluations, while the autumn-term pilots will be implemented to evaluate business value and impact of the project outcomes. Web-based community building tools will be employed for teachers, head teachers, and policymakers. They will be informed about how novel gamified lesson paths are developed, elaborated, adapted to a local context, and implemented in the classroom. Most teachers are not gamers. They may regard platforms like BEACONING as "administrative tools." BEACONING learning experience design aims at inspiring and motivating teachers with their students to move beyond certain comfort zones in the classroom and become more engaged in learning. Teachers training, ambassador schemes, and train-the-trainer programmes will be prepared to promote and facilitate the adoption of the BEACONING approach.

With an expected 5000 users involved in countless schools, there will be differences in approach, size and design of the activity. However, seven clear goals for piloting are identified and evaluation guidelines for each one them is given in Deliverable 6.1. These goals serve as common denominators of purpose for all piloting activity so that the aggregated effort will let this work package fulfil its objectives. We are confident that the effects of this large-scale effort will cascade widely, and that projects approach to learning as a game will have its first market implementations during project's lifetime.

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[1] Europe 2020 indicators on education are available at http://ec.europa.eu/eurostat/statistics-explained/index.php/Europe_2020_indicators_-_education

# 1 INTRODUCTION

## 1.1 BACKGROUND

The main line of action during the last year of the project is to run large-scale pilots with thousands of users in order to disseminate and promote the integrated platform and all the exploitable parts. This document describes in advance the setup of the various piloting activities that the partners will commit across the continent.

## 1.2 ROLE OF THIS DELIVERABLE IN THE PROJECT

The work in Task 6.1 Pilot Design is presented in two deliverables D6.1 Evaluation Guidelines and D6.2 Set Up. This task and its deliverables link to the D7.2 Preliminary Exploitation Strategy deliverable in WP7 Exploitation in that the large-scale pilots are designed in a way to provide information about the viability of the potential business models. The task also links to D5.3 Deployment and Pilot Guidelines and Recommendation in WP5 Unit Testing and Small Scale Pilot in that the lessons learned in managing and evaluating game-based learning will inform the set up and implementation of the large-scale pilots.

While small-scale pilots are planned to inform research and development partners about the performance of various components of the system as well as the status of the integrated platform, the large-scale pilots are designed to evaluate the impact of the system and to seek various market implementation opportunities.
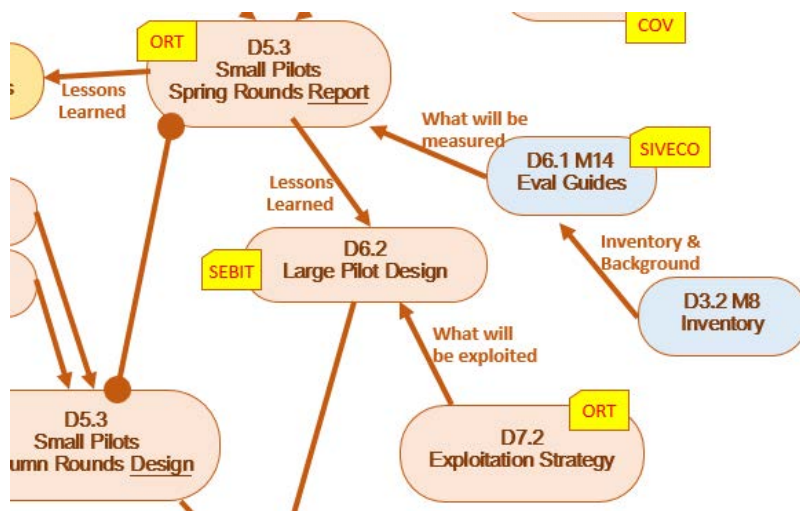


*Figure 1 Deliverables Chart and D6.2*

## 1.3 APPROACH

The year of large-scale piloting of BEACONING platform is 2018. Since the piloting has to regard school year, there cannot be activities during summer months. This inadvertently divides the piloting plans into two phases, and allows the platform, games and lesson paths to be updated during the summer months, based on feedback from the spring phase. BEACONING partners adopt a goals oriented approach to piloting. Therefore, the goals and evaluation framework for the spring pilots are selected to inform development partners while the goals and evaluation framework for the autumn pilots are selected to inform exploitation partners and dissemination.

## 1.4   STRUCTURE OF THE DOCUMENT

The document will first cover the European R&D benchmark projects on large-scale piloting followed by role definitions of participants. Large-scale piloting is a challenging enterprise and so lessons learned from these EC-funded benchmark projects are very important. The main part of the document describes two phases of large-scale pilots, their goals and case summaries. These pilots will be committed by ORT, SEBIT and SIVECO with support from other WP6 partners in BEACONING. Finally, a generic action plan for implementation is provided as an appendix.

Note that Task 6.1.2 Training Framework for Teachers and Learners did not contribute to this deliverable as this task "results will be detailed into a document that will include the description of the components, services, and tools provided by the platform.[2]" Therefore, the training framework will require more time to work upon, in conjunction with the technical integrity testing and further small scale pilots.

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[2] See BEACONING DoA Section A, Description of Task 6.1.2, page 33.

## 2 EUROPEAN BENCHMARK FOR LARGE-SCALE SCHOOL PILOTS

BEACONING project is committing one of the largest scale piloting of educational technology in the entire past of European R&D projects. The platform will include a minimum of 5,000 users and will be tested in different locations and at different levels, enabling to address a set of variables on skills acquisition, impact and market implementation. However, there has been a few projects before BEACONING, which accessed over 500 users. These projects constitute a benchmark for the designs and functions of BEACONING piloting activities.

### 2.1 AS PART OF THE RESEARCH AND TECHNOLOGY DEVELOPMENT FRAMEWORK PROGRAMMES

With the introduction of Integrated Projects (IPs) as an R&D instrument in FP6 (2003-2008) the first large-scale pilots of educational technologies in Europe started.

#### 2.1.1 iClass Project in FP6

iClass project was the first IP on technology-enhanced learning in FP6. During 2008, BEACONING partners, SEBIT and ORT led the iClass project pilots with the participation of European Schoolnet (EUN). EUN is a not-for-profit organization, formed from the network of 31 European Ministries of Education. Since its founding in 1997, EUN has used its links with education ministries to conduct trials and pilots of new educational technologies to help schools make effective use of them. Denoted as validation activities, workshops with 62 teachers and 263 students from 31 schools of 6 countries were carried out where the iClass system was used under the observation of researchers and constructed dialogue was used as evaluation tool. Moreover, just as much users participated pilots freely and filled out a survey based on their experience. The results were evaluated using the SIPTEC framework of EUN that aimed to produce an all-around evaluation. (D5.4 iClass Validation Report, June 2008)

**Relation to the BEACONING Project:** ORT, SEBIT

#### 2.1.2 iTEC Project in FP7

The iTEC project ran five pilot cycles in 2653 classrooms in 20 Countries in Europe (and Israel) over four years. At these pilots, a large number of teachers per country test two - four "Learning Stories" selected after the pre-pilots for the duration of 4 months and in all countries. Some of these Learning Stories involved game-based learning activities such as the Chemistry Treasure Hunt with QR Codes. Such as the one implemented at Istanbul Pendik High School in autumn 2014.

Although the whole process was coordinated centrally by EUN, the pilot protocol outlines two key roles: 1) National Pedagogical Coordinator (NPC). The NPC is responsible at the national level for the overall piloting in schools, which includes organizing participatory design sessions, selecting and supporting pre-pilots and pilot schools, and overseeing evaluation data collection and case studies. 2) National Technical Coordinator (NTC). The NTC is responsible for setting up the technical conditions for pilots in schools and supporting the testing and evaluation of iTEC technologies. A "School Pilot Protocol" was signed to recruit teachers who were already making some innovative use of ICT, in order to lower the levels of ICT anxiety. Selection was also influenced by the characteristics of the particular Learning Stories and activities to be piloted. National web sites were established for community building and for providing support material of various media types as well as an active stream of news clip (from happenings in other pilot countries and schools as well). Later national and (six) international workshops were organized where all pilot teachers met and shared their experiences. Some NPCs also

organized online sessions or webinars to present the resources to pilot teachers. (D4.8 iTEC Final Validation Report on Large-Scale Piloting, November 2014)

The evaluation of the pilots includes teacher surveys, case studies, teacher-authored multimedia stories (documenting and reflecting their experiences) and NPC interviews as well as the Knowledge Map produced by Manchester Metropolitan University, the partner university who had the responsibility for evaluating the large-scale piloting of iTEC scenarios across participating European countries. The Knowledge Map simply collects all the evaluation reports and studies of each country under an interactive map of Europe.

**Relation to the BEACONING Project:** SEBIT via MoNE Turkey

### 2.1.3    Next-Tell Project in FP7

D6.7 Final Report on Pilot Studies: Overall 45 schools, 252 teachers and 1058 students. One of the pilot studies in Next-Tell was "Evaluation of a gamified feedback tool."

The project mostly employed questionnaire-based evaluation study. However, they also committed to a critical retrospective classification, explanation, and analysis of developed tools/methods and conducted pilot studies using TPACK by Mishra and Koehler[3] and the RAT framework by J. Hughes[4]. Both are frameworks that can be considered when using or introducing technology in teaching or planning technology use for teaching. Based on these methodologies the final report of the project states that "Our initial approach to only train the technology turned out not to be effective because many of the teachers we have been working with were not fully aware of the Assessment for Learning concept. This is in in line with Zhao et al., who found that **an innovative technology is less likely to be adopted the more it deviates from existing values**, **pedagogical beliefs and practices of teachers[5]**"

**Relation to the BEACONING Project:** SEBIT via LEA's Box project

## 2.2    AS PART OF THE COMPETITIVENESS AND INNOVATION FRAMEWORK PROGRAMME

The ICT Policy support Programme (ICT PSP) in this framework commissioned some of the largest efforts to spread the use of digital content and educational technologies across Europe.

### 2.2.1    Open Discovery Space

CIP-ICT-PSP-2011-5, Coord: Intrasoft, 2000 schools

Overall, the aim of the **Open Discovery Space** consortium is to mobilize **10,000 teachers** and **40,000 students** in the framework of the proposed activities (requirements elicitation, implementation and assessment, validation), during the life cycle of the project. These teachers act as innovation leaders in their communities spreading the ideas and the vision of the Open Discovery Space project. The evaluation is based on quantitative and qualitative tools. As a quantitative tool portal analytics was used while case studies produced qualitative data. Together with the questionnaires that produced both types of data a comprehensive picture of the ODS project was produced[6].

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[3] Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. The Teachers College Record, 108(6), 1017-1054

[4] Hughes, J. (2005). The Role of Teacher Knowledge and Learning Experiences in Forming Technology-integrated Pedagogy. Journal of Technology and Teacher Education, 13(2), 277-302.

[5] Zhao, Y., Pugh, K., Sheldon, S., & Byers, J. (2002). Conditions for classroom technology innovations. The Teachers College Record, 104(3), 482-515.

[6] http://opendiscoveryspace.eu/sites/ods/files/d5_2_evaluation_plan_updated.compressed.pdf
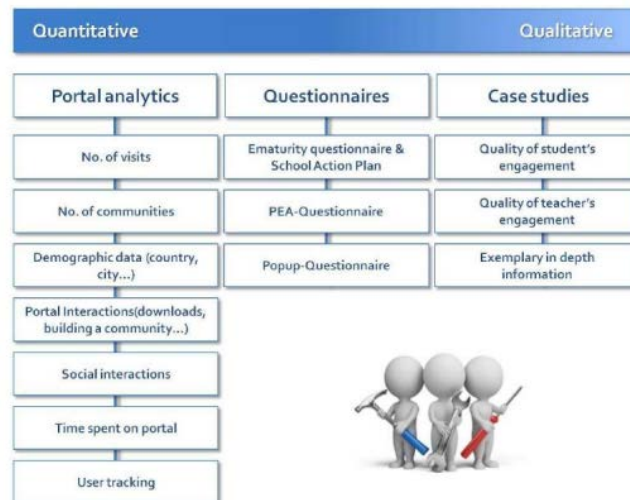
*Figure 2* Q*uantitative and Qualitative* Evaluation *Tools*

**Relation to the BEACONING Project:** SIVECO

### 2.2.2 Inspiring Science

CIP-ICT-PSP-2012-6, Coord: Intrasoft, 5000 schools

**Inspiring Science -Large-scale Experimentation Scenarios to Mainstream eLearning in Science, Mathematics and Technology in Primary and Secondary Schools** aimed for large-scale take-up of educational opportunities amongst European science teachers. Pilot activities took place in 5000 primary and secondary schools in 15 European countries. During these pilots, teachers accessed interactive simulations, educational games and eScience applications and integrated them with extra-curricular activities, such as field trips to science centres and discovery parks, and virtual visits to research centres. Teachers also had the possibility to access remote and online labs, and relevant scenarios for their use in the school classroom. Students are inspired to use eTools and digital resources to learn Science, Technology, Engineering and Maths (STEM related subjects) in a practical, competitive and exciting way.

The evaluation of the activities was based on the questionnaires to assess constructs in a pre/post design linked to background data. The teachers complete the questionnaires before carrying out a learning scenario and after running a learning scenario when is asked to estimate how effective this scenario was for his students to learn about the inquiry circle, to be motivated for using eLearning tools and for their ability to use eLearning tools and about its effect on his teaching practice. For learning scenarios with duration of at least five lessons the student is asked in a pre/post design. The aim is to assess the influence of the ISE approach on affective constructs like interest and motivation as well as on their knowledge about the nature of science[7]. The validation of the ISE approach is mainly based on cases studies, teacher interviews and video documentations. Web metric of the ISE portal indicate the acceptance of the proposed pedagogical framework of ISE and illustrate changes in the users´ behavior. The benchmark data of the portal recorded: the number of sessions, the number of page views, the mean duration of a visit, the exit rate, and the new sessions.

**Relation to the BEACONING Project:** SIVECO, COVUNI

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[7]http://inspiringscience.eu/sites/default/files/outcome/ise_d8_2_-_inspiring_science_education_evaluation_report.pdf

## 3 PILOT ACTORS AND ROLE DEFINITIONS

Key human resources for each country where pilots will be implemented are described below.

### 3.1 BUSINESS PARTNER

Maintains the local community pages of BEACONING web site, keeps it up-to date and active.

### 3.2 NATIONAL COORDINATOR

Plans, executes and manages the country implementation of the BEACONING pilot. Tasks of NC are

1. Select schools, teachers, classes
2. Produce resources, posts, blogs, tutorials in the local language and favourable medium. Maintain the local web site and community-sharing platform.
3. Organize and hold a national workshop (face to face or online, specific objectives, content, outcomes…) and 1 or 2 follow up meetings. This is to identify, engage and prepare teachers, learning designers and local game designers.
4. BEACONING may have stimulated different degrees of engagement with gaming and different levels of studying amongst pilot teachers. NC works with teachers to optimize practices including these various degrees and levels. Relays the best practice to the teachers.
5. Employs local IT support to mitigate any technical problems, specific barriers.
6. Uses beaconing.eu website to create an social activity stream from the piloting schools

### 3.3 LOCAL GAME DESIGNER

Translates an existing plot to the local language (if necessary) and based on the demand from learning designers may use the plot editor to update the plot.

### 3.4 LEARNING DESIGNER

Uses the authoring tool to translate and edit a play-lesson path. Learning Designers decide on how the gaming blends with studying. Note that, teachers can also carry out the Learning Designer role with the right capabilities and authorisation.

### 3.5 SCHOOL LEADER

No pilot may succeed if the school leader does not put his/her support behind the concept.

### 3.6 TEACHER

Customizes a play-lesson path at the authoring tool, assigns to his/her class and follows the student progress via the analytics dashboard

### 3.7 STUDENT

Feels the need to learn in order to pass, tackle or circumvent the challenges that the game presents.

# 4   SPRING 2018 PILOTS

These first round of large-scale pilots aims at technical and pedagogical value as well as setting up privacy/security mechanisms. Therefore, the pilot goals are selected accordingly. Autumn 2018 pilots will have another set of goals that will be listed in the relevant section. Note that the large-scale pilot goals are kept the same in D6.1 Evaluation Guidelines to establish coherence between these two deliverables. They are both carried out under the same task T6.1 in the project description of action.

## 4.1   PILOT GOALS

The first round of pilots should serve as a scalability and technical integrity testing opportunity since it would be the first time the platform is used at such a scale. Keeping that in mind, the goals of these pilots are:

G1 – Test the scalability of the BEACONING technology

G2 – Test the integration of BEACONING to national platforms and local platforms (such as LMS installed inside the schools)

G3 – Test standardization offers of BEACONING

G4 – Validate the learning outcomes of BEACONING play-lesson paths: Analytics for STEM Competencies: Inclusion of special needs students: and Radical Scenarios.

## 4.2   TESTING SCALABILITY (G1) AND INTEGRITY (G2)

What does scaling mean? If we target 5000 users, it means that an event, which has a chance of 1/1000 to occur, is likely to occur a few times! Considering the pilot deployments will provide pervasive learning experiences for four to six weeks at a stretch, the system has to be stable and maintained for an extended amount of time. Each piloting partner aims to deploy an instance of the BEACONING services at the piloting school or at a central location. That means the conditions of deployment will also vary.

### 4.2.1   Platform Integrity under Stress

A procedure for stress testing against flash crowds will be developed and provided to all the partners or local affiliates who would install and maintain an instance of the system.

### 4.2.2   Scaling the App

A list of checkpoints for scaling the mobile app and desktop app will be provided to ensure: 1 - Device compatibility; and 2 – Robustness against network connection types and irregularities.

### 4.2.3   Scaling the Authoring Tool

A list of checkpoints for scaling the authoring tool will be provided to ensure: 1 – Version control of gamified lesson paths; 2 – No broken links to activities and games; 3 – All quests having a competency or a set of competencies to target so that pedagogical evaluation can be done; 4 – An online survey to measure acceptance and impact is provided to all the participants so that impact evaluation can be done.

### 4.2.4   Scaling the Analytics Reports

A list of checkpoints for scaling the dashboard will be provided to ensure: 1 – Boundary conditions are met; 2 – Data pathways are open and safe; 3 – Databases are not corrupt.

## 4.3   CONTRIBUTIONS TO STANDARDIZATION (G3)

The project can contribute to some de facto standards such as with the data privacy measures that will be adopted, or the minigames API that will be developed or the combination of playing and studying as exemplified by the gamified lesson paths. One of the potential ways to impact formal standards is ADL standard called the Experience API (xAPI) or TinCan API, by means of introducing a new recipe. Recipes in this standard are a way of expressing how a common type of learning activity (e.g. geolocation recipe) can be syntactically represented in the form of a sample xAPI Statement. The strongest support for such a submission may be to prove that BEACONING is able to issue STEM Badges that certify with ignorable doubt that a student has acquired a certain STEM competency to a certain degree. As for the STEM competency set definitions, ISTE Standards can be used[8].
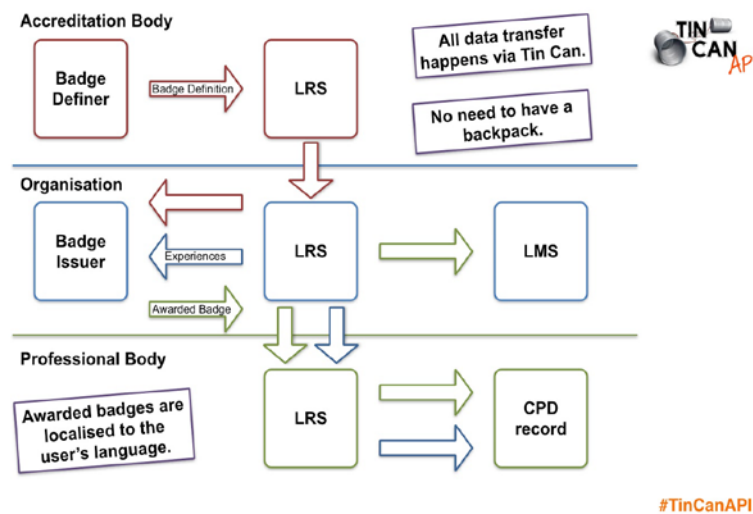


*Figure 3 Badge xAPI and Open Badges*

## 4.4   VALIDATING THE LEARNING OUTCOMES

Main evaluation goal of the Spring Pilots is to measure the pedagogical value of the platform. To do so we will measure the progress on *STEM Competencies such as* Critical Thinking; Complex Problem-Solving; Computational Thinking; Active Learning; and Adaptive Thinking.

These are the competencies suggested at the authoring tool templates. However, as stated in D6.1 Evaluation Guidelines, for competency maps and other formalism on these competencies ISTE standard or VALUE rubrics will be used[9].

Refer to D6.1 about the main approach for pedagogical evaluation, which is by means of evidence-centered design[10] of the play-lesson paths. As described in D6.1, this can be achieved either by Stealth Assessment[11] or by Open Response Assessment using rubrics. Besides this main approach, there alternative evaluation methods can be used, such as pre-test/post-test by respective countries.

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[8] ISTE Standards FOR STUDENTS are available at https://www.iste.org/standards/standards/for-students
[9] VALUE rubrics are available at https://www.aacu.org/value/rubrics/critical-thinking
[10] R. J. Mislevy, R. G. Almond and J. F. Lukas (2003), "A Brief Introduction to Evidence-Centered Design," ETS Research Report
[11] V .Shute, M. Ventura & D. Zapata-Rivera (2016), "Stealth Assessment in Digital Games," Retrieved from:
http://www4.ncsu.edu/~jlnietfe/Creativity_&_Critical_Thinking_Articles_files/Shute%20and%20Ventura%20(In%20Press).pdf

## 4.5   SPRING 2018 PILOT PLAN

During the spring of 2018, full BEACONING ecosystem will be taken to large-scale piloting for the first time. Large effort in this period will be devoted to setting up country or school installations, recruiting schools and key personnel, preparing community web pages and kicking off communications. During the pilots, technical, as well as pedagogical goals will be tested and validated. The operational plan of this period is as follows:

1. Deploy National Instance of BEACONING. Integrate to the national or Local LMS (including LMS installed at a pilot school premises).

2. Deploy beacons at key locations of target cities or schools to pilot geolocation scenarios and related gamified lesson paths

3. Focus on goals G1, G2, G3, G4 (integration to national platforms, scalability, standardization and outcomes) and Select Evaluation Instrument(s): Develop the Instrument; Place probes to obtain data for the Instrument; and Implement the Instrument.

4. Author/Edit Gamified Lesson Paths according to the specific needs of the pilot school (such as inclusion of special needs students, adaptivity for students' grade levels, available resources)

5. Upload the plans to the local LMS

6. Test the plans at location

7. Develop contingency plans based on the risks the tests reveal

8. Launch local community web/media center

9. Appoint the local roles

10. Bulk account setup for the participants

11. Train the teachers

12. Obtain privacy declarations from each participant (web-based)

13. Launch the pilot

## 4.6   SPRING PILOT CASES

For each case below, the mentioned partner will acquire, install, configure, run and maintain the country's own version of BEACONING platform.

The example scenarios in D3.3 are below, but new ones can be added by the time large-scale pilots are setup. These examples are developed by the partners to guide the design of the system and for early contact with stakeholders. Naturally, the gamified lesson plan that will be taken to pilot will be decided based on engagement with the stakeholders, leading to authoring of new lesson paths to be implemented in the local pilot (both small and large-scales). Meanwhile, these examples are used by the partners for spearheading the large-scale pilots, which are documented, currently as drafts in the subsequent sections. Note that this documentation mentions the meta-game that is intended to be used, but do not specify the mini-games that will be used. The minigames and location-based games are actual game-based lesson plan contents and hence will be documented D4.8 Gamified Lesson Plans.

1. Basic Algebraic Skills –ORT (pilots in France and Greece)

2. Stonemasonry –HWU (pilots in UK)

3. Digital Literacy – ORT (pilots in France and Greece)

4. Physics – SIVECO (pilots in Romania)

5. Chemistry applied to Environmental Health –IMA (pilots in Italy)

6. Organising and Distributing Data – SEBIT (pilots in Turkey)

7. Energy Management – COVUNI (pilots in UK)

8. Graph Theory and Tessellation –COVUNI (pilots in UK)

9. Basic Geometry Skills –SIVECO (pilots in Romania)

10. Water Management – COVUNI (pilots in UK)

11. Ratios/Fractions for celebrity residence and garden design (additional middle school plan for pilots in Turkey)

### 4.6.1    ORT Case in France

The first phase of large-scale piloting will be conducted in France with 7 ORT French schools. The objective of that first round to train and teach with beaconing to get at the end the return on experience and then be able to conduct the second round.

In France, the Pilots activities will be conducted in the ORT France schools covering different regions of France (Ile De France (Montreuil, Villiers le Bel, Choisy Le Roi), Rhone-Alps ( Lyon and Marseille) , Alsace ( Strasbourg) and Pyrénnees (Toulouse).

ORT France, in particular in Montreuil and Marseille are already running Coding clubs with teachers and students as a STEM subject as extra-time activities and the coding curriculum empowers participants in mathematical and science skills, design and technical skills as well as computer skills. In particular, during the coding clubs activities that shall be extended to other ORT French schools, the coding and robotics learning paths will be piloted using the Lego MindStorm bricks.

The defined schools teachers and stakeholders will meet during a series of workshops for the preparation and training according to a series of different workshops for:

-   first informing them and have their own reflection on the gamified learning paths,
-   second presenting and using the first set of tools and using in groups the beaconing solution
-   third by engaging their own students into beaconing classrooms.

*Table 1 ORT Case in France*

| Goals | G1 , G2, G4 |
|---|---|
| Target (when possible name the school or the entity) | 7 Schools in ORT France: Montreuil , Villiers Le Bel, Choisy le roi, Marseille, Toulouse, Strasbourg, Lyon |
| Expected Number of Teachers | 100 |
| Expected Number of Students | 1000 |
| demographic of students to be engaged | State school students  (16 – 20 years old) |
| Other stakeholders | Academia of Versailles schools and other educational stakeholders |
| Context | Once the ORT BEACONING platform is setup, the French schools will access the different tools and will pilot the different activities |
| Technical Setup | Own BEACONING platform (France) integrated to the LMS of the ORT schools |
| Extra Resources (indicate if it is proprietary) | The LMS in the schools will be used in conjonction with the one proposed by BEACONING to host the resources. The existing local |

| | |
|---|---|
| | resources will be integrated, in particular the ones related to the Coding Clubs extra-time activities. |
| Time & Duration | 12 weeks |
| The Meta-Game | TBD |
| The lesson path | The lessons paths designed by ORT in WP3 and WP4 |
| Evaluation Tool | TBD |
| National Coordinator | ORT |
| Inclusion | TBD |

In France, the teachers will be trained during a series of workshops dedicated first to the authoring tools and the capacity of beaconing to create gamified learning paths for the students. We will particularly focus in the pedagogical added values brought by BEACONING in teaching with gaming using Problem Based learning approaches. The objective will be to prepare the teachers in teaching using BEACONING during the second round of large piloting activities.

### 4.6.2    ORT Case in Greece

The ORT Pilot in Greece will take part in schools in the areas of Karditsa and Trikala in Greece. They will be involved by participating to an event where they will be given information on the available learning scenarios and how they can refine them for their purpose. For that, we plan to organize two informative events, one in Karditsa and one in Trikala, where the responding schools will be informed on BEACONING and the foreseen learning scenarios (math, digital skills, robotics, etc.). Given all the schools that will attend, a selection of around 10 schools will be made according to  the proposed learning paths and the so selected pilots will be carried out under the coordination of the teachers. Around 1000 end-users for the two different Pilot rounds (spring and autumn) will be engaged. At the end, of the Piloting activities, a follow-up event will be organized where the teachers will be interviewed and their responses will be documented. This will take place after the pilots are completed.

*Table 2 ORT Case in Greece*

| | |
|---|---|
| Goals | G1 , G2, G4 |
| Target (when possible name the school or the entity) | Schools in the areas of Karditsa and Trikala |
| Expected Number of Teachers | 100 |
| Expected Number of Students | 1000 |
| demographic of students to be engaged | State school students |
| Other stakeholders | Educational stakeholders and representatives |
| Context | Once the ORT Greece BEACONING platform is setup, the schools will access the different tools and will pilot the different activities |
| Technical Setup | Own BEACONING platform  integrated to the LMS of the ORT schools |
| Extra Resources (indicate if it is proprietary) | The LMS in the schools will be used in conjonction with the one proposed by BEACONING to host the resources |
| Time & Duration | 12 weeks |
| The Meta-Game | TBD |
| The lesson path | The lessons paths designed by ORT in WP3 and WP4 |
| Evaluation Tool | TBD |
| National Coordinator | ORT |
| Inclusion | TBD |

### 4.6.3 ORT Case in Israel

In Israel, in the World ORT network, some of the Israeli schools will be engaged to Pilot the activities. Among the large amount of schools in Israel, the most relevant ones for BEACONING will be selected. Among them the Beer Sheva College of Technology and the Tel Hai College that is developing a virtual learning environment to enable several schools working together using learning through Problem solving. In addition, as most of the schools in Israel are engaged in the Robotraffic Competition, an international school competition, hosted by the Technion Institute – Israel Institute of Technology,   in which it develops the teamwork and creative problem solving skills, the BEACONING Gamified Learning Paths will be used and/or enriched.

The defined schools teachers and stakeholders will meet during a series of workshops for the preparation and training for:

- first informing them and have their own reflection on the gamified learning paths,
- second presenting and using the first set of tools and using in groups the beaconing solution
- third by engaging their own students into beaconing classrooms.

*Table 3 ORT Case in Israel*

| Goals | G1 , G2, G4 |
|---|---|
| Target (when possible name the school or the entity) | 4 Schools in Israel |
| Expected Number of Teachers | 100 |
| Expected Number of Students | 1000 |
| demographic of students to be engaged | State school students  (16 – 22 years old) |
| Other stakeholders | Technion Institute of Technology. World ORT Network Schools |
| Context | Once the ORT BEACONING platform is setup, the Israelian schools will access the different tools and will pilot the different activities |
| Technical Setup | Own BEACONING platform (Israel) integrated to the LMS of the ORT schools |
| Extra Resources (indicate if it is proprietary) | The LMS in the schools will be used in conjonction with the one proposed by BEACONING to host the resources. The existing local resources will be integrated, in particular the ones related to the Coding Clubs extra-time activities. |
| Time & Duration | 4 sessions of 12 weeks |
| The Meta-Game | TBD |
| The lesson path | The lessons paths designed by ORT in WP3 and WP4. Enriched for the coding and robotic parts. |
| Evaluation Tool | TBD |
| National Coordinator | ORT |
| Inclusion | TBD |

In Israel, the teachers will be trained during a series of workshops dedicated first to the authoring tools and the capacity of beaconing to create gamified learning paths for the students. We will particularly focus in the pedagogical benefits brought by BEACONING in teaching with gaming using Problem Based learning approaches. The objective will be to prepare the teachers in teaching using BEACONING during the second round of large piloting activities.

### 4.6.4    ORT Case in Bulgaria

In Bulgaria, at the Lauder-ORT "Dimcho Debelianov" School, in Sofia, a set of teachers in STEM topics, particularly on Coding and Maths will be involved in the Piloting activities. The high school curriculum, among the different tracks, will focus on the information technology and digital design & media tracks in which BEACONING will be piloted. 10 teachers from the different targeted STEM topics (Chemistry; Physics and Biology and Maths) and around 100 students will be involved in the first round focusing on the piloting of the BEACONING learning paths and then on the training of some of the teachers as Learning Designers for the second round in autumn Pilot.

*Table 4 ORT Case in Bulgaria*

| Goals | G1 , G2, G4 |
|---|---|
| Target (when possible name the school or the entity) | Lauder-ORT "Dimcho Debelianov" |
| Expected Number of Teachers | 10 |
| Expected Number of Students | 100 |
| demographic of students to be engaged | State school students |
| Other stakeholders | Educational stakeholders and representatives from the school |
| Context | In Bulgaria, they will use the ORT French Platform to experiment with the end-users. |
| Technical Setup | Devices and Network connections : There are 3 IT classrooms with 50 PCs, 30 10" Asus (Windows 10) tablets and 9 10" with Android. A fast and stable optic Internet connection; |
| Extra Resources (indicate if it is proprietary) | The BEACONING LMS in ORT France premises will be used to host the resources |
| Time & Duration | 12 weeks |
| The Meta-Game | TBD |
| The lesson path | The lessons paths designed by ORT in particular the one related to Maths and Digital identities. |
| Evaluation Tool | TBD |
| National Coordinator | ORT |
| Inclusion | TBD |

### 4.6.5    ORT Case in Italy

In Italy, our network ORT school in Milan will conduct the piloting activities involving around 10 teachers and approximatively 100 students depending on the selected learning paths. The Learning paths targeted in the school are the one related to Maths Basic Algebraic skills and also the one related to digital identities.  The First Piloting activities will be carried out after the training program that will be carried out in the School for training the teachers on using the BEACONING tools. Some selected expert teachers (one or two among the se of teachers) will follow the training program for learning designers aiming at defining new set of learning game paths or refined existing one whilst the other teachers will teach using the existing set of scenarios. Note that the refined lesson paths will then be experimented with the teachers and learners during the Autumn Piloting session.

*Table 5 ORT Case in Italy*

| Goals | G1 , G2, G4 |
|---|---|
| Target (when possible name the school or the entity) | School in the Milan Italy. Scuola ebraica di Milano. we are 'scuola paritaria' that means we are officially recognized |

| | |
|---|---|
| | from It Ministry of Education |
| Expected Number of Teachers | 10 |
| Expected Number of Students | 100 |
| demographic of students to be engaged | State school students. High Schools. |
| Other stakeholders | Educational stakeholders and representatives from the school |
| Context | In Italy, they will use the ORT French Platform to experiment ith the end-users. |
| Technical Setup | Devices and Network connections. 50 classroom in the school, almost all with pc and IWB/LIM (Interwrite and MIMIO) , we have some PCs in teachers rooms too.  Wifi in all the school both for teachers and students.<br>Three good ICT Labs<br>around 90% of students in high school have a smartphone |
| Extra Resources (indicate if it is proprietary) | The BEACONING LMS in ORT France premises will be used to host the resources |
| Time & Duration | 12 weeks |
| The Meta-Game | TBD |
| The lesson path | The lessons paths designed by ORT in particular the one related to Maths and Digital identities. |
| Evaluation Tool | TBD |
| National Coordinator | ORT |
| Inclusion | TBD |

### 4.6.6 ORT Case in South Africa

ORT South Africa, due to its reputation and expertise in STEM education in South Africa, particularly in STEM programs in an identified Specialized STEM school, in Soweto. The Gauteng Department of Education Schools of specialization are distinct from normal public schools because they have a strong technical and vocational content. Learners are given work place exposure and career guidance in their chosen fields to prepare them for the transition to work or pursue higher training in the STEM fields. The school, Curtis Nkondo School of STEM Specialization was established in 2016 with the aim of changing the face of education in township schools. Each learner receives a tablet device to enhance their learning experience, while each teacher is issued with a laptop to aid their educational process. Learners have access to computer labs as well as free access to the Internet.

The project will be piloted with 15 teachers from Curtis Nkondo School of Specialization using the paths for learning with approximately 400 students. ORT SA is also running Coding clubs with teachers and students as a STEM subject. The ORT SA coding curriculum empowers participants in mathematical and science skills, design and technical skills as well as computer skills. All three existing learning paths of the BEACONING solution; coding, digital identity and algebra will be introduced to relevant teachers.

*Table 6 ORT Case in South Africa*

| Goals | G1 , G2, G4 |
|---|---|
| Target (when possible name the school or the entity) | School Curtis Nkondo |
| Expected Number of Teachers | 15 |
| Expected Number of Students | 400 |
| demographic of students to be engaged | State school students |

| | |
|---|---|
| Other stakeholders | Educational stakeholders and representatives from the school |
| Context | In SA, they will use the ORT French Platform to experiment ith the end-users. |
| Technical Setup | Devices and Network connections |
| Extra Resources (indicate if it is proprietary) | The BEACONING LMS in ORT France premises will be used to host the resources. The existing local resources will be integrated, in particular the ones related to the Coding Clubs extra-time activities. |
| Time & Duration | 12 weeks |
| The Meta-Game | |
| The lesson path | The lessons paths designed by ORT in particular the one related to Maths, Coding and Robotics, Digital identities. |
| Evaluation Tool | TBD |
| National Coordinator | ORT |
| Inclusion | TBD |

### 4.6.7  SEBIT Case in Ankara/Turkey

SEBIT works with a number of private school networks in Turkey such as Maya, Doğa, Uğur and Bahçeşehir school networks where the language of instruction is English and BEACONING gamified lesson paths can be used without a need for translation. Most of these schools provide STEM classes to lower grades and competitive lab projects for higher grades. Some schools also employ game based learning (such as with MineCraft educational edition like Maya and Doğa School Networks). All schools have coding classes as electives. These classes are managed by a Computer Class Teacher which is a well-established branch in educational faculties in Turkey, with employment opportunity in state schools as well. SEBIT will have to train these teachers or a Math/Science teacher who would be willing to introduce BEACONING approach in his/her classes. Normally teachers are not gamers and they are inclined to employ more scenarios that are didactic. The hardest part of training is expected to be about the validity of "learning as a game" approach of BEACONING in regards of these teachers.

*Table 7 SEBIT Case in Ankara/Turkey*

| Goals | G1, G2 and G4 |
|---|---|
| Target (when possible name the school or the entity) | Volunteering private schools. Namely Maya Koleji, Ayşe Abla Koleji, Bahçeşehir Schools, Uğur Schools and Doğa Schools |
| Expected Number of Teachers | 50 |
| Expected Number of Students | 500 |
| demographic of students to be engaged | Co-ed students, with about 10% having scholarships and about 10 with special needs |
| Other stakeholders | Educational coordinators of the schools and a head teacher at each school who would design instructional plans. |
| Context (this should be a win-win situation for both the partner and the school) | 1. utilizing digital content, services and platforms to improve inquiry/problem-based STEM education<br>2. enhancing engagement in science education among the young population<br>3. integration of mobile computing into existing practices |
| Technical Setup | Own BEACONING platform (Turkish) integrated to SEBIT's own private middle schools product Vitamin, 5 beacons per school. |
| Extra Resources (indicate if it is proprietary) | Sebit e-content on the subject matter of the lesson paths (proprietary) |

| Time & Duration | 3 or 4 weeks |
|---|---|
| The Meta-Game | Minecraft EDU. In case the BEACONING meta-game is not complete for the early pilots, we may as well rely on Minecraft educational edition as the meta-game, especially now that Minecraft has "code builder" extension and it is free for one year. |
| The PlayLesson Path | Potential to try 4 game based learning designs: Organising and Distributing Data, Energy Management, Graph Theory and Tessellation, Urban Geology |
| Evaluation Tool | Stealth Assessment |
| National Coordinator | Sezin Alkabir |
| Inclusion | At least 4 classes will have a SEN student |

### 4.6.8 SEBIT Case in Istanbul/Turkey

SEBIT participated in the establishment of Vizyon Koleji in Istanbul, which is a private high school that employs technology enhanced learning. All students are equipped with mobile devices, attend coding classes and use educational technologies throughout all levels of education. SEBIT plans to have a pilot case in the school where goals that are more technical can be checked such as contributions to standardization.

*Table 8 SEBIT Case in Istanbul/Turkey*

| Goals | G1 and G3 |
|---|---|
| Target (when possible name the school or the entity) | Vizyon Koleji |
| Expected Number of Teachers | 2 |
| Expected Number of Students | 20 |
| demographic of students to be engaged | Upper class families |
| Other stakeholders | Computer Technology Teachers |
| Context (this should be a win-win situation for both the partner and the school) | 1. Utilizing BEACONING offering for standardization such as analytics component and digital badges<br>2. Utilizing digital content, services and platforms to improve inquiry/problem-based STEM education<br>3. integration of mobile computing into existing practices |
| Technical Setup | Own BEACONING platform (Turkish) integrated to SEBIT's own private middle schools product Vitamin, 5 beacons per school. |
| Extra Resources (indicate if it is proprietary) | Sebit e-content and calibrated exams on the subject matter of the lesson paths (proprietary) |
| Time & Duration | 3 or 4 weeks |
| The Meta-Game | TBD |
| The PlayLesson Path | Potential to try a plan that involves coding |
| Evaluation Tool | Stealth Assessment |
| National Coordinator | Sezin Alkabir |
| Inclusion | N/A |

### 4.6.9 SIVECO Case in Romania

The first phase of large-scale piloting will be conducted in Romania in 14 schools in order to test the scalability of the BEACONING technology and the integration of BEACONING to

national platforms. The teachers will be trained to use the Beaconing technologies for engaging their students in such kind of activities.

Teachers, principals, school inspectors, parents and other stakeholders will participate to the workshops. The main goal will be to improve STEM education by using digital content and integration of mobile computer into existing practices.

We will use the play lesson plans developed by the national experts.

*Table 9 SIVECO Case in Romania*

| Goals | G1 and G2 |
|---|---|
| Target (when possible name the school or the entity) | 14 schools |
| Expected Number of Teachers | 20 |
| Expected Number of Students | 40 |
| demographic of students to be engaged | At least 5 with special needs |
| Other stakeholders | NGO's, schools principal, school inspectorates, parents |
| Context (this should be a win-win situation for both the partner and the school) | 1. utilizing digital content, services and platforms to improve inquiry/problem-based STEM education<br>2. enhancing engagement in science education among the young population<br>3. integration of mobile computing into existing practices |
| Technical Setup | Beaconing.eu platform, 5 beacons per school. |
| Extra Resources (indicate if it is proprietary) | N/A |
| Time & Duration | 4-6 weeks |
| The Meta-Game | TBD |
| The PlayLesson Path | Energy Production Effects; Math for hearing impaired students; The mini-games that will be used are DRAG IT, MATCH IT, MILLIONAIRE QUIZ |
| Evaluation Tool | Open Response Assessment (rubrics) |
| National Coordinator | Marius Preda |
| Inclusion | At least 6 students with special needs |

# 5 AUTUMN 2018 PILOTS

The main goal of the autumn pilots is to evaluate the impact of the platform on various areas of education and validate the viability of business models that the consortium partners are considering individually or jointly (see Deliverable 7.2). Following the spring 2018 large-scale pilots, summer months will be used to increase the robustness of the platform and the maturity of the available plots, minigames and gamified lesson paths. By autumn, the project outcome should be ready for more independent deployment, and for a probable first market implementation.

## 5.1 PILOT GOALS

By this round of pilots, the platform would be at its most mature state, and essentially ready for a market implementation. The goals of this final round are therefore more market oriented, measuring impact, acceptance and validity of various business models.

G5 – Measuring the acceptance of BEACONING platform in schools

G6 – Evaluate the impact on introducing playfulness in school life

G7 – Evaluate the viability of BEACONING business models

## 5.2 MEASURING ACCEPTANCE (G5)

Of the many survey based methods to discover the user experience such as Nielsen's Attributes of Usability, Purdue Usability Testing Questionnaire or Computer System Usability Questionnaire, one that is commonly used for evaluating technologies for enhancing learning is Technology Acceptance Model (TAM).
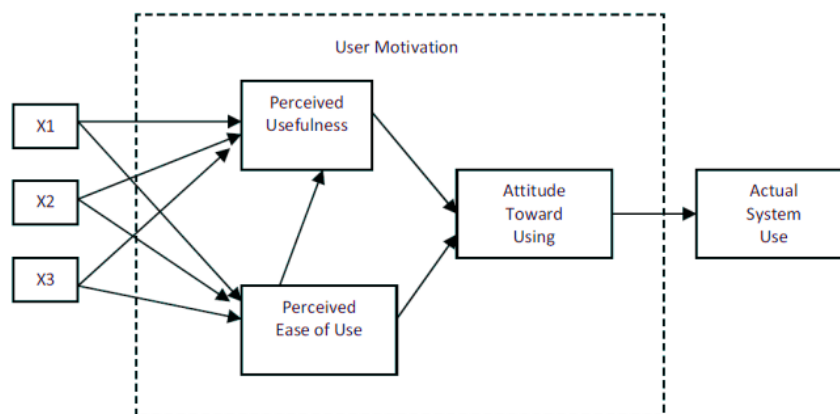


*Figure 4 TAM core construct based on Theory of Reasoned Action*

$X_i$ are a set of variables, each of which can be measured with a survey statement. These include, but not limited to job relevance, output quality, personal image, result demonstrability, perceived enjoyment, and computer self-efficacy.

## 5.3 IMPACT OF GAME-BASED LEARNING USING BEACONING PLATFORM (G6)

Structural equation modelling[12] is a contemporary method in statistical evaluation and TAM is essentially a structural equation model[13]. The latest version of this equation is TAM3. In this

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[12] R. B. Kline (2016), Principles and Practice of Structural Equation Modeling, The Guilford Press

project, we aim to update the equation of TAM3 to include new input variables and latent variables that would add elements that correspond to the expected impact factors such as perceived playfulness.
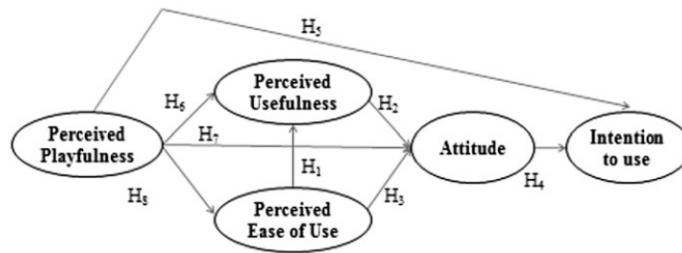


*Figure 5  Revised TAM3 Construct with Perceived Playfulness as a Variable*

The survey that would capture large-scale end user judgements will include these factors as well. The survey will be translated to the local languages of the piloting countries and made available online. The statistical tools will be provided to the piloting partners that will take the survey data and form the structural equation to calculate likelihood of acceptance. The virtue of this method is that the variables that affect (load) the changes in acceptance will also be revealed. The magnitude of the loading factor relates to the magnitude of the impact that is likely to occur due to that variable. Note that, this evaluation method is described in further detail in D6.1 Evaluation Guidelines.

## 5.4    VALIDATING BUSINESS MODELS

Below business models can be selected as a context for the Autumn Pilots: BM1 – Back up by a global non-profit; BM2 – Back up by an incumbent telecom operator; BM3 – Back up by local publishers; BM4 – Back up by government national platform; BM5 – Add it in a partner's product; BM6 – Add it in a 3rd party product; BM7 - Add it in an App Store; BM8 – Create a P2P marketplace. Based on the evaluation of piloting results, these business models will be validated using Business Canvases. In Section 6 of D6.1 the use of Business Canvases for business model validation is explained. This evaluation can serve as a guideline for respective partners in exploiting the project outcomes.

## 5.5    AUTUMN 2018 PILOT PLAN

1.  Enrich game narratives towards a marketplace or other business goals

2.  Improve geolocation functionalities for having lesson paths that are linked to local life.

3.  Focus on goals G5, G6, G7 (acceptance, playfulness and business) and Select Evaluation Instrument(s). Refer D6.1 about such instruments. Phases: Develop the Instrument; Place probes to obtain data for the Instrument; Implement the Instrument.

4.  Update competency maps based on Spring pilot results

5.  Author/Edit new Gamified Lesson Paths and upload to the local LMSs

6.  Test the plans at location and develop contingency plans

7.  Showcase Spring pilots at local community web/media center

8.  Involve business stakeholders via local community web/media center

9.  Launch the pilot

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[13] S. S. Al-Gahtani (2016), Empirical investigation of e-learning acceptance and assimilation: A structural equation model, Applied Computing and Informatics, Vol 12 (1), 27-50

## 5.6    AUTUMN 2018 PILOT CASES

For each case below, the mentioned partner will acquire, install, configure, run and maintain the country's own version of BEACONING platform.

### 5.6.1    ORT Case in France

After a first phase of large-scale piloting conducted in France with 7 ORT French schools the objective of that second round is to encourage the teachers to act as learning designers by boosting their creativity during a set of workshops in which they will be challenged each other's to create the best learning experiences for the students.

In France, the Pilots activities will be conducted in the ORT France schools covering different regions of France (Ile De France (Montreuil, Villiers le Bel, Choisy Le Roi), Rhone-Alps (Lyon and Marseille), Alsace (Strasbourg) and Pyrénnees (Toulouse).

The defined schools teachers and stakeholders will meet for the preparation and training according to a series of different workshops for:

- first informing them and have their own reflection on the gamified learning paths,
- second presenting and using the first set of tools and using in groups the beaconing solution
- third by engaging their own students into beaconing classrooms.

*Table 10 ORT Case in France*

| Goals | G5 and G6 |
|---|---|
| Target (when possible name the school or the entity) | 7 Schools in ORT France: Montreuil , Villiers Le Bel, Choisy le roi, Marseille, Toulouse, Strasbourg, Lyon |
| Expected Number of Teachers | 100 |
| Expected Number of Students | 1000 |
| demographic of students to be engaged | State school students  (16 – 20 years old) |
| Other stakeholders | Academia of Versailles schools and other educational stakeholders |
| Context | Once the ORT BEACONING platform is setup, the French schools will access the different tools and will pilot the different activities |
| Technical Setup | Own BEACONING platform (France) integrated to the LMS of the ORT schools |
| Extra Resources (indicate if it is proprietary) | The LMS in the schools will be used in conjonction with the one proposed by BEACONING to host the resources |
| Time & Duration | 12 weeks |
| The Meta-Game | TBD |
| The lesson path | The refined lessons paths and new experimental ones |
| Evaluation Tool | TBD |
| National Coordinator | ORT |
| Inclusion | TBD |

In France, the teachers will be trained during a series of workshops to create new learning plans taking into account the experienced learnt from the first piloting sessions. The newly created learning plans will be firstly experimented in small groups and then run with the students.

### 5.6.2    ORT Case in Greece

The ORT Automn Pilot in Greece will take part in the same schools as the Spring Pilots. Is objective will be to assess the acceptance of the BEACONING technology. At the end, of the

Piloting activities, a follow-up event will be organized where the teachers will be interviewed and their responses will be documented. This will take place after the pilots are completed.

*Table 11 ORT Case in Greece*

| Goals | G5 and G6 |
|---|---|
| Target (when possible name the school or the entity) | Schools in the areas of Karditsa and Trikala |
| Expected Number of Teachers | 100 |
| Expected Number of Students | 1000 |
| demographic of students to be engaged | State school students |
| Other stakeholders | Educational stakeholders and representatives |
| Context | Once the ORT Greece BEACONING platform is setup, the schools will access the different tools and will pilot the different activities |
| Technical Setup | Own BEACONING platform integrated to the LMS of the ORT schools |
| Extra Resources (indicate if it is proprietary) | The LMS in the schools will be used in conjonction with the one proposed by BEACONING to host the resources |
| Time & Duration | 12 weeks |
| The Meta-Game | TBD |
| The lesson path | The refined gamified lessons paths |
| Evaluation Tool | TBD |
| National Coordinator | ORT |
| Inclusion | TBD |

### 5.6.3 ORT Case in Israel

In Israel, in the World ORT network, some of the Israelian schools will be engaged to Pilot the activities. Among the large amount of schools in Israel, the most relevant ones for BEACONING will be selected. Among them the Beer Sheva College of Technology and the Tel Hai College that is developing a virtual learning environment to enable several schools working together using learning through Problem solving. Also, as most of the schools in Israel are engaged in the Robotraffic Competition, an international school competition, hosted by the Technion Institute – Israel Institute of Technology,   in which it develops the teamwork and creative problem solving skills, the BEACONING Gamified Learning Paths will be used and/or enriched.

The defined schools teachers and stakeholders will meet during a series of workshops for the preparation and training for:

-   first informing them and have their own reflection on the gamified learning paths,
-   second presenting and using the first set of tools and using in groups the beaconing solution
-   third by engaging their own students into beaconing classrooms.

*Table 12 ORT Case in Israel*

| Goals | G5 and G6 |
|---|---|
| Target (when possible name the school or the entity) | 4 Schools in Israel |
| Expected Number of Teachers | 100 |
| Expected Number of Students | 1000 |
| demographic of students to be engaged | State school students  (16 – 22 years old) |
| Other stakeholders | Technion Institute of Technology. World ORT Network Schools |

| | |
|---|---|
| Context | After the first Spring Pilots, the Israelian schools will access the different tools and will refined the Learning Paths to imporve the iloting and assess the Goals G5 and G6 conducting the different activities |
| Technical Setup | Own BEACONING platform (Israel) integrated to the LMS of the ORT schools |
| Extra Resources (indicate if it is proprietary) | The LMS in the schools will be used in conjonction with the one proposed by BEACONING to host the resources. The existing local resources will be integrated, in particular the ones related to the Coding Clubs extra-time activities. |
| Time & Duration | 4 sessions of 4 weeks |
| The Meta-Game | TBD |
| The lesson path | The Enriched lessons paths used during the spring pilots. |
| Evaluation Tool | TBD |
| National Coordinator | ORT |
| Inclusion | TBD |

### 5.6.4    ORT Case in Bulgaria

In Bulgaria, in Sofia, at the ORT school, after a training program for learning designers aiming at setting new learning paths, the different learning paths produced by the team and also by other ORT teams, will be presented and piloted with teachers and students. This will allow the evaluation of the improvement achieved between the two piloting rounds.

### 5.6.5    ORT Case in Italy

In Italy, after the first round of Piloting activities, a training program dedicated to some selected expert teachers (one or two among the set of teachers) will be conducted aiming at training learning designers for defining new set of learning game paths or refined existing one whilst the other teachers will teach using the existing set of scenarios. The refined learning plans will be then experimented with the set of teachers and learners during this session. With that respect, we will be able to value the difference in teaching between the two pilot rounds.

*Table 13 ORT Case in Italy*

| | |
|---|---|
| Goals | G5 and G6 |
| Target (when possible name the school or the entity) | School in the Milan Italy. Scuola ebraica di Milano. we are 'scuola paritaria' that means we are officially recognized from It Ministry of Education |
| Expected Number of Teachers | 10 |
| Expected Number of Students | 100 |
| demographic of students to be engaged | State school students . High Schools. |
| Other stakeholders | Educational stakeholders and representatives from the school |
| Context | In Italy, they will use the ORT French Platform to experiment ith the end-users. |
| Technical Setup | Devices and Network connections. 50 classroom in the school, almost all with pc and IWB/LIM (Interwrite and MIMIO) , we have some PCs in teachers rooms too.  Wifi in all the school both for teachers and students.<br>Three good ICT Labs<br>around 90% of students in high school have a smartphone |
| Extra Resources (indicate if it is proprietary) | The BEACONING LMS in ORT France premises will be used to host the resources |
| Time & Duration | 12 weeks |

| The Meta-Game | TBD |
|---|---|
| The lesson path | The refined gamified lessons paths |
| Evaluation Tool | TBD |
| National Coordinator | ORT |
| Inclusion | TBD |

### 5.6.6 ORT Case in South Africa

*Table 14 ORT Case in South Africa*

| Goals | G5, G6 |
|---|---|
| Target (when possible name the school or the entity) | School Curtis Nkondo |
| Expected Number of Teachers | 15 |
| Expected Number of Students | 400 |
| demographic of students to be engaged | State school students |
| Other stakeholders | Educational stakeholders and representatives from the school |
| Context | In SA, they will use the ORT French Platform to experiment ith the end-users. |
| Technical Setup | Devices and Network connections |
| Extra Resources (indicate if it is proprietary) | The BEACONING LMS in ORT France premises will be used to host the resources . The existing local resources will be integrated, in particular the ones related to the Coding Clubs extra-time activities. |
| Time & Duration | 12 weeks |
| The Meta-Game | TBD |
| The lesson path | The lessons paths designed by ORT in particular the one related to Maths, Coding and Robotics, Digital identities. |
| Evaluation Tool | TBD |
| National Coordinator | ORT |
| Inclusion | TBD |

### 5.6.7 SEBIT Case in Turkey

As refered in DoA SEBIT product VCloud is an advanced platform for collaboration, communication, distribution and execution on lesson paths. This platform is used in some school networks as well as forming the backbone of the national educational technology infrastructure. VCloud also provides a (free) marketplace for lesson paths to be shared and utilized. If the bureaucratic processes with the MoNE can be completed this case will be implemented on the national infrastructure, that all state schools use. The scale will be much larger. Otherwise, as a contingency, the pilot case will be implemented at the private school networks that employ the VCloud technology.

*Table 15 SEBIT Case in Turkey*

| Goals | G5,G6 and G7 |
|---|---|
| Target (when possible name the school or the entity) | Turkish National Educational IT Network (approx 35K schools are connected). If the bureaucratic processes with the MoNE can not be completed, it can also be implemented at private school networks that use VCloud software infrastructure (Approx 500 schools) |
| Expected Number of Teachers | 500 |
| Expected Number of Students | 2000 |
| demographic of students to be engaged | State school students (typically low-to-mid income) |
| Other stakeholders | MoNE officers, government decision makers |

| Context (this should be a win-win situation for both Sebit and the school) | 1. Backed up by a government national platform (BM4) 2. Sponsored by a tablet producer (e.g. Samsung or Microsoft) which aims at the educational sector (BM6) |
|---|---|
| Technical Setup | Own BEACONING platform (Turkish) integrated to EBA (National Educational IT Network). |
| Extra Resources (indicate if it is proprietary) | Sebit Teachers Portal will be used for teachers training. This portal can also be used to showcase pilot outcomes so that other teachers may also like to try |
| Time & Duration | 12 weeks |
| The Meta-Game | Earth Special Agents, All Plots (in Turkish) |
| The lesson path | Potential to try all game based lesson paths |
| Evaluation Tool | Structural Equation Modelling |
| National Coordinator | Sadi Türeli |
| Inclusion | TBD |

### 5.6.8    SIVECO Case in Romania

The main goals in the Romanian pilot will be to measure the acceptance of BEACONING platform in schools and to evaluate the impact on introducing playfulness in school life. We will organize several workshops with schools teachers and stakeholders for: informing them and have their own reflection on the gamified learning paths; presenting and using the first set of tools and using in groups the beaconing solution. The workshops will involve all the teachers, at national level, for engaging their own students into beaconing classrooms. At the end of the pilot, a follow-up event will be organized where the teachers will be interviewed and their responses will be documented. This will take place after the pilots are completed

*Table 16 SIVECO Case in Romania*

| Goals | G5 and G6 |
|---|---|
| Target (when possible name the school or the entity) | 14 schools |
| Expected Number of Teachers | 73 |
| Expected Number of Students | 488 |
| demographic of students to be engaged | At least 15 with special needs |
| Other stakeholders | NGO's, schools principal |
| Context (this should be a win-win situation for both the partner and the school) | TBD |
| Technical Setup | beaconing.eu platform |
| Extra Resources (indicate if it is proprietary) | N/A |
| Time & Duration | 12 weeks |
| The Meta-Game | Earth Special Agents, All Plots (in Romanian) |
| The PlayLesson Path | Potential other play lesson paths other than Energy Production Effects; Math for hearing impaired students |
| Evaluation Tool | Open Response Assessment (Rubrics) |
| National Coordinator | Marius Preda |
| Inclusion | At least 15 students with special needs |

# 6   LINKS FROM WP5 – SMALL SCALE PILOTS

Small pilots are closely related with integrity testing and stakeholder needs analysis. Small pilots take place during spring and autumn 2017, in conjunction with integration testing. On the other hand, this activity provides critical information for setting up large-scale pilots. Some of that information can be listed as follows:

- Reusables: Consent sheets, Training material,

- Cost Reporting

- Material to populate local community web/media centers

- Establish local contacts (eg. beacon service provider)

- Benchmark activities and rubrics for *STEM Competencies* such as Critical Thinking, Complex Problem-Solving, Computational Thinking, Active Learning, Adaptive Thinking

- Included Standardization Offers in Testing

- Variables for randomized controlled trials

- Pain points from the "radical pilots" among the small-scale pilots.

Criteria for designing and identifying "Radical Pilots" are as follows[14]:

- No or very little evidence of the scenario currently in use, other than in specific research projects

- Clear barriers to up-scaling resulting in very low probability of mainstreaming in the near future e.g. policy barriers (BYOD), technical barriers such as limited technical infrastructure and current pedagogical constraints of curriculum and assessment

- Making use of technologies rarely used in schools (e.g. very new technology, expensive technology, or technology not perceived to have a place in education)

Serious games, mobile learning, personalised learning, pervasive learning and gamified learning are among current TEL research themes, which are subject to radical pilots. These themes also constitute the BEACONING project scope. Given that the ultimate goal of this "innovation action" project is market implementation, radical situations should be studied, accounted for or at least be confined as manageable.

Finally, a key takeaway from WP5 could be a monitoring tool to track: Happenings, news stream at each participating school; the gamified lesson path being used; the business model they took as context; their evaluation results; problems in the implementation, and solution, lesson learned; the time plan.

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[14] S. Cranmer and M. Ulicsak (2015) Development of the Future Classroom Toolkit, in eds. F. Van Assche, L. Anido-Rifón, D. Griffiths, C. Lewin, and S. McNicol, Re-engineering the Uptake of ICT in Schools, Springer

# 7   CONCLUSION

BEACONING large-scale pilots will commence in spring 2018. Even so, the project makes an early attempt (M18) within Task 6.1 Pilot Setup, to create evaluation guidelines (D6.1) and pilot set up preparations (D6.2). This is to inform all development partners of the goals of the pilots, their time frame, scope and evaluation criteria. Besides, piloting partners would have a head start to organize towards the large effort that will be required next year.

Notice that Task 6.1.2 Training Framework for Teachers and Learners is not covered within this deliverable. This task will have a dedicated outcome, which focus on the creation of a training framework that will include the description and use of the components, services, and tools provided by the platform. Since the training framework will include a description of the developed solution, it will be created alongside the integration effort.

Section 6 details links from WP5 activities, where the set of workshops with teachers will serve as rehearsal for setting up new pilots in WP6 are defined as well as delivers other information that will be needed in WP6. It is therefore, likely that based on the experiences in WP5, this document can be updated before the large-scale pilots start.

## ANNEX I: THE SCHOOL ACTION PLAN TEMPLATE

This is the workflow that can be followed when involving a school in the pilots.

| Action Step | Who? | Resources Needed (incl. outside people) | Potential Challenges |
|---|---|---|---|
| 1. First Contact with the School Leader | National Coordinator | • BEACONING Concept Presentation, • Video from a Small-Scale Pilot, • School Requirements List | • Cost for the school may be negotiated. • Had to have a win-win situation with the school ie the proposal must have a clear benefit for the school beyond the outcomes expected by the project • Anticipate school vision in a 2/3 yrs time horizon and identify how BEACONING would support that vision |
| 2. Recruit a teacher per each class that will participate | National Coordinator | • BEACONING Concept Presentation, • Teacher Requirements List | • If there is no computer class teacher, or a teacher who assumed responsibility about STEM education, Maths or Science teachers can be recruited • Explain the starting point (learning design) and actions needed to integrate gamified learning in the classes and clarify the benefits |
| 3. Run a teachers workshop to select a gamified lesson path, provide training if a teacher chooses to have learning designer role and modify the plan or the game narratives. | Learning Designer  Local Game Designer | • Human Resource: Learning designers employed by BEACONING partner • Gamified Lesson Paths • Content Resources • Training material • Access to a BEACONING instance for demonstration | • If no teacher opts to have "instructional designer" role, but they would still demand revisions in the lesson path, then contact a learning in your organization or external • The plan may be revised to suit the current curricular topics of the school/grade |
| 4. Create a local BEACONING instance | Tech Support | • Human Resource: BEACONING developer who would install an instance of the | • The school connection speed and/or WiFi availability can be a problem. The piloting partners should have 3G/4G GSM modems as a backup |

| | | software and configure WhatsApp | plan. |
|---|---|---|---|
| 5. Set up an instant messaging list with teachers for timely communication and coordination | | | |
| 6. Create required accounts in BEACONING and link their Unique IDs to the LMS of the school. | School Admins | • Admin privileges for BEACONING and School LMS<br>• This action must regard anonymity and privacy measures | If integration with the school LMS cannot be achieved for any reason, develop a plan for timely coordination of individual activities in the gamified lesson path<br><br>Admin accounts for BEACONING would ideally be granted to school admins so that no identity info leaks out of the school |
| 7. Setup Beacons | Beacon service provider | Beacons | If the local BEACONING partner does not have the tech know-how for installing a beacons network, a local beacon service provide can be contacted. |
| 8. Setup a web page at beaconing.eu for the school | Business Partner | BEACONING.eu website | The dedicated editor for this task must be provided with content from the field |
| 9. If the gamified lesson path involves collaboration with other schools or cooperation with a local entity such as municipality or public company make sure connections and agendas are set properly | National Coordinator | | If the gamified lesson path involves out-of-school quests all involved entities has to be informed, reserved and coordinated. |
| 10. Implement the gamified lesson path | Teacher, Students | Local BEACONING instance and LMS | Maintenance is required throughout the weeks that the plan lasts |
| 11. Prepare the | Learning | BEACONING | There has to be contingency plans against incomplete or |

| evaluation reports | Designer | evaluation guidelines | corrupt data |
|---|---|---|---|
| 12. Provide the school with a certificate of participation | National Coordinator | | |
| 13. Showcase the pilot as a success story | National Coordinator | BEACONING.eu | Visuals, Evaluation Results, Testimonies, Reports |
| 14. Report the results to local Business Partner | National Coordinator | | Present the results to the local business partner and make a follow up plan for market implementation |
| 15. Devise ambassador schemes and train-the-trainer programmes for participating teachers to disseminate/transfer outcomes and best practices | National Coordinator Teachers | | Funding for such dissemination |

## ANNEX II: PRIVACY MEASURES AND ETHICAL POLICIES

Details of the privacy measures and ethical policies of the project can be found in Deliverable 1.7 Data Management and Ethics Process plan and its updates. However the three partners of the consortium that will commit large-scale pilots, hereby declare that they will follow the privacy measures and ethics policies

**SEBIT PILOT CASES**

In Turkey, the Personal Data Protection Law has entered into force on 7th April 2016. The new law introduces principles such as:

1. allowing the right to demand one's data to be erased

2. integrating the authorisation system to the IT systems at all levels

3. keeping the data in a distributed manner so that no single piece would bear any meaning

4. watermarking in case any third party is involved

5. encrypting all personal data which is stored

The law allows a 2 years period for these principles to be employed, in which case, the last stage of BEACONING large-scale pilots would also be affected. SEBIT plans to introduce these last stage pilots in Autumn 2018 at the national educational technology infrastructure. Software layers of this infrastructure was developed and being maintained by SEBIT. Aside from technical issues, the legal risk seems to be low considering BEACONING will be an open source. Hereby, SEBIT declares that the pilot cases that are committed will abide by the present digital privacy laws and BEACONING ethics process.

**ORT PILOT CASES**

Hereby, ORT declares that the pilot cases that are committed will abide by the present and loyal digital privacy laws and BEACONING ethics process.

**SIVECO PILOT CASES**

Hereby, SIVECO declares that the pilot cases that are committed will abide by the present and loyal digital privacy laws and BEACONING ethics process.